

CAULMERT LIMITED

Engineering, Environmental & Planning
Consultancy Services

Brookhill Landfill Site

Flintshire County Council Waste Management Services

Quarterly Monitoring Review

April – June 2015

Prepared by:

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EXECUTIVE SUMMARY

This report has been compiled in compliance with the Environmental Permit (EP) BV7273 - Variation Notice Number YP3835MJ for Brookhill Landfill Site located near Buckley in Flintshire, North Wales. The data reviewed by this report was collected between the 1st of April and the 30th of June 2015. The report records the monitoring data for landfill gas, groundwater, leachate, surface water and dust and discusses this data in relation to emission limits set in the EP.

None of the monitored perimeter gas boreholes were in breach of their respective methane or carbon dioxide EP limits during this review period.

Groundwater levels around the site decreased over the review period, in keeping with the seasonal trend. Concentrations of ammoniacal nitrogen and chloride exceeded their respective EP limits at locations GW2A, GW3A and GW4. All other parameters remained below their respective EP limits throughout the review period.

The leachate level exceeded the EP limit in R5 throughout the review period, as observed in the previous review period. FCC investigated the condition of this well and suggested that the leachate measurements prior to June 2015 were likely affected by the presence of foam within the well. The leachate level within R1B was slightly above the EP limit in April, but below the EP limit for the remainder of the review period. Leachate levels at all other locations remained below their respective trigger limits throughout the review. The concentration of parameters indicates leachate was medium to strong within the site.

Chemical analysis of the final discharge from the leachate treatment plant showed that two consent limits were exceeded during this review period. COD concentrations were above the limit throughout the review period. The ammoniacal nitrogen concentration was also above the limit on three occasions.

Concentrations of ammoniacal nitrogen, COD and suspended solids were above the EP limits at P2 during the review period. Water quality at P4 was comparable to the long-term trends for water quality at this location.

Deposited dust concentrations were below the EP limit at locations 1 and 2 during this period. The gauge at location 3 was damaged by farming activity.

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1902.EMP.01 – Environmental Monitoring Plan

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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) BV7273 – Variation Notice Number YP3835MJ for Brookhill Landfill Site, held by Flintshire County Council (FCC) Waste Management Services, which requires that the monitoring data collected at the site is reviewed quarterly. The data reviewed by this report was collected between the 1st of April and the 30th of June 2015.
- 1.1.2 This report records the monitoring data for landfill gas, leachate, groundwater, surface water and dust, and discusses this data in relation to emission limits set in the EP. This data will also be compiled into an Annual Monitoring Review in accordance with the EP, to be submitted by the 31st of January 2016.

1.2 Site Location and Surrounding Land-use

- 1.2.1 Brookhill Landfill Site is located approximately 1.5 km north of Buckley, Flintshire, North Wales at NGR SJ 278 656. The site is accessed via the Pinfold Industrial Estate, Pinfold Lane, which is located off the A494 Mold to Ewloe Road.
- 1.2.2 The site is bound to the east by a wooded, disused railway leading to open grassland. Agricultural land lies to the west of the site. The Pinfold Industrial Estate and a number of residential properties (on the outskirts of Buckley, approximately 400 m away) are situated to the south of the site. A restored refuse tip (Ewloe Barn Landfill) lies to the north of the site. It is currently rough grassland leading to open grazing land and some woodland.
- 1.2.3 The landfill site has been developed in a former quarry, which was worked for Buckley Fireclay and the siltstones and mudstones beneath the Fireclay (known as the Warrant) for use in the manufacturing of bricks and tiles.
- 1.2.4 In 1997, in preparation for the engineering for the landfill site, further Fireclay was removed together with a quantity of coal in the quarry base under agreement with the Coal Authority.
- 1.2.5 Brookhill landfill site started accepting waste in 1999. The wastes permitted at the site were stipulated within the site permit. The general waste streams which were permitted at the site through its history can be summarised as:
- Domestic food and organic wastes – approximately 60%
 - Non-hazardous industrial wastes, (including plastic, paper, cardboard, wood, stone and sand, etc) – approximately 40%
 - Most special wastes (allowed until June 2004).

- 1.2.6 The special wastes which were tipped at the site were accepted pre-June 2004 (under the WML for the site). Therefore they would have been deposited predominantly within Cell 1, and the lower parts of Cells 2, 3 and 4. It is unlikely that any of the waste tipped in Cells 5 and 6 contains any 'special waste' waste streams.
- 1.2.7 The site ceased accepting waste in late 2007. The final capping and restoration phases were completed in 2010.

2.0 LANDFILL GAS

2.1 Monitoring regime

- 2.1.1 Routine landfill gas monitoring is carried out on a weekly basis at perimeter locations BH1 to BH25 and monthly at 23 in-waste locations. Perimeter borehole locations are shown on Drawing 1902.EMP.01, enclosed. Methane, carbon dioxide, oxygen and atmospheric pressure are recorded on each visit.
- 2.1.2 Methane and carbon dioxide data from all perimeter boreholes are displayed in a summary table and time-series graphs in Appendix 1. The landfill gas data obtained during the review period was compared with the EP limits stipulated in the EP. Monitoring data gathered at in-waste gas monitoring locations is also listed in Appendix 1.

2.2 Perimeter Boreholes

Methane

- 2.2.1 None of the monitored perimeter gas boreholes were in breach of their respective methane EP limits during this review.
- 2.2.2 Similarly to the previous quarter, no methane was detected at any time during the quarter in BH1, BH4, BH5, BH6, BH7, BH10, BH11, BH12, BH13, BH14, BH15, BH16, BH23, BH24 and BH25.
- 2.2.3 The highest methane concentrations were detected at BH8 (29.8 %) and BH9 (28.1 %) with average concentrations of 28.8 % and 27.4 % respectively. No increasing trends were observed, with consistent methane concentrations at both locations throughout this review period. These concentrations are compliant with the EP limits for these locations and are very similar to that of the previous quarter.

Carbon Dioxide

- 2.2.4 Carbon dioxide was recorded in all perimeter gas boreholes during the review period but remained below the relative EP limits throughout the review period in all locations.
- 2.2.5 The maximum recorded carbon dioxide concentration of 3.3 % in BH20 was lower than that recorded during the previous quarter, 5.6 % in BH21.

2.3 In-waste Boreholes

- 2.3.1 The gas field at Brookhill Landfill Site is monitored and balanced on a regular basis. In accordance with Condition 4.2.2 of the EP, landfill gas monitoring data for the in-waste boreholes for this review period is included in Appendix 1.
- 2.3.2 The average methane concentration in the GV wells was similar to that recorded in the previous quarter, 40.1 % while the average carbon dioxide concentration was 26.1 %.
- 2.3.3 H₂S concentrations showed a decreasing trend across the GV wells over the review period. The maximum concentration was 50 ppm, detected in GV26/27.

3.0 GROUNDWATER

3.1 Introduction

3.1.1 Borehole locations are shown on Drawing 1902.EMP.01, enclosed. Groundwater levels were recorded on a monthly basis in monitoring boreholes GW1 – GW8.

3.1.2 Collected samples were analysed for the range of determinants listed below:

pH, electrical conductivity, ammoniacal nitrogen, chloride and dissolved oxygen.

3.1.3 All groundwater samples collected on the 29th of June were also analyzed for the following quarterly parameters:

Alkalinity - total as CaCO₃, biological oxygen demand (BOD), chemical oxygen demand (COD), sulphate, total oxidised nitrogen, total organic carbon, xylenes, toluene and metals – cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium and zinc.

3.1.4 Table S4.4 in the EP requires that GW2A, GW3A and GW4 are controlled by individual limits for ammoniacal nitrogen, chloride, nickel, zinc, total xylenes and toluene. The EP limit for total xylenes has been set at 0.011 mg/l, as agreed in a meeting with NRW on the 16th of April 2013.

3.1.5 Revised EP limits for ammoniacal nitrogen and chloride were proposed in report reference 1629.9.FCC.JDM.ÅKS.A0¹, submitted to NRW on the 11th of July 2013 and is awaiting review.

3.1.6 Time-series graphs and a results summary of the laboratory analysis data are included in Appendix 2.

¹ Caulmert Ltd. July 2013. Groundwater Quality Compliance Level Review. 1629.9.FCC.JDM.ÅKS.A0.

3.2 Groundwater Levels

- 3.2.1 Groundwater levels were recorded on the 28th of April, 25th of May and 29th of June. Groundwater levels decreased over the review period as part of the seasonal trend of groundwater variation. Time series graphs of the groundwater levels are included in Appendix 2.

3.3 Groundwater Quality

- 3.3.1 Exceedances of the EP limit for ammoniacal nitrogen (1.7 mg/l) and chloride (60 mg/l) were observed in GW2A, GW3A and GW4 throughout the review period.
- 3.3.2 Maximum concentrations of ammoniacal nitrogen in GW2A, GW3A and GW4 were similar to those in the previous quarter: 7.9 mg/l, 132.0 mg/l and 18.4 mg/l respectively. The maximum chloride concentrations had increased since the previous review however. Maximum concentrations at GW2A, GW3A and GW4 of 126 mg/l, 390 mg/l and 128 mg/l respectively were recorded in this quarter, as opposed to the maximums of 118 mg/l, 235 mg/l and 92 mg/l during the first quarter.
- 3.3.3 Maximum ammoniacal nitrogen concentrations in the remaining locations ranged between 0.3 mg/l in GW6 and 19.4 mg/l in GW8.
- 3.3.4 Chloride concentrations in locations with no EP limits ranged between a minimum of 30 mg/l in GW6 and a maximum of 256 mg/l in GW1.1. As in the previous review period, chloride concentrations in GW1.1 remained relatively high throughout the review period.
- 3.3.5 Electrical conductivity ranged between a minimum of 0.69 mS/cm in GW7 and a maximum of 3.69 mS/cm in GW1.
- 3.3.6 Dissolved oxygen concentrations were generally low and ranged between a minimum of <0.3 mg/l in several locations and a maximum of 4.23 mg/l in GW6.
- 3.3.7 The pH in the groundwater locations ranged between 6.29 in GW1.1 and 7.9 in GW8.
- 3.3.8 As in the previous quarter in the quarterly monitoring round, no toluene or xylenes were detected in any of the groundwater locations in the June 2015 analysis. Nickel and zinc concentrations remained an order of magnitude below the respective EP limits at all locations.

4.0 LEACHATE

4.1 Introduction

4.1.1 Leachate levels at leachate chambers LC1B, LC2B, LC4B and LC6B and remote leachate monitoring points R1B, R2B, R3, R4B, R5 and R6B were recorded monthly. Well locations are shown on Drawing Number 1902.EMP.01, enclosed. No results for LC3 and LC5 are reported, as agreed with Natural Resources Wales on the 16th of April 2013.

4.1.2 The leachate treatment plant at the site accepts leachate from Brookhill Landfill Site and the nearby Standard Landfill Site. The treated effluent is discharged to public sewer and is therefore subject to a trade effluent agreement (Discharge Consent, DC).

