CAULMERT LIMITED

Engineering, Environmental & Planning
Consultancy Services

Bryn Posteg Landfill Site

Sundorne Products (Llanidloes) Ltd

Quarterly Monitoring Review

July – September 2019

Prepared by:

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APPROVAL RECORD

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Client: **Potters Waste Management**

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Approved	Diana Brookshaw	**Date**	07/11/2019

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1.0 INTRODUCTION

1.1 Background

1.1.1 This report has been compiled in compliance with the Environmental Permit (EP) BU7766, Variation Notice Number EPR/BU7766IC for Bryn Posteg Landfill Site, which requires that the monitoring data collected at the site is reviewed quarterly. The data reviewed in this report was collected between the 1st of July and the 30th of September 2019.

1.1.2 This report records and reviews monitoring data collected during this quarter, for landfill gas, leachate, groundwater and surface water and discusses this data in relation to emission limits set in the latest EP variation. The data will also be included in an Annual Monitoring Review, as required by the EP. Third party information supplied by Potters Waste Management (Potters) has been used in good faith within this document. Caulmert Ltd has not attempted to verify the information.

1.2 Site Location and Surrounding Land-use

1.2.1 Bryn Posteg Landfill Site is located approximately 3 km south east of Llanidloes in Powys and is centred at National Grid Reference SN 971 822. The site is accessed via the B4518, Llanidloes to Tylwch road. The B4518 runs parallel with the western site boundary.

1.2.2 The landfill site was developed from the surface void of a former lead mine. Controlled landfilling has taken place since 1982.

1.2.3 Bryn Posteg is situated amongst predominantly agricultural land. There are seven residential receptors located within approximately 450 m of the waste mass, these are:

- Valley View, 100 m to the north west;
- Rhoswen, 200 m to the east;
- Pant, 250 m to the east;
- Bryn Posteg Farm, 250 to the west;
- Penbryn Du, 300 m to the north
- Tawelfa, 300 m to the North
- Maes-Socyn, 350 m to the south-west
- Talcen-Llwydiarth, 450 m to the south-east

2.0 LANDFILL GAS

2.1 Gas Collection Compound and Extraction Wells

2.1.1 In-waste gas and daily gas collection data is included in Appendix 1. In-waste gas was recorded in July, August and September.

2.1.2 Methane concentrations in-waste ranged from 0.0 % in GW90 to 86.2 % in GW204. Carbon dioxide concentrations ranged from 0.0 % in GW901 to 46.3 % in GW307.

2.1.3 Oxygen concentrations similar to atmospheric concentrations were detected in GW51, GW66, GW68, GW90, GW204 and GW912. The potential reasons for his including any required further actions will be considered further as part of the Gas Extraction System review being undertaken currently.

2.1.4 Carbon monoxide concentrations were above the management trigger level (100 ppm) at least once in 9 locations. The highest concentrations were seen in Phase 9D with concentrations near the limit of detection (500 ppm) in GW304 and GW325, as observed during the last Quarterly Review period.

2.1.5 There were 149 occasions that the total percentage of gas was above 100%.

2.2 Perimeter Monitoring Results

2.2.1 Routine landfill gas (LFG) monitoring is required to be carried out on a weekly basis at 36 boreholes situated around the site perimeter. All boreholes have the prefix 'G' in the monitoring data. Concentrations of methane (CH_4) and carbon dioxide (CO_2) are measured alongside oxygen (O_2), relative pressure and atmospheric pressure on each visit.

2.2.2 Summary tables displaying all CH_4, CO_2 and O_2 monitoring data collected during this period are included in Appendix 1. Concentrations are compared to Trigger Limits and Compliance Limits. The Trigger Limits are included in the Site's Gas Action Plan, part of the Landfill Gas Management Plan (3428-CAU-XX-XX-RP-V-0303.A0.C4) and serve as a first stage of identifying any potential lateral landfill gas migration. The Trigger Limits are lower than the Permit Compliance Limits to allow early identification of any methane or carbon dioxide increase at perimeter wells.

2.2.3 A summary of the average landfill gas concentrations detected at the perimeter locations with ongoing lateral landfill gas migration is included in Table 2.1 below.

Table 2.1 Landfill Gas Average Concentrations (% v/v)

Date	G12		G19		G20		G21		G22	
	CH4	CO2	CH4	CO2	CH4	CO2	CH4	CO2	CH4	CO2
2016	68.8	3.8	71.4	32.9	71.9	28.3	50.0	12.9	67.8	20.1
2017	57.6	3.6	68.7	32.1	71.0	26.9	54.5	14.8	71.6	23.3
2018 Q1	75.7	4.2	67.6	27.0	64.0	19.6	39.8	10.3	50.4	18.8
2018 Q2	53.2	3.4	60.4	17.5	52.8	18.1	64.3	15.7	68.7	21.7
2018 Q3	49.6	3.4	68.9	34.0	67.8	35.3	52.5	16.2	71.8	27.2
2018 Q4	60.1	3.9	65.0	14.7	60.7	13.3	45.1	13.7	74.0	22.4
2019 Q1	66.4	4.6	70.2	21.9	71.9	5.5	50.5	14.8	68.5	16.7
2019 Q2	64.5	4.4	64.2	25.3	68.7	19.5	54.7	17.6	76.3	19.7
2019 Q3	46.6	3.3	36.1	7.5	21.1	7.7	22.4	8.0	62.4	19.1
Date	G23		G24		G25		G35		G38	
	CH4	CO2	CH4	CO2	CH4	CO2	CH4	CO2	CH4	CO2
2016	14.4	9.4	8.9	5.1	51.0	13.0	26.8	15.4	56.7	27.9
2017	14.8	9.8	12.4	5.3	37.8	14.8	48.5	23.1	54.9	29.2
2018 Q1	3.1	7.0	5.4	1.8	36.0	12.0	4.6	4.0	46.2	17.5
2018 Q2	14.6	9.4	27.9	13.1	14.0	11.2	42.3	22.2	34.1	12.9
2018 Q3	18.5	11.6	29.6	13.4	52.8	16.4	64.8	30.0	48.6	31.6
2018 Q4	14.3	8.9	4.4	2.6	23.6	16.5	22.3	13.5	29.6	14.3
2019 Q1	5.1	5.2	14.1	2.8	23.9	15.3	13.3	12.2	50.1	22.1
2019 Q2	7.7	5.8	12.2	5.8	5.6	5.6	24.1	14.7	22.2	20.7
2019 Q3	2.9	11.0	16.3	9.0	17.8	14.0	40.5	22.9	1.5	2.0

Table showing average gas concentrations for locations with ongoing lateral landfill gas migration. Increases in concentration compared to the previous period are highlighted by red text.

2.2.4 Methane concentrations exceeded the Compliance Limit value of 1.0 %[1] at least once in 15 of the monitoring locations. The maximum concentration was 77.3 %, detected at G22, on the 4th of July 2019. This is a decrease in concentration in comparison to that detected during the previous review period (89.6 % at G20).

2.2.5 Carbon dioxide concentrations exceeded the Compliance Limit value of 1.5 % on at least one occasion at 27 monitoring locations. The maximum concentration was 34.2 %, detected in G35 on the 20th September 2019. This is very similar to the concentration detected during the previous review period (33.0 % at G19).

2.2.6 Methane concentrations along the south western boundary of the site (G01 – G08) typically show very little gas migration with maximum concentrations of 0.1 % at all locations, with the exception of G01. An increase in methane concentration was detected in this location earlier in 2019. This trend has continued during this review period with methane concentrations ranging between 0.0 % and 28.3 %. Carbon dioxide concentrations were similar to that detected in the previous review period (average of 2.68 %) with an average of 2.85 %.

2.2.7 Methane concentrations remained low at the other locations along the south eastern boundary, however, carbon dioxide fluctuated at G03 and G08 where averages were 1.59 % and 1.83 % respectfully.

[1] All gas concentrations are expressed as % v/v

2.2.8 The highest landfill gas concentrations have been detected primarily in the vicinity of the oldest phases; Phase 1 and 2 in perimeter wells G19 – G25. Gas extraction is undertaken in these phases. The concentrations of landfill gas in these perimeter wells has fluctuated during the review period (see graphs and tables in Appendix 1).

2.2.9 Highly variable concentrations of landfill gas are often detected at G35 and G38. Concentrations of methane and carbon dioxide in G35 fluctuated across the review period. Average methane concentrations within G35 were 13.34 % in Q1 2019 and 24.14 % in Q2 2019. This increased significantly during this Q3 review period to an average of 42.9 %. Average carbon dioxide concentrations also increased from 12.2 % in Q1 2019 to 14.66 % in Q2 2019 and 23.9 % in this Q3 review period.

2.2.10 Concentrations in G38, however, have decreased significantly in this quarter. Average methane decreased from 50.5 % in Q1 2019 to 44.14 % during Q2 2019 and to 1.5 % in this Q3 review period. Carbon dioxide at G38 also decreased from 22.05 % in Q1 2019 to 20.68 % during Q2 2019 and 2.1 % during this Q3 review period.

2.2.11 Landfill gas concentrations have increased at G36 during this review period. Methane increased on average from 9.4 % in Q2 to 22.3 % during this Q3 review period. Average carbon dioxide also increased from 2.0 % in Q2 to 4.4 % in Q3.

2.2.12 Consistently elevated concentrations of methane and carbon dioxide have also been detected at G12. A maximum methane concentration of 68.4 % was detected in July, a slight decrease from the 77.3 % detected during the previous quarter. Concentrations at G12 will be monitored closely to identify any improvement in the control of landfill gas migration as a result of the recently installed leachate extraction infrastructure in this area of the landfill.

2.2.13 Perimeter landfill gas concentrations are currently being addressed as part of ongoing investigation of the efficiency and improvement actions for the operation and management of the landfill gas extraction system.

2.2.14 A cut off trench is currently scheduled to be constructed along the eastern section of Phase 1 to facilitate leachate and gas extraction to a greater capacity than the current infrastructure can support (CQA Plan reference; EXEA/Bryn Posteg/CQAP/IVT/December 2018). The perimeter landfill gas concentrations along this flank will be monitored closely, both during the works and after, to identify any trends.

3.0 LEACHATE

3.1 Summary of Monitoring Results

Monitoring of leachate levels

3.1.1 The installation of replacement leachate extraction and monitoring wells was carried out between April and June 2019, in accordance with the CQA Plan (3376-CAU-XX-XX-RP-V-0302.A0-C1). The infrastructure layout is shown in Drawing 3997-CAU-XX-XX-DR-V-1804-X, and details of the work are included in the CQA Validation Report (3997-CAU-XX-XX-RP-V-0303-A0.C1).

3.1.2 This new infrastructure facilitates leachate extraction to be managed in line with the requirements of the permit.

3.1.3 Leachate levels obtained from all locations during this quarter are presented below and in Appendix 2.

Table 3.1 Leachate Level Summary

Location	LCP1		LCP2		LCP3		LCP6		LCP7	
Date	Dip (mBGL)	Leachate Head (m)	Dip (mBGL)	Leachate Head (m)	Dip (mBGL)	Leachate Head (m)	Dip (mBGL)	Leachate Head (m)	Dip (mBGL)	Leachate Head (m)
08/08/2019	5.2	3.7	29.4	8.1	33.1	5.9	23.0	6.3	15.7	1.42
29/08/2019	5.7	3.7	26.7	10.8	28.8	10.2	22.7	6.6	13	4.12
11/09/2019	5.7	3.7	27.4	10.2	31.4	7.6	21.9	7.4	16.5	0.62
EP Limit	1		1		1		1		1	

Location	LCP8		RMLP9A		RMLP9B West		RMLP9C		RMLP9D	
Date	Dip (mBGL)	Leachate Head (m)	Dip (mBGL)	Leachate Head (m)	Dip (mBGL)	Leachate Head (m)	Dip (mBGL)	Leachate Head (m)	Dip (mBGL)	Leachate Head (m)
08/08/2019	11.34	2.35	23.4	4.3	28.7	3.5	11.1	16.0	9.2	18.4
29/08/2019	9.2	4.49	23.8	3.9	21.8	10.5	8.0	19.1	4.9	22.7
11/09/2019	10.06	3.63	22.4	5.3	27.4	4.9	13.3	13.9	6.3	21.3
EP Limit	1		1		1		1		1	

3.1.4 Leachate level is presented as leachate above the base of the well as required by the Permit. The 2019 installations all intercept the leachate drainage layer of their respective cells. Further leachate level information is included in Appendix 2, showing the ordinance level utilized to accurately calculate the leachate height.

3.1.5 All leachate levels were above the compliance limit of 1 m above the cell base, with the exception of LCP7 on the 11th September.

Monitoring of leachate quality

3.1.6 Raw leachate samples were analysed in July, August and September for ammoniacal nitrogen, chloride, COD and pH. All results are summarised in tables in Appendix 2.

3.1.7 The pH was relatively stable throughout the review period with values between 7.2 and 8.5 recorded. Ammoniacal nitrogen ranged from 53 mg/l (LCP 1) to 3640 mg/l (RMLP9D).

3.1.8 Chloride concentrations ranged from 176 mg/l in LCP 1 to 8220 mg/l within LCP 2. On average, chloride concentrations within LCP2 (7787 mg/l) were considerably higher than the rest of the site. The location containing the next highest average concentration was LCP3 at 4373 mg/l.

3.1.9 These concentrations are comparable to those previously detected at these locations and reflects the age of the waste in the respective phases.

Treated leachate

3.1.10 Potters undertake daily in-situ and monthly laboratory testing of treated leachate in order to assess its suitability for discharge. If the parameters exceed the Discharge Consent Limit, no discharge is made.

3.1.11 Treated leachate (final discharge) was tested during July, August and September for pH, ammoniacal nitrogen, suspended solids, BOD, COD, Total Petroleum Hydrocarbons (C6 – C40), sulphate and dissolved methane. All results are tabulated in Appendix 2.

