



Hendy Quarry Landfill

Annual Report

Permit Reference BT1088ID

01 January 2020 to 31 December 2020

CONTENTS

1.0	<i>Introduction</i>	1
1.1	Background	1
1.2	Site Location and Surrounding Land-use	2
2.0	<i>Landfill Gas</i>	2
2.1	Introduction	2
2.2	Landfill Gas Data	3
3.0	<i>Groundwater</i>	3
3.1	Groundwater Levels	4
3.2	Groundwater Quality	4
4.0	<i>Surface Water</i>	4
5.0	<i>Annual Performance Data</i>	5
6.0	<i>Management improvements</i>	5
7.0	<i>Annual Topographical Surveys and Waste Volumes.</i>	5
7.1	Annual Topographical Survey	5
7.2	Annual Waste Volume	5
7.3	Settlement Behaviour	6
7.4	Remaining Void Capacity	6
8.0	<i>Compliance Testing</i>	6

APPENDICES

Appendix A: Drawings

Appendix B: Landfill Gas Data

Appendix C: Groundwater Data

1.0 Introduction

1.1 Background

This report has been compiled in compliance with condition 4.2.1 of the Environmental Permit EPR/BT1088ID for Hendy Quarry Landfill.

The Permit was originally issued to Tarmac on 17 September 2002. The EP was varied by Tarmac in December 2005 in order to remove a daily limit for the importation of waste. A further variation reference XP3933MR was issued on 22 June 2007 by the Environment Agency to introduce the standard Permit template and conditions for landfills, combine the separate discharge consent into the single permit, introduce trigger levels for groundwater and increase the monitoring frequency.

As a result of changes to the conditions of the new EP, Tarmac submitted an application to vary the Permit further to revise the groundwater trigger levels, and also to increase the annual permitted tonnage from 200,000t to 450,000t. Before the trigger levels could be amended, Tarmac installed a further 8 perimeter monitoring boreholes at the request of the Environment Agency. The monitoring frequency of groundwater at the site was increased to obtain enough data for a detailed review of the hydrogeology to be undertaken. The independent hydrogeological assessment identified contaminants in the groundwater which were arising from an up-stream source. As a result of this contamination in the locality, the site could not comply with groundwater trigger levels, even in up-stream boreholes. This was accepted by the Environment Agency following extensive investigation and sampling and a varied EP establishing revised site trigger levels was issued on 09 October 2009, reference PP3738XM. The varied Permit contained a number of Improvement Conditions which have been discharged.

A further variation was accepted in May 2019, to increase the surface water discharge limits, and change the waste types to be accepted.

Section 4.2.1 of the Permit, requires that a report on the performance of the activities over the previous year shall be submitted to the Environment Agency (now Natural Resources Wales) by 31 January.

The report shall include as a minimum:

- a) A review of the monitoring and assessment carried out in accordance with the Permit against the relevant assumptions, parameters and results in the risk assessments submitted with the Application;
- b) Where the operator's management system encompasses annual improvement targets, a summary report of the previous year's progress against such targets;
- c) The energy consumed at the Site, reported in the format set out in Schedule 5 Table S5.3;
- d) The water consumed at the Site, reported in the format set out in Schedule 5 Table S5.3;
- e) The annual production/treatment set out in Schedule 5 Table S5.2;
- f) Details of any contamination or decontamination of the site which has occurred;
- g) The topographical surveys required by condition 3.6.3 other than those submitted as part of a CQA validation report;

- h) The volumetric difference (reported in cubic metres) between the most recent topographical survey and the previous annual topographical survey i.e. the additional volume of the landfill void that is occupied by waste;
- i) An assessment of the settlement behaviour of the landfill body based on the difference between the most recent topographical survey and previous annual topographical survey for the areas of the landfill which did not receive waste between the surveys;
- j) A calculation of the remaining capacity (reported in cubic metres) derived from the pre-settlement contours and the most recent topographical survey;
- k) The compliance testing undertaken in the period.

The review period consists of 12 months of monitoring, from 1 January to 31 December 2020.

1.2 Site Location and Surrounding Land-use

Hendy Quarry Landfill is located at Grid Reference ST 05423 81045.