4.1.3 Samples collected in June from the leachate chambers only were analyzed for the suite below:

Alkalinity, ammoniacal nitrogen, biological oxygen demand, calcium, chloride, chemical oxygen demand, magnesium, total organic carbon, pH, potassium, sodium, sulphate and total oxidised nitrogen.

4.1.4 The treated leachate discharge (Final Discharge, FD) was sampled and analysed for:

Alkalinity, ammoniacal nitrogen, chromium, chemical oxygen demand (COD), copper, lead, nickel, nitrate, nitrite, pH, suspended solids and zinc.

4.1.5 Data summaries of leachate and discharge quality can be found in Appendix 3.

4.2 Leachate Levels

- 4.2.1 Table S4.1 in the EP requires that leachate levels must not exceed 2m above the base of each cell. This trigger level was discussed in the Leachate Management Plan. Following an assessment of the lowest achievable leachate levels for each landfill cell, new EP limits were proposed for Cells 2, 3, 4 and 5. These levels, detailed in Table 2 below, were agreed in a meeting between Alison Soper of the Environment Agency and representatives from Flintshire County Council Waste Management Services (then AD Waste Ltd) and Caulmert on the 17th of September 2009.

Table 2: Leachate Level EP limits

Landfill Cell	Monitoring Points	Revised Limit (m)
Cell 1	LC1B & R1	2.0
Cell 2	LC2B & R2	3.0
Cell 3	R3	5.5
Cell 4	LC4B & R4	3.0
Cell 5	R5	3.0
Cell 6	LC6B & R6	2.0

- 4.2.2 Leachate levels recorded during this review period are summarised in Table 3 below.

Table 3: Leachate Head Data (exceedances highlighted in yellow)

Landfill Cell	Monitoring Point	April (m above base)	May (m above base)	June (m above base)	Trigger Limit
Cell 1	BK LC 1B	0.86	0.74	1.15	2.00
	BK R1 B	2.01	1.96	1.99	
Cell 2	BK LC 2B	1.13	0.92	0.88	3.00
	BK R2B	0.56	0.56	0.56	
Cell 3	BK R3	1.09	1.03	0.99	5.50
Cell 4	BK LC 4B	1.22	0.96	1.60	3.00
	BK R4B	2.35	0.98	2.31	
Cell 5	BK R5	5.47	5.40	3.78**	3.00
Cell 6	BK LC 6B	0.06	0.76	0.72	2.00
	BK R6B	0.81	0.70	0.61	

** R5 investigated by FCC and found to be foaming & silted at base. April & May levels therefore represent presence of foam, while April indicates the actual leachate level.

- 4.2.3 The leachate level exceeded the EP limit in R5 throughout the review period, as observed in the previous review period. FCC investigated the condition of this well and in an email to Alison Soper of Natural Resources Wales dated 12th June 2015, confirmed that the leachate measurements prior to June 2015 were affected by the presence of foam within the well. As a result, the June leachate level provides a more accurate representation of the leachate level in R5. The leachate level at this well did not exceed the surrounding groundwater level.

4.2.4 Leachate level within R1B was very slightly above the EP Limit in April at 2.01 m above the cell base.

4.2.5 Leachate levels at all other locations remained below their respective trigger limits throughout the review.

4.3 Leachate Quality

4.3.1 The concentrations of most parameters in LC1B, LC2B and LC4B remained similar to those recorded in the previous quarter.

4.3.2 Highest concentrations of key leachate parameters were recorded in LC5 and LC6 and had similar concentrations compared to the previous quarter. These results are consistent with strongest leachate being present in the most recently completed cells 5 and 6.

4.3.3 A continued decrease in the concentrations of ammoniacal nitrogen, chloride, and COD since the last quarter was observed in LC3.

4.4 Final Discharge to Sewer

4.4.1 The pH and the concentrations of suspended solids and metals (copper, lead, nickel and zinc) remained compliant during this quarter (See Table 2 in Appendix 3).

4.4.2 The ammoniacal nitrogen limit of 50 mg/l was exceeded on three occasions, with a maximum of 65.4 mg/l detected on the 30th of April.

4.4.3 The COD consent level of 1000 mg/l was exceeded throughout review period. The highest concentration, 4310 mg/l, was recorded on the 3rd of June.

5.0 SURFACE WATER

5.1 Introduction

- 5.1.1 Surface water samples are routinely taken from three locations, SW2, P2 and P4. Water flows in a northerly direction alongside the outside perimeter fence of the western boundary of the site and accumulates in a pond at SW2 before slowly seeping through a man made underground bypass drain which runs along the outside of the site towards the northern boundary. P2 is a pond to the west, which collects surface water run-off from the landfill. P4 is located in a field to the north west of the site, beyond landfill gas monitoring borehole BH10.
- 5.1.2 As agreed with NRW, water in P2 is only sampled when there is the likelihood of an overflow to the discharge point². The chemical quality data for surface water is presented in Appendix 4.
- 5.1.3 Collected samples were analysed for the range of determinants listed below:

Ammoniacal nitrogen, chloride, chemical oxygen demand (COD), pH and total suspended solids

- 5.1.4 In the EP, Table S4.3 requires that only location P2 be controlled by chemical quality limits. Monitoring locations are shown on Drawing 1902.EMP.01, enclosed. A summary of the laboratory analysis data is included in Appendix 4.

5.2 Surface Water Quality

- 5.2.1 Water quality at P4 was comparable to the long-term trends for water quality at this location. Chloride concentration increased slightly in June, while COD, pH and suspended solids decreased. Ammoniacal nitrogen concentration remained stable at 0.6 mg/l at P4.
- 5.2.2 Surface water samples were collected at locations SW2 in April and May only.
- 5.2.3 P2 was only sampled in April. Ammoniacal nitrogen concentration exceeded the EP limit (1.6 mg/l) at P2 at 3.1 mg/l. COD also exceeded the EP limit (100 mg/l) at a concentration of 594 mg/l. Suspended solid concentration was also above the EP limit (100 mg/l) at 1550 mg/l.

² E-mail correspondence, 14.07.2014, Alison Soper (NRW) to Phil Mulhall (FCC).

6.0 DUST

6.1 Introduction

- 6.1.1 Dust monitoring was undertaken between the 02/06/2015 to the 02/07/2015 in this quarter as required by the EP.
- 6.1.2 Location 1 was located on bund by leachate storage tanks and opposite the transfer pad. Location 2 was on the site perimeter. Location 3 was in Oaks Farm.

6.2 Dust Results

- 6.2.1 Dust monitoring results are shown in Table 4 below:

Table 4: Results from dust monitoring at Brookhill

Monitoring Locations	Total Suspended Solids	Result	Trigger Level
	(mg/l)	(mg/m ² /day)	(mg/m ² /day)
Location 1	49	40	200
Location 2	200	165	200
Location 3	No data	No data	200

- 6.2.2 Deposited dust concentrations were below the EP trigger level at locations 1 and 2 during this period.
- 6.2.3 The dust gauge at Location 3 had been knocked over and the sample bottle had been destroyed. It is thought that this was due to farming activities in the vicinity.

7.0 CONCLUSIONS

7.1 Landfill Gas

- 7.1.1 Landfill gas concentration was monitored at locations around the site perimeter on a weekly basis. During this review period, none of the monitored perimeter gas boreholes were in breach of their respective methane or carbon dioxide EP limits.
- 7.1.2 During this review period methane concentrations remained below the instrumental detection limit of 0.1 % in many of the boreholes on site. The highest concentrations were, as expected, in BH8 and BH9 where average concentrations of 28.9 % and 27.4 % respectively were recorded. These boreholes therefore have individually set EP limits, which were not exceeded during this review period.
- 7.1.3 The maximum carbon dioxide concentration was 3.3 % recorded in BH20.

7.2 Groundwater

- 7.2.1 The results indicate that groundwater levels decreased around the site, reflecting the seasonal trend.
- 7.2.2 The EP limits for ammoniacal nitrogen and chloride were exceeded in GW2A, GW3A and GW4 throughout the review period.
- 7.2.3 Concentrations of the majority of parameters within the groundwater were highest in GW3A. The concentrations of most determinants were similar to those recorded in the previous quarter.

7.3 Leachate

- 7.3.1 Exceedances of the EP limit for leachate level was recorded in location R5 throughout the review period, although a decreasing trend is noted. The leachate level within R1B was slightly above the EP limit in April, but below the EP limit for the remainder of the review period. Leachate levels at all other locations remained below their respective trigger limits throughout the review.
- 7.3.2 Highest concentrations of key leachate parameters were recorded in LC5 and LC6 and had similar concentrations compared to the previous quarter. These results are consistent with strongest leachate being present in the most recently completed cells 5 and 6.
- 7.3.3 A decrease in the concentrations of ammoniacal nitrogen, chloride, and COD since the last quarter was observed in LC3.

7.3.4 Chemical analysis of the final discharge from the leachate treatment plant showed that two consent limits were exceeded during this review period, those for ammoniacal nitrogen and COD.

7.3.5 All chromium, copper, lead, nickel, pH, suspended solids and zinc concentrations in the final discharge remained below the respective consent limits.

7.4 Surface Water

7.4.1 EP limits for ammoniacal nitrogen, COD and suspended solids were exceeded at P2 in April. No samples were collected in May or June as there was no likelihood of an overflow to the discharge point.

7.4.2 Water quality at P4 was comparable to the long-term trends for water quality at this location.

7.5 Dust

7.5.1 Deposited dust concentrations were below the EP limit at locations 1 and 2 during this period. The gauge at location 3 was damaged by farming activity.



