



CWM ENVIRONMENTAL LTD

NANTYCAWS LANDFILL SITE ANNUAL COMPLIANCE REPORT 2022

CP3735PB





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LIMITATIONS

1. INTRODUCTION

1.1. TERMS OF REFERENCE

- 1.1.1. This report has been produced by WSP on behalf of CWM Environmental Ltd and comprises the 2022 Annual Compliance Report for the Nantycaws Landfill Site, Carmarthenshire (the site).

1.2. BACKGROUND

- 1.2.1. Nantycaws Landfill Site is situated approximately 8.0 km east of Carmarthen and 1.5 km south-east of Nantycaws in a rural setting. It is operated by CWM Environmental Ltd and only accepts non-hazardous waste.
- 1.2.2. The site has developed in a northerly direction and comprises seven cells, of which Cell 1 to Cell 5 (corresponding to Phase 1 and Phase 2) have been completed and capped. Phase 3, comprising Cell 6 and Cell 7, is currently operational but has not accepted waste for the past 12 months and is covered with a temporary cap. The configuration of the cells is shown in Figure 1.
- 1.2.3. The site has the following monitoring infrastructure:
- 16 combined groundwater and gas monitoring boreholes;
 - 2 groundwater monitoring boreholes;
 - 5 under-drainage monitoring points;
 - 10 gas monitoring wells;
 - 6 leachate monitoring points; and
 - 7 surface water monitoring locations.
- 1.2.4. The monitoring points are shown in Figure 1.
- 1.2.5. The laboratory limits of detection (LOD) for mecoprop and 4-methylphenol are higher than the compliance limit under the Site Permit for some monitoring rounds in 2022 that have resulted in false exceedances of these determinants on occasion. The LOD is increased by the lab where a sample dilution is applied because of interference caused by the sample when analysed for a specific determinant. The laboratory tries to avoid applying a sample dilution, but this has to be applied to samples and sometimes repeated in order to get a result.
- 1.2.6. There have also been instances where the sample holding time has been exceeded and as a result the sample is not UKAS Accredited. This will be reviewed with ALS in 2023 in order to reduce the likelihood of this occurring.
- 1.2.7. The laboratory LOD for dichloromethane is by default higher than the compliance limit for surface water and groundwater locations.

1.3. SCOPE OF WORKS

- 1.3.1. This report has been produced in accordance with points (a) and (j) as listed in Section 4.2.1 of Environmental Permit No. CP3735PB and its subsequent variations, hereafter referred to as “the Site Permit”. Specific reference has been made to the requirements within Compliance Assessment Report

(CAR) reference 4547 from Natural Resources Wales (formerly Environment Agency Wales), dated 1st May 2012.

1.4. LIMITATIONS

- 1.4.1. This report is presented to CWM Environmental and Natural Resource Wales (NRW) with respect to the 2022 Annual Compliance Report for the site and may not be used or relied on by any other person or by the Client in relation to any other matters not covered specifically by the scope of this Report.
- 1.4.2. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party. WSP cannot be held liable for third party information. Full details of the limitations are provided as Appendix D.

2. SITE SETTING

2.1. TOPOGRAPHY AND DRAINAGE

- 2.1.1. The site lies within the catchment of the Afon-y-Bantwen, which is approximately 1.2 km from the southern margin of the site at its closest extent. The site is effectively a land raise and was constructed on gentle southerly sloping land with approximate ground elevations of between 140 mAOD (metres Above Ordnance Datum) in the north, and 125 mAOD in the south.
- 2.1.2. Two small surface watercourses (little more than ditches receiving surface water runoff from the site) are present along the south eastern and south western margins of the site, both of which flow into the Afon-y-Bantwen (locations of these features are shown on Figure 1).

2.2. GEOLOGY AND HYDROGEOLOGY

- 2.2.1. The bedrock beneath the site comprises the Devonian aged Old Red Sandstone Formation. This unit forms the main water-bearing strata beneath the site and is classified as a Secondary A Aquifer according to the published 1:100,000 Groundwater Vulnerability Map (Map Sheet 35). Generally, the waters within the Old Red Sandstone Formation have low trace metal concentrations, but small areas can be anoxic and as a result may have elevated concentrations of certain trace metals such as iron or manganese.
- 2.2.2. The Old Red Sandstone Formation is overlain in places by unconsolidated drift deposits of variable thickness. These predominantly comprise stiff glacial till (formerly Boulder Clay); however, some water-bearing granular horizons are present, possibly representing esker deposits (Fluvioglacial Deposits). These are laterally discontinuous but may be hydraulically linked to the underlying Devonian Old Red Sandstone Formation.
- 2.2.3. The site is located within a groundwater discharge area which provides base flow to the adjacent surface water features.

2.3. LANDFILL CONSTRUCTION

- 2.3.1. Construction of the landfill has progressed in three phases comprising seven cells:
- Phase 1 (Cell 1);
 - Phase 2 (Cell 2 to Cell 5 inclusive); and
 - Phase 3 (Cell 6 and Cell 7).
- 2.3.2. Phase 1 and Phase 2 have been completed and capped. Phase 3 is currently covered with temporary polythene cover to limit water infiltration and leachate production.
- 2.3.3. Phase 1 was constructed more than 25 years ago. It was not constructed as a fully contained facility and has no engineered liner. This part of the site is a 'closed' landfill and is subject to a different environmental permit.
- 2.3.4. Phase 2 and Phase 3 of Nantycaws Landfill Site are contained by engineered linings. The base and sides of Phase 2 consist of a high-density polyethylene (HDPE) geocomposite liner (GCL). This is underlain by an engineered geological barrier comprising reworked, locally sourced glacial material, approximately 1.0 m in thickness.

- 2.3.5. Phase 3 has a composite liner comprising 'Trisoplast' (0.09 m of bentonite-enriched sand) underlain by an engineered geological barrier 0.5 m in thickness, also formed from engineered glacial till.
- 2.3.6. A groundwater drainage system was incorporated below the base of Phase 1 and below the GCL of Phase 2 and Phase 3. This comprises a series of collection drains which drain by gravity to the south, with finger drains extending to individual seepages that were present within the undeveloped ground. This system currently discharges to the surface water ditches.
- 2.3.7. Groundwater levels around the site confirm a general southerly movement of groundwater on the site (Figure 1).

2.4. LEACHATE MANAGEMENT

- 2.4.1. All leachate from the three phases is pumped to a Leachate Holding Lagoon to the north of Cell 1 where it is aerated before being tankered off-site for disposal. An automated leachate extraction system was installed within the leachate sumps and the retrofitted in-waste monitoring wells in Cell 1 to Cell 5 (M1A to M4B and LMP5A and 5B), which was commissioned in January 2013. The system uses submersible pumps, which are triggered by float switches, positioned at pre-determined levels.
- 2.4.2. Leachate wells are monitored at sumps installed into each cell. During construction of the early phases of the site, Cell 1 was connected to Cell 2 via a pipe and similarly that Cell 3 is now hydraulically connected to Cell 4. These features are illustrated on Figure 1.
- 2.4.3. Cell 7, in Phase 3 of the landfill, was constructed in March 2014 in which the monitoring wells Cell 7 Sump, LMP7a and LMP7b were installed. These have been added to the routine monitoring round and the results from Cell 7 Sump included within this report.

3. MONITORING REQUIREMENTS

3.1. PERMIT REQUIREMENTS

- 3.1.1. The monitoring considered in this report was undertaken by CWM Environmental Ltd, in accordance with the requirements in Section 3.6.1 of the Site Permit, detailed within the site *Environmental Monitoring and Management Plan (EMMP)*¹. The Site Permit refers to 'trigger levels' and 'control levels' (also referred to hereafter as compliance limits) derived from a Hydrogeological Risk Assessment (HRA) prepared for the site in 2006 and reviews of the HRA in 2014 and 2017². The Site Permit was subsequently updated by Permit Variation No. EA/EPR/CP3735PB/V004 following submission and agreement of improvement conditions to Natural Resources Wales (NRW). This resulted in a change to the compliance limits concentrations for diethylphalate and mecoprop³⁴. This report refers to 'compliance limits' as the greater of the trigger and control concentrations.

3.2. LEACHATE

- 3.2.1. The requirements for monitoring of leachates included within the Site Permit are summarised in Table 3-1. Monitoring is required at six locations, with different suites required at monthly, quarterly and annual frequencies. The locations of the monitoring points are shown on Figure 1. The leachate pond monitoring point was decommissioned in June 2014 and therefore no results for this are contained in this report.
- 3.2.2. Compliance limits specific to individual cells are included within the HRA (2006 and 2017), and the relevant determinands are highlighted in bold text within Table 3-1.

Table 3-1 Leachate Monitoring Undertaken During 2022

Determinand	Monitoring Frequency	Monitoring Points
Ammoniacal Nitrogen as N	Monthly	Cell Sump 1 /2, Cell Sump 3 /4, Cell Sump 5, Cell sump 6, Cell Sump 7 and Leachate Holding Lagoon*
Chloride	Monthly	
Electrical Conductivity	Monthly	
Depth of leachate above the base of the liner	Monthly	

¹ Parsons Brinckerhoff (2012). Nantycaws Landfill Site Environmental Monitoring and Management Plan. Permit No. CP3735PB. Issue No. 4, March 2012.

² SLR (2006). Nantycaws Landfill Site. Hydrogeological Risk Assessment. SLR Report Ref 407.0610.00011/HRA, May 2006. Parsons Brinckerhoff (2014 and 2017). Nantycaws Landfill. Hydrogeological Risk Assessment – Four Yearly Review September 2014 and October 2017.

³ SLR (2008). Nantycaws Landfill Site. Application for a Permit Variation, Reference DP3134XD A(1) PPC Installation. Appendix SS3: Hydrogeological Modelling Report. SLR Report Ref 407.0610.00011, June 2008.

⁴ Environment Agency determination of Variation Application EPR/CP3735PB/V004, 23/09/2009.

Determinand	Monitoring Frequency	Monitoring Points	
Mecoprop (pesticide)	Quarterly		
Diethylphthalate	Quarterly		
Dichloromethane	Quarterly		
4-methlyphenol	Quarterly		
Cadmium	Quarterly		
Total alkalinity	Quarterly		
Magnesium	Quarterly		
Potassium	Quarterly		
Total Sulphate	Quarterly		
Calcium	Quarterly		
Sodium	Quarterly		
Biological Oxygen Demand (BOD)	Quarterly		
Chemical Oxygen Demand (COD)	Quarterly		
Total Organic Carbon (TOC)	Quarterly		
Total Oxidised Nitrogen (TON)	Quarterly		
Manganese	Quarterly		
Iron	Quarterly		
Chromium	Quarterly		
Copper	Quarterly		
Lead	Quarterly		
Zinc	Quarterly		
Nickel	Quarterly		
Monitoring Point Base	Annually		
Hazardous 'List 1' Substances	Annually		
* Monthly only, not included in quarterly compliance limit			
Compliance limits for determinands in bold are included in the HRA (2017)			

3.3. SURFACE WATER

- 3.3.1. The requirements for monitoring of surface waters included within the Site Permit are summarised in Table 3-2. The internal drainage ditches are monitored in accordance with Table S4.10 of the Site Permit. The Site Permit specifies compliance limits in Table S4.3 for the relevant determinands and monitoring locations (SW205a and SW206) highlighted in bold in Table 3-2.