3.1.12 Ammoniacal nitrogen remained below the discharge consent of 150 mg/l throughout the duration of the review period. pH remained within the discharge consent of 6 – 10.

3.1.13 COD, sulphate and suspended solids concentrations remained below their respective EP limits throughout the review period. A concentration of dissolved methane was detected during July at 0.029 mg/l, no dissolved methane was detected during the remainder of the review period.

3.1.14 TPH was detected at a concentration of 8330 µg/L, 2170 µg/L and 2180 µg/L during July, August and September. As required by the Permit, no visible oils were detected in the treated leachate.

3.1.15 The volume of treated leachate discharged between the 1st July and the 30th September 2019 was 7621 m^3. 1,860 m^3 was removed by tanker for off-site treatment.

4.0 GROUNDWATER

4.1 Groundwater Levels

4.1.1 Groundwater levels were recorded monthly at W1-W15. The results indicated that groundwater elevation remained relatively stable over the review period in all locations. Summary tables and time series graphs are presented in Appendix 3.

4.2 Summary of Monitoring Results

4.2.1 Groundwater is sampled at locations W1 – W9. W10 requires replacing and W11 was dry for the duration of the review period. Samples were tested for a monthly suite of parameters and a larger quarterly suite was carried out in September. All monitoring data is included in Appendix 3.

4.2.2 Concentrations of monthly parameters were below their respective Compliance Limits, with the exception of ammoniacal nitrogen in W3 and Chloride in W1.

4.2.3 The maximum chloride concentration in W1 was 310 mg/l, slightly lower than the maximum found during the last review period (343mg/l). This trend in chloride at W1 has occurred seasonally at this location, as discussed in detail in the Caulmert Letter Report 3033-CAU-XX-XX-CO-V-9101.

4.2.4 Ammoniacal nitrogen concentrations were above the compliance limit (2 mg/l) at W3 throughout the review period. Ammoniacal nitrogen was not detected at this location during the last quarter. As observed in the previous review period, ammoniacal nitrogen at concentrations below the compliance limit was detected at W4 (1.1 mg/l to 1.53 mg/l). No ammoniacal nitrogen was detected at any of the other monitoring points during this review period.

4.2.5 Of the quarterly parameters, toluene was detected above the Compliance Limit (4 µg/l) at a concentration of 38.3 µg/l. Mecoprop was detected at concentrations of 0.13 µg/l and 0.16 µg/l at W4 and W5 respectively, slightly above the compliance limit (0.1 µg/l). The remaining quarterly parameters were all below their respective compliance limits and were mostly undetected

5.0 SURFACE WATER

5.1 Summary of Monitoring Results

5.1.1 The permit requires monthly monitoring at monitoring points P1, P2 and P3.

5.1.2 P3 is the discharge point for the proposed reed bed which has not yet been commissioned, therefore no samples were analysed during this review period.

5.1.3 Surface water samples were collected at SW1 (P1) and SW2 (P2) in July, August and September. A summary table displaying surface water monitoring data is enclosed in Appendix 4.

5.1.4 Ammoniacal nitrogen concentrations were below the limit of detection in P1 and P2 throughout the review period.

5.1.5 Suspended solids concentration were slightly above the 50 mg/l Compliance Limit at P1 during July (69 mg/L). Concentrations were below the compliance limit on all other occasions at P1 and P2.

5.1.6 pH was relatively neutral with values ranging from 6.5 in P1 to 7.9 in P2. All values were within the permitted range of 6-9.

5.1.7 Electrical conductivity ranged from 105 µS/cm to 114 µS/cm in P1 and 195 µS/cm to 462 µS/cm in P2. Chloride concentrations were low with maxima at P1 and P2 of 13.9 mg/l and 35.2mg/l respectively.

5.1.8 BOD concentrations were low, with maximums of 5 mg/L at P1 and 3 mg/L at P2.

5.1.9 Low concentrations of petroleum hydrocarbons were detected in P1 and P2 during this review period. Hydrocarbons in the ranges; EH >C16- C24 and EH >C24 - C40 were detected at P1 during July in low concentrations; 19 µg/l and 46 µg/l respectively. Hydrocarbons in the ranges; EH >C16- C24 and EH >C24 - C40 were ALSO detected at P2 during July (22 µg/l and 89 µg/l respectively) and 12 µg/l EH >C16- C24 in August.

6.0 DUST

6.1 Monitoring Results

6.1.1 Dust monitoring was undertaken between the 23rd of June 2019 to the 28th of July 2019 at locations BP1, BP2 and BP3. The dust monitoring results, as supplied by the subcontracted laboratory, are summarized in Table 2 below. A Certificate of Analysis is enclosed in Appendix 5.

Table 2: Dust Monitoring Results

Period	23/06/2019 - 28/07/2019		
Location	**Mass of Undissolved Solids mg**	**Result mg/m²/day**	**Compliance Limit mg/m²/day**
BP 1	49.3	34	200
BP 2	56.4	39	200
BP 3	24.9	17	200

6.1.2 Dust concentrations remained below the Compliance Limit at all locations during this review period.

7.0 SUMMARY

7.1 Landfill gas

7.1.1 The CH_4 Compliance Limit was exceeded at 15 locations, as observed in the previous review period (Quarter 2 2019). CO_2 Compliance Limit was exceeded at 27 locations on a number of occasions during the monitoring period, similar to the 26 observed in the previous review period. Compliance Limits exceedances and landfill gas management are currently under review by Potters as part of the improvement actions stipulated in the Landfill Gas Management Plan, in agreement with NRW.

7.2 Leachate

7.2.1 Replacement leachate extraction and monitoring wells were installed at Bryn Posteg during the second quarter of 2019, in accordance with the CQA Plan (3376-CAU-XX-XX-RP-V-0302.A0-C1). The CQA Validation Report (3997-CAU-XX-XX-RP-V-0303-A0.C1) has been submitted to NRW separately. Leachate levels were collected at the majority of the new locations during this review period. Leachate levels were above the compliance limit at all monitored locations during this quarter. Repeat monitoring will confirm if increased extraction rates have successfully reduced the leachate level over the next quarter.

7.2.2 As reported previously, considerably higher concentrations of chloride were detected within LCP2 when compared to the rest of the monitoring locations.

7.2.3 There were no exceednaces of the discharge consent in the final discharge (treated leachate) quality data during this review period.

7.2.4 The volume of treated leachate discharged between the 1st July and the 30th September was 7621 m^3. Additionally, 1860 m^3 was tankered off site for treatment.

7.3 Groundwater

7.3.1 Groundwater levels in all locations remained relatively stable over the review period.

7.3.2 Ammoniacal nitrogen concentrations were above the compliance limit (2 mg/l) at W3 throughout the review period. Concentrations were also detected at W4, however these did not exceed the compliance limit. Ammoniacal Nitrogen concentrations remained below the compliance limit at all other locations throughout the review period.

7.3.3 Chloride within W1 exceeded the compliance limit as noted in the previous reviews since 2005. This trend in chloride at W1 has occurred seasonally at this location, as discussed in detail in the Caulmert Letter Report 3033-CAU-XX-XX-CO-V-9101.

7.4 Surface Water

7.4.1 Surface water samples were collected at P1 and P2 monthly during this quarter. A slight exceedance of the suspended solids compliance limit was detected at P1 in July. No other

compliance limits were exceeded at any of the monitoring points. Low concentrations of petroleum hydrocarbons were detected at both locations.

7.5 Dust

7.5.1 Dust concentrations remained below the 200 mg/m^2/day Compliance Limit at all locations during this review period.

NOTE

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4. MAXIMUM SURCHARGE LOAD ON 50.0m FLOOR 20KN/m2 UNLESS OTHERWISE STATED.

LEGEND

- IN WASTE GAS WELL
- LEACHATE COLLECTION / MONITORING POINT
- PERIMETER GAS MONITORING BOREHOLE
- PERIMETER GROUNDWATER MONITORING BOREHOLE
- PERIMETER GAS & GROUNDWATER MONITORING BOREHOLE
- SURFACE WATER MONITORING LOCATION
- DUST MONITORING POINT

REV	MODIFICATIONS	BY	RE	AP	DATE
C2	GAS MONITORING LOCATIONS NAME CHANGE	DA	SO	SO	09.05.19
C1	BOREHOLE NAME CHANGE	DA	HC	HC	16.10.18
P3	MINOR AMENDMENTS	DA	SO	SO	31.05.18
P2	MINOR AMENDMENTS	DA	SO	SO	29.05.18
P1	ISSUED FOR COMMENT	RWG	SO	SO	04.05.18

POTTERS WASTE MANAGEMENT

PROJECT:

BRYN POSTEG LANDFILL SITE

TITLE:

GAS EXTRACTION AND MONITORING INFRASTRUCTURE PLAN

DRAWN BY	DATE	
RWG	04.05.2018	
REVIEWED BY: SO	SCALE @ A1: 1:1250	JOB REF: 3376
AUTHORISED BY: SO	ISSUE: S1	REVISION: C2

DRAWING NUMBER: 3376-CAU-XX-XX-DR-V-1801

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4. LOCATIONS OF PEGS TAKEN FROM NRG DRAWING : Bryn Posteg_Proposed Drilling Locations_May2019 : 1284/TP/14 : 01

LEGEND

- IN WASTE GAS WELL
- OLD, REPLACED LEACHATE WELL
- NEW, REPLACEMENT LEACHATE WELL
- LEACHATE COLLECTION/MONITORING POINT
- NEW IN WASTE GAS WELL

REV	MODIFICATIONS	BY	RE	AP	DATE
X	AS BUILT	AAR	SO	DB	18.07.19

PURPOSE OF ISSUE: AS BUILT

STATUS: CR

CLIENT: PotterGroup

PROJECT:
BRYN
POSTEG
LANDFILL

TITLE:
AS BUILT
REPLACEMENT
LEACHATE WELLS

DRAWN BY	REVIEWED BY	AUTHORISED BY	SCALE @ A1
AAR	SO	DB	1:1250

DATE	JOB REF:	REVISION
18.07.2019	3997	X

DRAWING NUMBER: 3997-CAU-XX-XX-DR-V-1804

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DISSOLVED AIR FLOTATION SYSTEM

BIOMASS CHP SYSTEM

LANDFILL GAS UTILISATION PLANT

STORAGE

LEACHATE TREATMENT PLANT

INACTIVE CAPPED LANDFILL

SURFACE WATER COLLECTION PONDS

WHEEL WASH

OFFICE & WEIGHBRIDGE

SITE ENTRANCE

SITE CANTEEN & OFFICE

ACTIVE LANDFILL

GREEN WASTE COMPOST SLAB (SEPARATE PERMIT)

1 2 3 4

282400N
282300N
282200N
282100N
282000N
281900N
281800N

296700E 296800E 296900E 297000E 297100E 297200E 297300E 297400E 297500E

NOTE

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2. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING WILL BE ALLOWED WITHOUT THE PRIOR PERMISSION IN WRITING.

3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS.

- SITE BOUNDARY
- MRF PERMIT ACTIVITY
- LANDFILL PERMIT / GENERAL SITE ACTIVITY
- GREEN WASTE COMPOSTING PERMIT ACTIVITY
- CAPPED LANDFILL

1. MBT COMPOST (MRF PERMIT)
2. WASTE RECPETION (MRF PERMIT)
3. TYRE STORAGE & BAILING (MRF PERMIT)
4. TROMMEL (LANDFILL PERMIT)

REV	MODIFICATIONS	BY	RE	AP	DATE
C1	APPROVED AND ISSUED	EJD	SB	SB	19/12/17
P1	ISSUED FOR COMMENT	EJD	SB	SB	20/11/17

POTTERS WASTE MANAGEMENT

PROJECT:

BRYN POSTEG LANDFILL SITE

TITLE:

ENVIRONMENTAL MONITORING PLAN

DRAWN BY	DATE	
EJD	20/11/2017	
REVIEWED BY	SCALE @ A1	JOB REF:
SB	1:1250	3033
AUTHORISED BY	ISSUE	REVISION
SB	A0	C1

DRAWING NUMBER: 3033-CAU-XX-XX-DR-S-1800

Caulmert
engineering environmental planning

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Registered Office: InTec, Parc Menai, Bangor, Gwynedd, LL57 4FG Company Registered No: 06716319