- NOTES
1. SURVEY INFORMATION PROVIDED BY SOUTH STAFFS SURVEYS, TITLE: UPDATE SURVEY, REF: 4839a.dwg, DATE: 08.02.2008.
- LEGEND
- GAS BOREHOLE
 - GAS EXTRACTION WELL
 - GROUND WATER MONITORING BOREHOLE
 - LEACHATE WELL
 - SURFACE WATER MONITORING POINT
 - COAL VENT
 - LEACHATE MONITORING POINT

REV	MODIFICATIONS	BY	CH	AP	DATE
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BROOKHILL LANDFILL SITE

ENVIRONMENTAL MONITORING PLAN

DRAWN BY	AS	DATE	23.07.2010
CHECKED BY	JM	SCALE @ A1	1:750
APPROVED BY	XX	ISSUE	Dr
		REVISION	-

DRAWING NUMBER 1140.EMP.01



APPENDIX 1 – LANDFILL GAS

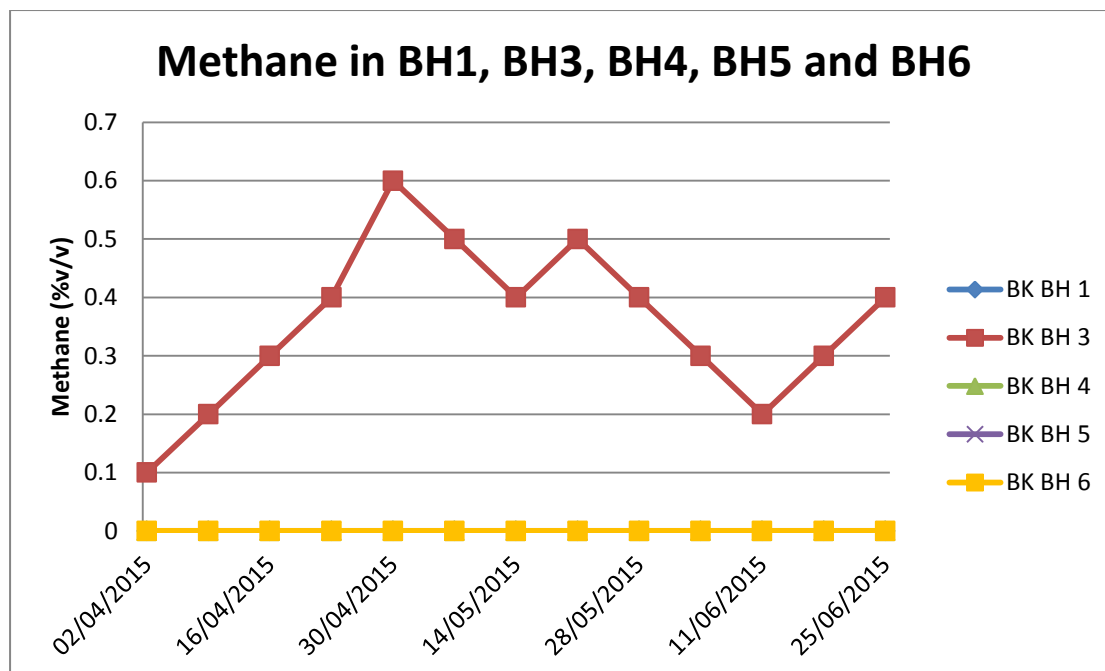
Table 1: Perimeter Landfill Gas Monitoring Data Summary

Location	Data	CH4 (%v/v)	Trigger (%v/v)	CO2 (%v/v)	Trigger (%v/v)
BK BH 1	Min	0.00	1	0.70	8.8
	Max	0.00		1.40	
	Average	0.00		1.17	
	Count	13		13	
BK BH 3	Min	0.10	1	0.50	3.1
	Max	0.60		1.00	
	Average	0.35		0.76	
	Count	13		13	
BK BH 4	Min	0.00	1	1.00	5.1
	Max	0.00		1.50	
	Average	0.00		1.22	
	Count	13		13	
BK BH 5	Min	0.00	1	0.60	1.5
	Max	0.00		1.40	
	Average	0.00		0.92	
	Count	13		13	
BK BH 6	Min	0.00	1	0.50	1.5
	Max	0.00		1.20	
	Average	0.00		0.93	
	Count	13		13	
BK BH 7	Min	0.00	1	0.50	10
	Max	0.00		1.40	
	Average	0.00		0.97	
	Count	13		13	
BK BH 8	Min	28.10	32.2	0.60	3.6
	Max	29.80		1.40	
	Average	28.88		0.97	
	Count	13		13	
BK BH 9	Min	26.40	29.6	0.80	10.4
	Max	28.10		1.60	
	Average	27.42		1.26	
	Count	13		13	
BK BH 10	Min	0.00	1	0.80	3.9
	Max	0.00		2.00	
	Average	0.00		1.24	
	Count	13		13	
BK BH 11	Min	0.00	1	0.60	6.5
	Max	0.00		2.30	
	Average	0.00		1.46	
	Count	13		13	
BK BH 12	Min	0.00	1	0.90	6.6
	Max	0.00		2.20	
	Average	0.00		1.45	
	Count	13		13	
BK BH 13	Min	0.00	1	1.00	9.4
	Max	0.00		2.00	
	Average	0.00		1.42	
	Count	13		13	

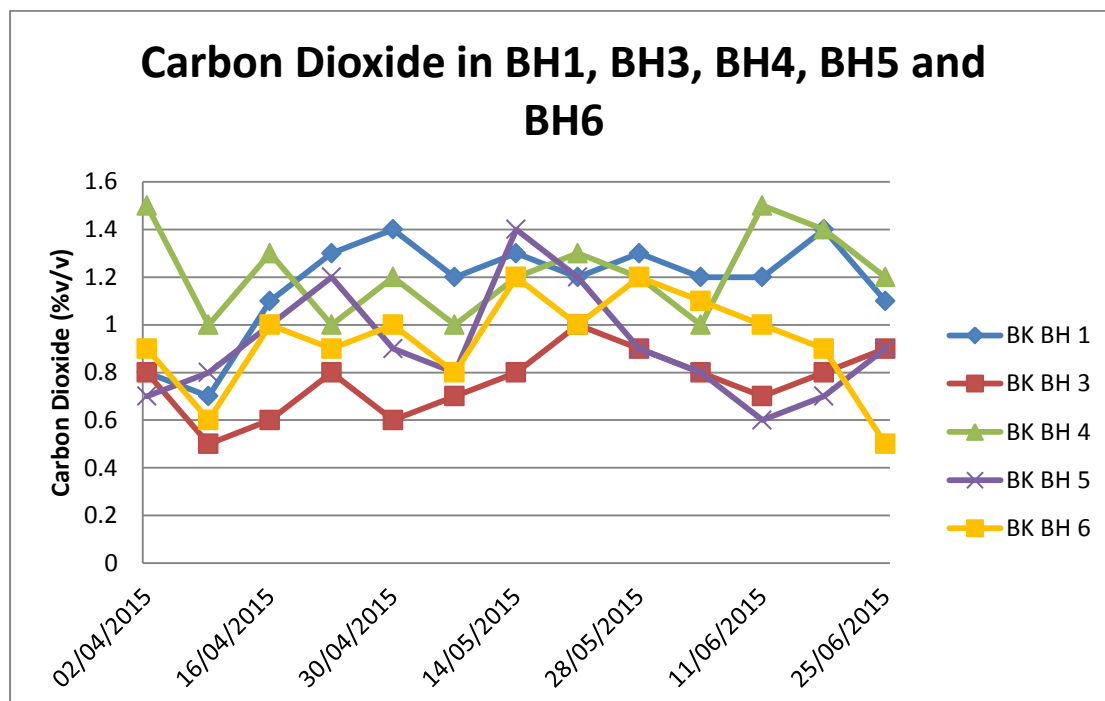
APPENDIX 1 – LANDFILL GAS

Location	Data	CH4 (%v/v)	Trigger (%v/v)	CO2 (%v/v)	Trigger (%v/v)
BK BH 14	Min	0.00	1	1.00	3.5
	Max	0.00		1.70	
	Average	0.00		1.33	
	Count	13		13	
BK BH 15	Min	0.00	1	0.90	17.6
	Max	0.00		1.50	
	Average	0.00		1.22	
	Count	13		13	
BK BH 16	Min	0.00	1	1.00	11.4
	Max	0.00		2.60	
	Average	0.00		1.66	
	Count	13		13	
BK BH 17	Min	0.20	1	1.10	12.9
	Max	0.60		2.10	
	Average	0.35		1.50	
	Count	13		13	
BK BH 18	Min	0.10	6.8	1.10	21.2
	Max	0.70		1.90	
	Average	0.37		1.51	
	Count	13		13	
BK BH 19	Min	0.00	1	2.00	11.2
	Max	0.00		3.20	
	Average	0.00		2.36	
	Count	13		13	
BK BH 20	Min	0.20	1	1.00	17.6
	Max	0.80		3.30	
	Average	0.42		2.29	
	Count	13		13	
BK BH 21	Min	0.20	1	1.00	11.4
	Max	0.70		1.90	
	Average	0.47		1.30	
	Count	13		13	
BK BH 23	Min	0.00	1	1.00	7.3
	Max	0.00		1.60	
	Average	0.00		1.23	
	Count	13		13	
BK BH 24	Min	0.00	1	0.60	1.5
	Max	0.00		1.20	
	Average	0.00		0.81	
	Count	13		13	
BK BH 25	Min	0.00	1	1.00	9.9
	Max	0.00		1.50	
	Average	0.00		1.19	
	Count	13		13	