Table 3-2 - Surface Water Monitoring Undertaken During 2022

Determinand	Monitoring Frequency	Monitoring Points
Ammoniacal Nitrogen	Monthly	SW201, SW202, SW203, SW204, SW205a, SW206 , SW207.
Chloride	Monthly	
Suspended Solids	Monthly	
pH	Monthly	
Temperature	Monthly	
Electrical Conductivity	Monthly	
Water Depth	Monthly	
Mecoprop (pesticide)	Quarterly	
Diethyphthalate	Quarterly	
Dichloromethane	Quarterly	
4-Methylphenol	Quarterly	
Cadmium	Quarterly	
Total Alkalinity	Quarterly	
Magnesium	Quarterly	
Potassium	Quarterly	
Total Sulphate	Quarterly	
Calcium	Quarterly	
Sodium	Quarterly	
Total Oxidised Nitrogen (TON)	Quarterly	
Total Organic Carbon (TOC)	Quarterly	
Manganese	Quarterly	
Iron	Quarterly	
Chromium	Quarterly	
Copper	Quarterly	
Lead	Quarterly	

Determinand	Monitoring Frequency	Monitoring Points
Zinc	Quarterly	
Nickel	Quarterly	
Ionic Balance	Quarterly	
Hazardous 'List 1' Substances	Annually	
The Site Permit (Table S4.3) specifies compliance limits for the relevant determinands and monitoring locations (SW205a and SW206) highlighted in bold		

3.4. GROUNDWATER

- 3.4.1. The requirements for monitoring groundwaters within the Site Permit are summarised in Table 3-3. Monitoring is required at twenty-one locations, comprising five locations within the under-drainage (UD) system and sixteen (16 no.) perimeter groundwater monitoring boreholes. As with the leachate monitoring, different suites are required at monthly, quarterly and annual frequencies. The monitoring points are shown on Figure 1.
- 3.4.2. All groundwater monitoring wells are sampled at the site in accordance with Table S4.11 of the Site Permit. The Site Permit specifies compliance limits in Table S4.5 at twelve locations, with the relevant determinands and locations highlighted in bold in Table 3.3.

Table 3-3 - Groundwater Monitoring Undertaken During 2022

Determinand	Monitoring Frequency	Monitoring Points
Ammoniacal Nitrogen as N	Monthly	NACW212, NACW219*, NACW227, NACW228, NACW229*, NACW203, NACW205, BH3/4, BH5/02, BH208, BH3/2*, BH3/3*, BH3/5*, BH3/6*, BH3/8*, BH3/9*, UD1, UD2, UD3, UD4, UD5*.
Chloride	Monthly	
Electrical Conductivity	Monthly	
Water Level	Monthly	
Monitoring Point Base	Quarterly	
Mecoprop (pesticide)	Quarterly	
Diethylphthalate	Quarterly	
Dichloromethane	Quarterly	
4-methylphenol	Quarterly	
Cadmium	Quarterly	
Total Alkalinity	Quarterly	
Magnesium	Quarterly	
Potassium	Quarterly	
Total Sulphate	Quarterly	
Calcium	Quarterly	

Determinand	Monitoring Frequency	Monitoring Points
Sodium	Quarterly	
Nitrates	Quarterly	
Nitrites	Quarterly	
Total Oxidised Nitrogen (TON)	Quarterly	
Manganese	Quarterly	
Iron	Quarterly	
Chromium	Quarterly	
Copper	Quarterly	
Lead	Quarterly	
Zinc	Quarterly	
Nickel	Quarterly	
Hazardous 'List 1' Substances	Annually	
* Quarterly only, not included in monthly compliance limit		
The Site Permit (Table S4.5) specifies compliance limits at twelve locations, with the relevant determinands and locations highlighted in bold		

3.5. GAS MONITORING

- 3.5.1. The requirements for monitoring of landfill gases included within the Site Permit are summarised in Table 3-4. All in-waste boreholes are connected to the gas extraction system at the site. This report only contains the results of monitoring undertaken within the perimeter wells identified in Table 3-3 and Table 3-4. The locations of the twenty-five (25 no.) gas monitoring points are shown on Figure 1 and listed in Table 3-4 below.

Table 3-4 - Gas Monitoring Undertaken During 2022

Determinand	Monitoring Frequency	Monitoring Points
Methane	Monthly	NACW201, NACW202, NACW203, NACW204, NACW205, NACW212, NACW213, NACW215, NACW216, NACW219, NACW220, NACW227, NACW228, NACW229, NACW230, BH3/1, BH3/2, BH3/3, BH3/4, BH3/5, BH3/6, BH3/8, BH3/9, BH3/10, BH3/11.
Carbon Dioxide	Monthly	
Oxygen	Monthly	
Atmospheric Pressure	Monthly	
Differential Pressure	Monthly	
Temperature	Monthly	
Gas Flow Rate	Monthly	
Trace Gas Analysis	Annually	

4. MONITORING RESULTS

4.1. INTRODUCTION

- 4.1.1. This section presents the results of the monitoring undertaken during 2022 with specific attention given to the compliance limits in the Site Permit (where applicable) and to time-series data trends by comparison with the historic record obtained since 2014, illustrated by Figure 2 to Figure 19 and Table 4-1 to Table 4-9 at the end of this report. A summary of the compliance issues is provided at the end of the section.
- 4.1.2. The compliance monitoring is based on the 'monthly' and 'quarterly' monitoring suites, the results of which are shown on the laboratory certificates included within Appendix A. The extended suites undertaken in the annual monitoring are summarised in Appendix B, and the laboratory analysis for these included within Appendix C.

4.2. LEACHATE MONITORING

LEACHATE LEVELS

- 4.2.1. Leachate levels are monitored on a monthly frequency to determine the depth of leachate above the landfill liner, which is a requirement set out within the Site Permit (Table S4.1) as shown in Table 3-1.
- 4.2.2. The monitored leachate levels within the leachate sumps obtained during 2022 are summarised in Table 4-1 and shown graphically in Figure 2, which also shows historic data from the beginning of 2014 compared to the relevant compliance limits. All recorded leachate heads were below their respective compliance limits and an increasing trend in leachate head is identified towards the end of 2022 for all locations. It should be noted that the sharp increase in leachate head for Cell 5 Sump, Cell 6 Sump and Cell 7 Sump are due to human error in recording depth to base at these monitoring locations. This has resulted in falsified increases in head at the sites between September and December 2022. The true depth of these locations will be confirmed with the Client. The mean recorded head above all sumps during 2022 was 0.42 m. There were no recorded exceedances of the compliance limits for 2022.
- 4.2.3. The following in-waste monitoring wells were retrofitted into Cell 1 to Cell 7 Sumps respectively:
- M1A to M4B inclusive (Cell 1 to Cell 4 Sumps);
 - LMP5a to LMP5b (Cell 5 Sumps);
 - LMP6a to LMP6b (Cell 6 Sumps); and
 - LMP7a to LMP7b (Cell 7 Sumps).
- 4.2.4. Given the absence of target pads at these locations, these boreholes were terminated approximately 2.0 m above the landfill base to avoid harming the landfill liner system and therefore cannot be used for compliance purposes. The mean head above the base of the boreholes monitored within these locations during 2022 is 0.14 m for all locations. A maximum head of 0.42 m was recorded at LMP7a (November 2022), and a minimum head of 0.01 m was also recorded at LMP7a (February and July 2022). The data obtained since the start of 2014 are summarised in Figure 3 and show leachate heads within the in-waste holes within similar ranges to the observed data between 2014 and 2021. This is with the exception of a decrease in leachate heads between June and August 2022, which can potentially be attributed to the record hot dry summer experienced in the UK at the time.

- 4.2.5. The head data shown in Figure 2 and Figure 3 indicate that the automated leachate extraction system has continued to be effective in maintaining low leachate heads across the site since early 2014, with the exception of the anomalous values recorded at LMP7b and M3A in 2020 and 2021 respectively and in leachate sump heads during late 2022.

LEACHATE CHEMISTRY - MONTHLY AND QUARTERLY SUITES

- 4.2.6. The leachate chemistry monitoring is summarised in Table 4-2 and shown graphically in Figure 4 to Figure 10. Table 4-2 has multiple lines per monitoring location due to changes in the laboratory LOD for that particular determinand. For all figures, where determinands were below laboratory LOD, a value of half the detection limit has been plotted. The summary of concentrations provided below are based solely on laboratory data and does account for laboratory LOD (as reported). Results are shown on the laboratory certificates in Appendix A and Appendix C.
- 4.2.7. It should be noted that there was insufficient sample volume from Cell 6 Sump and Cell 7 Sump in May 2022 and no laboratory analysis could be undertaken. All other field parameters for Cell 6 Sump and Cell 7 Sump were recorded.
- 4.2.8. The leachate pond monitoring point was decommissioned in June 2014.

Ammoniacal Nitrogen as N and Chloride

- 4.2.9. The time series of ammoniacal nitrogen as N and chloride concentrations recorded within the site leachates since 2014 are shown in Figure 4 and Figure 5, respectively. No exceedances of the compliance limits for ammoniacal nitrogen as N (3,640 mg/l) and chloride (19,000 mg/l) were noted during 2022.
- 4.2.10. The minimum recorded concentration of ammoniacal nitrogen as N (Figure 4) over the duration of the 2022 monitoring was 73 mg/l (Cell 1/2 Sump) and the maximum recorded concentration of 2,460 mg/l in Cell 1/2 Sump.
- 4.2.11. The minimum chloride concentration (Figure 5) recorded over the duration of the 2022 monitoring was 218 mg/l (Cell 6 Sump) and a maximum concentration of 12,300 mg/l was recorded in Cell 1/2 Sump. Chloride concentrations were well below the compliance limit for all leachate monitoring sites.

Mecoprop (MCP)

- 4.2.12. Recorded concentrations of MCP in 2022 are provided in Figure 6. The minimum recorded concentration over the duration of 2022 was 0.0094 mg/l (Cell 6 Sump) and a maximum concentration of 0.1080 mg/l (Cell 1/2 Sump). Cell 1/2 Sump exceeded the compliance limit of 0.071 mg/l for MCP on two (2 no.) occasions during 2022 (January and October) and recorded an average concentration of 0.060 mg/l across the year. Concentrations of MCP at Cell 1/2 Sump was continuously above the compliance limit between mid-2018 and early 2021. Concentrations of MCP from Q2 2021 dropped below the compliance limit for Cell 1/2 until Q3 of that year in which another exceedance occurred. This trend is noticeable for 2022 i.e. MCP is exceeded at Cell 1/2 in Q1 and then drops below the compliance limit for Q2 and Q3 until a further rise and exceedance is recognised in Q4 (2022). The trend in MCP exceedances occurring at this location for specific months will be investigated further in 2023.. All other monitoring points were within their respective compliance limits during 2022. Schedule 6 Notices were issued for all exceedances of MCP in Cell 1/2 Sump (see Section 4.6).

4-methylphenol

- 4.2.13. Recorded concentrations of 4-methylphenol in 2022 (Figure 7) were below the laboratory LOD and compliance limit for all leachate monitoring points. A small increase of 4-methylphenol was observed in Q4 2022, where a value of 0.104 mg/l was recorded in Cell 7 Sump. Aside from this, no obvious trends are apparent in the data for 2022, with most of the results being below the laboratory LOD and compliance limit. The compliance limit for Cell 1/2 Sump and Cell 3/4 Sump is 1.6 mg/l. The compliance limit for Cell 5 Sump, Cell 6 Sump and Cell 7 Sump is 0.126 mg/l.