The site is located to the east of Miskin in Rhondda Cynon Taf, Wales. To the east of the site is the A4119 road. To the south of the site is Glyn Park, which comprises of the Miskin Wood and Mill Wood. The B4264 (School Road) is situated to the north of the site.

2.0 Landfill Gas

2.1 Introduction

Landfill gas (LFG) monitoring was performed quarterly during the review period. Methane, carbon dioxide, oxygen, atmospheric pressure and relative pressure were recorded during the monitoring visits. The Permit requires monitoring for landfill gas at “All Landfill Gas Monitoring points”.

HY1/08, HY2/08, HY3/08, HY4/08, HY5/08, HY6/08, HY7/08 and HY8/08 (also referred to as PZ1-08 – PZ8-08) denote perimeter gas monitoring boreholes. HY1/08 is situated north of the landfill, HY2/08 and HY3/08 to the east, HY5/08 and HY6/08 on the southern boundary, while HY7/08 and HY8/08 are located to the west of the site. BH-B, BH-E, BH-H, BH-X and BH-Y are also perimeter monitoring locations.

In-waste gas monitoring boreholes are denoted as BH01 – BH12, and are also monitored quarterly.

Gas monitoring borehole locations are shown on the Monitoring Plan in Appendix A. Landfill gas data is presented in Appendix B.

The following monitoring locations could not be sampled throughout the entire study period, either because of unsafe access or being lost/destroyed: PZ04/08, BH0E, BH0Y, BH01, BH03, BH04, BH06, BH09, BH10, BH11 and BH12.

In line with RPS-C7 no monitoring was undertaken in April or July 2020 due to restrictions caused by the Covid-19 Pandemic.

Further, sample points, BH05, BH07, BH08, and BH0X were only monitored on one occasion during the study period.

Compliance limits are set for both in-waste and perimeter wells as per Table S4.3 of the Permit; these are reproduced in Table 1.

Table 1: EP Limits for Landfill Gas in external and internal wells

LFG parameter	EP Limit
Methane (CH ₄)	1.0 % v/v
Carbon dioxide (CO ₂)	1.5 % v/v

2.2 Landfill Gas Data

The following general points can be made with regard to the gas data from the gas wells over the review period:

In Waste Boreholes

Zero methane concentrations were detected in the in-waste monitoring boreholes during the review period.

Carbon dioxide concentrations ranged from 0.1% to a maximum of 0.6% v/v in the in-waste boreholes. The compliance limit was not exceeded in the study period.

Perimeter Boreholes

Zero to negligible (0.1%) methane was recorded in any of the perimeter monitoring locations during the review period.

Carbon dioxide concentrations ranged from zero to a maximum of 1.6% v/v in PZ05/08. This does not represent a breach of the limit when considered in conjunction with the GA5000 uncertainty of +/- 0.41%v/v.

3.0 Groundwater

Four boreholes are specified in Table S4.4 of the Permit as requiring sampling on a quarterly basis these are PZ2/08 and PZ3/08 which are considered to be up gradient locations and PZ07/08 and PZ08/08 which are considered down gradient and as such have quality compliance limits as presented in Table S4.2 of the Permit. These limits have been reviewed in the 2018 HRA review¹ and the compliance limit for Nickel reduced; limits are presented in Table 1, and groundwater quality during the study period is reviewed on this basis.

In line with RPS7 and RPS10 no monitoring was undertaken in April or July 2020 due to restrictions caused by the Covid-19 Pandemic.

Table 2: Groundwater Compliance Limits (PZ07/08 & PZ08/08)

Parameter	Permit Limits	HRA Review Limits
Chloride (mg/l)	150	150
Ammoniacal Nitrogen (mg/l)	0.5	0.5
Cadmium (ug/l)	1	1
Nickel (mg/l)	0.2	0.034
Sulphate (mg/l)	200	200
Napthalene (ug/l)	10	10

The locations of the boreholes are shown on the Monitoring Plan in Appendix A.

¹ 3145-CAU-XX-XX-RP-O-0301: HENDY LANDFILL SITE HYDROGEOLOGICAL RISK ASSESSMENT REVIEW 2017. CAULMERT LTD 12 JANUARY 2018.