APPENDIX 1 – LANDFILL GAS

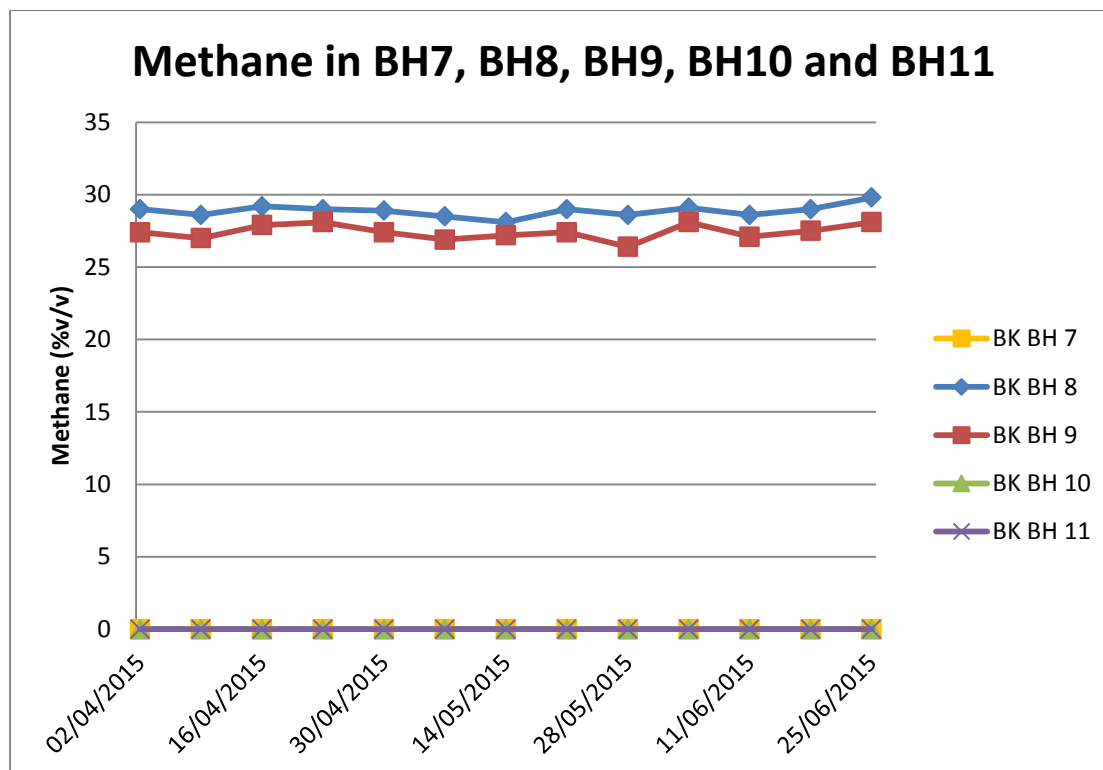


Graph 1: Methane in BH1, BH3, BH4, BH5 and BH6

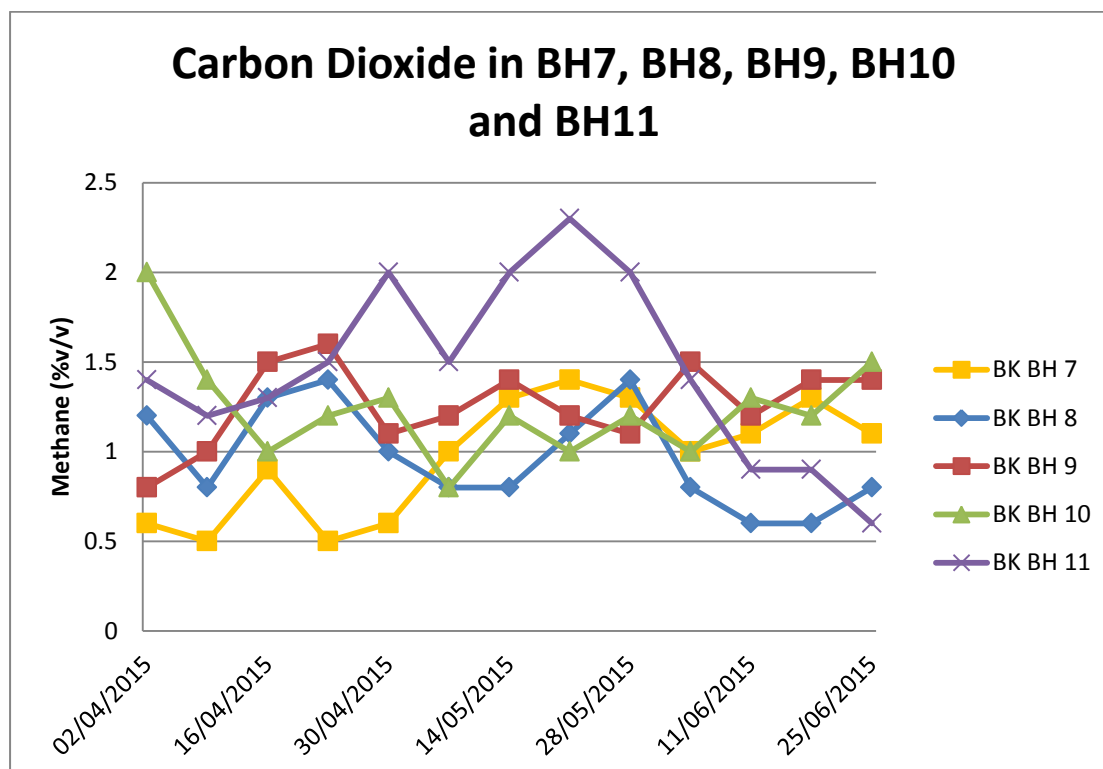


Graph 2: Gas: Carbon dioxide in BH1, BH3, BH4, BH5 and BH6

APPENDIX 1 – LANDFILL GAS

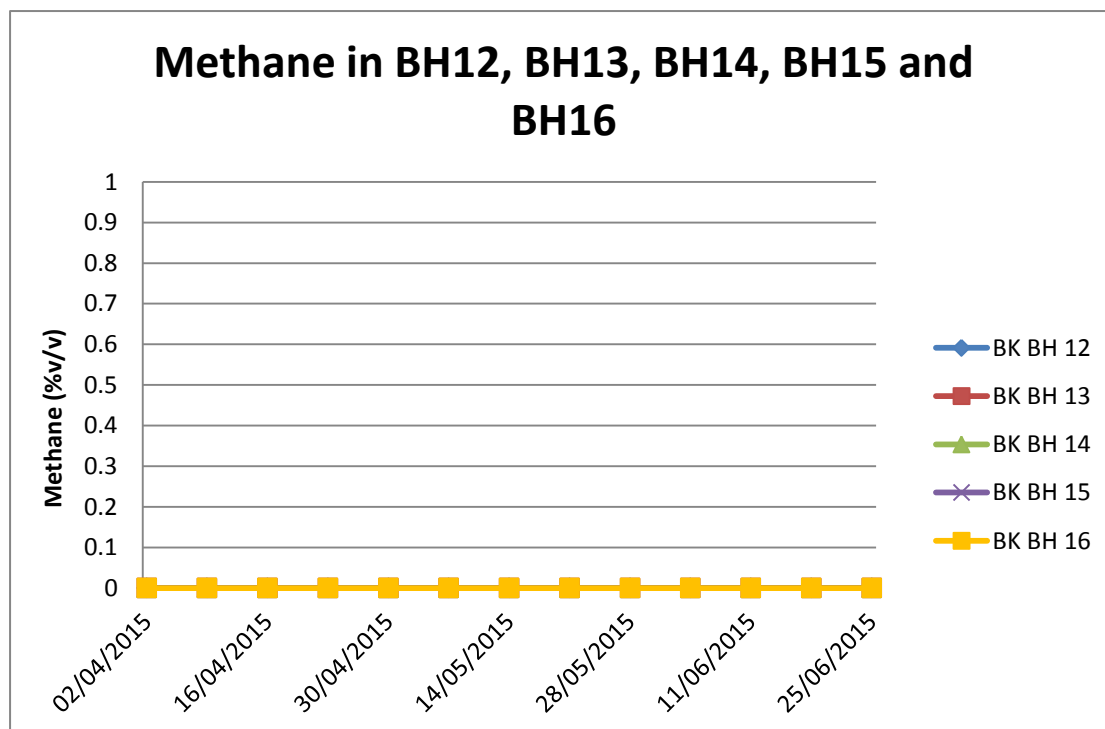


Graph 3: Methane in BH7, BH8, BH9, BH10 and BH11

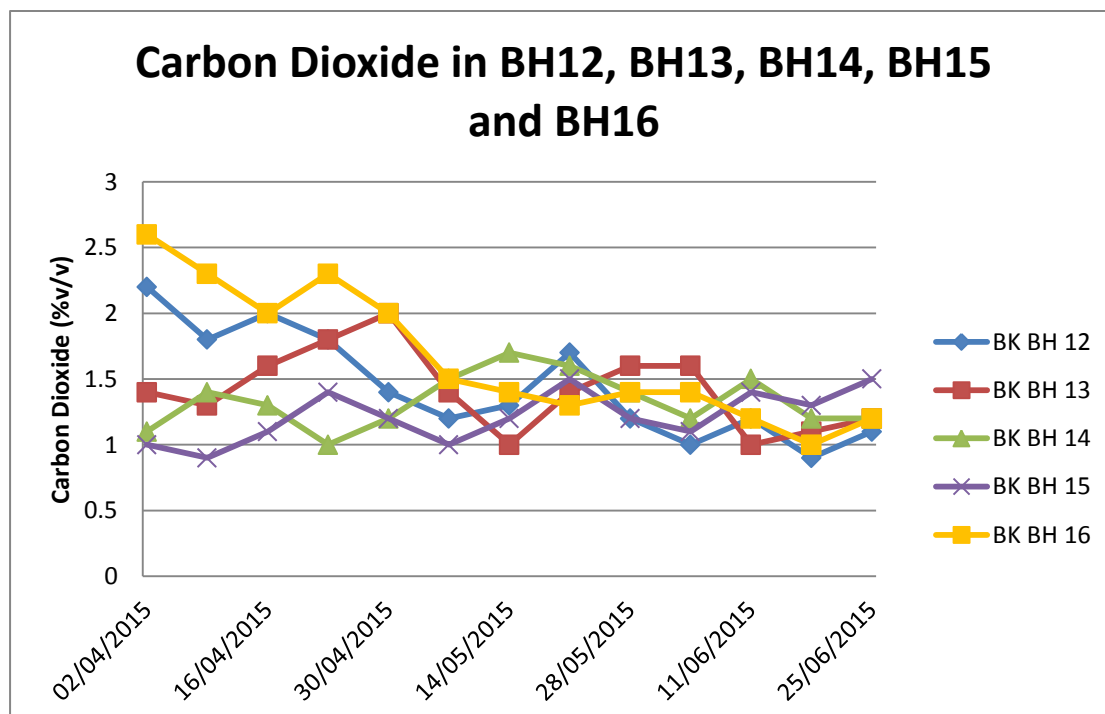


Graph 4: Carbon dioxide in BH7, BH8, BH9, BH10 and BH11

APPENDIX 1 – LANDFILL GAS

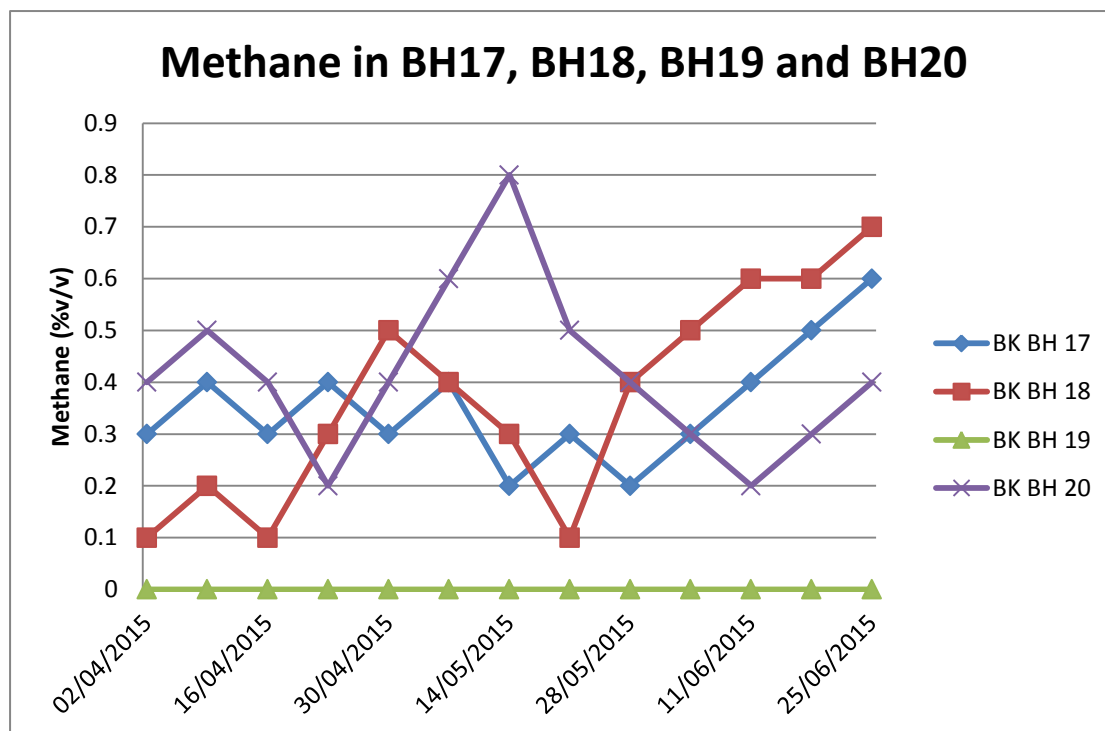


Graph 5: Methane in BH12, BH13, BH14, BH15 and BH16

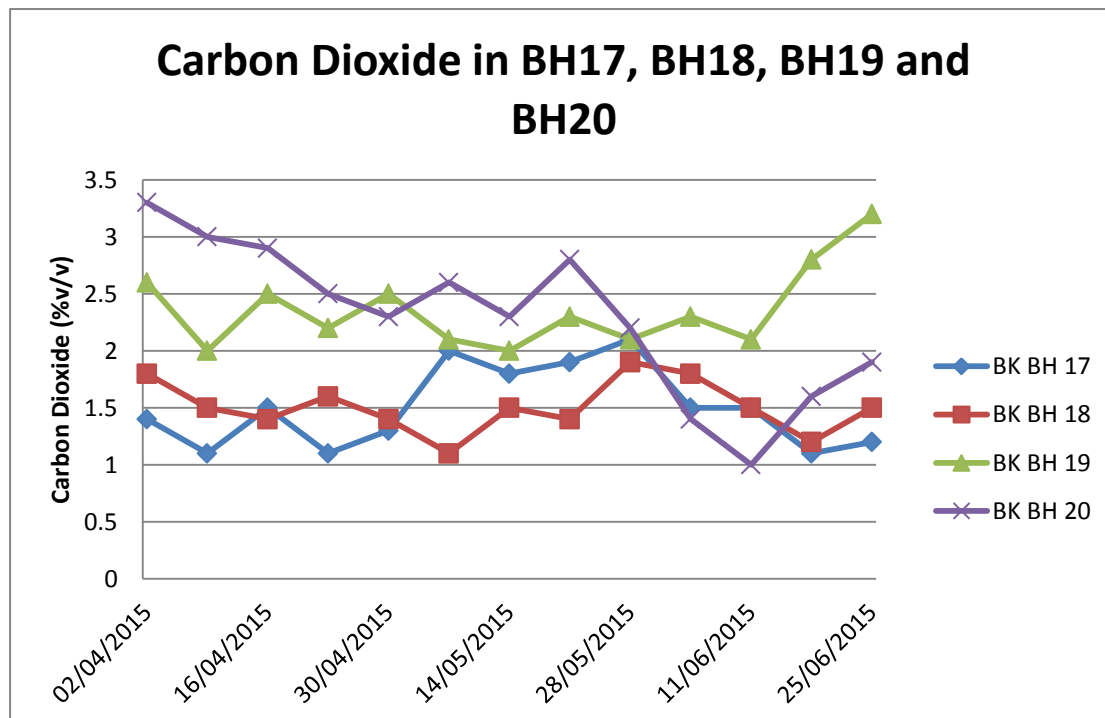


Graph 6: Carbon dioxide in BH12, BH13, BH14, BH15 and BH16

APPENDIX 1 – LANDFILL GAS

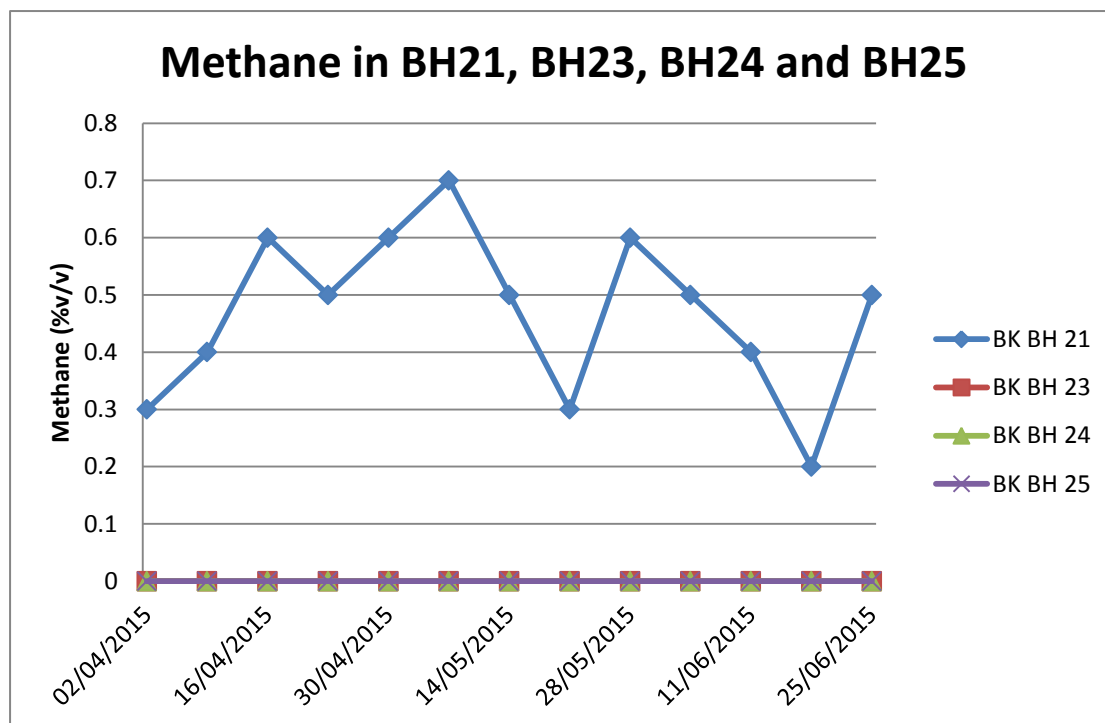


Graph 7: Methane in BH17, BH18, BH19 and BH20

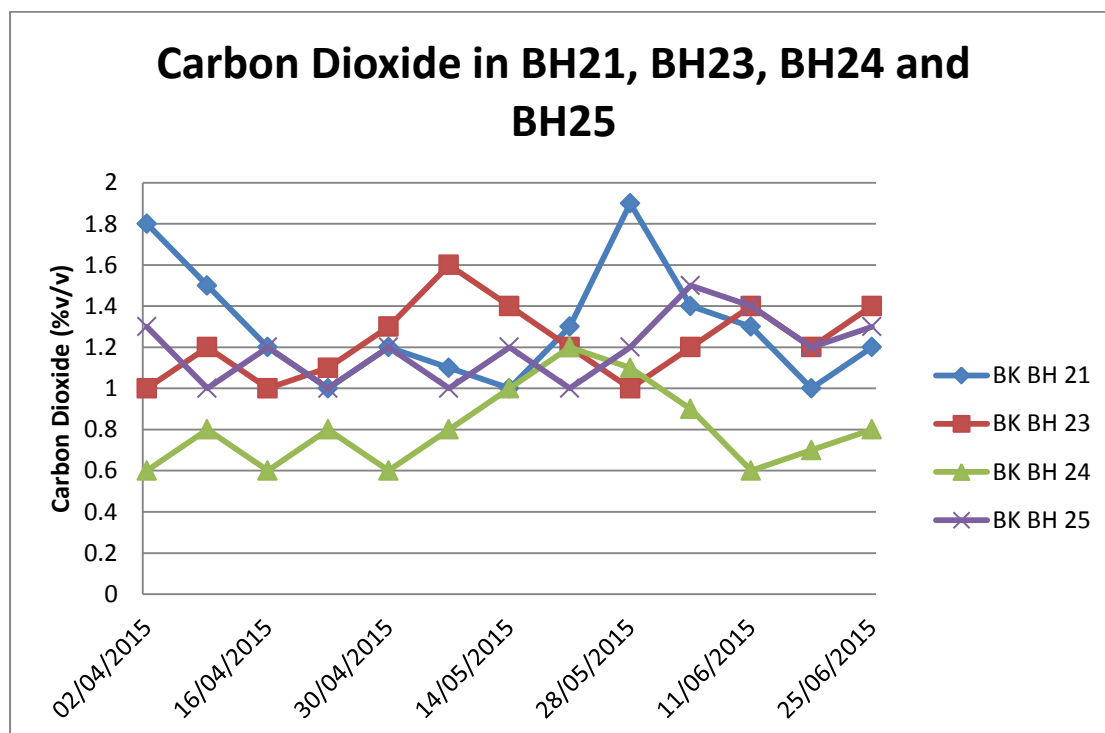


Graph 8: Carbon dioxide in BH17, BH18, BH19 and BH20

APPENDIX 1 – LANDFILL GAS



Graph 9: Methane in BH21, BH23, BH24 and BH25



Graph 10: Carbon dioxide in BH21, BH23, BH24 and BH25

APPENDIX 1 – LANDFILL GAS

Table 2: In waste landfill gas monitoring data summary

Monitoring Point	Date	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	H2S (ppm)
B+C	06/04/2015	51.2	28.9	0.2	19.7	6	18
	11/05/2015	50.2	27.4	0.3	22.1	8	18
	07/07/2015	48.8	22.5	0.5	28.2	9	16
	08/07/2015	51.3	25.8	0.5	22.4	10	16
Flare	06/04/2015	48.5	29.9	1.3	20.3	6	11
	06/04/2015	49	32.5	1.1	17.4	6	12
	11/05/2015	45.2	27.5	1.6	25.7	7	9
	11/05/2015	48.2	31.8	1.2	18.8	7	11
	07/07/2015	43.2	23.6	2	31.2	8	7
	07/07/2015	46.2	29.9	1	22.9	3	3
	08/07/2015	43.6	28.2	1.8	26.4	8	10
	08/07/2015	46.5	29.8	1.3	22.4	6	8
GV / LC3.1 + LC3	06/04/2015	28.5	26.9	9.2	35.4	5	6
	11/05/2015	26.4	26.9	9.2	37.5	6	8