Dichloromethane

- 4.2.14. Dichloromethane was not recorded above the laboratory LOD (<0.003 mg/l) or compliance limit (0.033 mg/l Cell 1/2 and Cell 3/4 and 0.066 mg/l Cell 5 to Cell 7 Sumps inclusive) at any leachate monitoring point during 2022. An increase in Dichloromethane can be seen in July 2022 on Figure 8, this is due to an increase in the limit of detection caused by an exceedance in the sample holding time. No trends are apparent in the data obtained since 2014 to present (Figure 8).

Diethylphthalate

- 4.2.15. Recorded concentrations of diethylphthalate in 2022 were below the laboratory LOD (0.01 mg/l) and compliance limit for all leachate monitoring points (Figure 9).

Cadmium (filtered)

- 4.2.16. Cadmium was detected eighteen times above the laboratory LOD at all leachate monitoring points. The maximum recorded concentration above the laboratory LOD was 0.00108 mg/l in Cell 5 Sump and a minimum concentration of 0.0000837 mg/l was recorded in Cell 6 Sump. No breaches of the compliance limit (0.105 mg/l) have occurred over the duration of the 2022 monitoring (Figure 10).

LEACHATE CHEMISTRY – EXTENDED ‘ANNUAL’ SUITE OF ANALYSIS

- 4.2.17. Sampling of the site leachates for the annual suite of analysis took place on 24th October 2022. The suites for the annual Hazardous ‘List 1’ Substances (List 1) monitoring was agreed with NRW beforehand and are summarised within the appended technical note (Appendix B). The results are shown on the certificates of analysis in Appendix C. The general chemistry of the leachates in terms of transition metals and Hazardous Substances is discussed below.
- 4.2.18. It should also be noted that due to a misunderstanding with the lab at the time of analysis (October 2022), only half of the ‘List 1’ monitoring was undertaken on all samples. This error occurred due to a change in laboratory management and assumptions that communications at the time were understood from both parties involved. Unfortunately, the error has been recognised on completion of this report. All outstanding and incomplete analysis of the ‘List 1’ suite will be completed on January 2023 samples. For the leachates this will include phenols, TPH, Cyanide, PCBs, herbicides and pesticides. This approach has been discussed and agreed with the Client and the results of outstanding analysis for the ‘List 1’ suite on all samples will be provided to NRW post-submission of this Annual Report.

Leachate Hazardous ‘List 1’ Substances Summary

- 4.2.19. In contrast to the other waters analysed, hazardous substances were detected in most leachates. For the sake of brevity and to aid comparison with the chemistry of the other waters (discussed later) these are discussed in general terms by compound type, with only specific mention of individual concentrations of determinands, where considered significant.

4.2.20. A summary of the following hazardous 'List 1' substances detected include:

- SVOCs (semi-volatile organic compound) 2-methylphenol (aq) and bis(2-ethylhexyl) phthalate (aq) were detected at Cell 1/2 Sump with recordings of 16.3 µg/l and 71.8 µg/l respectively. 4-methylphenol was detected at Cell 7 Sump with a recording of 104 µg/l; and,
- VOCs (volatile organic compounds) were detected at all locations, notably; Cell 1/2 Sump detected toluene with a concentration of 20.6 µg/l.

4.2.21. The recorded concentrations of the transition metals (dissolved concentrations) within the site leachates, not discussed above, were typically between one and two orders of magnitude greater than in the other waters sampled and were greatest in Cell 3/4 Sump, Cell 5 Sump and Cell 7 Sump:

- Chromium: recorded between 85.6 µg/l in Cell 5 Sump and 163.0 µg/l in Cell 1/2 Sump;
- Cadmium: was detected at Cell 1/2 Sump, Cell 3/4 Sump and Cell 5 Sump with values of 0.47 µg/l, 0.12 µg/l and 0.14 µg/l, respectively.
- Copper: recorded between 0.7 µg/l in Cell 7 Sump and 16.0 µg/l in Cell 1/2 Sump;
- Iron: recorded between 0.7 mg/l in Cell 7 Sump and 6.6 mg/l in Cell 6 Sump;
- Lead: recorded between 0.4 µg/l in Cell 7 Sump and 12.6 µg/l in Cell 1/2 Sump;
- Manganese: recorded between 87.8 µg/l in Cell 1/2 Sump and 1130.0 µg/l in Cell 3/4 Sump;
- Nickel: recorded between 67.7 µg/l in Cell 7 Sump and 306.0 µg/l in Cell 1/2 Sump; and
- Zinc: recorded between 7.5 µg/l in the Cell 7 Sump and 105.0 µg/l in Cell 1/2 Sump.

4.3. SURFACE WATER

SURFACE WATER CHEMISTRY - MONTHLY AND QUARTERLY SUITES

4.3.1. The surface water monitoring is summarised in Table 4-3 and shown graphically in Figure 11 to Figure 14. Table S4.3 of the Site Permit sets limits on allowable concentrations at two regulated emission points, SW205a and SW206. Sample point SW206 was recorded dry in July 2022 and no sample was collected on this occasion. It should also be noted that SW203, which is not a regulated emission point under the Site Permit, was dry on four occasions with no sample collected in May, July, August and September 2022. The results obtained are discussed below and results are shown on the laboratory certificates appended to this report (Appendix A and Appendix C).

4.3.2. During Q2 (April) 2022, unfiltered samples, from all monitoring locations, were submitted to the laboratory, and these had to be resampled and resubmitted to the laboratory in May 2022 which delayed the quarterly results of analysis. SW203 was dry in May 2022 and therefore only half a quarterly analysis was applied to this location.

pH

4.3.3. The compliance limit for the site is between pH 6.0 – pH 9.0 at the regulated emission points SW205a and SW206. The compliance limit for SW205a and SW206 was not breached during 2022. pH is not recorded in-situ. For all surface water monitoring sites (SW201 to SW207 inclusive), pH was recorded between 6.6 and 8.4 for 2022.

Suspended Solids

- 4.3.4. The time series of suspended solids is shown in Figure 11. Measured concentrations of suspended solids were all below Site Permit limits of 70 mg/l (SW205a) and 50 mg/l (SW206). The maximum concentration recorded for SW205a and SW206 was 21.6 mg/l (March 2022) and 15.8 mg/l (September 2022), respectively. The range of values for all surface water monitoring sites (SW201 to SW207 inclusive) ranged between 2.05 mg/l and 43.8 mg/l for 2022. No trends are apparent in the data obtained since 2014.

Ammoniacal Nitrogen as N

- 4.3.5. Figure 12 shows the recorded concentrations of ammoniacal nitrogen as N for surface waters. No exceedances of the compliance limit for ammoniacal nitrogen as N (1.0 mg/l) were recorded for SW205a and SW206. A maximum concentration of 0.9 mg/l and 0.2 mg/l were recorded at SW205a and SW206 respectively. The maximum recorded concentration of ammoniacal nitrogen as N at all other surface water locations was recorded at SW203 (10.6 mg/l) during February 2022, which follows a spike of 9.2 mg/l in November 2021 and then was below the LOD for the rest of 2022. No obvious trends are apparent in the data.
- 4.3.6. In November 2022, a concentration of 1.16 mg/l for ammoniacal nitrogen as N was recorded at SW205a and the compliance limit is 1.0 mg/l. SW205a was resampled due to the slight breach in compliance limit and to ensure there were no external factors (human and/or experimental) contributing to the result of analysis as this was the first recorded instance. A concentration of 0.4 mg/l was recorded for SW205a resample and on this basis, no Schedule 6 Notice was submitted.

Chloride

- 4.3.7. Concentrations of chloride recorded since 2014 are shown in Figure 13. No exceedance of the compliance limit (150 mg/l) was recorded at SW205a and SW206 in 2022. SW205a recorded a maximum concentration of 90.7 mg/l (October 2022) and SW206 recorded 38.9 mg/l (October 2022). The maximum concentration recorded at all other surface water monitoring locations was 81.4 mg/l (SW202). The data indicate a spike in chloride concentrations at most surface water locations in October and November 2022 (Figure 13).

MCP

- 4.3.8. The time series of MCP concentrations detected in the surface waters is shown in Figure 14. No exceedances of the compliance limit (0.000055mg/l) was recorded at SW205a and SW206 during 2022. MCP was detected above the laboratory LOD (0.00004 mg/l) at SW203 (not a regulated emission point), in April 2022 (0.0000544 mg/l).
- 4.3.9. Figure 14 shows a general increase in MCP at surface water locations between 2020 and 2022, relative to 2019. This increase is due to an increase in laboratory LOD for MCP for samples that had interference. This has appeared at some locations during 2022.

Dichloromethane

- 4.3.10. Dichloromethane was not detected at any location above the laboratory LOD (0.003 mg/l to 0.006 mg/l) at any surface water monitoring point during 2022. The laboratory LOD was marginally above the Site Permit compliance limit of 0.002 mg/l for SW205a and SW206 and therefore presents false breaches in Table 4-3.

4-methylphenol

- 4.3.11. 4-methylphenol was not detected at any surface water monitoring location above the laboratory LOD (0.001 mg/l) during 2022 and the Site Permit compliance limit of 0.001 mg/l at SW205a and SW206 was not exceeded (Table 4-3).

Diethylphthalate

- 4.3.12. Diethylphthalate was not detected at any surface water monitoring location above the laboratory LOD (varied between 0.001 mg/l and 0.002 mg/l) for all sampling locations during 2022. The Site Permit compliance limit of 0.003 mg/l at SW205a and SW206 was not exceeded.

Cadmium (filtered)

- 4.3.13. Cadmium was not detected at any location above the laboratory LOD (0.00008 mg/l) at any surface water monitoring point during 2022. The compliance limit for SW205a and SW206 is 0.0001 mg/l.

SURFACE WATER CHEMISTRY - EXTENDED 'ANNUAL' SUITE OF ANALYSIS

- 4.3.14. Sampling of the surface waters for the annual suite of analysis took place on 24th October 2022. The suites for the annual Hazardous 'List 1' Substances (List 1) monitoring was agreed with NRW beforehand and are summarised within the appended technical note (Appendix B). The results are shown on the certificates of analysis in Appendix C. The general chemistry of the surface waters in terms of transition metals and some Hazardous Substances is discussed below.
- 4.3.15. It should also be noted that due to a misunderstanding with the lab at the time of analysis, only half of the 'List 1' monitoring was undertaken on all samples. This error occurred due to a change in laboratory management and assumptions that communications at the time were understood from both parties involved. Unfortunately, the error has been recognised on completion of this report. All outstanding and incomplete analysis of the 'List 1' suite will be completed on January 2023 samples. This will include phenols, PAHs, BTEX, herbicides and pesticides. This approach has been discussed and agreed with the Client and the results of outstanding analysis for the 'List 1' suite on all samples will be provided to NRW post-submission of this Annual Report.

Hazardous 'List 1' Substances Summary

- 4.3.16. A summary of the following hazardous 'List 1' analysis includes:
- Organics specifically dinitro-o-cresol detected at all surface water sampling locations except for SW205a. A minimum concentration of 0.16 µg/l at SW202 and a maximum concentration of 0.46 µg/l at SW204 was recorded and
 - SVOCs (semi-volatile organic compound) and VOCs (volatile organic compounds) were not detected above the laboratory LOD at any surface water location.
- 4.3.17. Chromium was not detected above the laboratory LOD at any surface water location.
- 4.3.18. Other transition metals (i.e. in addition to cadmium (dissolved) above) were only detected at trace concentrations and are listed as follows:
- Copper: was detected at all surface water monitoring locations and concentrations ranged between 2.73 µg/l (SW203) and 5.96 µg/l (SW202);
 - Lead: was detected at all surface water monitoring locations and concentrations ranged between 0.30 µg/l (SW203) and 0.39 µg/l (SW207);
 - Manganese: was detected at all surface water monitoring locations and concentrations ranged between 8.11 µg/l (SW203) and 37.60 µg/l (SW205a);

- Nickel: was detected at all surface water monitoring locations and concentrations ranged between 0.73 µg/l (SW201) and 4.11 µg/l (SW205a); and
- Zinc was detected at all surface water monitoring locations and concentrations ranged between 2.77 µg/l (SW204) and 16.30 µg/l (SW207).