Tables of groundwater quality are presented in Appendix C, with water levels in Appendix B.

3.1 Groundwater Levels

Groundwater levels ranged from 43.69mAOD in PZ08/08 to 66.88mAOD recorded in PZ03/08. The maximum level was around 10m higher than in 2019. No trends can be assumed due to the missed monitoring rounds.

3.2 Groundwater Quality

Up-gradient

Up-gradient locations PZ2/08 and PZ3/08 recorded ammoniacal nitrogen concentrations below the laboratory LOD throughout the study period.

Chloride concentrations ranged from 13mg/l to 19mg/l in PZ2/08 and 46mg/l to 53mg/l in PZ3/08.

Sulphate concentrations ranged from 6mg/l to 9mg/l in PZ2/08 and 9mg/l to 10mg/l in PZ3/08.

Cadmium concentrations ranged from <0.00002mg/l to 0.00003mg/l in PZ2/08 and 0.0005mg/l to 0.00022mg/l in PZ3/08.

Nickel concentrations were below detection limits in the up-gradient boreholes.

Lead concentrations ranged from below detection limits in PZ02/08 to 0.07 mg/l in PZ03/08.

Concentrations of total petroleum hydrocarbons (TPH in the range C10 to C40) were recorded, ranging between <0.02 and 0.019mg/l in the up-gradient locations.

Down gradient

Down-gradient borehole PZ07/08 was dry for the entire reporting period. In down-gradient borehole PZ08/08 it was not possible to obtain a sample due to borehole deformation. During 2021, replacement boreholes are planned to be re-drilled at these locations.

It was therefore not possible to assess compliance against permitted groundwater limits.

4.0 Surface Water

The permit requires the collection of samples quarterly from the discharge to determine the quality of point source emissions to soak-away from the site. In line with RPS-C7 no monitoring was undertaken in April or July 2020 due to restrictions caused by the Covid-19 Pandemic.

The discharge is to be analysed for: pH, suspended solids, and mineral oil. In addition, there are limits on discharge volumes and rates. Surface water limits are set out in table 4 below.

Table 4: Point Source emissions to water; emission limits and monitoring requirements

Monitoring point	Parameter	Limit	Monitoring frequency
Discharge to soakaway at NGR ST 0538 8136	Volume	5,000 m ³ /day	Daily
	Rate of discharge	58 l/s	Weekly
	Suspended solids	100mg/l	Quarterly
	Mineral Oil	5 mg/l	Quarterly
	pH	6-9	Quarterly

There was no discharge during the monitoring visits, and as such no samples were obtained. The site meter is not able to monitor discharge rate. The site is currently unmanned, and as

such obtaining daily meter readings is not possible. Monthly readings are taken, and averages presented in Table 5 below.

Table 5 Discharge volumes (m³)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Meter Reading	819958	849327	898743			909649			948679			1046698
Monthly Volume	17837	29369	49416	0	0	10906	0	0	39030	0	0	98019
Daily Average	575	1049	1594	0	0	364	0	0	420	0	0	3162

There was no pumping in April, May, July, August, October or November. The maximum monthly volume was in December, assuming that the pump was running full time in this month, the daily average was 3162m³, meaning that the compliance limit of 5000m³/day was not exceeded.

5.0 Annual Performance Data

Annual production/treatment at Hendy Quarry Landfill during the period 01 January to December 2020 is reported in accordance with the Permit for the site. Information required by Table S5.2 and 5.3 of the Permit is presented as Table 6 below.

Table 6: Annual Production/Treatment and performance parameters

Surface water and/or groundwater	Cubic metres/year
Disposed of off site:	244,577
Disposed of to any onsite effluent treatment plant:	0
Parameter	Annual total
Total Energy Consumption:	0.24 MWh

6.0 Management improvements

The following management improvements are required in 2021:

1. Replace down gradient monitoring boreholes.
2. Install a suitable meter to allow the monitoring of discharge flow rate and monitor on a weekly basis.
3. Take daily discharge readings.
4. Maintain access to all permit monitoring points.

7.0 Annual Topographical Surveys and Waste Volumes.

7.1 Annual Topographical Survey

The annual topographical survey was completed on 27 July 2020 and is presented in Appendix A, drawing reference H074 2020-07-27 LF_A1L.pdf.