	07/07/2015	28.7	25.5	6.9	38.9	8	10
	08/07/2015	27.5	22.3	8.5	41.7	5	7
GV 2.1	06/04/2015	50.3	34.5	0.4	14.8	7	5
	11/05/2015	49.3	33.2	0.6	16.9	8	6
	07/07/2015	50.2	31.2	0.8	17.8	7	5
	08/07/2015	50.9	32.5	0.7	15.9	6	8
GV 2.2+ LC2B	06/04/2015	31.2	28.9	8	31.9	12	9
	11/05/2015	29.9	28.9	8	33.2	13	10
	07/07/2015	30.2	26.7	7.2	35.9	14	3
	08/07/2015	30.2	24.1	7.2	38.5	14	11
GV 22	06/04/2015	0.2	1.7	19	79.1	0	0
	11/05/2015	0.2	1.7	19	79.1	0	0
GV 22 + LC6B	07/07/2015	0	2.3	18.4	79.3	0	0
	08/07/2015	0.6	1.2	19.6	78.6	0	0
GV 26	07/07/2015	50	32.8	1.1	16.1	7	27
	08/07/2015	48.9	32.5	1	17.6	10	42
GV 26+27	06/04/2015	50.9	35.4	0.2	13.5	8	50
	11/05/2015	51.2	33.6	0.9	14.3	10	45
GV 27+28	07/07/2015	51.2	30.9	0.3	17.6	8	32
	08/07/2015	51.2	30.9	0.8	17.1	8	31
GV 28+ 29	06/04/2015	51.5	33.9	0.4	14.2	5	40
	11/05/2015	52.2	32.5	0.7	14.6	9	35
GV1	06/04/2015	3	0.3	19.2	77.5	0	0
	11/05/2015	3.5	0.6	18.5	77.4	0	0
	07/07/2015	4.7	0.8	17.5	77	0	0
	08/07/2015	2.7	0.8	17.5	79	0	0
GV10	06/04/2015	52.3	22.7	0.6	24.4	12	0
	11/05/2015	51.2	21.4	0.2	27.2	13	0
	07/07/2015	45.6	22.8	1.1	30.5	19	0
	08/07/2015	49.9	22.5	1.1	26.5	11	0
GV11	06/04/2015	49.9	27.5	1.3	21.3	10	4
	11/05/2015	47.4	26.1	1.1	25.4	12	8
	07/07/2015	50.2	25.4	0.2	24.2	12	9
	08/07/2015	55.2	25.6	0.8	18.4	17	6
GV12+R3	06/04/2015	51.2	29.6	0.4	18.8	8	42
	11/05/2015	50.1	28.5	0.2	21.2	9	32
	07/07/2015	53.7	27.5	0.3	18.5	6	27
	08/07/2015	49.8	27.4	0.6	22.2	10	24
GV13	06/04/2015	2	2.5	18.5	77	12	0
	11/05/2015	2.3	2.9	17.4	77.4	11	0
	07/07/2015	3.6	4.5	16.5	75.4	13	0
	08/07/2015	4	3.2	16.5	76.3	5	0
GV14	06/04/2015	51.5	32.5	0.3	15.7	8	38
	11/05/2015	50.2	31.5	0.4	17.9	9	31
	07/07/2015	49.9	32.5	1	16.6	7	25
	08/07/2015	51.2	32.9	0.5	15.4	8	28