4.4. GROUNDWATER

GROUNDWATER LEVELS

- 4.4.1. The groundwater level data obtained from the perimeter monitoring boreholes are summarised in Table 4-4 and Figure 1 (for January 2022 groundwater levels only). The 2022 recorded groundwater level data indicates a general movement of groundwater from north to south, consistent with the site topography and historical monitoring.

GROUNDWATER CHEMISTRY – MONTHLY AND QUARTERLY SUITES

- 4.4.2. This section includes the chemistry of the under-drainage locations (UD1 - UD5) and the perimeter monitoring boreholes. It should be noted that the under-drainage locations are internal to the site, whereas the perimeter monitoring boreholes are external to the containment facility (Figure 1). Under-drainage monitoring point UD2 and perimeter monitoring borehole NACW227 were unable to be sampled for the entire year as they were dry. UD5 was recorded dry in July 2022 and no sample was submitted for analysis on this occasion.
- 4.4.3. The groundwater compliance monitoring is summarised in Table 4-5 and shown graphically in Figure 15 to Figure 19.

Ammoniacal Nitrogen as N

- 4.4.4. In July 2022 an exceedance of ammoniacal nitrogen as N (compliance limit 5.5 mg/l) was recorded at perimeter borehole NACW228 (6.55 mg/l). Unfortunately, a Schedule 6 Notice for this monitoring site was not submitted due to an omission. Notwithstanding, the observed exceedance is not considered significant with regards to magnitude or frequency (minor exceedance on a single occasion over the 2014-2022 monitoring period). Moving forward and to ensure permit requirements are adhered to, an automated trigger level with the laboratory could be applied if there's a breach, and Schedule 6 Notices issued as and when required.
- 4.4.5. All other recordings did not exceed the compliance limit. Aside from the exceedance specified above, a maximum recorded concentration of 3.89 mg/l was recorded at NACW228 in July 2022. No trends are apparent within the time series data shown in Figure 15.

Chloride

- 4.4.6. No exceedances of the Site Permit compliance limit (150 mg/l) for chloride were recorded in either the under-drainage or perimeter monitoring boreholes during 2022. A range in chloride concentrations were recorded with the minimum concentration of 4.9 mg/l at BH3/8 (January 2022) and maximum concentration of 146.0 mg/l at NACW228 (April 2022).
- 4.4.7. The data shown in Figure 16 appears to show a long term slightly increasing trend at BH3/8, BH3/9, BH5/02, NACW203, NACW205, NACW228 and UD1 since 2014. Furthermore, noticeable perturbations in chloride concentrations were also observed during 2022 at several locations, with maximum concentrations observed at NACW228 from July 2022 onwards.

MCPP

- 4.4.8. Two exceedances for MCPP were recorded at NACW228 in January 2022 (0.000066 mg/l) and October 2022 (0.000059 mg/l). Schedule 6 Notices have been issued for these exceedances. There were also 3 instances where the laboratory LOD (ranging between 0.00004 mg/l and 0.00008 mg/l) exceeded the compliance limit for MCPP (0.000055 mg/l) and therefore present false breaches in Table 4-5. There were 3 other instances where the LOD was elevated to 0.002 mg/l at BH3/3, BH3/6 and BH3/9; however, these monitoring locations are not regulated emission points and therefore a Schedule 6 Notice was not required to be submitted. No other exceedances of the Site Permit Compliance Limit for MCPP, bar the two exceedances at NACW228, was recorded in any of the under-drainage and perimeter borehole monitoring locations for the duration of 2022.
- 4.4.9. The time series data shown in Figure 17 illustrate the sporadic nature of the MCPP detections and exceedances recorded at NACW228.

Dichloromethane

- 4.4.10. Dichloromethane was not detected at any location above the laboratory LOD (0.003 mg/l to 0.007 mg/l) at any point during 2022. The laboratory LOD was above the Site Permit compliance limit of 0.002 mg/l for all analytical results at all groundwater monitoring locations and therefore presents false breaches (Table 4-5).

4-methylphenol and diethylphthalate

- 4.4.11. There were no breaches of the Site Permit for these compounds during 2022, which were not detected in any groundwater location at any time. There was one instance where the laboratory LOD (0.002 mg/l) exceeded the compliance (0.001 mg/l) for 4-methylphenol at NACW203 and therefore presents a false breach (Table 4-5).

Cadmium (dissolved)

- 4.4.12. Cadmium was not detected above its laboratory LOD (0.00008 mg/l) at any perimeter borehole or under-drainage location. There was once instance where cadmium was detected above the laboratory LOD at BH3/8, where a recording of 0.000087 mg/l was detected in May 2022 but this did not exceed the compliance limit of 0.0001 mg/l.
- 4.4.13. The time series of reported cadmium is shown in Figure 18 and shows no trends or obvious patterns.

Nickel (dissolved)

- 4.4.14. Nickel was detected above its laboratory LOD (0.0004 mg/l) on thirty-one occurrences. However, there were no exceedances of the compliance limits for nickel (0.02 mg/l and 0.037 mg/l for NACW212 only) during 2022. A maximum concentration of 0.00899 mg/l was recorded in NACW219 in May 2022.
- 4.4.15. The time series of reported nickel is shown in Figure 19 and shows no obvious trend or pattern.

GROUNDWATER CHEMISTRY – EXTENDED ‘ANNUAL’ SUITE OF ANALYSIS

- 4.4.16. Sampling of the under-drainage and perimeter groundwater for the annual suite of analysis took place on 24th October 2022. The suites for the annual Hazardous ‘List 1’ Substances (List 1) monitoring were agreed with NRW beforehand and are summarised within the appended technical note (Appendix B). The results are shown on the certificates of analysis in Appendix C. The general chemistry of the groundwaters in terms of transition metals and some Hazardous Substances is

discussed below. Monitoring locations NACW227 and UD2 were dry on most sample visits in 2022 and unable to be sampled.

- 4.4.17. It should also be noted that due to a misunderstanding with the lab at the time of analysis, only half of the 'List 1' monitoring was undertaken on all samples. This error occurred due to a change in laboratory management and assumptions that communications at the time were understood from both parties involved. Unfortunately, the error has been recognised on completion of this report. All outstanding and incomplete analysis of the 'List 1' suite will be completed on January 2023 samples. This will include Phenols, Cyanide, PAHs, TPHs, BTEX, Herbicides and Pesticides. This approach has been discussed and agreed with the Client and the results of outstanding analysis for the 'List 1' suite on all samples will be provided to NRW post-submission of this Annual Report.

Under-drainage Hazardous 'List 1' Substances Summary

- 4.4.18. A summary of the following hazardous 'List 1' substances include:

- Organics, specifically dinitro-o-cresol was not detected above the laboratory LOD;
- SVOCs (semi-volatile organic compound) and VOCs (volatile organic compounds) were not detected above the laboratory LOD at any surface water location;
- Transition metals (dissolved), excluding those discussed above:
 - Chromium was below the laboratory LOD at all locations;
 - Copper was detected at all locations and concentrations ranged between 0.60 µg/l (UD3) to 1.04 µg/l (UD5);
 - Lead was detected at UD4 (0.33 µg/l). All other locations were below the laboratory LOD;
 - Manganese was detected at UD1 (37.5 µg/l) and UD4 (0.33 µg/l). All other locations were below the laboratory LOD;
 - Nickel was detected at UD1 (0.45 µg/l), UD4 (0.43 µg/l) and UD5 (0.46 µg/l); and,
 - Zinc was detected at all locations and concentrations ranged between 2.19 µg/l (UD4) to 9.87 µg/l (UD5).

Perimeter Groundwaters Hazardous 'List 1' Substances Summary

- 4.4.19. A summary of the following hazardous 'List 1' substances include:

- Organics, specifically dinitro-o-cresol, was detected at four locations (BH3/4, BH3/5, BH5/02 and NACW212). The concentrations ranged between 0.13 µg/l (BH3/4) to 0.19 µg/l (BH5/02);
- SVOCs (semi-volatile organic compound) and VOCs (volatile organic compounds) were not detected above the laboratory LOD at any surface water location;
- Transition metals (dissolved), in addition to cadmium noted above:
 - Chromium was below the laboratory LOD at all locations;
 - Copper was detected at fifteen locations (excluding NACW203 which was below laboratory LOD) and concentrations ranged between 0.50 µg/l (BH3/3) and 6.91 µg/l (BH3/4);
 - Lead was detected at BH208 and BH3/5 with concentrations of 0.23 µg/l and 0.70 µg/l respectively;
 - Manganese was detected at six locations (above the laboratory LOD) and concentrations ranged between 3.64 µg/l (BH3/5) and 993 µg/l (NACW219);
 - Nickel was detected at eight locations (above the laboratory LOD) and concentrations ranged between 0.46 µg/l (BH3/5) and 4.78 µg/l (BH3/4); and
 - Zinc was detected at fourteen locations (excluding NACW203 which was below laboratory LOD) and concentrations ranged between 1.18 µg/l (BH3/8) and 8.02 µg/l (NACW212).

4.5. LANDFILL GAS MONITORING PERIMETER BOREHOLES

4.5.1. The requirements of the Site Permit are summarised in Table 3-4 and the gas data obtained during 2022 are summarised in Table 4-6 to Table 4-8.

4.5.2. BH3/3 was recorded as artesian in January 2022, October 2022 and December 2022; therefore some gas measurements were not able to be taken. Borehole NACW220 was decommissioned in 2012 due to the construction and operation of Cell 7 Sump and no records are provided on this basis.

Methane

4.5.3. There was no exceedance of the compliance limit of 1% v/v above background methane during 2022. Methane was recorded at 0% v/v at all perimeter borehole monitoring locations.

Carbon Dioxide

4.5.4. There were no exceedances of the carbon dioxide compliance limit of 3.5% v/v during 2022. Carbon dioxide was recorded at all perimeter borehole monitoring locations and a maximum concentration of 3.3% was recorded at NACW212 (May 2022) and BH3/10 (December 2022).

Oxygen

4.5.5. Oxygen concentrations at all monitoring locations ranged between 13.2% (BH3/2) and 23.3% (BH3/11) during the 2022 monitoring.

4.6. SUMMARY OF CONTROL LEVEL BREACHES (SCHEDULE 6 NOTICES)

4.6.1. A total of five breaches (including NACW228 Section 4.4.4 of this report) were identified and four Schedule 6 Notices were issued to NRW during 2022 following breaches of the compliance limits within the Site Permit. These are shown in Table 4-9 and summarised below:

- Two submitted regarding Cell 1/2 Sump for breach of the compliance limit for Mecoprop (MCP) in Quarter 1 (Q1) and 4 (Q4); and,
- Two submitted regarding NACW228 for breach of the compliance limit for MCP in Quarter 1 (Q1) and 4 (Q4);

4.6.2. In July 2022 an exceedance of ammoniacal nitrogen as N (compliance limit 5.5 mg/l) was recorded at NACW228 (6.55 mg/l). Unfortunately, a Schedule 6 Notice for this monitoring site was not submitted due to an omission. Notwithstanding, the observed exceedance is not considered significant with regards magnitude or frequency (minor exceedance on a single occasion over the 2014-2022 monitoring period). Moving forward and to ensure permit requirements are adhered to, an automated trigger level with the laboratory could be applied if there's a breach, and Schedule 6 Notices issued as and when required.