7.2 Annual Waste Volume

No waste was accepted in between surveys in June 2019 and July 2020.

7.3 Settlement Behaviour

There are no permanently restored areas and as such a settlement survey is not required at this stage.

7.4 Remaining Void Capacity

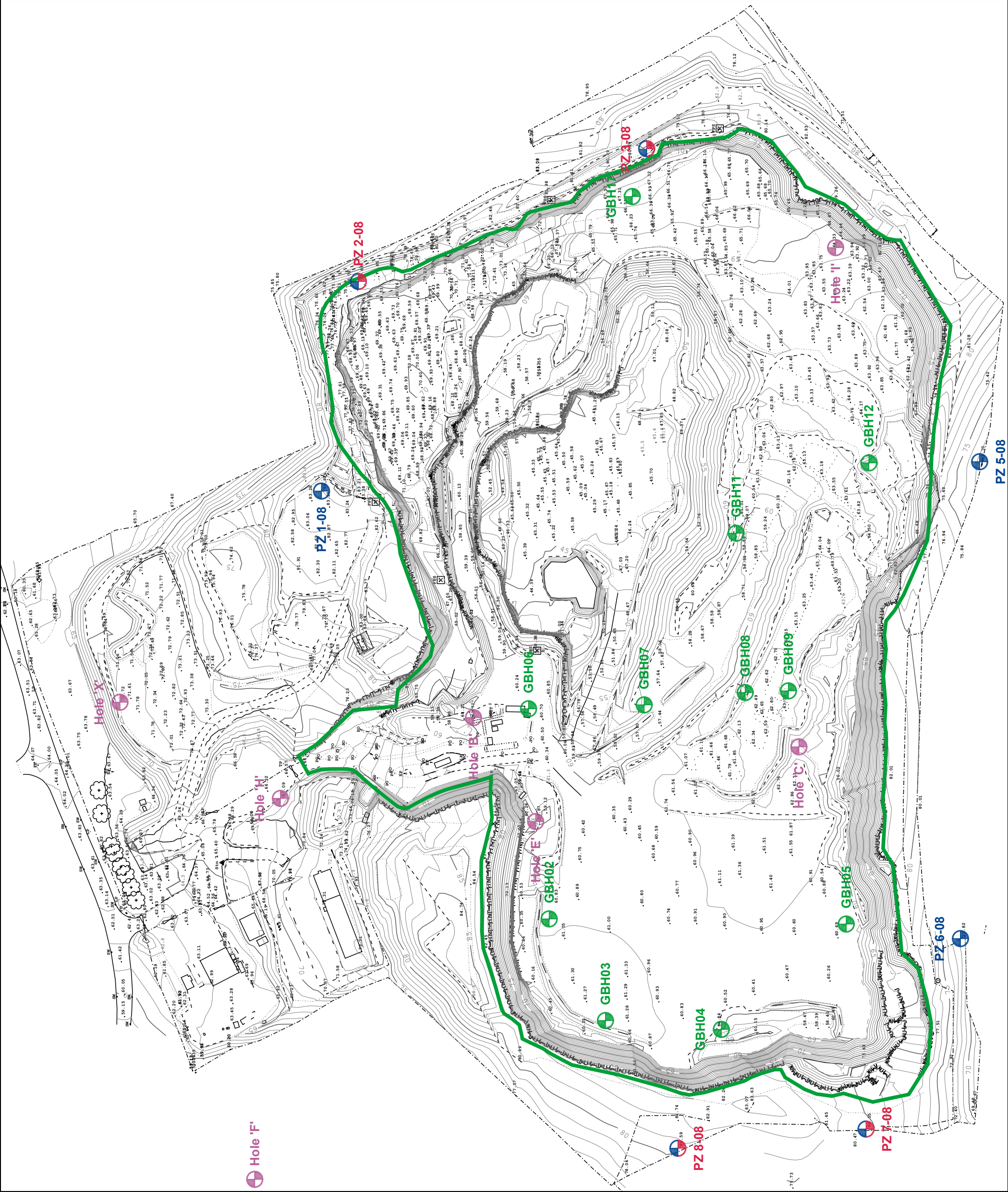
The calculated remaining void from the survey undertaken in July 2020 is 1,300,054m³.