Appendix 1

APPENDIX 1 – LANDFILL GAS

Table 1: In-waste Gas monitoring data

ID	Methane			Carbon Dioxide			Oxygen		
	Min	Max	Average	Min	Max	Average	Min	Max	Average
BPIW0007	38.80	47.20	43.30	31.20	35.40	33.73	1.90	3.40	2.77
BPIW0011	57.10	58.70	58.13	41.50	43.70	42.77	0.10	0.20	0.13
BPIW0014	62.50	63.20	62.73	39.30	41.30	40.10	0.10	0.10	0.10
BPIW0015	66.60	72.80	69.83	28.00	28.50	28.30	0.20	1.30	0.80
BPIW0016	53.40	62.40	58.60	38.80	41.00	39.97	0.20	0.30	0.23
BPIW0017	60.60	62.00	61.17	39.80	41.70	40.93	0.20	0.50	0.33
BPIW0018	51.40	62.40	56.50	33.90	41.20	37.13	0.10	0.40	0.23
BPIW0019	53.30	59.80	57.60	39.60	41.20	40.43	0.00	0.10	0.07
BPIW0021	63.80	64.90	64.30	37.50	38.80	38.27	0.10	0.20	0.17
BPIW0022	63.10	63.70	63.47	39.00	39.90	39.43	0.10	0.20	0.13
BPIW0024	48.90	64.70	59.17	33.60	34.30	33.83	0.10	0.50	0.30
BPIW0025	61.40	63.40	62.47	38.30	40.40	39.50	0.00	0.10	0.07
BPIW0030	54.80	61.90	59.43	37.00	39.50	38.53	0.10	0.70	0.30
BPIW0032	45.30	59.40	53.93	38.20	41.40	40.17	0.10	0.20	0.13
BPIW0033	46.20	51.60	48.20	34.20	39.10	36.27	2.10	3.90	2.77
BPIW0034	20.00	35.10	27.87	13.10	24.40	19.20	8.30	14.20	11.17
BPIW0035	35.10	59.00	44.53	29.70	41.90	35.33	0.30	4.00	2.23
BPIW0037	61.00	64.10	62.97	36.20	38.80	37.77	0.00	1.10	0.43
BPIW0038	30.10	64.80	43.53	17.40	38.10	26.97	0.10	12.20	6.10
BPIW0039	61.20	65.20	62.67	39.40	40.60	39.97	0.10	0.10	0.10
BPIW0043	42.70	53.20	47.57	34.00	35.50	34.67	0.30	1.10	0.63
BPIW0044	30.70	64.70	52.33	19.60	38.50	32.03	0.10	10.30	3.67
BPIW0045	59.10	60.60	59.63	42.30	42.60	42.50	0.10	0.60	0.33
BPIW0047	56.50	58.50	57.63	38.30	39.30	38.83	0.10	0.30	0.17
BPIW0048	59.40	61.80	60.40	37.40	39.60	38.27	0.10	0.50	0.23
BPIW0049	64.90	66.10	65.53	32.20	36.70	34.60	0.10	0.70	0.47
BPIW0051	0.10	2.20	0.80	1.30	2.70	1.80	20.20	21.00	20.67
BPIW0052	51.50	61.00	57.63	36.70	40.80	39.07	0.10	0.50	0.37
BPIW0054	48.00	55.30	52.63	36.60	37.80	37.20	0.10	0.10	0.10
BPIW0055	51.00	61.70	56.80	37.20	38.60	37.97	0.10	0.20	0.13
BPIW0061	34.80	55.00	46.70	30.90	37.30	34.67	0.40	2.70	1.50
BPIW0062	57.30	63.40	61.03	36.90	39.50	38.37	0.10	1.60	0.60
BPIW0063	57.80	61.90	60.40	37.50	41.10	39.83	0.10	1.30	0.50
BPIW0066	0.30	36.00	23.95	3.80	34.80	25.80	0.10	18.70	4.75
BPIW0067	28.50	43.70	35.63	29.60	36.30	32.90	0.10	0.50	0.33
BPIW0068	4.10	56.80	28.88	3.10	45.00	20.70	0.10	19.90	10.95
BPIW0069	52.40	55.30	54.30	42.40	43.60	42.83	0.00	0.10	0.07
BPIW0082	30.80	41.90	36.60	31.30	34.80	33.40	0.10	0.10	0.10
BPIW0083	36.50	49.50	42.33	33.40	36.60	34.90	0.00	0.10	0.07
BPIW0084	53.10	57.00	55.50	39.00	45.80	42.67	0.10	0.10	0.10
BPIW0085	19.20	56.10	32.93	15.80	41.20	24.53	1.10	12.70	8.43
BPIW0086	49.00	57.70	53.53	38.20	41.20	39.73	0.20	1.10	0.73
BPIW0087	62.10	63.00	62.53	38.60	40.40	39.73	0.10	0.30	0.17
BPIW0088	59.00	61.60	59.93	38.60	41.00	40.07	0.10	0.80	0.33
BPIW0090	0.00	44.80	28.47	1.00	37.00	24.23	1.00	21.20	7.87
BPIW0093	8.60	63.00	44.83	12.10	40.80	31.23	0.10	15.40	5.20
BPIW0094	60.40	62.30	61.23	40.10	42.10	41.10	0.20	0.20	0.20
BPIW0095	52.40	64.80	60.37	33.50	38.20	36.43	0.00	3.30	1.17
BPIW0099	57.00	62.80	60.40	39.50	40.40	40.07	0.10	0.10	0.10
BPIW0104	62.50	63.60	62.93	39.40	40.60	40.07	0.10	0.10	0.10
BPIW0106	47.00	54.40	51.37	28.10	36.60	33.63	0.30	1.80	1.03
BPIW011A	33.20	54.20	45.43	32.90	38.50	36.47	0.10	0.80	0.33
BPIW013A	66.30	67.60	67.10	33.50	34.60	34.23	0.20	0.70	0.37

APPENDIX 1 – LANDFILL GAS

ID	Methane			Carbon Dioxide			Oxygen		
	Min	Max	Average	Min	Max	Average	Min	Max	Average
BPIW0202	37.80	54.40	47.43	22.50	30.50	27.20	0.00	0.10	0.07
BPIW0203	42.00	57.40	51.57	23.30	30.20	27.30	0.00	0.10	0.07
BPIW0204	0.10	86.20	57.04	5.10	33.10	16.38	0.10	19.00	4.72
BPIW0206	47.20	58.40	51.77	31.20	33.40	32.57	0.20	0.50	0.33
BPIW0207	59.90	62.70	60.97	30.70	36.90	33.60	0.10	0.20	0.13
BPIW0208	59.70	64.90	62.43	35.80	37.30	36.40	0.20	0.70	0.43
BPIW0209	72.20	75.10	73.90	27.30	28.50	27.77	0.10	0.30	0.17
BPIW020A	59.40	62.60	60.93	40.40	43.40	42.37	0.10	0.20	0.13
BPIW0211	52.60	65.40	59.68	27.40	29.50	28.00	0.10	1.50	0.45
BPIW0212	41.70	66.20	51.67	21.60	35.70	27.40	0.50	7.30	4.67
BPIW0213	66.90	67.80	67.50	33.50	34.90	34.10	0.40	0.40	0.40
BPIW0214	70.40	71.20	70.80	30.80	33.20	32.03	0.10	0.10	0.10
BPIW0215	53.50	62.80	56.77	26.80	37.20	31.73	0.00	0.20	0.07
BPIW0216	43.00	63.20	56.43	28.10	38.70	34.63	0.20	3.80	1.40
BPIW021A	63.40	64.30	63.87	39.10	39.50	39.33	0.10	0.10	0.10
BPIW0300	59.20	59.90	59.53	42.50	44.20	43.57	0.10	0.10	0.10
BPIW0301	58.60	62.20	60.03	38.80	43.60	41.03	0.20	0.60	0.33
BPIW0303	54.60	58.60	56.90	44.60	45.30	45.03	0.00	0.20	0.10
BPIW0304	56.90	59.70	58.10	44.30	45.40	44.70	0.10	0.10	0.10
BPIW0305	34.50	59.00	44.93	31.50	45.10	37.27	0.10	0.40	0.20
BPIW0306	60.70	62.60	61.63	40.70	41.10	40.83	0.10	0.20	0.13
BPIW0307	56.40	57.10	56.75	45.80	46.30	46.05	0.10	0.10	0.10
BPIW0308	49.40	58.30	53.85	41.10	45.60	43.35	0.10	0.50	0.30
BPIW0309	54.80	54.80	54.80	44.40	44.40	44.40	0.80	0.80	0.80
BPIW0310	59.50	60.70	60.30	42.60	43.20	42.93	0.10	0.20	0.17
BPIW0311	57.80	59.10	58.53	44.20	45.00	44.57	0.00	0.10	0.07
BPIW0312	48.70	58.30	54.93	40.70	45.00	43.07	0.10	0.30	0.17
BPIW0313	43.80	58.60	50.27	38.90	45.30	41.43	0.10	0.10	0.10
BPIW0314	56.30	58.80	57.87	39.40	41.50	40.40	0.60	1.60	0.93
BPIW0315	44.30	58.60	49.23	36.00	45.00	39.17	0.00	0.50	0.27
BPIW0316	49.60	58.30	53.07	40.10	44.90	42.17	0.10	0.10	0.10
BPIW0317	57.30	57.80	57.60	43.20	45.70	44.53	0.10	0.40	0.27
BPIW0318	54.50	59.30	56.47	40.40	42.40	41.10	0.10	1.60	0.97
BPIW0319	49.20	52.90	51.10	37.10	38.60	37.90	0.10	0.40	0.23
BPIW0320	61.70	62.20	61.90	39.60	41.30	40.57	0.20	0.30	0.23
BPIW0321	17.10	59.90	40.00	11.70	42.00	28.33	0.10	15.00	6.93
BPIW0322	62.40	63.20	62.73	37.80	40.40	38.93	0.10	0.30	0.17
BPIW0323	59.90	63.30	61.77	37.80	39.20	38.47	0.20	1.00	0.53
BPIW0325	58.10	58.50	58.27	44.00	44.80	44.30	0.00	0.20	0.10
BPIW0326	48.20	53.50	51.50	38.50	39.80	39.20	0.10	0.50	0.27
BPIW0327	57.00	58.30	57.77	44.20	45.60	44.97	0.10	0.10	0.10
BPIW037A	60.90	64.20	62.77	37.70	38.70	38.03	0.10	0.80	0.47
BPIW040A	55.90	62.20	58.63	37.80	38.50	38.23	0.00	0.10	0.07
BPIW041B	64.60	69.40	67.27	33.50	36.50	34.87	0.00	0.30	0.13
BPIW042B	54.30	60.20	58.00	38.10	39.20	38.60	0.00	0.10	0.07
BPIW045A	42.00	60.00	52.23	31.60	42.90	38.30	0.00	5.60	1.90
BPIW053A	24.40	64.40	43.43	28.60	38.20	34.47	0.00	0.10	0.07
BPIW056A	45.60	54.00	49.80	36.70	38.40	37.55	0.10	0.10	0.10
BPIW059A	58.60	59.90	59.20	41.10	42.00	41.47	0.10	0.30	0.17
BPIW063A	60.50	62.30	61.13	38.10	40.60	39.47	0.10	0.70	0.43
BPIW208A	37.10	65.10	51.07	18.90	38.10	29.40	0.60	10.10	4.87
BPSP0001	44.20	53.60	50.03	33.40	36.90	35.73	0.90	2.20	1.37
BPSP0002	42.50	53.60	49.47	32.80	37.70	35.77	1.10	2.70	1.67
BPSP0003	44.80	64.60	57.23	33.50	35.90	34.93	0.20	1.20	0.73

APPENDIX 1 – LANDFILL GAS

ID	Methane			Carbon Dioxide			Oxygen		
	Min	Max	Average	Min	Max	Average	Min	Max	Average
BPSP0004	45.20	51.40	49.30	36.80	38.80	37.97	0.50	0.80	0.67
BPSP0005	39.10	56.40	47.27	26.50	33.00	28.97	0.20	1.40	0.70
BPW00901	10.70	10.70	10.70	3.60	3.60	3.60	5.00	5.00	5.00
BPW00912	0.10	64.90	32.50	0.00	4.00	2.00	3.80	20.40	12.10
BPW00919	68.70	68.70	68.70	14.30	14.30	14.30	3.20	3.30	3.25

APPENDIX 1 – LANDFILL GAS

Table 2: In-waste Gas Carbon monoxide and Hydrogen sulphide monitoring data

ID	Carbon Monoxide			Hydrogen Sulphide		
	Min	Max	Average	Min	Max	Average
Management Limit	100 ppm			N/A		
BPIW0007	8	13	10	0	0	0
BPIW0011	22	30	27	0	0	0
BPIW0014	11	22	16	0	0	0
BPIW0015	2	4	3	0	0	0
BPIW0016	6	122	46	0	0	0
BPIW0017	12	17	15	0	0	0
BPIW0018	11	82	36	0	0	0
BPIW0019	13	15	14	0	0	0
BPIW0021	12	17	15	0	0	0
BPIW0022	7	10	9	0	0	0
BPIW0024	6	10	8	0	0	0
BPIW0025	10	61	27	0	0	0
BPIW0030	6	37	23	0	0	0
BPIW0032	5	15	10	0	0	0
BPIW0033	9	11	10	0	0	0
BPIW0034	4	7	6	0	0	0
BPIW0035	20	50	30	0	0	0
BPIW0037	6	11	9	0	0	0
BPIW0038	2	7	5	0	0	0
BPIW0039	42	66	57	0	0	0
BPIW0043	4	6	5	0	0	0
BPIW0044	1	9	4	0	0	0
BPIW0045	25	35	29	0	0	0
BPIW0047	6	14	10	0	0	0
BPIW0048	9	23	14	0	0	0
BPIW0049	2	4	3	0	0	0
BPIW0051	0	1	0	0	0	0
BPIW0052	11	21	14	0	0	0
BPIW0054	8	13	10	0	0	0
BPIW0055	3	4	4	0	0	0
BPIW0061	6	9	8	0	0	0
BPIW0062	2	5	4	0	0	0
BPIW0063	10	13	11	0	0	0
BPIW0066	2	21	15	0	0	0
BPIW0067	6	18	11	0	0	0
BPIW0068	2	64	19	0	0	0
BPIW0069	35	44	39	0	0	0
BPIW0082	9	11	10	0	0	0
BPIW0083	4	5	4	0	0	0
BPIW0084	13	64	32	0	0	0
BPIW0085	11	37	20	0	0	0
BPIW0086	14	24	19	0	0	0
BPIW0087	86	124	102	0	0	0
BPIW0088	12	16	14	0	0	0
BPIW0090	0	92	53	0	0	0
BPIW0093	5	48	31	0	0	0
BPIW0094	28	39	33	0	0	0
BPIW0095	20	27	22	0	0	0
BPIW0099	50	68	61	0	0	0
BPIW0104	8	15	10	0	0	0
BPIW0106	4	6	5	0	0	0
BPIW011A	9	11	10	0	0	0