APPENDIX 1 – LANDFILL GAS

Monitoring Point	Date	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	H2S (ppm)
GV15	06/04/2015	53.6	30.5	0.6	15.3	14	27
	11/05/2015	51.4	29.9	0.2	18.5	12	21
	07/07/2015	53.2	27.4	0.6	18.8	11	19
	08/07/2015	52.3	30.8	0.3	16.6	10	18
GV16	06/04/2015	42.3	29.9	2	25.8	8	12
	11/05/2015	49.3	27.5	1.1	22.1	10	11
	07/07/2015	39.8	25.6	2.2	32.4	8	7
	08/07/2015	48.4	25.4	3	23.2	8	15
GV17+LC4	06/04/2015	40	30.5	4	25.5	6	15
	11/05/2015	42.2	30.8	3.5	23.5	7	14
	07/07/2015	38.4	27.5	3.1	31	9	11
	08/07/2015	35.5	29.9	3.2	31.4	6	16
GV18	06/04/2015	51.2	30.6	0.4	17.8	9	32
	11/05/2015	50.2	31.2	0.6	18	10	28
GV18 + 21	07/07/2015	52.3	31	0.4	16.3	13	25
	08/07/2015	51.2	31	0.5	17.3	18	21
GV19	06/04/2015	0.3	0.8	19.5	79.4	0	0
	11/05/2015	0.3	0.8	19.5	79.4	0	0
	07/07/2015	0.8	1.2	19.6	78.4	0	0
	08/07/2015	0.4	0.9	20.1	78.6	0	0
GV2	06/04/2015	54.9	30.2	0.3	14.6	6	29
	11/05/2015	53.3	28.4	0.2	18.1	7	25
	07/07/2015	47.5	26.8	1.2	24.5	9	22
	08/07/2015	52.1	28.9	0.3	18.7	6	24
GV20	06/04/2015	0.7	134	19.9	-54.6	0	0
	11/05/2015	0.7	34	19.9	45.4	0	0
	07/07/2015	0.6	31.4	19.4	48.6	0	0
	08/07/2015	1	31.5	21.3	46.2	0	0
GV23	06/04/2015	0.6	1.5	20	77.9	0	0
	11/05/2015	51.2	27.8	0.3	20.7	0	0
	07/07/2015	52.2	26.3	0.4	21.1	0	0
	08/07/2015	50.2	28.7	0.4	20.7	0	0
GV24	06/04/2015	53.4	33.5	0.6	12.5	14	8
	11/05/2015	52.4	34.8	0.6	12.2	12	8
	07/07/2015	51.4	32.8	0.4	15.4	14	9
	08/07/2015	51.9	33.5	0.9	13.7	13	6
GV25	06/04/2015	52.6	32.5	0.1	14.8	3	12
	11/05/2015	54.3	31.7	0.5	13.5	5	10
	07/07/2015	48.8	39.9	1	10.3	6	11
	08/07/2015	50.2	29.9	1	18.9	6	7
GV29+D	07/07/2015	52.9	35.6	0.5	11	9	14
	08/07/2015	52.7	35.4	0.4	11.5	11	15
GV3	06/04/2015	52.1	29.6	0.2	18.1	8	18
	11/05/2015	51.2	29.1	0.4	19.3	9	17
	07/07/2015	52.6	30.2	0.3	16.9	12	15
	08/07/2015	52.3	29.8	0.5	17.4	10	15
GV30	06/04/2015	49.6	30.6	0.3	19.5	19	22
	11/05/2015	50.2	32.5	0.5	16.8	18	16
	07/07/2015	45.2	31.8	0.6	22.4	9	14
	08/07/2015	48.6	27.8	1	22.6	17	14
GV31	06/04/2015	50.1	32.5	0.6	16.8	16	19
	11/05/2015	50.9	31.2	0.4	17.5	15	21
	07/07/2015	42.2	29.9	0.6	27.3	14	14
	08/07/2015	41.2	29.9	0.6	28.3	14	18
GV32	06/04/2015	47.5	25.1	1	26.4	7	12
	11/05/2015	46.2	23.6	1	29.2	8	14
	07/07/2015	48.9	21.3	0.3	29.5	7	13
	08/07/2015	48.9	22.2	0.3	28.6	8	11
GV33	06/04/2015	47	32.4	1.3	19.3	8	11
	11/05/2015	45.2	31.2	1.2	22.4	10	12
	07/07/2015	48.5	29.8	1.3	20.4	13	16
	08/07/2015	48.9	32.8	1.2	17.1	11	16

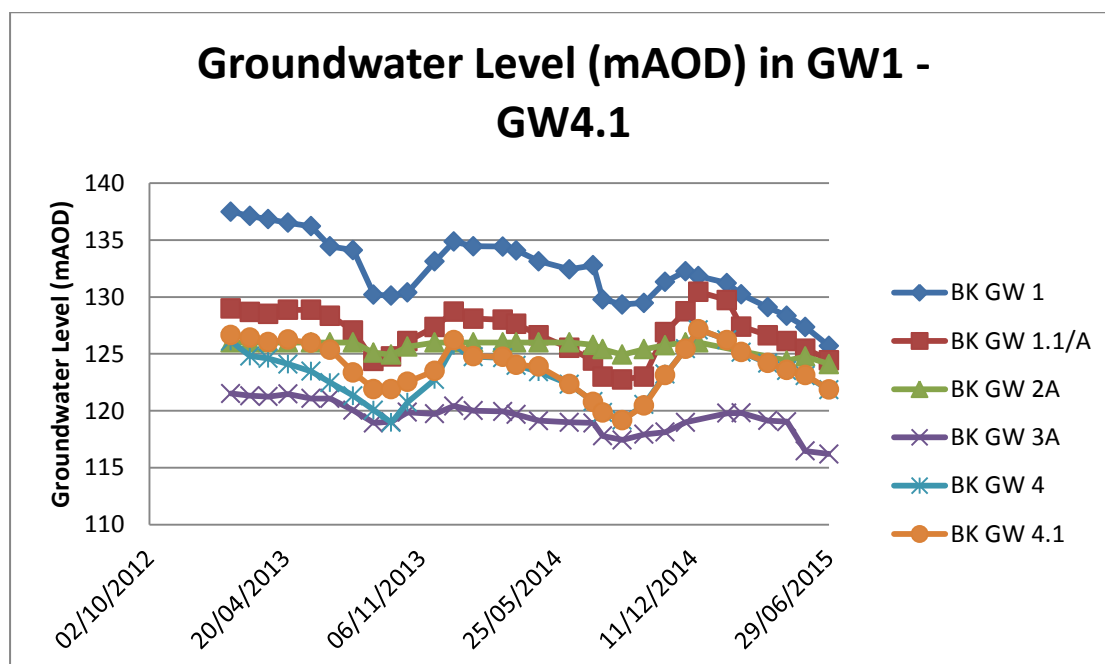
APPENDIX 1 – LANDFILL GAS

Monitoring Point	Date	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	H2S (ppm)
GV34	06/04/2015	49.9	3.08	1.1	45.92	14	16
	11/05/2015	52.3	29.8	0.8	17.1	12	15
	07/07/2015	40.3	25.4	0.2	34.1	9	22
	08/07/2015	40.2	25.5	0.6	33.7	13	12
GV4	06/04/2015	50.3	29.4	0.5	19.8	14	8
	11/05/2015	51.9	28.4	0.3	19.4	13	9
	07/07/2015	48.9	27.4	1.1	22.6	14	6
	08/07/2015	52.7	29.1	0.2	18	15	10
GV5+R1	06/04/2015	50.6	29.5	0.3	19.6	10	4
	11/05/2015	51.2	30.2	0.2	18.4	11	5
	07/07/2015	29.9	27.5	3.2	39.4	10	9
	08/07/2015	50.9	31.4	0.1	17.6	7	3
GV6	06/04/2015	52.6	28.9	0.4	18.1	5	2
	11/05/2015	53.9	29.9	0.6	15.6	7	6
	07/07/2015	51.8	27.4	0.5	20.3	8	7
	08/07/2015	52.6	28.5	0.6	18.3	6	5
GV7	06/04/2015	50.6	30.5	0.5	18.4	9	19
	11/05/2015	50.9	29.9	0.3	18.9	12	20
	07/07/2015	52.3	28.5	0.1	19.1	6	11
	08/07/2015	51.2	30.2	0.5	18.1	13	16
GV8	06/04/2015	48.9	29.8	1.4	19.9	8	15
	11/05/2015	48	29.5	1.2	21.3	7	16
	07/07/2015	39.6	26.5	3.4	30.5	8	15
	08/07/2015	47.5	30.2	1	21.3	5	19
GV9	06/04/2015	48.9	29.9	0.3	20.9	12	12
	11/05/2015	49.8	30.2	0.1	19.9	11	13
	07/07/2015	51.2	29.5	0.2	19.1	14	12
	08/07/2015	48.6	29.9	0.3	21.2	14	14
GV9.1	06/04/2015	2.4	3.2	19.2	75.2	6	0
	11/05/2015	2	2.6	19.9	75.5	7	0
	07/07/2015	2.5	3.6	20.1	73.8	8	0
	08/07/2015	2.3	3.6	19.6	74.5	8	0
GVA	06/04/2015	45.6	31.2	1.1	22.1	3	24
	11/05/2015	48.7	32.5	1.1	17.7	4	28
	07/07/2015	49.8	31.7	0.6	17.9	9	25
	08/07/2015	50	31.1	0.5	18.4	5	23
LC1.1	06/04/2015	38.1	23	5	33.9	10	10
	11/05/2015	36.7	21.4	4.8	37.1	9	11
	07/07/2015	31.9	20.3	5	42.8	12	7
	08/07/2015	35.6	22.4	3.9	38.1	10	12
LC1B	06/04/2015	33.6	20.5	6	39.9	9	7
	11/05/2015	32.5	19.9	5.5	42.1	7	8
	07/07/2015	31.8	20.1	4.5	43.6	8	2
	08/07/2015	31.2	19.6	4.5	44.7	8	4
LC2R?	06/04/2015	51.2	27.4	0.5	20.9	11	8
	11/05/2015	50.2	29.9	0.4	19.5	12	7
	07/07/2015	45.6	25.5	0.9	28	11	9
	08/07/2015	51.2	30.7	0.5	17.6	13	2
LC4B	06/04/2015	29.9	31.4	3.6	35.1	14	10
	11/05/2015	52.1	29.9	0.9	17.1	12	9
	07/07/2015	50.2	28.5	1.1	20.2	6	9
	08/07/2015						
LC5	06/04/2015	40.2	23.6	6.2	30	8	0
	11/05/2015	42.1	21.4	5.5	31	9	0
	07/07/2015	43.5	22.9	3.5	30.1	10	0
	08/07/2015	39.9	22.7	5.9	31.5	17	0
LC6	06/04/2015	35.6	22.9	5.9	35.6	10	0
	11/05/2015	39.9	23.5	6.9	29.7	9	0
	07/07/2015	40.8	21.8	4.9	32.5	8	0
	08/07/2015	35.1	22.5	7.1	35.3	8	0
LC6B	06/04/2015	50.2	39.9	0.2	9.7	14	19
LC6B + D	11/05/2015	51.2	40.2	0.3	8.3	13	16