8.0 Compliance Testing

Compliance testing has not been undertaken in the reporting period.

Appendix A

Monitoring Plan (CE/HNDY/08)
H074 HENDY 2020-07-27 LF_A1L



Legend:



Environmental Permit area



Groundwater monitoring boreholes to be included within the Permit



Internal landfill gas monitoring boreholes



Landfill gas monitoring boreholes external to the body of waste



Existing/former boreholes at the site

Final revision:	Date:	Description:
-	-	-
-	-	-

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Site: **HENDY QUARRY LANDFILL**

Drawing Title:

MONITORING PLAN

Drawn By: PSW	Date: 4th June '09	Scale: 1:2,000	Page Size: A3
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H074 - HENDY

AREA OF LANDFILL
27th JULY 2020

LSS Models Used To Create Plot
H074 HENDY 2020-07-27 QU

Drawn By
SJB

Scale
1 : 1250

LIS Drawing Number
H074-00068

Drawing Name
H074 2020-07-27 LF_A1L.pdf

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NOTE: Certain information on this plan has been
digitized and therefore is accurate against the
groundwork. Do not scale off plan/plotting locations.

Appendix B

Landfill Gas Data

Sample Point	Date	Water Level (m AOD)	Methane (%Vol)	Carbon Dioxide (%Vol)	Oxygen (%Vol)	Atmospheric pressure (mb)	Relative Pressure (mb)	Balance (%)	Data Comments
HEN_BH01	16/01/2020								removed
HEN_BH01	20/10/2020								removed
HEN_BH02	16/01/2020		0	0.1	20.9	1008	-0.36	79	63mm pipe with bung & valve
HEN_BH02	20/10/2020		0	0.6	20	987	-1.91	79.4	63mm pipe with bung & valve
HEN_BH03	16/01/2020								removed
HEN_BH03	20/10/2020								removed
HEN_BH04	16/01/2020								removed
HEN_BH04	20/10/2020								removed
HEN_BH05	16/01/2020								
HEN_BH05	20/10/2020		0	0.2	20.9	991	-1.84	78.9	63mm pipe with bung & valve
HEN_BH06	20/10/2020								removed
HEN_BH07	20/10/2020		0	0.6	19.6	991	-2.06	79.8	63mm pipe with bung & valve
HEN_BH08	20/10/2020		0	0.2	21.1	992	-0.05	78.7	63mm slotted pipe with bung & valve
HEN_BH09	20/10/2020								110mm slotted pipe - no bung/valve - unsafe access
HEN_BH0B	16/01/2020		0	0.3	20.4	1007	-0.02	79.3	
HEN_BH0B	20/10/2020		0	0.2	21.3	992	-0.19	78.5	
HEN_BH0E	16/01/2020								unsafe access - danger of falling rocks
HEN_BH0E	20/10/2020								unsafe access - danger of falling rocks
HEN_BH0H	16/01/2020		0	0.1	20.8	1003	-0.05	79.1	
HEN_BH0H	20/10/2020		0	0.2	21.3	992	-0.19	78.5	
HEN_BH0X	16/01/2020								no access-compound lock code changed
HEN_BH0X	20/10/2020		0	0.2	18.6	990	-0.09	81.2	inner bh tube distorted - not airtight
HEN_BH0Y	16/01/2020								no access
HEN_BH0Y	20/10/2020								no key available to access location
HEN_BH10	20/10/2020								removed
HEN_BH11	20/10/2020								removed
HEN_BH12	20/10/2020								removed
HEN_PZ01/08	16/01/2020	Dry	0	0.5	20.7	1003	-0.09	78.8	
HEN_PZ01/08	20/10/2020	Dry	0	1.1	19.7	990	-0.09	79.2	
HEN_PZ02/08	16/01/2020	54.43	0	0.1	20.8	1004	-0.14	79.1	sampled
HEN_PZ02/08	20/10/2020	48.64	0	0.3	20.8	991	0.03	78.9	Sampled - (slotted pipe above ground level)
HEN_PZ03/08	16/01/2020	55.11	0	0.1	21	1000	-0.43	78.9	sampled
HEN_PZ03/08	20/10/2020	49.72	0	0.2	20.9	990	-0.09	78.9	Sampled - (slotted pipe above ground level)
HEN_PZ04/08	16/01/2020	Dry							not installed
HEN_PZ04/08	20/10/2020	Dry							not installed
HEN_PZ05/08	16/01/2020	66.88	0.1	0.8	18.9	1001	-0.29	80.2	
HEN_PZ05/08	20/10/2020	65.27	0	1.6	18.8	992	0.03	79.6	
HEN_PZ06/08	16/01/2020	61.62	0	0.9	20.6	1003	-0.1	78.5	
HEN_PZ06/08	20/10/2020	57.52	0	2	19.6	991	-0.1	78.4	
HEN_PZ07/08	16/01/2020	46.50	0	1.4	19.1	1001	-0.28	79.5	unable to sample
HEN_PZ07/08	20/10/2020	Dry	0	0.3	20.9	990	-0.29	78.8	Dry -(nb: CO2 trigger is >1.5%)
HEN_PZ08/08	16/01/2020	46.29	0	0.2	20.7	1001	-0.4	79.1	unable to sample
HEN_PZ08/08	20/10/2020	43.69	0	0.5	20.6	991	-0.34	78.9	Unable to sample due to severe bh distortion
Max		66.878	0.1	2	21.3	1008	0.03	81.2	
Min		43.693	0	0.1	18.6	987	-2.06	78.4	