4.6.3. The reported breaches are discussed in more detail in Section 5.

5. DISCUSSION

5.1. GENERAL CONSIDERATIONS

- 5.1.1. The overall impression from the results of the monitoring undertaken during 2022, was that the site had little (if any) impact on the surrounding water environment during this period, consistent with previous reporting. This will be reassessed when all analytic results relating to the Hazardous 'List 1' Substances screen become available.
- 5.1.2. A variation in leachate strength is apparent within the leachate sumps, for example chloride is found at approximately 4,500 mg/l in Cell 7 Sump but at approximately 12,300 mg/l in Cell 1/2 Sump. However, there is no indication that this is impacting on surrounding groundwater or surface water. Concentrations of indicator parameters within the leachate are greater than in the surrounding water environment typically by between one and two orders of magnitude and occasionally more. Furthermore, the leachate chemistry (excluding parts of the annual suite analysis), both in terms of its general indicators (e.g. ammoniacal nitrogen and chloride) and some of its trace chemistry (e.g. transition metals, VOCs and SVOCs) is sufficiently different from the chemistry of the surrounding water environment that chronic leakage would be detected in groundwater. There has been no change to groundwater determinands or emerging trends that would indicate an impact from the rising leachate concentrations upon the water environment. This will be reassessed when all analytical results relating to the Hazardous 'List 1' Substances screen become available.

5.2. PERMIT BREACHES

- 5.2.1. The Permit breaches (excluding NACW228) that occurred in 2022 related to reported concentrations of the following:
- In Q1 and Q4 2022, an exceedance of Mecoprop (MCP) was recorded at the leachate monitoring point Cell 1/2 Sump; and
 - In Q1 and Q4 2022, an exceedance of MCP was recorded at the groundwater monitoring point NACW228.
- 5.2.2. Regular occurrences of MCP exceedances at Cell 1/2 Sump have occurred throughout 2019 and 2020; and have appeared during the first and last quarter of 2021 and 2022. The MCP exceedance at NACW228 has occurred once during 2021 and twice during 2022, indicating a possible increasing trend that will be investigated as monitoring progresses. It is recommended that a review of MCP exceedance in leachate and other monitoring locations is undertaken as a wider review outside of this factual report.
- 5.2.3. In July 2022 an exceedance of ammoniacal nitrogen as N (compliance limit 5.5 mg/l) was recorded at NACW228 (6.55 mg/l). Unfortunately, a Schedule 6 Notice for this monitoring site was not submitted due to an omission. Notwithstanding, the observed exceedance is not considered significant with regards magnitude or frequency (minor exceedance on a single occasion over the 2014-2022 monitoring period). Moving forward and to ensure permit requirements are adhered to, an automated trigger level with the laboratory could be applied if there's a breach, and Schedule 6 Notices issued as and when required.

5.3. PROBLEMS ENCOUNTERED DURING MONITORING, 2022

- 5.3.1. The main problem experienced during the monitoring undertaken in 2022 was inability to obtain samples from borehole NACW227, immediately south of the Leachate Holding Lagoon and at under-drainage location UD2, on the north-eastern site margin.
- 5.3.2. Borehole NACW227 and UD2 were dry for all of 2022, as mentioned in Section 4.4.2 above. The reasons for the absence of fluid column is unclear. Both these locations are controlled locations within the Site Permit and investigations are therefore recommended to ascertain the causes for the absence of fluid column and whether the sampling locations should be re-instated.
- 5.3.3. Due to a misunderstanding with the lab, the October 2022 annual suite (Hazardous 'List 1' Substances) was unable to be fully analysed. This error occurred due to a change in laboratory management and assumptions that communications at the time were understood from both parties involved. Unfortunately, the error has been recognised on completion of this report. All outstanding and incomplete analysis of the Hazardous 'List 1' Substances suite will be completed on January 2023 samples. This will include phenols, Cyanide, TPH, PCBs, BTEX, herbicides and pesticides. This approach has been discussed and agreed with the Client and the results of outstanding analysis for the Hazardous 'List 1' Substances suite on all samples will be provided to NRW post-submission of this Annual Report.
- 5.3.4. In April 2022 (quarterly monitoring round) no samples were filtered and resampling of all monitoring sites had to be undertaken in May 2022. This delayed the submission of the quarterly reports. SW203 was dry in May 2022 and therefore only half of the quarterly suite analysis was applied to this sample location.
- 5.3.5. There have also been instances where the sample holding time has been exceeded and alternative method of analyses applied which has resulted in non-compliant sample that are not UKAS Accredited. This will be reviewed with ALS in 2023 to reduce the likelihood of this occurring.

5.4. LIMITS OF DETECTION

- 5.4.1. The detection limits for MCPP and 4-methylphenol are in places higher than permit requirements for surface water and groundwater monitoring locations. The LOD is increased by the lab where a sample dilution is applied because of interference caused by the sample when analysed for a specific determinant. The laboratory tries to avoid applying a sample dilution, but this has to be applied to samples and sometimes repeated in order to get a result.
- 5.4.2. The laboratory LOD for Dichloromethane is higher than the compliance limit for surface water and groundwater locations.

5.5. RECOMMENDATIONS FOR ANNUAL HAZARDOUS 'LIST 1' SUBSTANCES SAMPLING 2023

- 5.5.1. A partial analysis of the Hazardous 'List 1' Substances (List 1) screen sampling was undertaken in October 2022 and has been summarised in this report. Analysis of the 'List 1' screen is being undertaken on January 2023 samples. The results of analysis will be available post-submission of this annual report and will be provided to the Regulator in due course.
- 5.5.2. The requirements for the parameters to be tested in the 'List 1' sampling during 2022, should be reviewed in the context of a review of the HRA. WSP recommend that the HRA is updated, with a

view of submitting an Environmental Permit Variation, and should be considered for 2023/2024 monitoring programme.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. CONCLUSIONS

- 6.1.1. The monitoring results obtained during 2022 indicate that the landfill had little measurable and no significant or sustained impact on the surrounding environment.
- 6.1.2. There were five breaches (including NACW228 Section 4.4.4 and Section 4.6.2 of this report) and four Schedule 6 Notices issued following breaches of the compliance limits within the Site Permit. These are summarised in Table 4-9 and summarised below:
- In Q1 and Q4 2022, an exceedance of Mecoprop (MCP) was recorded at the leachate monitoring point Cell 1/2 Sump; and
 - In Q1 and Q4 2022, an exceedance of MCP was recorded at the groundwater monitoring point NACW228.
- 6.1.3. Exceedances in MCP at NACW228 have occurred once during 2021 and twice during 2022, suggesting a potential emerging pattern. MCP in Cell 1/2 Sump had previously been a sustained breach from mid-2018 to 2020 and had 2 exceedances during 2021 and 2022.
- 6.1.4. During 2016, CWM undertook an internal audit of all the water monitoring undertaken in the three preceding years, 2013 – 2015. This confirmed between two and seven Site Permit breaches in these years, set against a backdrop of between 21,000 and 22,000 laboratory determinations, and that the total site compliance exceeded 99.99 % in each year. Similar compliance was achieved in 2016 and 2017. Some rationalisation of the existing monitoring is therefore technically justified.
- 6.1.5. Figure 2 shows a sharp increase in leachate head for Cell 5 Sump, Cell 6 Sump and Cell 7 Sump which is due to a human error in recording depth to base at these monitoring locations towards the end of 2022. This resulted in falsified increased in head at the sites and the true depth of these locations will be confirmed with the Client. Monitored leachate heads within the sumps were compliant with the requirements of the Site Permit throughout 2022. The mean head recorded across all sumps during 2022 was 0.42 m.

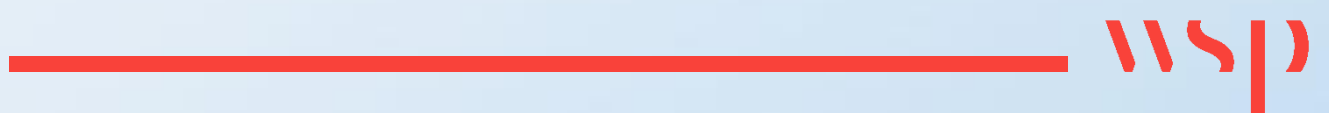
6.2. RECOMMENDATIONS

- 6.2.1. The following recommendations are made:
1. Monitoring locations UD2 and NACW227 should be investigated to assess the causes for the absence of fluid column. These locations should be reinstated and/or replaced if possible;
 2. The detection limits for dichloromethane, MCP and 4-methylphenol should be discussed with the laboratory to confirm if there is any scope for reducing the detection limit to below the compliance limit or if there is an alternative method for analysis;
 3. An investigation into exceedances of MCP at Cell 1/2 Sump, NACW228 and also nearby monitoring locations should be undertaken;
 4. A trend analysis of the changes in chloride concentrations (e.g., using the Mann Kendall trend analysis) at groundwater locations to see if chloride concentrations are increasing overtime.
 5. An investigation to confirm assumptions regarding natural cadmium ranges in groundwater could be implemented;
 6. Implementation of the recommendations made in the latest review of the HRA (Parsons Brinkerhoff, November 2017, where WSP and Parsons Brinkerhoff are the same entity) and 2019

annual compliance report, regarding modification of the Site Permit and EMMP in the context of the monitoring information obtained.

- 6.2.2. CWM had intentions to submit an Environmental Permit Variation Application during 2022. This should be considered for 2023 to reduce the sites monitoring burden. WSP and CWM will seek NRW assistance in achieving this.

TABLES



TABLES

**Table 4-1 - Leachate Heads for Cell Sumps and In-waste Boreholes, 2022**

Leachate Thickness (m above base of liner)												
	11/01/2022	08/02/2022	02/03/2022	13/04/2022	11/05/2022	14/06/2022	12/07/2022	16/08/2022	06/09/2022	24/10/2022	07/11/2022	12/12/2022
Cell Sumps												
Cell 1/2 Sump	0.24	0.28	0.29	0.37	0.32	0.12	0.08	0.17	0.25	0.34	0.65	0.55
Cell 3/4 Sump	0.34	0.32	0.33	0.40	0.37	0.40	0.13	0.20	0.15	0.40	0.95	0.70
Cell 5 Sump	0.34	0.31	0.40	0.49	0.37	0.32	0.24	0.07	0.23	0.29	0.62	0.59
Cell 6 Sump	0.28	0.25	0.40	0.32	0.10	0.29	0.30	0.32	1.39	1.20	1.37	0.94
Cell 7 Sump	0.26	0.24	0.29	0.34	0.07	0.32	0.40	0.30	0.83	0.52	0.97	0.93
In Waste Boreholes												
M1A	0.14	0.13	0.08	0.17	0.30	0.12	0.08	0.10	0.20	0.09	0.08	0.40
M1B	0.15	0.30	0.11	0.14	0.10	0.06	Dry	0.05	Dry	0.02	0.04	0.26
M2A	0.39	0.27	0.18	0.15	0.15	0.15	0.10	0.05	Dry	Dry	Dry	Dry
M2B	0.22	0.20	0.29	0.33	0.29	0.08	0.05	0.10	0.10	0.12	Dry	0.18
M3A	0.20	0.20	0.08	0.12	0.20	0.09	0.10	Dry	0.10	0.10	0.14	0.22
M3B	0.21	0.21	0.08	0.10	0.10	Dry	Dry	Dry	0.08	Dry	Dry	0.17
M4A	0.19	0.17	0.11	0.27	0.33	0.06	0.09	Dry	0.34	0.08	0.11	0.18
M4B	0.19	0.15	Dry	0.04	0.27	Dry	Dry	Dry	0.09	Dry	0.09	0.06
LMP5a	0.04	0.04	0.05	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
LMP5b	0.03	0.02	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
LMP6a	0.04	0.03	0.02	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
LMP7a	0.02	0.01	Dry	0.02	Dry	Dry	0.01	0.16	0.35	0.21	0.42	0.26
LMP7b	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	0.11	0.08	0.10	0.18