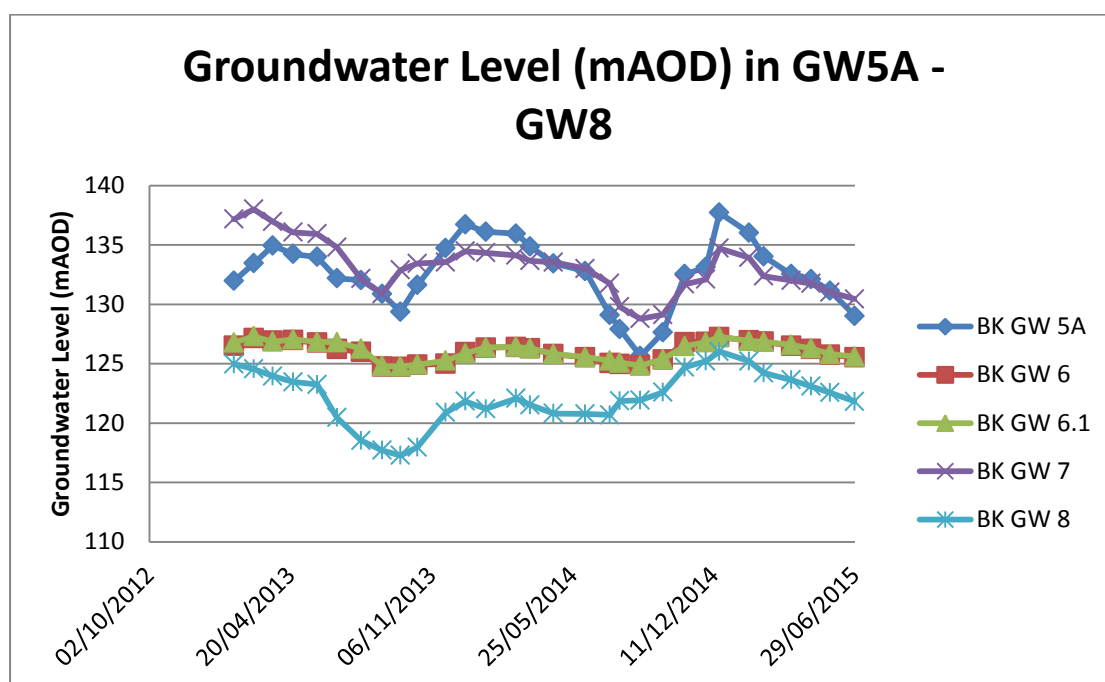
APPENDIX 1 – LANDFILL GAS

Monitoring Point	Date	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	H2S (ppm)
PW1	06/04/2015	0.1	0.9	20	79	9	0
	11/05/2015	0.3	2.1	19.9	77.7	10	0
	07/07/2015	0.6	1.8	16.9	80.7	16	0
	08/07/2015	0.5	3	20.1	76.4	6	0
PW2	06/04/2015	0.3	0.6	19.8	79.3	0	0
	11/05/2015	0.4	2.3	20.2	77.1	0	0
	07/07/2015	0.9	2	19.8	77.3	0	0
	08/07/2015	0.9	2.4	19.9	76.8	0	0
PW3	06/04/2015	0.9	1	19.5	78.6	8	0
	11/05/2015	2.3	1.5	19.4	76.8	7	0
	07/07/2015	1.5	2.5	16.8	79.2	6	0
	08/07/2015	1.1	1.56	20.1	77.24	6	0
PW4	06/04/2015	48.5	19.9	1.1	30.5	11	6
	11/05/2015	46.5	20.1	1	32.4	14	7
	07/07/2015	48.5	19.5	0.5	31.5	12	6
	08/07/2015	48.9	19.8	0.3	31	14	6
PW5	06/04/2015	34.5	19.6	8.5	37.4	9	9
	11/05/2015	33.2	20.1	7.9	38.8	11	10
	07/07/2015	30.2	19.8	6.5	43.5	7	9
	08/07/2015	34.5	19.6	6.5	39.4	10	9
PW6	06/04/2015	0.6	0.8	19.5	79.1	6	5
	11/05/2015	0.5	0.6	19.2	79.7	9	6
	07/07/2015	0.6	0.9	16.8	81.7	8	6
	08/07/2015	0.8	0.5	19.5	79.2	8	7
R1B	11/05/2015	49.9	29.6	1.1	19.4	9	7
	07/07/2015	42.1	25.5	0.9	31.5	10	8
	08/07/2015	48.6	26.7	1.2	23.5	10	5
R2B	11/05/2015	50.2	27.8	1	21	9	6
	07/07/2015	42.3	25.7	0.9	31.1	7	5
	08/07/2015	49.1	25.4	1	24.5	7	5
R4B	06/04/2015	26.4	25.4	7.4	40.8	19	0
	11/05/2015	29.9	21.4	6.9	41.8	14	0
	07/07/2015	48.2	20.3	1.2	30.3	13	0
	08/07/2015	45.6	22.5	1	30.9	15	0

APPENDIX 2 - GROUNDWATER



Graph 1: Groundwater level as mAOD at locations GW1 – GW4.1



Graph 2: Groundwater level as mAOD at locations GW5 – GW8

APPENDIX 2 - GROUNDWATER

Table 1: Monthly monitoring data (exceedances highlighted)

Location	Parameter	Ammoniacal Nitrogen	Chloride	Conductivity	Dissolved Oxygen	pH
	Units	mg/l as N	mg/l	mS/cm	mg/l	pH Units
GW1	02/06/2015	4.5	143	3.69	3.13	7.52
	29/06/2015	17.2	256	2.43	1.09	6.76
GW1.1	30/04/2015	7.6	230	1.58	<0.3	6.46
	02/06/2015	2.3	138	1.55	<0.3	6.82
	29/06/2015	4.7	216	1.36	<0.3	6.29
GW2A	Trigger	1.7	60	N/A	N/A	N/A
	30/04/2015	5.4	111.0	1.36	<0.3	7.07
	02/06/2015	5.8	112.0	1.39	<0.3	7.26
	25/06/2015	7.9	126.0	1.44	<0.3	7.48
GW3A	Trigger	1.7	60	N/A	N/A	N/A
	30/04/2015	59.9	164	1.90	<0.3	7.20
	02/06/2015	2.5	73	1.12	<0.3	7.83
	25/06/2015	132.0	390	3.38	<0.3	7.41
GW4	Trigger	1.7	60	N/A	N/A	N/A
	30/04/2015	18.4	93	0.75	<0.3	6.89
	02/06/2015	15.1	115	0.94	<0.3	7.21
	29/06/2015	13.1	128	0.00	<0.3	6.69

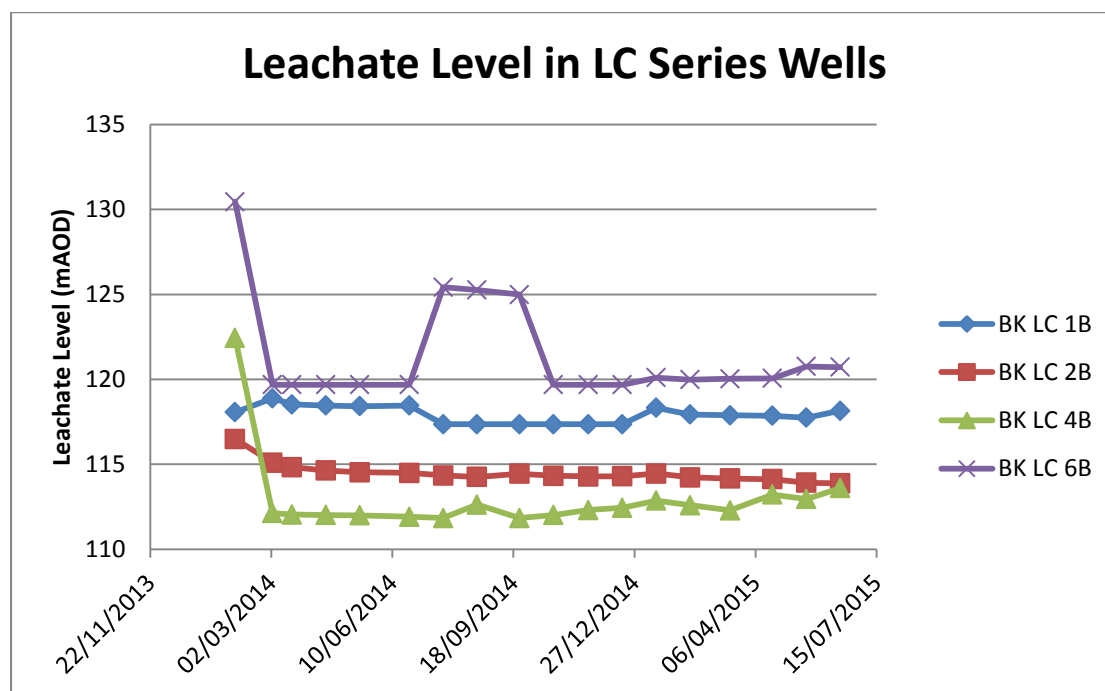
Location	Parameter	Ammoniacal Nitrogen	Chloride	Conductivity	Dissolved Oxygen	pH
	Units	mg/l as N	mg/l	mS/cm	mg/l	pH Units
GW5A	30/04/2015	2.7	104	0.92	0.81	7.06
	02/06/2015	3.1	99	0.98	<0.3	7.24
	29/06/2015	2.66	100	0.00	<0.3	6.64
GW6	30/04/2015	0.25	31	0.75	4.23	7.76
	02/06/2015	0.28	30	0.77	2.16	7.84
	25/06/2015	0.3	34	0.78	1.48	7.66
GW7	30/04/2015	2.9	132	0.70	2.70	7.78
	02/06/2015	3.3	125	0.72	1.61	8.14
	29/06/2015	3.1	125	0.69	2.37	7.77
GW8	30/04/2015	19.4	166	1.49	0.93	7.19
	02/06/2015	13.4	121	1.29	2.17	7.90
	29/06/2015	19.3	151	0.00	2.84	6.74