APPENDIX 1 – LANDFILL GAS

ID	Carbon Monoxide			Hydrogen Sulphide		
	Min	Max	Average	Min	Max	Average
Management Limit	100 ppm			N/A		
BPIW013A	7	10	9	0	0	0
BPIW0202	2	5	3	0	0	0
BPIW0203	1	3	2	0	0	0
BPIW0204	0	10	6	0	0	0
BPIW0206	2	4	3	0	0	0
BPIW0207	4	4	4	0	0	0
BPIW0208	5	8	6	0	0	0
BPIW0209	2	5	4	0	0	0
BPIW020A	14	23	18	0	0	0
BPIW0211	2	4	3	0	0	0
BPIW0212	4	6	5	0	0	0
BPIW0213	8	9	8	0	0	0
BPIW0214	9	11	10	0	0	0
BPIW0215	4	7	5	0	0	0
BPIW0216	2	4	3	0	0	0
BPIW021A	9	14	12	0	0	0
BPIW0300	81	141	104	0	0	0
BPIW0301	23	33	29	0	0	0
BPIW0303	60	278	203	0	1	0
BPIW0304	141	498	320	0	2	1
BPIW0305	9	57	27	0	1	0
BPIW0306	13	21	18	0	0	0
BPIW0307	105	125	115	0	0	0
BPIW0308	95	227	161	0	2	1
BPIW0309				8	8	8
BPIW0310	18	29	22	0	0	0
BPIW0311	53	60	56	0	0	0
BPIW0312	51	69	62	0	0	0
BPIW0313	61	95	78	0	0	0
BPIW0314	29	37	33	0	1	0
BPIW0315	17	30	23	0	1	0
BPIW0316	46	69	54	0	0	0
BPIW0317	49	58	52	0	4	1
BPIW0318	24	25	25	0	1	0
BPIW0319	9	13	11	0	2	1
BPIW0320	15	16	15	0	0	0
BPIW0321	11	52	30	0	0	0
BPIW0322	6	8	7	0	0	0
BPIW0323	7	13	10	0	0	0
BPIW0325	476	476	476	1	9	5
BPIW0326	21	23	22	0	0	0
BPIW0327	45	63	52	0	0	0
BPIW037A	5	8	6	0	0	0
BPIW040A	65	98	81	0	0	0
BPIW041B	14	24	18	0	0	0
BPIW042B	61	76	70	0	0	0
BPIW045A	4	31	14	0	0	0
BPIW053A	6	12	10	0	0	0
BPIW056A	19	20	20	0	0	0
BPIW059A	23	24	24	0	0	0
BPIW063A	9	12	10	0	0	0
BPIW208A	4	9	7	0	0	0
BPSP0001	24	66	46	0	0	0

APPENDIX 1 – LANDFILL GAS

ID	Carbon Monoxide			Hydrogen Sulphide		
	Min	Max	Average	Min	Max	Average
Management Limit	100 ppm			N/A		
BPSP0002	29	50	37	0	0	0
BPSP0003	6	12	9	0	0	0
BPSP0004	11	112	64	0	0	0
BPSP0005	4	17	8	0	0	0
BPW00901	0	0	0	0	0	0
BPW00912	0	8	4	0	0	0
BPW00919	0	0	0	4	5	5

APPENDIX 1 – LANDFILL GAS

Table 3: Perimeter Gas Monitoring Data (exceedances highlighted yellow)

Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
G01	04/07/2019	2.3	3.8	5.6
	11/07/2019	1.2	3.8	4.5
	16/07/2019	0.3	3.6	7.1
	26/07/2019	1.7	3.8	6.1
	08/08/2019	0	1.1	15.9
	15/08/2019	6.8	2.9	4.1
	21/08/2019	2.8	2.6	6.9
	29/08/2019	0.2	2.7	10.5
	04/09/2019	0	0.8	17.9
	11/09/2019	12.8	3.3	4.5
	20/09/2019	6	4.1	4.1
	02/10/2019	28.3	1.8	3.5
G02	04/07/2019	0	0	20.3
	11/07/2019	0	0	20.5
	16/07/2019	0	0	20.7
	26/07/2019	0	0	20.4
	08/08/2019	0	0	20.6
	15/08/2019	0	0.1	20.4
	21/08/2019	0	0	20.5
	04/09/2019	0	0	20.7
	11/09/2019	0.1	0	20.5
	20/09/2019	0.1	0	20.3
	02/10/2019	0.1	0	20.5
G03	04/07/2019	0	1.1	19.2
	11/07/2019	0	2.4	14.9
	16/07/2019	0	1.7	19.1
	26/07/2019	0	2.1	15.8
	08/08/2019	0	1	17.5
	15/08/2019	0	1.5	18.1
	21/08/2019	0	1.4	18.3
	04/09/2019	0	0.4	20.1
	11/09/2019	0.1	2	16.9
	20/09/2019	0.1	1.3	19
	02/10/2019	0.1	2.6	13.8
G07	04/07/2019	0	0.6	19.9
	11/07/2019	0	0.6	20.1
	16/07/2019	0	0.6	20.2
	26/07/2019	0	0.6	19.8
	08/08/2019	0	1.7	19.5
	15/08/2019	0	2.6	19.1
	21/08/2019	0	2.2	19.3
	04/09/2019	0	0.8	20.5
	11/09/2019	0	0.7	20.4
	20/09/2019	0.1	0.8	20
	02/10/2019	0.1	0.1	20.4
G08	04/07/2019	0	2.1	16.2
	11/07/2019	0	2.3	16.4
	11/07/2019	0	2.3	16.6

APPENDIX 1 – LANDFILL GAS

Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
	16/07/2019	0	2.1	17
	26/07/2019	0	2.2	16.8
	08/08/2019	0	0.8	19.2
	15/08/2019	0	1.7	18.2
	21/08/2019	0	1.9	17.9
	04/09/2019	0	0	21
	04/09/2019	0	1.4	19.3
	11/09/2019	0.1	2.3	17.8
	20/09/2019	0	2.4	17.4
	02/10/2019	0.1	2.4	17
G09	04/07/2019	0	0	20.5
	11/07/2019	0	0	20.7
	16/07/2019	0	0	20.8
	26/07/2019	0	0	20.5
	08/08/2019	0	0	20.8
	15/08/2019	0	0	21
	21/08/2019	0	0	20.6
	04/09/2019	0	0	21
	11/09/2019	0.1	0	20.9
	20/09/2019	0.1	0	20.8
	02/10/2019	0	0	20.5
	02/10/2019	0.1	0	21
G10	04/07/2019	0	1.8	19.2
	11/07/2019	0	1.6	19.9
	16/07/2019	0	1.5	19.9
	26/07/2019	0	1.5	19.6
	08/08/2019	0	1.1	20
	15/08/2019	0	2.8	19.3
	21/08/2019	0	1.3	19.9
	11/09/2019	0.1	2	19.8
	20/09/2019	0	3.4	18.6
	02/10/2019	0	2.2	20
G11	04/07/2019	0	2.2	18.1
	11/07/2019	0	2.5	18.5
	16/07/2019	0	1.8	19.6
	26/07/2019	0	1.2	19.3
	08/08/2019	0	0.9	19.6
	15/08/2019	0	0	21.1
	21/08/2019	0	0	20.8
	04/09/2019	0	1	20.4
	20/09/2019	0	2.1	17.5
	02/10/2019	0	0	21
G12	04/07/2019	66.3	4.2	3.5
	11/07/2019	68.4	4.3	3.4
	16/07/2019	62.1	4	4.2
	26/07/2019	52	3.5	6.8
	08/08/2019	57.6	3.8	5.2
	15/08/2019	40.9	3	9.6
	21/08/2019	54.4	4.1	5.2

APPENDIX 1 – LANDFILL GAS

Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
	29/08/2019	22	1.6	14.7
	04/09/2019	37.4	2.6	11.3
	11/09/2019	57.5	3.8	5.6
	20/09/2019	66.9	4	3.4
	02/10/2019	0	0	21.4
	02/10/2019	20.2	3.4	12.8
G13	04/07/2019	0	0	20.5
	11/07/2019	0	0	20.8
	16/07/2019	0	0	20.8
	26/07/2019	0	0	20.6
	08/08/2019	0	0	21.5
	15/08/2019	0	0	21.2
	21/08/2019	0	0	20.9
	04/09/2019	0	0	21.3
	11/09/2019	0.1	0	21.5
	02/10/2019	0.1	0	0
G14	04/07/2019	0	2.3	18.3
	11/07/2019	0	2.7	18.2
	16/07/2019	0	2.7	18.2
	26/07/2019	0	2.5	18.4
	08/08/2019	0	1.8	19.5
	15/08/2019	0	1.3	19.9
	21/08/2019	0	1.8	19.6
	04/09/2019	0	1.2	20.7
	11/09/2019	0.1	2.7	18.6
	20/09/2019	0.1	0	21
	02/10/2019	0	0.9	20.5
G15	04/07/2019	0	0.3	19.8
	11/07/2019	0	0.5	20.3
	16/07/2019	0	0.6	20
	26/07/2019	0	0.6	19.9
	08/08/2019	0	0.7	19.5
	15/08/2019	0	0.8	19.8
	21/08/2019	0	0.4	20.2
	04/09/2019	0	0.1	21
	11/09/2019	0.1	0.7	19.5
	20/09/2019	0.1	2.6	18.7
	02/10/2019	0	0.7	20.1
G16	04/07/2019	0	0	20.6
	11/07/2019	0	0	21
	16/07/2019	0	0	20.9
	26/07/2019	0	0	20.8
	08/08/2019	0	0	21
	15/08/2019	0	0	21.4
	21/08/2019	0	0	21.1
	04/09/2019	0	0	21.4
	11/09/2019	0.1	0	22.3
	20/09/2019	0.1	1.2	18.6
	20/09/2019	0.1	0	21

APPENDIX 1 – LANDFILL GAS

Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
	02/10/2019	0	0	22.1
G17	04/07/2019	0	0	20.5
	11/07/2019	0	0	20.9
	16/07/2019	0	0	20.8
	26/07/2019	0	0	20.6
	08/08/2019	0	0	20.7
	15/08/2019	0	0	21.3
	21/08/2019	0	0	21.1
	04/09/2019	0	0	21.2
	11/09/2019	0.1	0	21
	20/09/2019	0.1	0	20.9
G18	04/07/2019	0	0.1	20.4
	11/07/2019	0	0	21
	16/07/2019	0	0.3	20.6
	26/07/2019	0	0	20.8
	08/08/2019	0	0.1	20.7
	15/08/2019	0	0	21.3
	21/08/2019	0	0	21.2
	04/09/2019	0	0.5	21.1
	11/09/2019	0.1	0.9	20.5
	20/09/2019	0.1	0.1	21.1
	02/10/2019	0	0.4	21.1
G19	04/07/2019	62.5	9.5	4.6
	11/07/2019	14	3.1	16.9
	16/07/2019	33.6	7.2	11.8
	26/07/2019	5.5	1.6	19.2
	08/08/2019	41.7	11	8.7
	15/08/2019	39.5	9.1	6.8
	21/08/2019	52.7	11.1	5.9
	29/08/2019	29.5	6.5	14.5
	04/09/2019	13.2	3.4	17.7
	20/09/2019	68.4	12.9	2.5
G20	04/07/2019	0.1	4	15.1
	11/07/2019	27.2	17.6	0.2
	16/07/2019	0	9.2	9.4
	26/07/2019	0.1	6	12.9
	08/08/2019	0	2.3	18.2
	15/08/2019	52.4	8.3	0.8
	21/08/2019	40.7	9.8	0.9
	29/08/2019	9.8	3.8	17.8
	04/09/2019	0.1	2.8	18.8
	11/09/2019	47.2	21	0.2
	20/09/2019	0.1	0.5	19.9
	02/10/2019	75.9	7.4	0.8
G21	04/07/2019	59.4	18.6	0.9
	11/07/2019	47.6	17.6	1.8
	16/07/2019	43.5	17.9	1.1
	26/07/2019	0	0	21
	08/08/2019	0	0	20.6

APPENDIX 1 – LANDFILL GAS

Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
	15/08/2019	22.9	10.7	5.8
	21/08/2019	40.5	7.5	0.2
	29/08/2019	29.2	9.5	4.5
	04/09/2019	0	0	21.3
	11/09/2019	13.8	7.8	10.7
	20/09/2019	33.7	14.3	0.6
	02/10/2019	0.1	0	21.4
	02/10/2019	0.1	0	21.5
G22	04/07/2019	77.3	19.5	0.2
	11/07/2019	76.9	20.2	0.2
	16/07/2019	67.9	19.6	0.3
	26/07/2019	51.5	19.6	0.4
	08/08/2019	49.4	20.5	0.2
	15/08/2019	66.7	22.5	0.3
	21/08/2019	73	20.9	0.2
	29/08/2019	76.2	22.1	0.1
	04/09/2019	66.6	19.4	1.9
	11/09/2019	76.4	22.8	0.2
	20/09/2019	76.5	23	0.2
	02/10/2019	0.1	0	21.5
	02/10/2019	52.8	18.3	3.9
G23	04/07/2019	8.9	11.1	1.9
	11/07/2019	8	13.7	0.2
	16/07/2019	4	13.8	0.3
	26/07/2019	0.2	13.7	1.6
	08/08/2019	1	12.3	2
	15/08/2019	1	5.4	2.8
	21/08/2019	1.7	7.8	0.3
	29/08/2019	1.9	11.5	0.4
	04/09/2019	1.3	13.2	2
	11/09/2019	3	9.5	1
	20/09/2019	0.9	11.7	0.2
	02/10/2019	2.7	8.1	0.2
G24	04/07/2019	0	0	20.7
	11/07/2019	0.1	0.1	21
	16/07/2019	50.6	24.5	4.8
	26/07/2019	51.3	31.3	4
	08/08/2019	55.1	29.1	3.3
	15/08/2019	22.1	13.8	12.7
	21/08/2019	2.1	1.9	20.1
	29/08/2019	0.2	0.2	20.9
	04/09/2019	0	0	21.2
	11/09/2019	0.1	0.2	20.8
	20/09/2019	0.1	0.3	20.5
	02/10/2019	14.2	6.1	17
G25	04/07/2019	7.5	7.1	11.6
	11/07/2019	11.4	13.9	4
	16/07/2019	9.7	10.5	7.8
	26/07/2019	17.5	17	1.1