Table 4-2 - Summary of Compliance Monitoring, Site Leachate 2022

Monthly Monitoring										
Borehole	Determinand	Units	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit (CL)	N > CL
Cell 1/2 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	1	3	3	144.77	73.3	204	<3,640	0
Cell 1/2 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	2	1	1	273	273	273	<3,640	0
Cell 1/2 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	4	5	5	741.6	558	905	<3,640	0
Cell 1/2 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	10	3	3	1786.67	1340	2460	<3,640	0
Cell 3/4 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	1	2	2	169	134	204	<3,640	0
Cell 3/4 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	2	1	1	480	480	480	<3,640	0
Cell 3/4 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	4	6	6	810.5	642	946	<3,640	0
Cell 3/4 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	10	3	3	1113.33	1040	1220	<3,640	0
Cell 5 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	2	1	1	486	486	486	<3,640	0
Cell 5 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	4	2	2	725.5	515	936	<3,640	0
Cell 5 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	10	9	9	1230	1020	1380	<3,640	0
Cell 6 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	1	4	4	122.25	102	157	<3,640	0
Cell 6 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	2	2	2	350.5	278	423	<3,640	0
Cell 6 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	4	5	5	810.4	573	952	<3,640	0
Cell 7 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	1	1	1	195	195	195	<3,640	0
Cell 7 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	2	2	2	336.5	269	404	<3,640	0



Monthly Monitoring										
Borehole	Determinand	Units	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit (CL)	N > CL
Cell 7 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	4	3	3	736.33	553	867	<3,640	0
Cell 7 Sump	Ammoniacal Nitrogen as N mg/l	mg/l	10	5	5	1192	1010	1420	<3,640	0
Leachate Holding Lagoon	Ammoniacal Nitrogen as N mg/l	mg/l	0.2	1	1	1.46	1.46	1.46	<3,640	0
Leachate Holding Lagoon	Ammoniacal Nitrogen as N mg/l	mg/l	4	1	1	553	553	553	<3,640	0
Leachate Holding Lagoon	Ammoniacal Nitrogen as N mg/l	mg/l	10	10	10	1212	1030	1330	<3,640	0
Cell 1/2 Sump	Chloride mg/l	mg/l	20	3	3	1600	1520	1710	<19,000	0
Cell 1/2 Sump	Chloride mg/l	mg/l	40	3	3	2900	2380	3390	<19,000	0
Cell 1/2 Sump	Chloride mg/l	mg/l	100	2	2	5135	4970	5300	<19,000	0
Cell 1/2 Sump	Chloride mg/l	mg/l	200	4	4	12025	11700	12300	<19,000	0
Cell 3/4 Sump	Chloride mg/l	mg/l	10	1	1	895	895	895	<19,000	0
Cell 3/4 Sump	Chloride mg/l	mg/l	20	5	5	1470	1400	1610	<19,000	0
Cell 3/4 Sump	Chloride mg/l	mg/l	40	3	3	2076.67	1200	3250	<19,000	0
Cell 3/4 Sump	Chloride mg/l	mg/l	100	3	3	5353.33	4280	5920	<19,000	0
Cell 5 Sump	Chloride mg/l	mg/l	20	1	1	963	963	963	<19,000	0
Cell 5 Sump	Chloride mg/l	mg/l	40	1	1	3400	3400	3400	<19,000	0
Cell 5 Sump	Chloride mg/l	mg/l	100	10	10	6413	4690	7520	<19,000	0
Cell 6 Sump	Chloride mg/l	mg/l	4	2	2	282.5	218	347	<19,000	0

Monthly Monitoring										
Borehole	Determinand	Units	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit (CL)	N > CL
Cell 6 Sump	Chloride mg/l	mg/l	20	6	6	1305	1090	1840	<19,000	0
Cell 6 Sump	Chloride mg/l	mg/l	40	3	3	1631.67	815	2830	<19,000	0
Cell 7 Sump	Chloride mg/l	mg/l	10	2	2	493.5	484	503	<19,000	0
Cell 7 Sump	Chloride mg/l	mg/l	20	4	4	1637.5	1420	1880	<19,000	0
Cell 7 Sump	Chloride mg/l	mg/l	40	3	3	2006.67	1630	2750	<19,000	0
Cell 7 Sump	Chloride mg/l	mg/l	100	2	2	3145	1790	4500	<19,000	0
Leachate Holding Lagoon	Chloride mg/l	mg/l	20	1	1	1620	1620	1620	<19,000	0
Leachate Holding Lagoon	Chloride mg/l	mg/l	40	4	4	2860	2100	3710	<19,000	0
Leachate Holding Lagoon	Chloride mg/l	mg/l	100	7	7	4637.14	4130	5340	<19,000	0
Cell 1/2 Sump	Electrical conductivity @20°C (lab) µS/cm	µS/cm	20	12	12	18407.5	5060	37200		0
Cell 3/4 Sump	Electrical conductivity @20°C (lab) µS/cm	µS/cm	20	12	12	11403.33	5120	21600		0
Cell 5 Sump	Electrical conductivity @20°C (lab) µS/cm	µS/cm	20	12	12	20041.67	7300	26500		0
Cell 6 Sump	Electrical conductivity @20°C (lab) µS/cm	µS/cm	20	11	11	7836.36	2350	12200		0
Cell 7 Sump	Electrical conductivity @20°C (lab) µS/cm	µS/cm	20	11	11	11347.27	3660	17900		0
Leachate Holding Lagoon	Electrical conductivity @20°C (lab) µS/cm	µS/cm	20	12	12	16355.83	8620	22000		0

Table note: Cell 6 and 7 Sump are both missing 1 analysis (during May) due to insufficient water at both locations for a sample.



Quarterly Monitoring										
Borehole	Determinand	Units	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	N > CL
Cell 1/2 Sump	4-Methylphenol	mg/l	0.01	3	0	0.01	0.01	0.01	<1.6 mg/l	0
Cell 1/2 Sump	4-Methylphenol	mg/l	0.02	1	0	0.02	0.02	0.02	<1.6 mg/l	0
Cell 3/4 Sump	4-Methylphenol	mg/l	0.01	3	0	0.01	0.01	0.01	<1.6 mg/l	0
Cell 3/4 Sump	4-Methylphenol	mg/l	0.02	1	0	0.02	0.02	0.02	<1.6 mg/l	0
Cell 5 Sump	4-Methylphenol	mg/l	0.01	3	0	0.01	0.01	0.01	<0.126 mg/l	0
Cell 5 Sump	4-Methylphenol	mg/l	0.02	1	0	0.02	0.02	0.02	<0.126 mg/l	0
Cell 6 Sump	4-Methylphenol	mg/l	0.01	2	0	0.01	0.01	0.01	<0.126 mg/l	0
Cell 6 Sump	4-Methylphenol	mg/l	0.02	2	0	0.02	0.02	0.02	<0.126 mg/l	0
Cell 7 Sump	4-Methylphenol	mg/l	0.01	2	0	0.01	0.01	0.01	<0.126 mg/l	0
Cell 7 Sump	4-Methylphenol	mg/l	0.02	2	1	0.06	0.02	0.104	<0.126 mg/l	0
Leachate Holding Lagoon	4-Methylphenol	mg/l	0.01	2	0	0.01	0.01	0.01		0
Leachate Holding Lagoon	4-Methylphenol	mg/l	0.02	2	0	0.02	0.02	0.02		0
Cell 1/2 Sump	Cadmium (filtered)	mg/l	0.00008	4	4	0	0.000152	0.000776	<0.105 mg/l	0
Cell 3/4 Sump	Cadmium (filtered)	mg/l	0.00008	4	3	0	0.00008	0.000579	<0.105 mg/l	0
Cell 5 Sump	Cadmium (filtered)	mg/l	0.00008	4	4	0	0.000101	0.00108	<0.105 mg/l	0
Cell 6 Sump	Cadmium (filtered)	mg/l	0.00008	3	2	0	0.00008	0.000163	<0.105 mg/l	0
Cell 6 Sump	Cadmium (filtered)	mg/l	0.0008	1	0	0	0.0008	0.0008	<0.105 mg/l	0
Cell 7 Sump	Cadmium (filtered)	mg/l	0.00008	3	2	0	0.00008	0.00015	<0.105 mg/l	0

Quarterly Monitoring										
Borehole	Determinand	Units	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	N > CL
Cell 7 Sump	Cadmium (filtered)	mg/l	0.0008	1	0	0	0.0008	0.0008	<0.105 mg/l	0
Leachate Holding Lagoon	Cadmium (filtered)	mg/l	0.00008	4	3	0	0.00008	0.000294		0
Cell 1/2 Sump	Dichloromethane	mg/l	0.003	4	2	0	0.003	0.007	<0.033 mg/l	0
Cell 3/4 Sump	Dichloromethane	mg/l	0.003	4	2	0	0.003	0.006	<0.033 mg/l	0
Cell 5 Sump	Dichloromethane	mg/l	0.003	4	2	0	0.003	0.006	<0.066 mg/l	0
Cell 6 Sump	Dichloromethane	mg/l	0.003	4	2	0	0.003	0.006	<0.066 mg/l	0
Cell 7 Sump	Dichloromethane	mg/l	0.003	4	2	0	0.003	0.006	<0.066 mg/l	0
Leachate Holding Lagoon	Dichloromethane	mg/l	0.003	4	2	0	0.003	0.006		0
Cell 1/2 Sump	Diethyl phthalate	mg/l	0.01	3	0	0.01	0.01	0.01	<0.44 mg/l	0
Cell 1/2 Sump	Diethyl phthalate	mg/l	0.02	1	0	0.02	0.02	0.02	<0.44 mg/l	0
Cell 3/4 Sump	Diethyl phthalate	mg/l	0.01	3	0	0.01	0.01	0.01	<0.44 mg/l	0
Cell 3/4 Sump	Diethyl phthalate	mg/l	0.02	1	0	0.02	0.02	0.02	<0.44 mg/l	0
Cell 5 Sump	Diethyl phthalate	mg/l	0.01	3	0	0.01	0.01	0.01	<0.36 mg/l	0
Cell 5 Sump	Diethyl phthalate	mg/l	0.02	1	0	0.02	0.02	0.02	<0.36 mg/l	0
Cell 6 Sump	Diethyl phthalate	mg/l	0.01	2	0	0.01	0.01	0.01	<0.36 mg/l	0
Cell 6 Sump	Diethyl phthalate	mg/l	0.02	2	0	0.02	0.02	0.02	<0.36 mg/l	0
Cell 7 Sump	Diethyl phthalate	mg/l	0.01	2	0	0.01	0.01	0.01	<0.36 mg/l	0
Cell 7 Sump	Diethyl phthalate	mg/l	0.02	2	0	0.02	0.02	0.02	<0.36 mg/l	0