APPENDIX 2 - GROUNDWATER

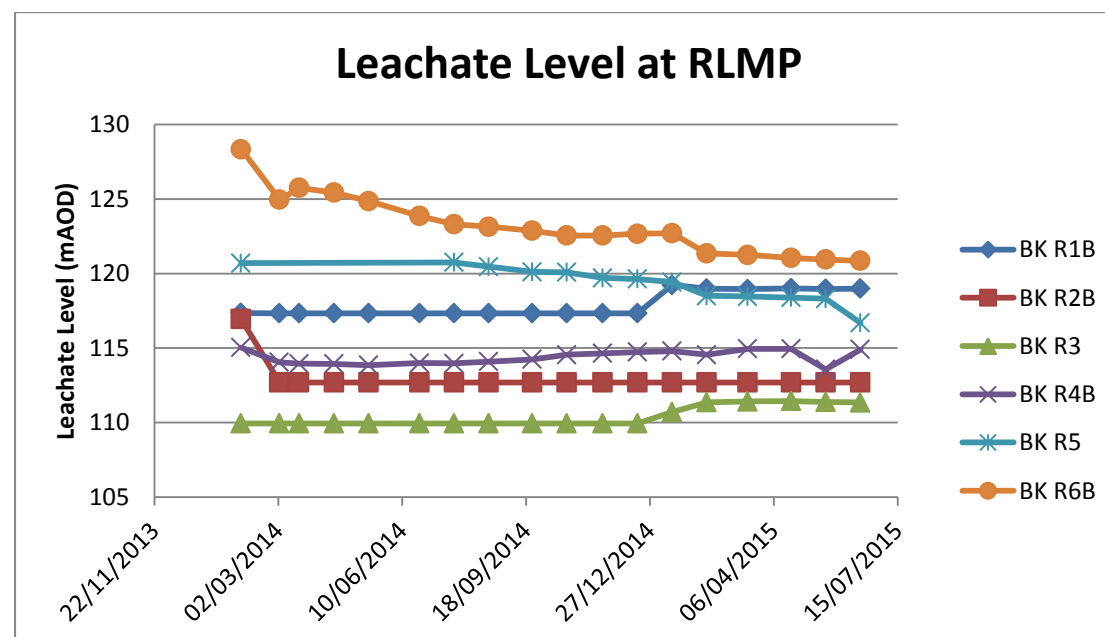
Table 2: Quarterly monitoring data (exceedances highlighted)

Sample Description		GW1	GW1.1	GW2A	GW3A	GW4	GW5A	GW6	GW7	GW8	Trigger Level
Date Sampled		29/06/15	29/06/15	29/06/15	29/06/15	29/06/15	29/06/15	29/06/15	29/06/15	29/06/15	
Carbon											
Organic Carbon, Total	mg/l	34	15.4	9.35	68.9	13.2	5.4	4.92	3.89	12	
Inorganics											
Alkalinity, Total as CaCO ₃	mg/l	837	156	605	1140	309	305	325	206	479	
Ammoniacal Nitrogen as N	mg/l	17.2	4.7	7.9	132	13.1	2.66	0.266	3.05	19.3	1.7
BOD, unfiltered	mg/l	-	-	4.91	146	-	-	<1	-	-	
Chloride	mg/l	256	216	126	390	128	100	33.8	125	151	60
COD, unfiltered	mg/l	213	103	174	554	53.1	19.4	27.9	22.6	41.1	
Conductivity @ 20 deg.C	mS/cm	2.430	1.360	1.440	3.380	0.964	0.915	0.780	0.692	1.430	
Oxygen, dissolved	mg/l	1.1	<0.3	<0.3	<0.3	<0.3	<0.3	1.5	2.4	2.8	
pH	pH Units	6.8	6.3	7.5	7.4	6.7	6.6	7.7	7.8	6.7	
Sulphate	mg/l	415	285	169	848	62	83	93	1	161	
Total Oxidised Nitrogen as N	mg/l	3.65	<0.01	6.99	0.63	<0.01	0.02	3.46	<0.01	0.48	
Filtered (Dissolved) Metals											
Cadmium (diss.filt)	mg/l	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Calcium (diss.filt)	mg/l	349.0	104.0	172.0	225.0	79.6	93.1	94.3	23.1	115.0	
Chromium (diss.filt)	mg/l	0.0121	0.0032	0.0042	0.0077	0.0041	0.0038	0.0016	0.0011	0.0073	
Copper (diss.filt)	mg/l	0.0031	0.00132	0.000922	0.002	<0.00085	<0.00085	0.00268	<0.00085	0.00111	
Iron (diss.filt)	mg/l	0.896	84.800	<0.019	6.800	9.430	8.930	<0.019	0.060	0.036	
Lead (diss.filt)	mg/l	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.000026	<0.00002	
Magnesium (diss.filt)	mg/l	69.2	48.7	39.4	76.4	30.9	34.5	29.6	30.7	40.5	
Manganese (diss.filt)	mg/l	4.770	9.340	8.450	2.930	2.230	0.708	0.005	0.183	0.413	
Nickel (diss.filt)	mg/l	0.043	0.040	0.016	0.097	0.022	0.007	0.004	0.001	0.036	0.15
Potassium (diss.filt)	mg/l	82.7	14.2	29.7	66.3	25.8	16.6	18.3	23.4	38.8	
Sodium (diss.filt)	mg/l	120	69.8	61.2	191	63	51.5	21	69.8	123	
Zinc (diss.filt)	mg/l	0.034	0.003	0.006	0.003	0.002	0.001	0.007	0.002	0.003	0.254
TPH Criteria Working Group (TPH CWG)											
Sum of detected Xylenes	mg/l	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	0.011
Toluene	mg/l	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.004

APPENDIX 3



Graph 1: Leachate Levels as mAOD at LC Series Wells (Jan 2014 – Jun 2015)



Graph 2: Leachate Levels as mAOD at Remote Leachate Monitoring Points (Jan 2014 – Jun 2015)

APPENDIX 3

Table 1: Quarterly monitoring data from leachate chambers

Parameters	Units	LC1B	LC2B	LC3	LC4B	LC5	LC6
Carbon							
Organic Carbon, Total	mg/l	763	916	102	1280	6130	6700
Inorganics							
Alkalinity, Total as CaCO₃	mg/l	8180	8980	2380	10400	12500	12800
Ammoniacal Nitrogen as N	mg/l	1630	1870	320	2060	3260	2960
BOD, unfiltered	mg/l	113	143	17.2	585	>2680	>5250
Chloride	mg/l	2140	2070	493	2980	3220	3260
COD, unfiltered	mg/l	2260	2520	335	4000	17600	17600
pH	pH Units	7.83	7.74	7.42	7.89	8.08	8.06
Sulphate	mg/l	42.4	38.8	26.8	38.6	25.7	25.9
Total Oxidised Nitrogen as N	mg/l	3.26	0.713	<0.01	0.13	3.31	3.34
Filtered (Dissolved) Metals							
Calcium (diss.filt)	mg/l	61.9	22.4	138	30.9	61.6	61.1
Magnesium (diss.filt)	mg/l	85.5	79.5	58.7	69.3	83	81.3
Potassium (diss.filt)	mg/l	711	869	151	791	1090	1080
Sodium (diss.filt)	mg/l	1500	1460	302	2270	3850	3740

APPENDIX 3

Table 2: Final Discharge (FD) monitoring data (exceedances highlighted)

Final Discharge	Alkalinity mg/l	Ammoniacal Nitrogen mg/l	Chromium mg/l	COD mg/l	Copper mg/l	Lead mg/l	Nickel mg/l	Nitrate as N mg/l	Nitrite as N mg/l	pH -	Suspended solids, Total mg/l	Zinc mg/l
Trigger	-	50	2	1000	2	2	2	-	-	>5<10	500	2
30/04/2015	894	65.4	-	1480	-	-	-	1820	<0.05	7.82	203	-
22/05/2015	795	60.5	0.0827	1500	0.0227	0.0276	0.21	1240	51.6	7.58	178	0.227
03/06/2015	915	48.2	-	4310	-	-	-	1070	26.4	7.87	406	-
12/06/2015	715	50.1	0.0703	1360	0.0161	0.026	0.199	1100	<0.5	7.37	219	0.252
19/06/2015	565	46.3	0.0861	1350	0.0198	0.0226	0.207	1010	7.29	7.59	192	0.179
26/06/2015	250	1.6	0.0988	1300	0.0244	0.0146	0.251	1070	<0.5	7.39	33	0.195

APPENDIX 4 – SURFACE WATER

Table 1: Monthly monitoring data

Location	Parameter	Ammoniacal N	Chloride	COD	pH	Suspended Solids
	Units	mg/l as N	mg/l	mg/l	pH Units	mg/l
P4	30/04/2015	0.6	84.4	247	7.7	139
	02/06/2015	0.6	84.4	247	7.7	139
	29/06/2015	0.6	92.4	149	7.3	96
SW2	30/04/2015	0.2	68.8	124	7.6	231
	02/06/2015	1.5	91.6	49	7.8	27
P2	30/04/2015	3.1	192.0	594	7.4	1550
P2 Limit		1.6	250.0	100	>6 <9	100

Flintshire County Council Deposited Dust Monitoring

Analysis of matter collected in atmospheric deposit gauge during the period of:

From: 02/06/2015 To: 02/07/2015
No. of days 30

Collector: MW

Gauge Bowl No. Location 1 OES1
Location 2 OES2
Location 3 OES3

Factor (mg deposit to mg/m²) 24.7

Monitoring Location	Sample Volume (ml)	Total Suspended Solids (mg/l)	mg/m ² /day
Location 1		49	40
Location 2		200	165
Location 3		0	0

Comments:

- Dust analysis carried out by SAL Laboratories, Manchester
- Algal growth noted in sample bottles, more prominent in Location 1 possibly due to greater exposure to sunlight?

Location 2 sample bottle had high suspended solids and algal growth

- Location 3 dust gauge knocked over and sample bottle destroyed (see photograph)

Location 1: Site Operations - located on bund by leachate storage tanks and opposite new transfer pad

Location 2: Industrial Estate Boundary - located on perimeter near leachate treatment plant

Location 3: Oaks Farm







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