APPENDIX 1 – LANDFILL GAS

Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
	08/08/2019	17.5	18.7	0.8
	15/08/2019	27.3	21.4	0.3
	21/08/2019	39.9	23.1	0.6
	29/08/2019	10.9	6.4	15.6
	04/09/2019	3.7	3.7	17.8
	11/09/2019	9	10.6	9.2
	20/09/2019	17.4	19	1.8
	02/10/2019	41.6	17.1	1.2
G26	04/07/2019	0	2.1	19.2
	11/07/2019	0	1.4	20.2
	16/07/2019	0	1.6	20.1
	26/07/2019	0	0.6	20.5
	08/08/2019	0	1.6	19.4
	15/08/2019	0	3.1	17.2
	21/08/2019	0.1	2.3	17.8
	04/09/2019	0	1.8	19.1
	11/09/2019	0.1	2.5	18.7
	20/09/2019	0.1	2.7	18.4
	02/10/2019	0.2	3.2	14.4
G27	04/07/2019	0	0	20.8
	11/07/2019	0	0	21
	16/07/2019	0	0	21.2
	26/07/2019	0	0	20.9
	08/08/2019	0	0	20.6
	15/08/2019	0	0	21.5
	21/08/2019	0	0	21.1
	04/09/2019	0	0.3	21.1
	11/09/2019	0.1	0	20.9
	11/09/2019	0.1	0	21
	20/09/2019	0.1	0	20.9
	02/10/2019	0.1	0	21.6
G29	04/07/2019	0	0	20.8
	11/07/2019	0	0	21.1
	16/07/2019	0	0	21.1
	26/07/2019	0	0	21.2
	08/08/2019	0	0	20.7
	15/08/2019	0	0	21.5
	21/08/2019	0	0	21.1
	04/09/2019	0	0	21.3
	11/09/2019	0.6	4.5	15.1
	20/09/2019	0.1	0	21.1
	02/10/2019	20.8	4.5	10.9
G30	04/07/2019	0	0	21
	11/07/2019	0	0.1	21
	16/07/2019	0	0.1	20.8
	26/07/2019	1.1	1	18.8
	08/08/2019	7.3	3	13.1
	15/08/2019	2.6	1.5	18
	21/08/2019	0	0	21.2
	29/08/2019	1.2	1.3	18.5

APPENDIX 1 – LANDFILL GAS

Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
	04/09/2019	0.7	0.5	20
	11/09/2019	4.1	1.9	16.2
	20/09/2019	2	0.5	19.1
	02/10/2019	0	0	21.6
G31	04/07/2019	0	3.6	17.6
	11/07/2019	0	4.7	16.4
	16/07/2019	0	4.4	17.4
	26/07/2019	0	5.4	15.7
	08/08/2019	0	5.3	15.4
	15/08/2019	0	5.5	15.7
	21/08/2019	0	6.3	14.1
	04/09/2019	0	6.7	14.7
	11/09/2019	0	5	16.8
	20/09/2019	0	4.7	17
	02/10/2019	0.1	6.4	15.4
G32	04/07/2019	0	0.1	20.6
	11/07/2019	0	0.7	20.4
	16/07/2019	0	0.6	20.5
	26/07/2019	0	0.8	20.2
	08/08/2019	0	0.6	20
	15/08/2019	0	0.6	20.9
	21/08/2019	0	1.1	20.3
	04/09/2019	0	0.1	21.3
	11/09/2019	0	0.6	20.4
	20/09/2019	0	0.9	20.2
	02/10/2019	0.1	0.6	21
G35	04/07/2019	40.7	23.2	3.2
	11/07/2019	48.7	28.4	1.6
	16/07/2019	46.4	28.5	1.6
	26/07/2019	47.1	25.8	1.8
	08/08/2019	50	29.4	1.5
	15/08/2019	29.8	13.2	9.7
	21/08/2019	15.7	7.8	15.3
	29/08/2019	46	27.7	1.3
	04/09/2019	32.2	18.2	9.4
	04/09/2019	31.5	18.3	9.7
	11/09/2019	54.1	30.7	2.5
	20/09/2019	61.7	34.2	1
	02/10/2019	22.7	12.3	13.5
G36	04/07/2019	14.9	5.1	10.7
	11/07/2019	35.9	5	8.2
	16/07/2019	21.9	5.7	8.2
	26/07/2019	23	4.3	11.9
	08/08/2019	16.3	3.9	12.9
	15/08/2019	14.8	3.1	15.4
	21/08/2019	9.5	4	13.3
	29/08/2019	30.1	4.6	10.6
	04/09/2019	21.8	3.4	13.8
	11/09/2019	27.3	4.3	10.8
	20/09/2019	29.6	5.1	8.8

APPENDIX 1 – LANDFILL GAS

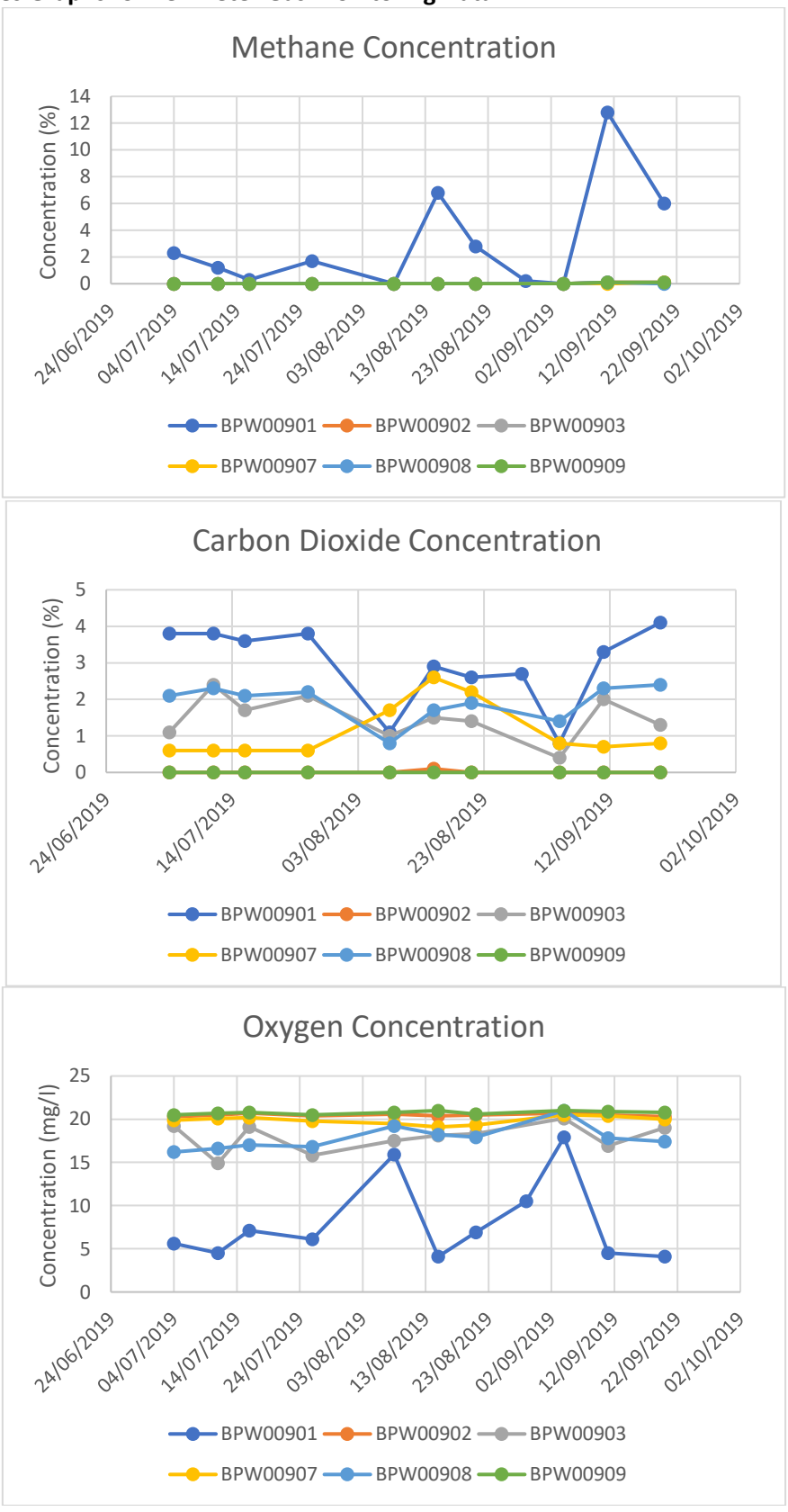
Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
G37	04/07/2019	0	0.2	20.5
	11/07/2019	0	0.3	20.8
	26/07/2019	0	0.3	20.9
	08/08/2019	0	0.3	20
	15/08/2019	0	0.5	20.9
	21/08/2019	0.1	0.4	20.7
	04/09/2019	0	0.2	21.2
	04/09/2019	0	0.2	21.2
	11/09/2019	0	0.4	20.5
	20/09/2019	0.1	0.4	20.5
G38	04/07/2019	0	0	20.7
	11/07/2019	0	0	21
	16/07/2019	0	0	21
	26/07/2019	0	0	20.9
	08/08/2019	0	2.4	18.1
	15/08/2019	0	0	21.7
	21/08/2019	16.3	18.8	0.2
	29/08/2019	0	0	21
	04/09/2019	0	0	21.5
	11/09/2019	0.1	0	22.3
	20/09/2019	0.1	2.1	18
	02/10/2019	1	1.2	20.2
G39	04/07/2019	0	0.6	20.5
	11/07/2019	0	0	21.2
	16/07/2019	0	1.4	20
	26/07/2019	0	0	21.2
	08/08/2019	0	0.4	20.1
	15/08/2019	0	3.2	19.4
	21/08/2019	0	2.2	19.3
	04/09/2019	0	4	18.5
	11/09/2019	0	0	21.2
	20/09/2019	0	2.9	18.7
	02/10/2019	0.1	2.6	19.2
G40	04/07/2019	0.1	0.4	20.1
	04/07/2019	0.1	0.4	20.1
	04/07/2019	0.1	0.4	20.1
	11/07/2019	0.1	5.1	12.7
	16/07/2019	0.4	3.6	16.1
	26/07/2019	0	0.1	21.4
	08/08/2019	0	1.7	18.4
	15/08/2019	0	7.5	10.6
	21/08/2019	9.1	10.4	5.2
	29/08/2019	0	2	18.2
	04/09/2019	0	7	10.9
	11/09/2019	0.1	5.9	10.6
	20/09/2019	0	5	11.2
	02/10/2019	1	1.1	18.9
G41	04/07/2019	0.2	1.3	19.5
	11/07/2019	0.3	1.7	19.2

APPENDIX 1 – LANDFILL GAS

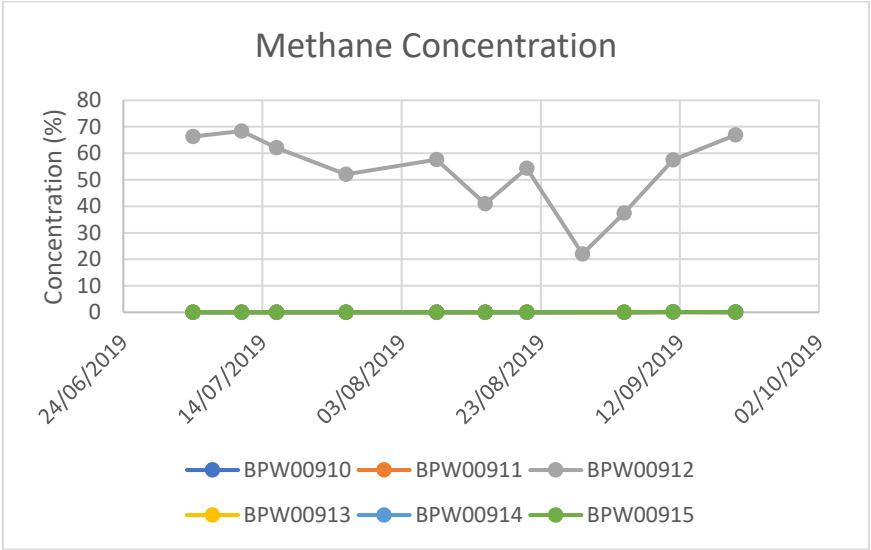
Sample Point	Date	Methane	Carbon Dioxide	Oxygen
		% v/v	% v/v	% v/v
Compliance Limit		1	1.5	N/A
Trigger Limit		0.8	1.3	N/A
	16/07/2019	0.1	1.2	19.7
	26/07/2019	0	1.4	19.3
	08/08/2019	0	0.5	19.8
	15/08/2019	0.4	1.2	19
	21/08/2019	2.4	3.1	17.5
	29/08/2019	0.1	1.2	20.3
	04/09/2019	0	0	21.5
	11/09/2019	0.1	2.6	17.8
	20/09/2019	0	0.9	19.8
	02/10/2019	0.9	2.9	16.2
G42	04/07/2019	0	0	20.9
	11/07/2019	0	0	21.1
	16/07/2019	0	0	21.1
	26/07/2019	0.1	0	20.3
	08/08/2019	0	0	20.2
	15/08/2019	0	0.9	20.6
	21/08/2019	0	0	21.3
	04/09/2019	0	0	21.5
	11/09/2019	0.1	0	20.9
	20/09/2019	0.1	0	20.9
	02/10/2019	0.1	0	21.3