Quarterly Monitoring										
Borehole	Determinand	Units	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	N > CL
Leachate Holding Lagoon	Diethyl phthalate	mg/l	0.01	2	0	0.01	0.01	0.01		0
Leachate Holding Lagoon	Diethyl phthalate	mg/l	0.02	2	0	0.02	0.02	0.02		0
Cell 1/2 Sump	Mecoprop	mg/l	0.004	3	2	0.05	0.004	0.108	<0.071 mg/l	1
Cell 1/2 Sump	Mecoprop	mg/l	0.008	1	1	0.1	0.0986	0.0986	<0.071 mg/l	1
Cell 3/4 Sump	Mecoprop	mg/l	0.004	3	2	0.01	0.004	0.0286	<0.071 mg/l	0
Cell 3/4 Sump	Mecoprop	mg/l	0.008	1	1	0.02	0.0202	0.0202	<0.071 mg/l	0
Cell 5 Sump	Mecoprop	mg/l	0.004	3	2	0.01	0.004	0.0255	<0.14 mg/l	0
Cell 5 Sump	Mecoprop	mg/l	0.008	1	1	0.03	0.0289	0.0289	<0.14 mg/l	0
Cell 6 Sump	Mecoprop	mg/l	0.004	3	0	0	0.004	0.004	<0.14 mg/l	0
Cell 6 Sump	Mecoprop	mg/l	0.008	1	1	0.01	0.00944	0.00944	<0.14 mg/l	0
Cell 7 Sump	Mecoprop	mg/l	0.004	3	1	0.01	0.004	0.0119	<0.14 mg/l	0
Cell 7 Sump	Mecoprop	mg/l	0.008	1	1	0.01	0.011	0.011	<0.14 mg/l	0
Leachate Holding Lagoon	Mecoprop	mg/l	0.004	3	2	0.01	0.004	0.021		0
Leachate Holding Lagoon	Mecoprop	mg/l	0.008	1	1	0.03	0.0277	0.0277		0

Table notes: N denotes 'Number of Results' and CL denotes 'Compliance Limit'

Table 4-3 - Summary of Compliance Monitoring, Site Surface Waters, 2022

Monthly Monitoring								
Monitoring point	Determinand	N	N > LOD	Mean	Min	Max	Compliance Limit	N>CL
SW201	Ammoniacal Nitrogen as N mg/l	12	3	0.62	0.20	4.11		0
SW202	Ammoniacal Nitrogen as N mg/l	12	4	0.36	0.20	1.26		0
SW203	Ammoniacal Nitrogen as N mg/l	7	3	3.03	0.20	10.60		0
SW204	Ammoniacal Nitrogen as N mg/l	12	0	0.20	0.20	0.20		0
SW205a	Ammoniacal Nitrogen as N mg/l	12	4	0.31	0.20	0.93	<1.0	0
SW206	Ammoniacal Nitrogen as N mg/l	11	0	0.20	0.20	0.20	<1.0	0
SW207	Ammoniacal Nitrogen as N mg/l	12	0	0.20	0.20	0.20		0
SW201	Chloride mg/l	12	12	36.63	18.20	79.40		0
SW202	Chloride mg/l	12	12	40.64	21.50	81.40		0
SW203	Chloride mg/l	7	7	29.94	7.20	60.20		0
SW204	Chloride mg/l	12	12	31.91	13.60	79.70		0
SW205a	Chloride mg/l	12	12	40.27	27.70	90.70	<150	0
SW206	Chloride mg/l	11	11	16.61	11.40	38.90	<150	0
SW207	Chloride mg/l	12	12	26.27	15.50	32.30		0
SW201	Electrical conductivity @20°C (lab) µS/cm	12	12	468.42	233.00	834.00		0
SW202	Electrical conductivity @20°C (lab) µS/cm	12	12	520.50	330.00	838.00		0
SW203	Electrical conductivity @20°C (lab) µS/cm	8	8	368.94	59.60	670.00		0
SW204	Electrical conductivity @20°C (lab) µS/cm	12	12	456.17	326.00	766.00		0

Monthly Monitoring								
Monitoring point	Determinand	N	N > LOD	Mean	Min	Max	Compliance Limit	N>CL
SW205a	Electrical conductivity @20°C (lab) µS/cm	12	12	542.92	402.00	899.00		0
SW206	Electrical conductivity @20°C (lab) µS/cm	11	11	309.00	210.00	514.00		0
SW207	Electrical conductivity @20°C (lab) µS/cm	12	12	373.25	278.00	477.00		0
SW201	pH (lab) pH units	12	12	7.96	7.38	8.33		0
SW202	pH (lab) pH units	12	12	8.06	7.24	8.37		0
SW203	pH (lab) pH units	8	8	7.76	6.62	8.35		0
SW204	pH (lab) pH units	12	12	8.03	7.70	8.40		0
SW205a	pH (lab) pH units	12	12	8.17	7.88	8.42	6 to 9	0
SW206	pH (lab) pH units	11	11	8.11	7.80	8.35	6 to 9	0
SW207	pH (lab) pH units	12	12	8.08	7.83	8.35		0
SW201	Total Suspended solids mg/l	11	9	10.21	2.00	39.40		0
SW201	Total Suspended solids mg/l	1	1	4.34	4.34	4.34		0
SW202	Total Suspended solids mg/l	11	10	6.76	2.00	18.00		0
SW202	Total Suspended solids mg/l	1	0	4.00	4.00	4.00		0
SW203	Total Suspended solids mg/l	8	8	10.44	2.10	43.80		0
SW204	Total Suspended solids mg/l	12	9	6.52	2.00	32.10		0
SW205a	Total Suspended solids mg/l	11	9	7.03	2.00	21.60	<70	0
SW205a	Total Suspended solids mg/l	1	1	7.12	7.12	7.12	<70	0
SW206	Total Suspended solids mg/l	11	9	6.71	2.00	15.80	<50	0

Monthly Monitoring								
Monitoring point	Determinand	N	N > LOD	Mean	Min	Max	Compliance Limit	N>CL
SW207	Total Suspended solids mg/l	11	8	4.67	2.00	12.90		0
SW207	Total Suspended solids mg/l	1	0	4.00	4.00	4.00		0

Table notes: N denotes 'Number of Results'. SW203 was dry for four months and the 5th missing data point for some parameters was caused by the samples not being filtered during April. SW206 was dry during July's sampling round.

Quarterly Monitoring								
Monitoring point	Determinand	N	N > LOD	Mean	Min	Max	Compliance Limit	N>CL
SW201	4-Methylphenol mg/l	4	0	0	0.001	0.001		0
SW202	4-Methylphenol mg/l	4	0	0	0.001	0.001		0
SW203	4-Methylphenol mg/l	3	0	0	0.001	0.001		0
SW204	4-Methylphenol mg/l	4	0	0	0.001	0.001		0
SW205a	4-Methylphenol mg/l	4	0	0	0.001	0.001	<0.001	0
SW206	4-Methylphenol mg/l	3	0	0	0.001	0.001	<0.001	0
SW207	4-Methylphenol mg/l	3	0	0	0.001	0.001		0
SW207	4-Methylphenol mg/l	1	0	0	0.002	0.002		0
SW201	Cadmium (filtered) mg/l	4	0	0	0.00008	0.00008		0
SW202	Cadmium (filtered) mg/l	4	0	0	0.00008	0.00008		0
SW203	Cadmium (filtered) mg/l	2	0	0	0.00008	0.00008		0
SW204	Cadmium (filtered) mg/l	4	0	0	0.00008	0.00008		0
SW205a	Cadmium (filtered) mg/l	4	0	0	0.00008	0.00008	<0.0001	0

Quarterly Monitoring								
Monitoring point	Determinand	N	N > LOD	Mean	Min	Max	Compliance Limit	N>CL
SW206	Cadmium (filtered) mg/l	3	0	0	0.00008	0.00008	<0.0001	0
SW207	Cadmium (filtered) mg/l	4	0	0	0.00008	0.00008		0
SW201	Dichloromethane mg/l	4	2	0	0.003	0.006		0
SW202	Dichloromethane mg/l	4	2	0	0.003	0.007		0
SW203	Dichloromethane mg/l	3	1	0	0.003	0.0035		0
SW204	Dichloromethane mg/l	4	2	0	0.003	0.006		0
SW205a	Dichloromethane mg/l	4	2	0	0.003	0.006	<0.002	4
SW206	Dichloromethane mg/l	3	1	0	0.003	0.005	<0.002	3
SW207	Dichloromethane mg/l	4	2	0	0.003	0.006		0
SW201	Diethyl phthalate mg/l	4	0	0	0.001	0.001		0
SW202	Diethyl phthalate mg/l	4	0	0	0.001	0.001		0
SW203	Diethyl phthalate mg/l	3	0	0	0.001	0.001		0
SW204	Diethyl phthalate mg/l	4	0	0	0.001	0.001		0
SW205a	Diethyl phthalate mg/l	4	0	0	0.001	0.001	<0.003	0
SW206	Diethyl phthalate mg/l	3	0	0	0.001	0.001	<0.003	0
SW207	Diethyl phthalate mg/l	3	0	0	0.001	0.001		0
SW207	Diethyl phthalate mg/l	1	0	0	0.002	0.002		0
SW201	Mecoprop mg/l	4	0	0	0.00004	0.00004		0
SW202	Mecoprop mg/l	4	0	0	0.00004	0.00004		0

Quarterly Monitoring								
Monitoring point	Determinand	N	N > LOD	Mean	Min	Max	Compliance Limit	N>CL
SW203	Mecoprop mg/l	2	1	0	0.00004	0.0000544		0
SW203	Mecoprop mg/l	1	0	0	0.00008	0.00008		0
SW204	Mecoprop mg/l	4	0	0	0.00004	0.00004		0
SW205a	Mecoprop mg/l	4	0	0	0.00004	0.00004	<0.000055	0
SW206	Mecoprop mg/l	3	0	0	0.00004	0.00004	<0.000055	0
SW207	Mecoprop mg/l	3	0	0	0.00004	0.00004		0
SW207	Mecoprop mg/l	1	0	0	0.00008	0.00008		0

Table notes: N denotes 'Number of Results' and CL denotes 'Compliance Limit'. SW203 was dry during July and the sample was not filtered during April's (Q2) monitoring round, therefore only some analysis is available for that quarter.