Appendix C

Groundwater Data

Sample Point	HEN_PZ02/08		HEN_PZ03/08		HEN_PZ07/08		HEN_PZ08/08	
Date	16/01/2020	20/10/2020	16/01/2020	20/10/2020	16/01/2020	20/10/2020	16/01/2020	20/10/2020
Data Comments	sampled	Sampled	sampled	Sampled	Dry	Dry	unable to sample	Unable to sample
Alkalinity (mg/l)	149	165	314	329				
Calcium (mg/l)	59	71	95	95				
Cadmium (mg/l)	0.00003	<0.00002	0.0005	0.00022				
Chloride (mg/l)	13	19	53	46				
Chromium (mg/l)	<0.001	<0.001	<0.001	<0.001				
Copper (mg/l)	<0.001	<0.001	<0.001	0.001				
Dissolved Oxygen (mg/l)	10.2	9.2	8.6	8.8				
Iron (mg/l)	<0.01	<0.01	<0.01	<0.01				
Potassium (mg/l)	<1	<1	2	2				
Magnesium (mg/l)	6	8	29	29				
Manganese (mg/l)	0.011	<0.002	<0.002	<0.002				
Sodium (mg/l)	6	17	33	32				
Ammonical Nitrogen (mg/l)	<0.01	<0.01	<0.01	<0.01				
Nickel (mg/l)	<0.001	<0.001	<0.001	<0.001				
Lead (mg/l)	<0.001	<0.001	0.005	0.007				
Sulphate (mg/l)	6	9	10	9				
Total Organic Carbon (mg/l)	0.41	0.46	0.59	0.35				
Total Oxidised Nitrogen (mg/l)	<0.2	<0.2	0.8	0.9				
Zinc (mg/l)	<0.002	<0.002	0.089	0.047				
Electrical conductivity (us/cm)	328	404	752	749				
pH (liquid)	7.7	7.8	7.4	7.7				
Naphthalene (UG/L)	< 0.01	0.02	< 0.01	0.01				
TPH (mg/l)	0.01	<0.01	0.019	0.01				
Acenaphthylene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Acenaphthene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Fluorene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Phenanthrene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Anthracene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Fluoranthene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Pyrene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Chrysene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Benzo-a-anthracene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Benzo-b-fluoranthene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Benzo-k-fluoranthene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Benzo-a-pyrene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Indeno-123-cd-pyrene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Dibenz-ah-anthracene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Benzo-ghi-perylene (UG/L)	< 0.01	<0.01	< 0.01	<0.01				
Total (USEPAH16) PAH's (UG/L)	< 0.16	<0.17	< 0.16	<0.17				