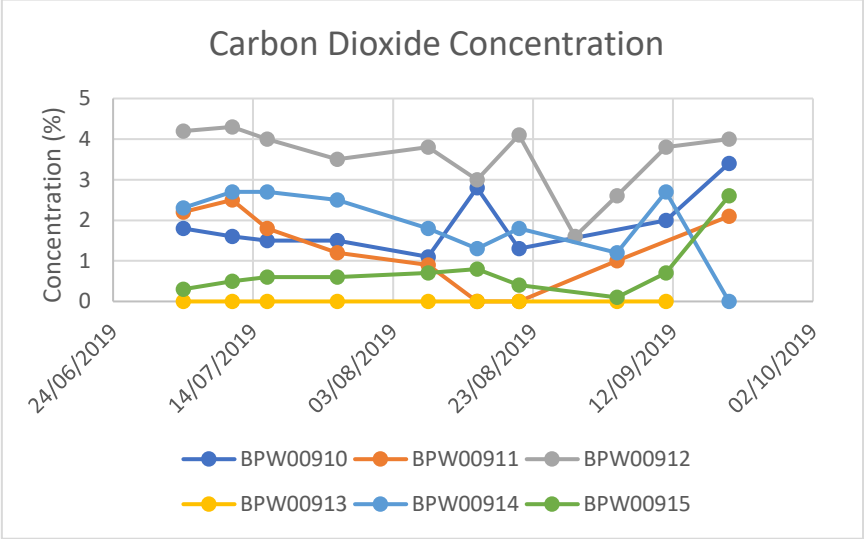
APPENDIX 1 – LANDFILL GAS

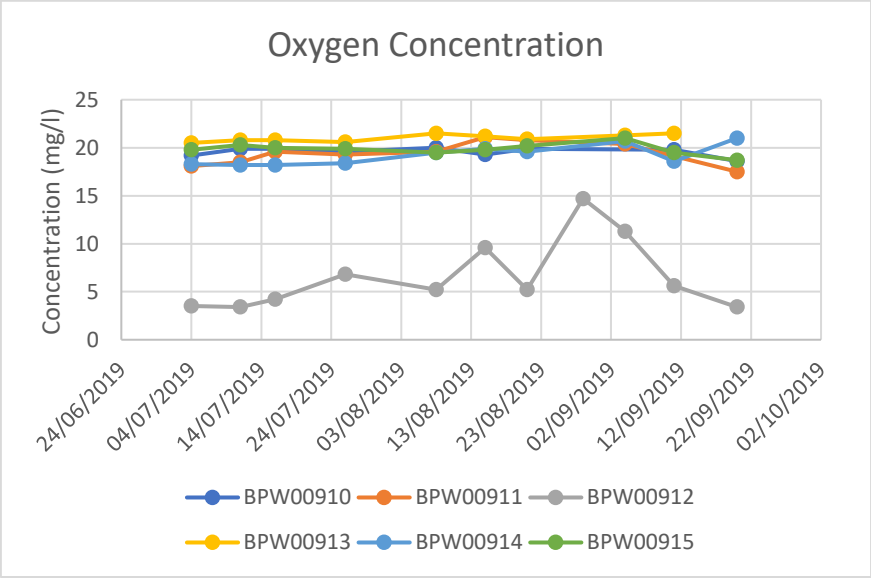
Time Series Graphs for Perimeter Gas Monitoring Data



