

FCC WASTE SERVICES (UK) LIMITED



**SITE INVESTIGATION FACTUAL REPORT FOR
THE INTRUSIVE INVESTIGATION
AT PEN-Y-BONT LANDFILL SITE**

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Contract

This report describes work commissioned by FCC Waste Services (UK) Ltd. Jack Davies of Sirius Environmental Ltd carried out this work.

Purpose

This document was prepared as a factual Site Investigation Report for FCC Waste Services (UK) Ltd for the intrusive investigation works at Pen-y-Bont Landfill Site. Sirius Environmental accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

Sirius Environmental has no liability regarding the use of this report except to FCC Waste Services.

Contents

1	INTRODUCTION	1
2	WINDOW SAMPLING	1
2.1	General	1
2.2	Geology and Sample Recovery	2
2.3	Sampling and Observation	2
3	TRIAL PITS.....	3
3.1	General	3
3.2	Geology/Material Characteristics.....	3
3.3	Sampling and Observation	3
4	LABORATORY TESTING AND RESULTS.....	4
4.1	General	4
4.2	Overview of Results	4
5	DAILY RECORDS AND PHOTOGRAPHIC RECORD	5

List of Appendices

Appendix 1	:	Intrusive Locations Drawings
Appendix 2	:	Borehole and Trial Pit Logs
Appendix 3	:	Laboratory Results
Appendix 4	:	Daily Records
Appendix 5	:	Photographic Record

1 INTRODUCTION

- 1.1.1 Sirius Environmental Limited (Sirius) were requested by FCC Waste Services (UK) Ltd (FCC) to carry out intrusive site investigation work at Pen-Y-Bont Landfill Site on areas of hard standing to provide supporting evidence to the Environmental Permit (Part) Surrender application.
- 1.1.2 Pen-Y-Bont Landfill Site is situated approximately 9.5km south west of Wrexham at National Grid Reference SJ 293 416. Pen-Y-Bont Landfill Site is approximately 21Ha with waste deposition occurring in 9Ha of the site. The site began landfill operation in November 1997 and was closed and permanently capped in late 2016.
- 1.1.3 The purpose of the Site Investigation Works was to undertake a visual assessment of the material and obtain samples for laboratory chemical testing to ensure the material below the concrete slab and stockpiling area had not become contaminated due to operations associated with landfilling activities.
- 1.1.4 The site investigation works were carried out over two days (13th and 14th June 2018). The methods used for the intrusive works were window sampling and trial pitting. These were specifically chosen due to site conditions and allowed a sufficient depth to be achieved so representative data could be collected.
- 1.1.5 The window sampling was undertaken by RP Drilling Ltd, with supervision and logging of the strata provide by a Sirius Engineer. The trial pitting was done using a JCB 3CX and extended down as deep as the machine would go.

2 WINDOW SAMPLING

2.1 General

- 2.1.1 During the works a total of 13 boreholes were drilled across a variety of location. The window sampling was undertaken on any areas of concrete hard standing. The locations of the boreholes were carefully selected by the Sirius Engineer to ensure that all areas were covered, especially looking at locations where contamination is more likely than other (For Example: near weighbridge, fuel tank, leachate tanks and contractors compound). The locations of the drilled boreholes are shown on Drawing WR7449/6/001 presented in Appendix 1.
- 2.1.2 Prior to drilling the area was CAT scanned to ensure no services were struck during the works with the approved locations marked with an X to mark.

2.1.3 The methodology for the drilling was as follows:

- (i) Core through the concrete with a concrete corer;
- (ii) Install casing;
- (iii) Drive a steel tube into the ground in 1m section;
- (iv) Recover the casing and sample of material; and
- (v) Repeat for each metre until depth had been achieved or hole refused.

2.2 Geology and Sample Recovery

2.2.1 The geology encountered during the drilling of the boreholes was consistent across the 13 holes, with some minor variation in exact composition of soil. The main geology was colliery spoil and then sands and clays. The top 250mm of each borehole was the in-situ concrete used for the construction of the concrete slab. Underneath this there was approximately 250mm of angular large sandy gravel used as the subbase. At between 500mm and 3m/4m (borehole dependant) the material was colliery spoil; this formation was approximately 2.5m/3.5m thick. Underlying the colliery spoil was a sandy clay material. This material varied in colour (some boreholes were red, and some were a brown/grey colour), the composition varied slightly with some areas containing more sandy material with others being more clayey and silty. For detailed geology description and full borehole records see borehole logs presented in Appendix 2.

2.3 Sampling and Observation

2.3.1 After recovery of each tube the material was inspected by the Sirius Engineer for any signs of contamination (for example: staining on soil, oily patches or odour). No discolouration was noted on any of the samples recovered from the boreholes. On boreholes 5 and 7 a hydrocarbon (petrol/diesel) odour was noted in the material; On borehole 5 this was noted at 2.95m below ground level and on borehole 7 this odour extended from 2m to 4.1m below ground level.