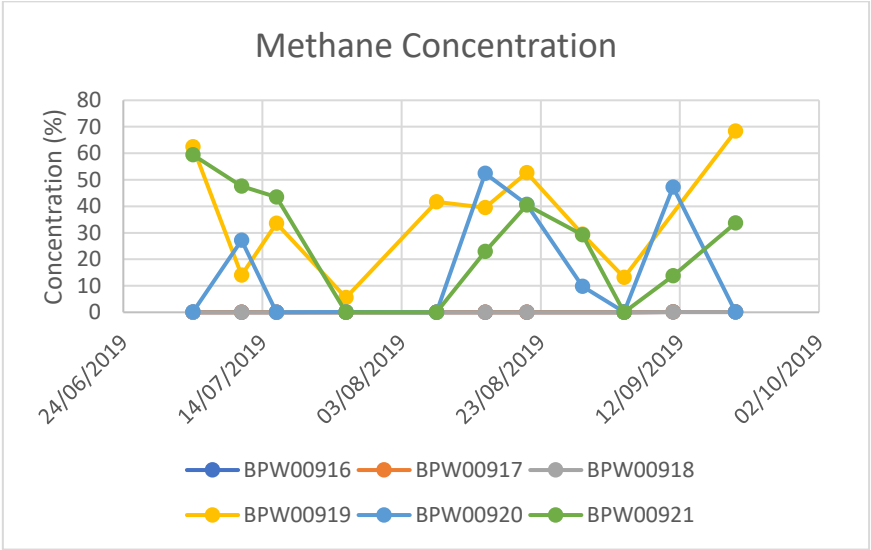
APPENDIX 1 – LANDFILL GAS

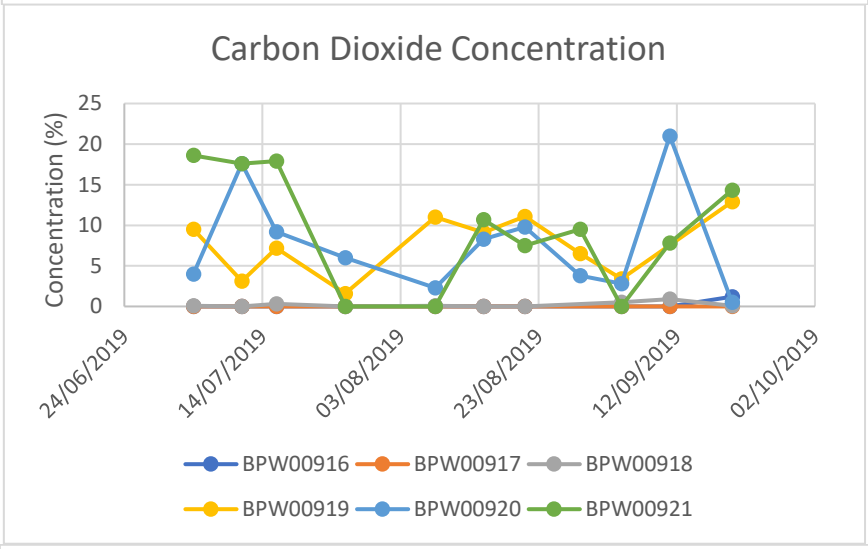


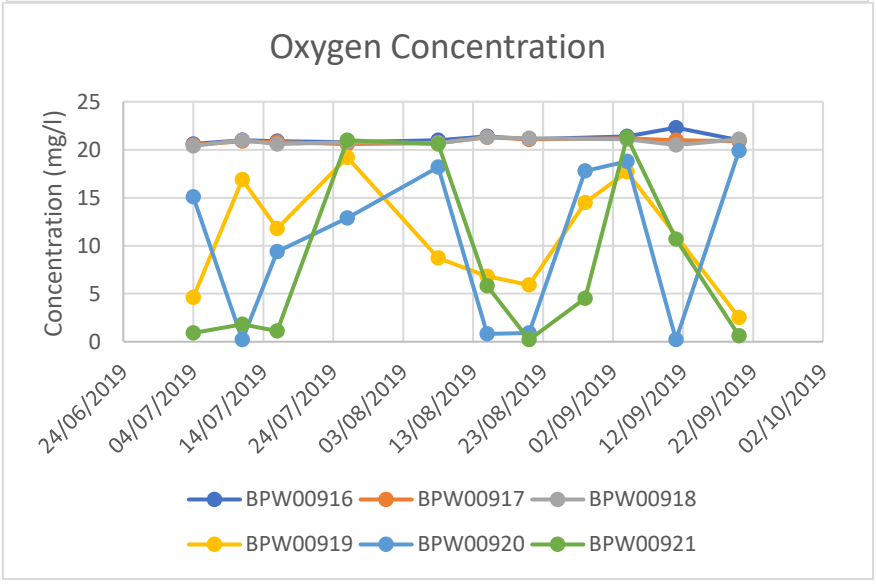




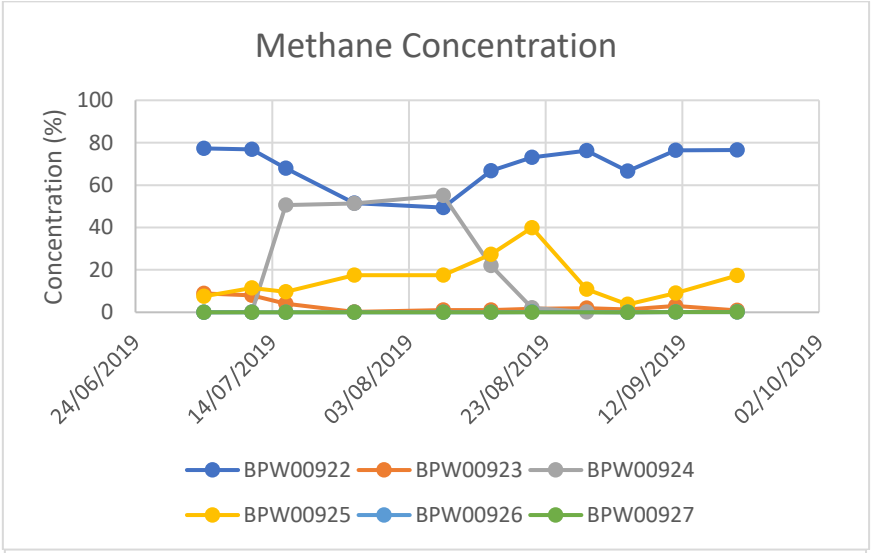
APPENDIX 1 – LANDFILL GAS

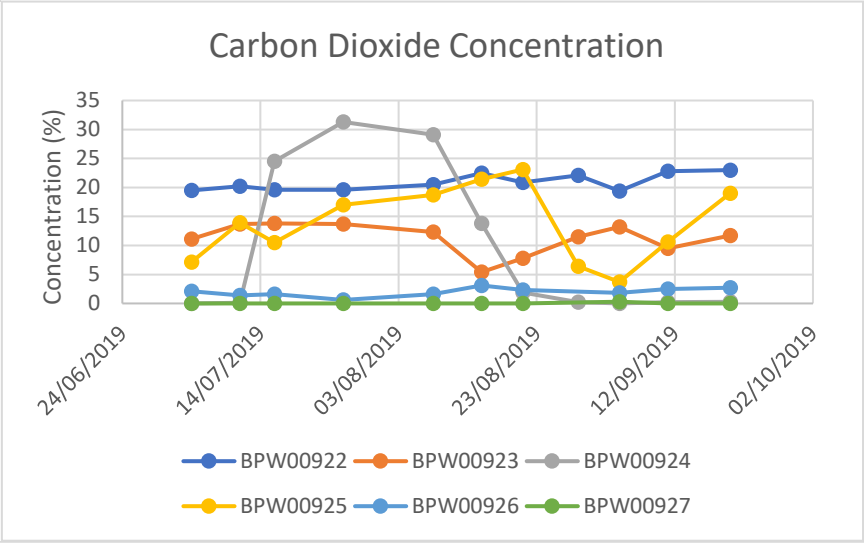


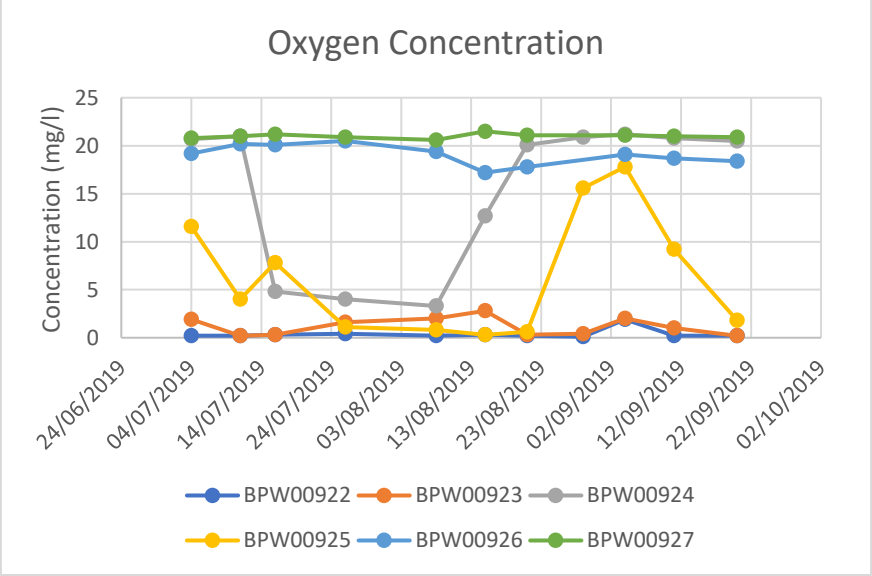




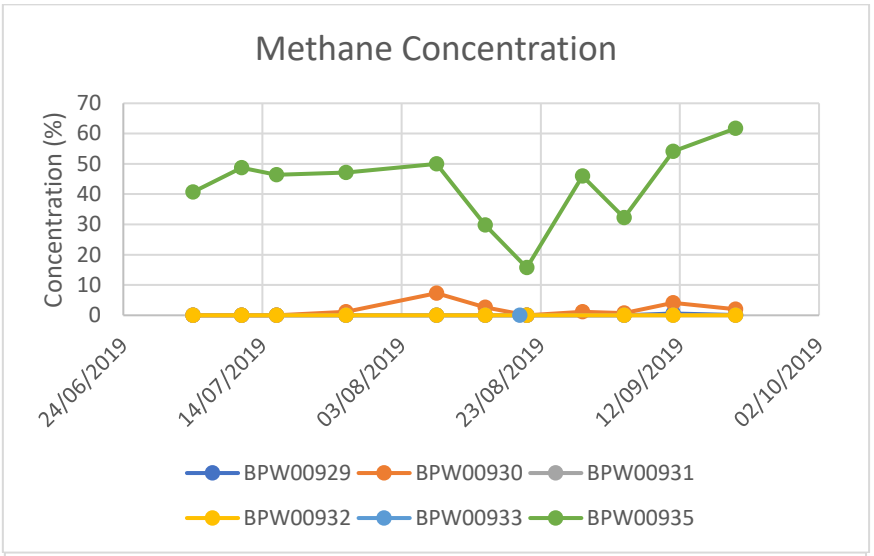
APPENDIX 1 – LANDFILL GAS

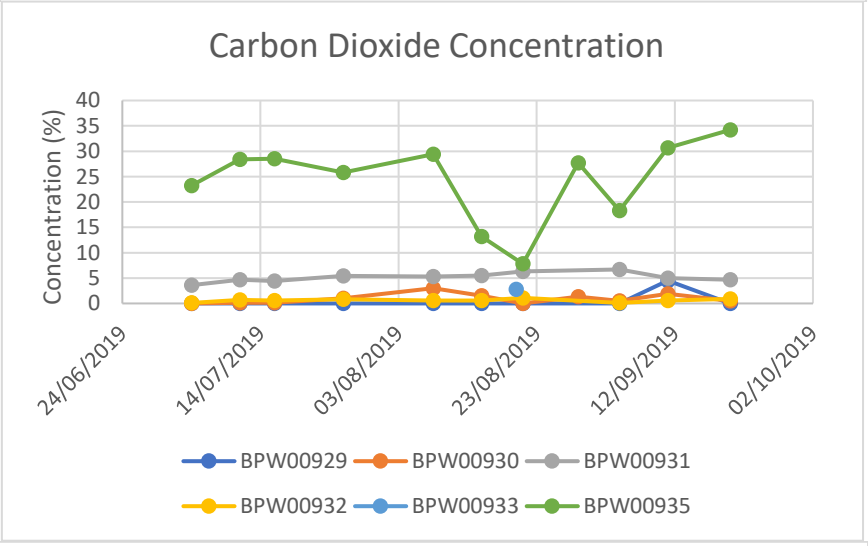


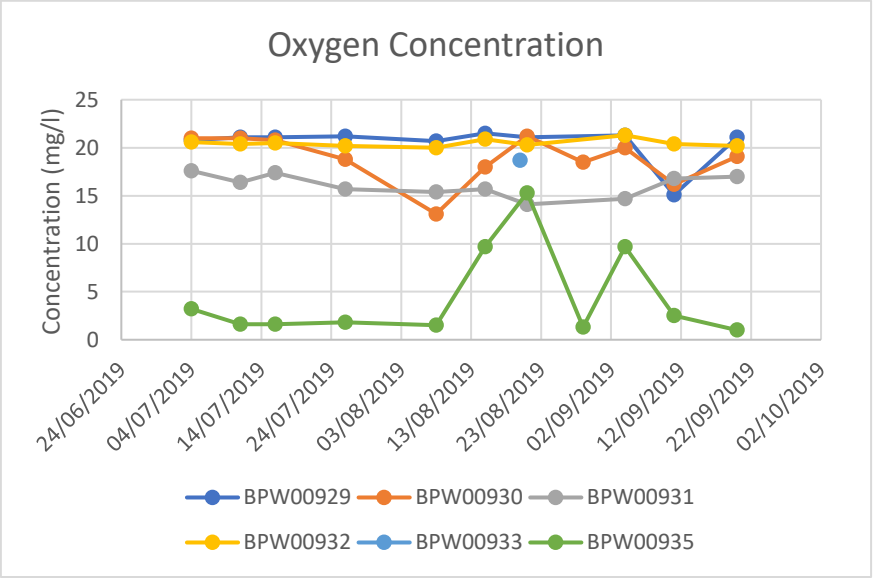




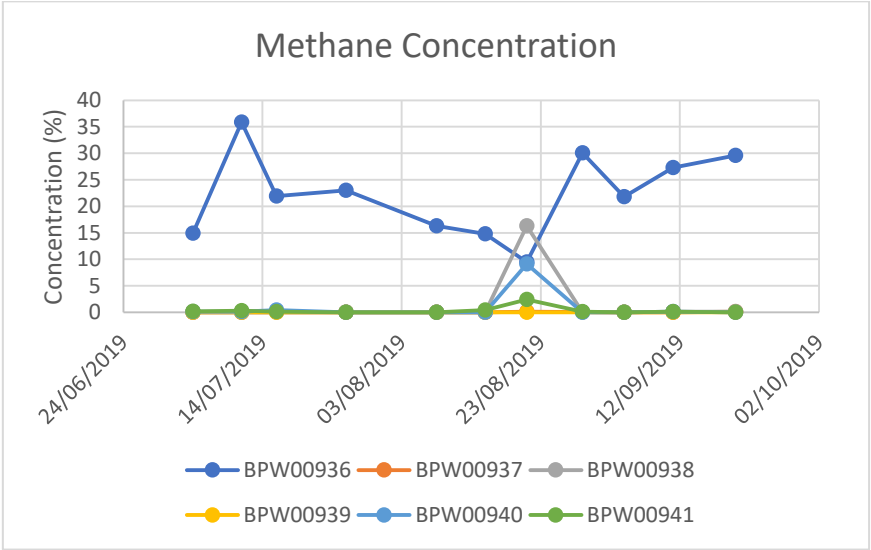
APPENDIX 1 – LANDFILL GAS

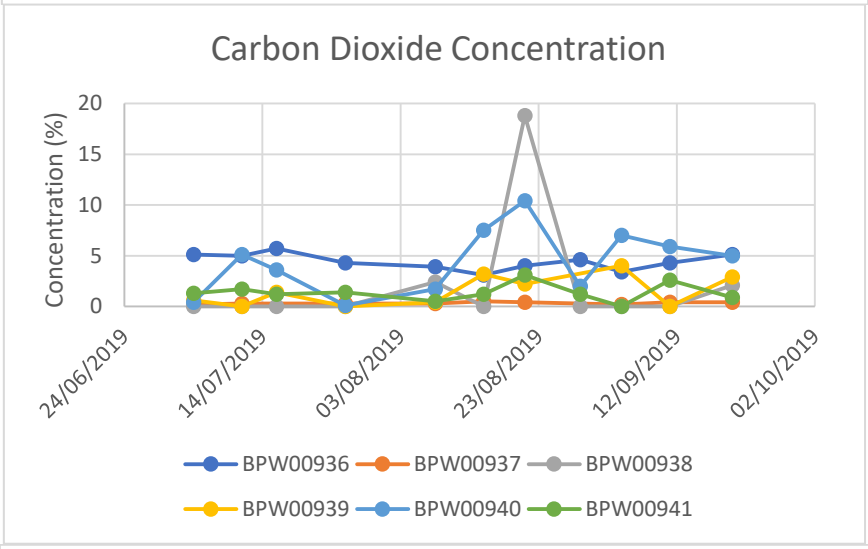


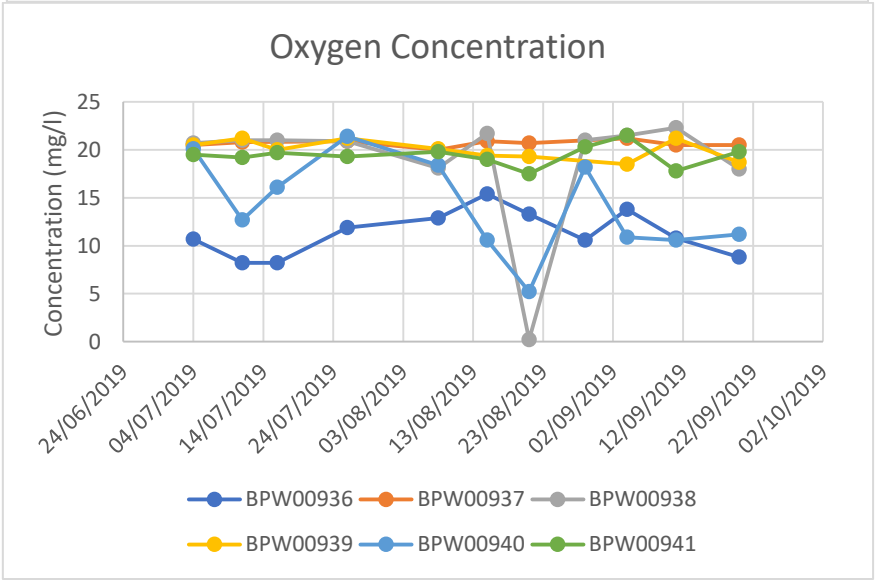




APPENDIX 1 – LANDFILL GAS







Appendix 2

APPENDIX 2 – LEACHATE

Table 1: Leachate Level Data

Location	LCP1			LCP2			LCP3			LCP6			LCP7			LCP8		
	Cover Level (mAOD)		318.91	Cover Level (mAOD)		348.51	Cover Level (mAOD)		350	Cover Level (mAOD)		339.26	Cover Level (mAOD)		327.12	Cover Level (mAOD)		323.69
	Base (mAOD)		310	Base (mAOD)		311	Base (mAOD)		311	Base (mAOD)		310	Base (mAOD)		310	Base (mAOD)		310
Date	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)
08/08/2019	5.22	313.69	3.69	29.43	319.08	8.08	33.1	316.9	5.9	23	316.26	6.26	15.7	311.42	1.42	11.34	312.35	2.35
29/08/2019	5.68	313.69	3.69	26.7	321.81	10.81	28.76	321.24	10.24	22.7	316.56	6.56	13	314.12	4.12	9.2	314.49	4.49
11/09/2019	5.72	313.69	3.69	27.36	321.15	10.15	31.43	318.57	7.57	21.89	317.37	7.37	16.5	310.62	0.62	10.06	313.63	3.63
EP Limit			1			1			1			1			1			1

Location	RMLP9A			RMLP9B West			RMLP9C			RMLP9D		
	Cover Level (mAOD)		335.17	Cover Level (mAOD)		340.1	Cover Level (mAOD)		334.11	Cover Level (mAOD)		334.62
	Base (mAOD)		307.54	Base (mAOD)		307.83	Base (mAOD)		307	Base (mAOD)		307
Date	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)	Dip (mBGL)	Level (mAOD)	Leachate Head (m)
08/08/2019	23.35	311.82	4.284	28.73	311.37	3.54	11.14	322.97	15.97	9.2	325.42	18.42
29/08/2019	23.77	311.4	3.864	21.75	318.35	10.52	8.04	326.07	19.07	4.89	329.73	22.73
11/09/2019	22.36	312.81	5.274	27.35	312.75	4.92	13.25	320.86	13.86	6.29	328.33	21.33
EP Limit			1			1			1			1

APPENDIX 2 – LEACHATE

Table 2: Monthly raw leachate monitoring data

Perameter	Units	Date	LCP 1	LCP 2	LCP 3	LCP 7	LCP 8	LCP 6	RMLP9A	RMLP9B	RMLP9C	RMLP9D
Ammoniacal Nitrogen as N	mg/l	28/07/2019	479	2080	1900	847	1300	1360	1890	1970	723	2070
		29/08/2019	82.5	2010	1990	829	1180	1430	1830	1700	783	1540
		29/09/2019	53	2160	2140	801	865	1420	1720	1900	698	3640
Chloride as Cl	mg/l	28/07/2019	533	8220	4240	1240	2550	2010	2690	2770	985	2580
		29/08/2019	182	7520	4340	1250	2390	1970	2580	2730	899	1780
		29/09/2019	176	7620	4540	1240	1900	2090	2620	2800	994	4000
pH	pH units	28/07/2019	7.3	8	8	7.6	7.7	7.8	8	8.3	7.6	8.3
		29/08/2019	7.2	8.1	8.1	8.4	8.1	8	8.2	8	8.1	8.1
		29/09/2019	8	8.5	8	8.2	8	8	8.2	8.1	7.9	7.5
COD	mg/l	28/07/2019	472	3110	4550	1370	2140	2630	3900	4570	1390	9990
		29/08/2019	-	-	-	-	-	-	-	-	-	-
		29/09/2019	204	2870	4290	1170	1350	2610	3470	4280	1380	57200

APPENDIX 2 – LEACHATE

Table 3: Final discharge monthly monitoring data (EP exceedances highlighted)