2.3.2 In addition to the odour in borehole 5, water was encountered at 3m below ground level. The amount of water encountered during the strike was minimal so there was not enough volume produced to submit a water sample. The material at around 3m was very soft and could be easily indented with finger. Water strikes were not encountered on any other of the borehole locations.

- 2.3.3 As a water strike and odour were noted in borehole 5, two further boreholes were drilled 5m east (BH9) and 5m west (BH8) of borehole 5 to see whether the same conditions were noted. In both BH8 and BH9 no hydrocarbon odour was noted, nor any water strikes encountered.
- 2.3.4 Sampling was undertaken from each borehole. Two samples were collected from each hole, one from the first metre tube and one from the last metre. In Borehole 5 the second sample was taken from 3.50m rather than 6m as a result of odour observed. In borehole 7 an extra two samples were collected for analysis because of the noted odour spanning the 2m section of material.

3 TRIAL PITS

3.1 General

- 3.1.1 During the works a total of 13 trial pits were excavated across the area used for stockpiling of soils and the far eastern flank of the site boundary. The locations of the trial pits were carefully selected by the Sirius Engineer to ensure that all areas were covered. The trial pits were undertaken on a roughly 25m grid. The locations of the trial pits are shown on Drawing WR7449/6/001 presented in Appendix 1.
- 3.1.2 The trial pits were dug to a depth of between 3 and 3.5m which was the limit of the machine. The excavated material was stored at the side of each hole and logged by the Sirius Engineer. Logs for the trial pit are presented in Appendix 2.

3.2 Geology/Material Characteristics

- 3.2.1 The composition of the materials excavated showed a larger variation compared with the window sampling. The material was a combination of both sandy clay material, silty clays and colliery spoil. The clay material varied in colour in some trial pits the material was grey and in others it was brown or red. The thickness of the clay material varied between 0.5m and 3m. The composition of the clay also varied, in places it was a sandy clay in others it was a silty clay and in others it was a gravelly clay. The colliery spoil characteristics were very similar in each trial pit however the thickness of each unit varied between 1m and 3m. For detailed description of each trial pit see trial pit logs presented in Appendix 2.

3.3 Sampling and Observation

- 3.3.1 All trial pits excavated were visually inspected for evidence of soil contamination. No visual evidence was noted in any trial pits. A tar odour was noted in Trial Pit 3, this smell was found in all excavated material from this trial pit. No further odour was found in any of the other trial pits.

4 LABORATORY TESTING AND RESULTS

4.1 General

4.1.1 The samples collected during the site investigation works were scheduled for a full suite of chemical tests in addition to MCERTS Preparation. The samples were subjected to four different suites of chemical testing. The suites were as follows:

- (i) Suite 1 – pH and Electrical Conductivity;
- (ii) Suite 2 – Heavy Metals (As, Ba, Cd, Cr, Cu, Hg, Mo, Ni, Pb, Sb, Se and Zn);
- (iii) Suite 3 – Ammonia, N, Cl, F, SO₄ and Cyanide; and
- (iv) Suite 4 – TOC, PAHS, TPH and Phenol.

4.1.2 A total of 37 samples were taken from the SI works. All 37 samples were tested for all 4 suites of tests. The laboratory work was carried out by Concept Life Sciences based in Manchester.

4.2 Overview of Results

4.2.1 The results of the laboratory testing are summarised below with the laboratory reports presented in Appendix 3.

- (i) Suite 1 – pH and electrical conductivity levels recorded in samples are consistent across the site.
- (ii) Suite 2 – The heavy metal concentrations recorded in the samples are consistent across the site.
- (iii) Suite 3 – The values reported are consistent for each chemical tested. There are occasionally elevated levels noted in both the colliery spoil and clay samples.
- (iv) Suite 4:
 - a. Phenols and TOC – Phenol results are consistent site wide with no significant elevated TOC values recorded. However, low TOC values are noted in the clay samples.
 - b. PAH USEPA plus Coronene – Uniform baseline condition across site with the majority of values below or at laboratory Limit of Detection (LOD). There are occasional spikes identified in some of the samples from the colliery spoil or clay.

- c. TPH – In areas of hardstanding the samples report a generally low trend. However higher levels are noted in samples collected from the trial pits with the exception of TP13 which was undertaken in northern field. Elevated levels of petroleum are noted in BH7 in the samples taken from 3m and 3.10m. Elevated levels are also noted in BH10, BH11 and BH12 in areas occupied by the tachograph garage and access road into the site.

(v) MCERTS Preparation:

- a. Water Content – The water content of the samples ranged between 6.5% and 27%. The highest water content was recorded in Borehole 5. The samples collected from the shallowest depths recorded higher water content.
- b. Mass retained on 10mm sieve – No results recorded above LOD values.

5 DAILY RECORDS AND PHOTOGRAPHIC RECORD

- 5.1.1 The Sirius Engineer maintained daily records on both days, providing details of the general works undertaken on site, observations and any problems encountered. These daily records are presented in Appendix 4.
- 5.1.2 During the Site Investigation Works a photographic record was kept showing the material recovered from the boreholes and trial pits for a visual record. The photographic record is presented in Appendix 5.