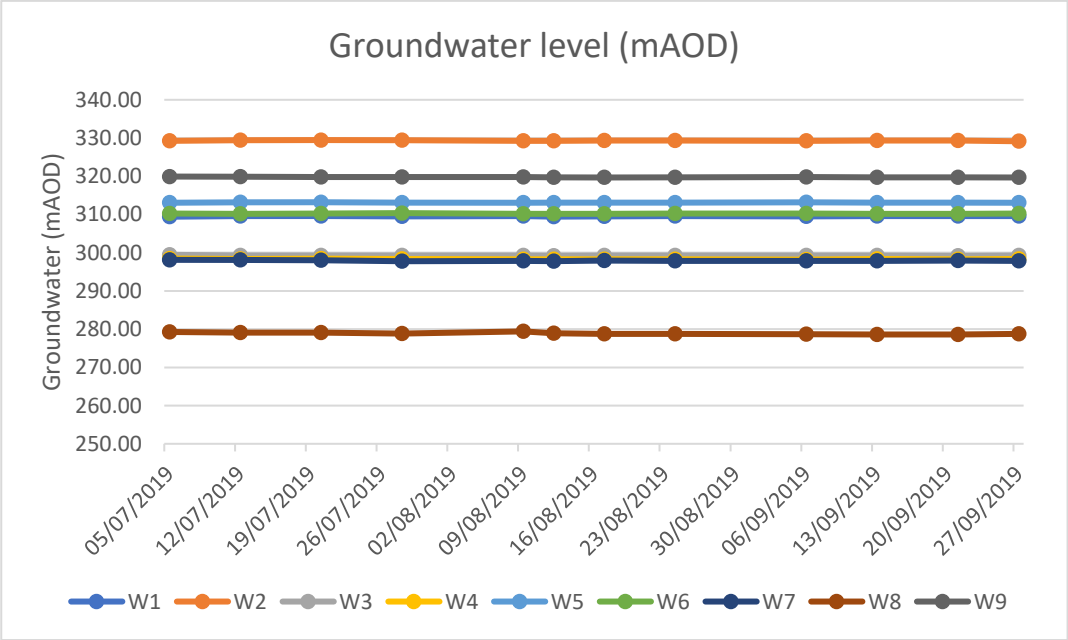
Parameter	Unit	Discharge Consent	Treated Leachate		
			28/07/2019	29/08/2019	29/09/2019
Ammoniacal Nitrogen as N	mg/l	150	112	43.1	50
BOD + ATU (20 day)	mg/l	-	78	34	96
BOD + ATU (5 day)	mg/l	-	24	9	10
COD (1 hr settled)	mg/l	1000	649	474	435
COD (Filtered)	mg/l	-	611	437	427
COD (Total)	mg/l	-	672	483	461
EH >C6 - C40	ug/l	-	8330	2170	2180
Methane, Dissolved	mg/l	-	0.029	<0.010	<0.010
pH	pH units	6 to 10	6.8	6.7	6.6
Sulphate as SO4, High Level	mg/l	1000	75.2	83.4	58
Total Suspended Solids	mg/l	500	32	4	17

Appendix 3

APPENDIX 3 – GROUNDWATER

Table 1: Weekly level data (calculated metres above ordinance datum)

mAOD	W1	W2	W3	W4	W5	W6	W7	W8	W9
05/07/2019	309.44	329.29	299.44	298.46	313.07	310.25	298.13	279.24	319.92
12/07/2019	309.57	329.40	299.28	298.32	313.16	310.19	298.09	279.13	319.90
20/07/2019	309.59	329.47	299.30	298.41	313.20	310.28	297.98	279.05	319.78
28/07/2019	309.47	329.44	299.30	298.38	313.12	310.36	297.81	278.83	319.79
09/08/2019	309.54	329.28	299.28	298.29	313.07	310.17	297.84	279.41	319.76
12/08/2019	309.43	329.30	299.22	298.25	313.08	310.20	297.79	278.90	319.72
17/08/2019	309.51	329.32	299.27	298.26	313.12	310.17	297.93	278.78	319.68
24/08/2019	309.57	329.34	299.29	298.25	313.10	310.21	297.86	278.72	319.70
06/09/2019	309.48	329.23	299.31	298.19	313.14	310.22	297.85	278.68	319.79
13/09/2019	309.57	329.31	299.25	298.38	313.10	310.20	297.83	278.60	319.72
21/09/2019	309.57	329.36	299.23	298.30	313.13	310.19	297.91	278.60	319.71
27/09/2019	309.56	329.16	299.24	298.36	313.07	310.27	297.89	278.76	319.68



APPENDIX 3 – GROUNDWATER

Table 3: Groundwater Monthly monitoring data

Parameter	Unit	Compliance Limit	Date	GW 1	GW 2	GW 3	GW 4	GW 5	GW 6	GW 7	GW 8	GW 9
Ammoniacal Nitrogen as N	mg/l	2	28/07/2019	<0.41	0.5	7.39	1.4	<0.41	<0.41	<0.41	<0.41	<0.41
			29/08/2019	<0.41	<0.41	7.02	1.53	<0.41	<0.41	<0.41	<0.41	<0.41
			29/09/2019	<0.41	<0.41	4.73	1.1	<0.41	<0.41	<0.41	<0.41	<0.41
Chloride as Cl	mg/l	69	28/07/2019	310	32.9	8.4	22.6	23.2	15.7	15.9	17.1	18.2
			29/08/2019	271	33.1	11.4	23.7	23.4	9.6	15.3	16.8	17.2
			29/09/2019	179	35	11.2	22.3	24.6	11.9	15.1	16.9	17.1
Conductivity- Electrical 20C	uS/cm	-	28/07/2019	993	182	210	311	196	108	319	269	177
			29/08/2019	885	192	249	316	203	83	321	272	178
			29/09/2019	632	184	275	322	206	97.5	326	279	179
Cyanide, Total as CN	mg/l	-	28/07/2019	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
			29/08/2019	<0.009	<0.009	<0.009	<0.009	N/S	<0.009	<0.009	<0.009	<0.009
			29/09/2019	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
pH	pH units	-	28/07/2019	6.2	7.4	6.7	6.9	6.2	6.3	7.6	7.1	6.7
			29/08/2019	6.8	7.6	7.1	7.8	7.5	7.1	7.8	8	7.7
			29/09/2019	7.4	7.4	7.6	7.5	6.8	6.7	7.9	7.6	6.7
Sulphate as SO4	mg/l	-	28/07/2019	21	<4.4	15.6	37.4	42	6.6	33	29	30.3
			29/08/2019	18.3	<4.4	<4.4	26.4	35.8	<4.4	20.2	24.1	23.9
			29/09/2019	25.9	<4.4	4.9	31.5	39.1	<4.4	21.2	24.8	23.9

APPENDIX 3 – GROUNDWATER

Table 4: Groundwater Quarterly monitoring data (with compliance limits)

Reference	Unit	Trigger	W1	W2	W3	W4	W5	W6	W7	W8	W9
Cadmium , Total as Cd	**mg/l**	**0.0056**	<0.0006	<0.0006	0.0008	<0.0006	<0.0006	0.0012	0.0006	0.0006	<0.0006
Nickel , Total as Ni	**mg/l**	**0.12**	0.008	<0.003	0.003	<0.003	0.018	0.01	<0.003	<0.003	0.004
Toluene	**µg/l**	**4**	<0.10	0.14	38.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Xylenes	**µg/l**	**3**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Zinc, Total as Zn	**mg/l**	**0.85**	0.04	<0.018	0.04	<0.018	0.09	0.181	<0.018	<0.018	0.05
Ethyl Benzene	**µg/l**	**1**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Mecoprop	**µg/l**	**0.1**	N/S	<0.04	<0.04	0.13	0.16	<0.04	<0.04	<0.04	<0.04
2,4 - D	**µg/l**	**0.1**	N/S	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Table 5: Groundwater Quarterly monitoring data (without compliance limits)

Reference	Unit	W1	W2	W3	W4	W5	W6	W7	W8	W9
Acenaphthene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Alkalinity as CaCO3	mg/l	24.6	40.2	131	113	26.6	20	141	103	37.4
Anthracene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzene	ug/l	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo (a) anthracene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo (a) pyrene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo (b) fluoranthene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo (g,h,i) perylene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo (k) fluoranthene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Bicarbonate Alkalinity	mg/l	24.6	40.2	131	113	26.6	20	141	103	37.4
Calcium , Total as Ca	mg/l	5.36	9.91	33.8	38.9	16.6	8.8	46.6	37.9	14
Chromium , Total as Cr	mg/l	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chrysene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper, Total as Cu	mg/l	0.019	<0.009	0.01	<0.009	0.031	0.018	<0.009	<0.009	<0.009
Dibenz (a,h) anthracene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Oxygen, Fixed	mg/l	4.9	1.7	<0.5	2.1	6.7	4.9	4.1	4.1	4.7
Fluoranthene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno (1,2,3) cd pyrene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron , Total as Fe	mg/l	2.42	<0.23	3.85	7.32	<0.23	2.64	1.08	0.82	<0.23
Lead , Total as Pb	mg/l	0.009	<0.006	0.015	<0.006	<0.006	0.034	0.024	0.045	<0.006

APPENDIX 3 – GROUNDWATER

Reference	Unit	W1	W2	W3	W4	W5	W6	W7	W8	W9
m&p Xylene	ug/l	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium, Total as Mg	mg/l	1.3	1.3	7.5	8.6	4.2	1.9	7.2	9.1	4.5
Manganese , Total as Mn	mg/l	0.29	0.022	2.77	3.47	1.26	0.753	1.17	0.898	0.109
Mercury, Total as Hg	mg/l	N/S	<0.00001	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Naphthalene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/l	<0.7	<0.7	<0.7	<0.7	<0.7	0.9	<0.7	<0.7	<0.7
o-Xylene	ug/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
PAH, Total	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenols Mono (Phenol Index)	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Potassium , Total as K	mg/l	1.14	4.11	3.16	2.8	2.48	0.77	2.68	1.24	0.95
Pyrene	ug/l	<0.02	<0.01	<0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver , Total as Ag	mg/l	0.0027	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007
Sodium , Total as Na	mg/l	96.7	24.8	7.57	13.3	14.4	6.37	17.9	9.28	12.8

Appendix 4

APPENDIX 4 – SURFACE WATER

Table 1: Monthly monitoring data

LOCATION	DATE	pH	Conductivity-Electrical 20C	Ammoniacal Nitrogen as N (LL)	Chloride as Cl	Total Suspended Solids	BOD + ATU (5 day)	EH >C6 - C40	EH >C6 - C8	EH >C8 - C10	EH >C16 - C24	EH >C24 - C40	EH >C10 - C16
		pH units	µS/cm	mg/l	mg/l	mg/l	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Compliance Limit		**6 - 9**	**N/A**	**0.25**	**N/A**	**50**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
P1 (SW 1)	**28/07/2019**	7.2	104	<0.06	13.6	69	5	66	<10	<10	19	46	<10
	29/08/2019	7.4	114	<0.06	13.9	7	2	<10	<10	<10	<10	<10	<10
	29/09/2019	6.5	105	<0.06	9.3	4	3	<40	<40	<40	<40	<40	<40
P2 (SW 2)	**28/07/2019**	7.6	462	<0.06	35.2	13	2	111	<10	<10	22	89	<10
	29/08/2019	7.8	408	<0.06	25.4	13	3	12	<10	<10	12	<10	<10
	29/09/2019	7.9	195	<0.06	9.8	26	2	<40	<40	<40	<40	<40	<40

Appendix 5

ALS Environmental Ltd
Torrington Avenue
Coventry
CV4 9GU

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Mr Williams
Potters Waste Management
Potters Yard
Severn Road
Welshpool SY21 7BE
Powys

06 August 2019

Test Report: COV/1748285/2019

Dear Mr Williams

Analysis of your sample(s) submitted on 29 July 2019 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)24 7642 1213 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using ALS Environmental Ltd and we look forward to receiving your next samples.

Yours Sincerely,

Signed:

Name: P. Johal

Title: Coventry Operations Manager

Report Summary

Mr David Williams
Potters Waste Management
Potters Yard
Severn Road
Welshpool
Powys
SY21 7BE

Date of Issue : **06 August 2019**

Report Number :**COV/1748285/2019** Issue **1** This issue replaces all previous issues

Number of Samples included in report: **3**

Number of Test Results included in rep **21**

Site Name : **Waste Water Analysis**
Job Received : **29 July 2019**

Analysis Commenced : **05 August 2019**
Order Number : **B1772POT2**

Signed : 

Name : **P. Johal**
Title : **Coventry Operations Manager**

Date : **06 August 2019**

ALS Environmental Ltd was not responsible for sampling unless otherwise stated.

Information on the methods of analysis and performance characteristics are available on request.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. The results relate only to the items tested.
Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.

Certificate of Analysis

Report Number: **COV/1748285/2019 Issue 1**
Site Name: **Waste Water Analysis**

Determinand	Units	Method/ Analysis Site		Dust					
				18450038		18450039		18450040	
				1		2		3	
Date In	dd/mm/yy	FIELD	Cov	N	28/07/2019	N	28/07/2019	N	28/07/2019
Date Out	dd/mm/yy	FIELD	Cov	N	23/06/2019	N	23/06/2019	N	23/06/2019
Deposited Dust, Total, Calc.	mg/m2/day	74	Cov	N	34	N	39	N	17
Description of Dust	Text	74	Cov	N	{/*}Medium brown deposition. {*/}	N	{/*}Heavy green deposition. Algae.{*/}	N	{/*}Medium green deposition. Algae.{*/}
Frisbee Diameter	mm	FIELD	Cov	N	230	N	230	N	230
Mass of Undissolved Solids	mg	74	Cov	N	49.3	N	56.4	N	24.9
Number of Days Exposed		FIELD	Cov	N	35	N	35	N	35

Signed :

Name : **P. Johal**

Date : **06 August 2019**

Title : **Coventry Operations Manager**

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH4 9EP), CTD = Coatbridge(ML5 4FR), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2SW), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. The LOD for the Legionella analysis will increase where the volume analysed is <1000g (1g is approximately equivalent to 1ml for

ANALYST COMMENTS FOR REPORT COV/1748285/2019 Issue 1

This issue replaces all previous issues

Date of Issue: **06 August 2019**

Sample No		Analyst Comments
18450038	DUST COMMENTS	Medium brown deposition.
18450039	DUST COMMENTS	Heavy green deposition. Algae.
18450040	DUST COMMENTS	Medium green deposition. Algae.

Signed: 

Name: **P. Johal** Date: **06 August 2019**

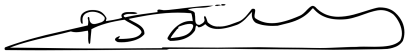
Title: **Coventry Operations Manager**

DETERMINAND COMMENTS FOR REPORT COV/1748285/2019

ISSUE 1 This issue replaces all previous issues

Date of Issue : 06 August 2019

Sample No	Description	Determinand	Comments
18450038	1	Description of Dust	{/*}Medium brown deposition. {*/}
18450039	2	Description of Dust	{/*}Heavy green deposition. Algae.{*/}
18450040	3	Description of Dust	{/*}Medium green deposition. Algae.{*/}

Signed: 

Name: **P. Johal** Date: **06 August 2019**

Title: **Coventry Operations Manager**

Caulmert
engineering environmental planning

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