Table 4-4 - Groundwater Elevations in Perimeter Boreholes, 2022

Borehole	Cover Elevation (mAOD)	Groundwater Elevation (mAOD)											
		11/01/2022	08/02/2022	02/03/2022	13/04/2022	11/05/2022	14/06/2022	12/07/2022	16/08/2022	06/09/2022	24/10/2022	07/11/2022	12/12/2022
BH208	124.00	123.90	123.75	123.80	123.30	123.07	123.14	123.42	123.24	123.20	123.74	123.90	123.69
BH3/1	137.99	137.16	136.29	136.96	136.39	135.53	134.86	134.85	134.86	134.34	136.34	137.27	136.87
BH3/10	144.54	142.98	143.47	143.56	142.79	140.68	138.77	138.44	139.47	138.54	143.48	143.74	143.24
BH3/11	139.88	139.11	138.20	138.78	137.68	136.31	135.44	135.40	135.72	134.95	137.88	139.32	138.61
BH3/2	142.41	141.48	139.95	140.44	139.08	137.98	136.66	136.41	137.05	136.15	139.51	141.69	139.94
BH3/3	146.85	ART	145.87	146.54	146.44	143.35	142.24	142.12	143.85	142.72	ART	ART	ART
BH3/4	138.12	136.65	137.28	137.67	136.72	136.36	135.46	135.42	135.94	135.45	136.75	137.00	137.08
BH3/5	141.1	139.25	138.51	139.06	138.06	136.08	134.83	138.11	136.20	134.89	137.90	139.01	138.88
BH3/6	140.53	136.13	136.03	135.73	135.58	134.60	133.66	133.60	134.25	133.43	135.05	136.94	135.83
BH3/8	139.79	139.07	139.05	139.09	137.51	136.14	135.79	136.11	137.83	135.07	138.97	138.93	138.81
BH3/9	143.24	141.12	140.04	140.40	138.35	137.19	136.14	136.24	136.98	135.98	139.54	142.94	140.46
BH5/02	126.50	124.64	124.59	124.49	124.57	124.45	124.25	124.40	124.18	124.20	124.24	124.40	124.60
NACW201	135.50	133.16	132.70	133.09	132.61	132.06	131.22	131.30	131.65	131.11	132.40	133.11	132.98
NACW202	135.10	132.80	132.70	132.71	132.44	131.75	130.94	131.07	131.38	130.83	132.38	132.76	132.60
NACW203	133.60	133.40	133.37	133.30	133.21	132.59	132.40	132.40	133.08	130.89	133.16	133.39	133.28
NACW204	133.10	131.15	131.04	131.19	131.00	130.68	130.25	130.40	130.37	130.16	130.82	131.10	131.21
NACW205	130.20	129.37	129.31	129.40	129.20	128.96	129.29	128.93	128.89	128.72	128.97	129.23	129.62
NACW212	119.80	118.78	118.73	118.72	118.59	118.46	118.57	118.55	118.40	118.19	118.53	118.63	118.47
NACW213	122.30	120.61	120.54	120.34	120.03	119.80	119.68	119.71	119.59	119.35	120.02	120.57	120.18
NACW215	132.50	128.73	128.63	128.88	128.34	128.37	128.38	128.05	128.06	128.07	130.66	130.50	130.25
NACW216	N/A												
NACW219	133.10	128.24	128.00	128.00	127.83	127.62	127.27	127.83	127.22	127.12	127.65	128.07	128.17
NACW227	134.80	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
NACW228	134.80	130.58	130.13	130.41	130.09	130.25	128.97	128.88	128.83	128.79	129.98	130.29	130.42
NACW229	135.00	133.98	133.91	133.80	133.76	133.62	133.30	133.06	133.81	132.42	133.19	134.25	133.68
NACW230	134.10	133.00	132.68	133.04	132.39	131.87	130.87	132.00	131.10	130.47	132.25	132.78	132.88

Table notes: ART – artesian, i.e. above ground elevation,

Where blank – no record provided by field team

Table 4-5 - Summary of Compliance Monitoring, Site Groundwater, 2022

Monthly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
BH208	Ammoniacal Nitrogen as N mg/l	0.2	12	0	0.2	0.2	0.2	<5.5	0
BH3/2	Ammoniacal Nitrogen as N mg/l	0.2	4	0	0.2	0.2	0.2	<5.5	0
BH3/3	Ammoniacal Nitrogen as N mg/l	0.2	4	0	0.2	0.2	0.2	<5.5	0
BH3/4	Ammoniacal Nitrogen as N mg/l	0.2	11	3	0.24	0.2	0.577	<5.5	0
BH3/5	Ammoniacal Nitrogen as N mg/l	0.2	4	0	0.2	0.2	0.2	<5.5	0
BH3/6	Ammoniacal Nitrogen as N mg/l	0.2	4	1	0.25	0.2	0.407	<5.5	0
BH3/8	Ammoniacal Nitrogen as N mg/l	0.2	4	1	0.26	0.2	0.436	<5.5	0
BH3/9	Ammoniacal Nitrogen as N mg/l	0.2	4	0	0.2	0.2	0.2	<5.5	0
BH5/02	Ammoniacal Nitrogen as N mg/l	0.2	12	1	0.21	0.2	0.369	<5.5	0
NACW203	Ammoniacal Nitrogen as N mg/l	0.2	12	0	0.2	0.2	0.2	<5.5	0
NACW205	Ammoniacal Nitrogen as N mg/l	0.2	12	1	0.21	0.2	0.281	<5.5	0
NACW212	Ammoniacal Nitrogen as N mg/l	0.2	12	1	0.21	0.2	0.341	<5.5	0
NACW219	Ammoniacal Nitrogen as N mg/l	0.2	4	1	0.21	0.2	0.249	<5.5	0
NACW228	Ammoniacal Nitrogen as N mg/l	0.2	12	3	1.05	0.2	6.55	<5.5	1
NACW229	Ammoniacal Nitrogen as N mg/l	0.2	4	2	0.91	0.2	2.73	<5.5	0
UD1	Ammoniacal Nitrogen as N mg/l	0.2	12	1	0.21	0.2	0.311	<5.5	0
UD3	Ammoniacal Nitrogen as N mg/l	0.2	12	0	0.2	0.2	0.2	<5.5	0

Monthly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
UD4	Ammoniacal Nitrogen as N mg/l	0.2	12	8	0.42	0.2	0.772	<5.5	0
UD5	Ammoniacal Nitrogen as N mg/l	0.2	11	0	0.2	0.2	0.2	<5.5	0
BH208	Chloride mg/l	2	12	12	16.42	10.4	18.2	<150	0
BH3/2	Chloride mg/l	2	4	4	12.08	8.9	16.2	<150	0
BH3/3	Chloride mg/l	2	4	4	13.22	10.9	15	<150	0
BH3/4	Chloride mg/l	2	11	11	37.25	8.7	75.8	<150	0
BH3/5	Chloride mg/l	2	4	4	14.55	9.7	21.2	<150	0
BH3/6	Chloride mg/l	2	4	4	12.85	10.3	16.8	<150	0
BH3/8	Chloride mg/l	2	4	4	39.95	4.9	91.5	<150	0
BH3/9	Chloride mg/l	2	4	4	46.7	13.1	99.5	<150	0
BH5/02	Chloride mg/l	2	12	12	22.78	19	24.1	<150	0
NACW203	Chloride mg/l	2	12	12	40.06	28.4	69.8	<150	0
NACW205	Chloride mg/l	2	12	12	41.05	34.5	73	<150	0
NACW212	Chloride mg/l	2	12	12	20.43	11.4	26.6	<150	0
NACW219	Chloride mg/l	2	4	4	22.22	16.4	27	<150	0
NACW228	Chloride mg/l	2	12	12	69.68	12.5	146	<150	0
NACW229	Chloride mg/l	2	4	4	20.67	12.6	30.1	<150	0
UD1	Chloride mg/l	2	12	12	49.02	45.9	56.4	<150	0

Monthly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
UD3	Chloride mg/l	2	12	12	17.32	12.7	18.8	<150	0
UD4	Chloride mg/l	2	12	12	23.57	12.9	67.2	<150	0
UD5	Chloride mg/l	2	11	11	24.11	14.1	38.1	<150	0
BH208	Electrical conductivity @20°C (lab) µS/cm	20	12	12	409	172	461		0
BH3/2	Electrical conductivity @20°C (lab) µS/cm	20	4	4	203.25	147	281		0
BH3/3	Electrical conductivity @20°C (lab) µS/cm	20	4	4	269.5	174	346		0
BH3/4	Electrical conductivity @20°C (lab) µS/cm	20	11	11	382.55	104	751		0
BH3/5	Electrical conductivity @20°C (lab) µS/cm	20	4	4	301.5	156	451		0
BH3/6	Electrical conductivity @20°C (lab) µS/cm	20	4	4	191.45	78.8	300		0
BH3/8	Electrical conductivity @20°C (lab) µS/cm	20	4	4	415.5	27	897		0
BH3/9	Electrical conductivity @20°C (lab) µS/cm	20	4	4	549.75	205	1020		0
BH5/02	Electrical conductivity @20°C (lab) µS/cm	20	12	12	459	365	479		0
NACW203	Electrical conductivity @20°C (lab) µS/cm	20	12	12	376.33	168	580		0
NACW205	Electrical conductivity @20°C (lab) µS/cm	20	12	12	573.58	519	891		0
NACW212	Electrical conductivity @20°C (lab) µS/cm	20	12	12	302.33	258	393		0
NACW219	Electrical conductivity @20°C (lab) µS/cm	20	4	4	403	295	479		0
NACW228	Electrical conductivity @20°C (lab) µS/cm	20	12	12	543.25	140	1060		0
NACW229	Electrical conductivity @20°C (lab) µS/cm	20	4	4	287.25	172	533		0

Monthly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
UD1	Electrical conductivity @20°C (lab) µS/cm	20	12	12	579.17	563	625		0
UD3	Electrical conductivity @20°C (lab) µS/cm	20	12	12	394	380	413		0
UD4	Electrical conductivity @20°C (lab) µS/cm	20	12	12	470.58	381	664		0
UD5	Electrical conductivity @20°C (lab) µS/cm	20	11	11	462.45	328	805		0

Table notes: N denotes 'Number of Results' and CL denotes 'Compliance Limit'

Quarterly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
BH208	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001	<0.001	0
BH3/2	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001		0
BH3/3	4-Methylphenol mg/l	0.001	3	0	0.001	0.001	0.001		0
BH3/3	4-Methylphenol mg/l	0.002	1	0	0.002	0.002	0.002		0
BH3/4	4-Methylphenol mg/l	0.001	3	0	0.001	0.001	0.001	<0.001	0
BH3/5	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001		0
BH3/6	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001		0
BH3/8	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001		0
BH3/9	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001		0
BH5/02	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001	<0.001	0
NACW203	4-Methylphenol mg/l	0.001	3	0	0.001	0.001	0.001	<0.001	0
NACW203	4-Methylphenol mg/l	0.002	1	0	0.002	0.002	0.002	<0.001	1
NACW205	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001	<0.001	0
NACW212	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001	<0.001	0
NACW219	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001		0
NACW228	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001	<0.001	0
NACW229	4-Methylphenol mg/l	0.001	3	0	0.001	0.001	0.001		0
NACW229	4-Methylphenol mg/l	0.002	1	0	0.002	0.002	0.002		0

Quarterly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
UD1	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001	<0.001	0
UD3	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001	<0.001	0
UD4	4-Methylphenol mg/l	0.001	4	0	0.001	0.001	0.001	<0.001	0
UD5	4-Methylphenol mg/l	0.001	3	0	0.001	0.001	0.001	<0.001	0
BH208	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008	<0.0001	0
BH3/2	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008		0
BH3/3	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008		0
BH3/4	Cadmium (filtered) mg/l	0.00008	3	0	0.00008	0.00008	0.00008	<0.0001	0
BH3/5	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008		0
BH3/6	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008		0
BH3/8	Cadmium (filtered) mg/l	0.00008	4	1	0.00008	0.00008	8.68E-05		0
BH3/9	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008		0
BH5/02	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008	<0.0001	0
NACW203	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008	<0.0001	0
NACW205	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008	<0.0001	0
NACW212	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008	<0.0001	0
NACW219	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008		0
NACW228	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008	<0.0001	0

Quarterly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
NACW229	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008		0
UD1	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008	<0.0001	0
UD3	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008	<0.0001	0
UD4	Cadmium (filtered) mg/l	0.00008	4	0	0.00008	0.00008	0.00008	<0.0001	0
UD5	Cadmium (filtered) mg/l	0.00008	3	0	0.00008	0.00008	0.00008	<0.0001	0
BH208	Dichloromethane mg/l	0.003	4	2	0.00438	0.003	0.006	<0.002	4
BH3/2	Dichloromethane mg/l	0.003	4	2	0.00425	0.003	0.006		0
BH3/3	Dichloromethane mg/l	0.003	4	2	0.00438	0.003	0.006		0
BH3/4	Dichloromethane mg/l	0.003	3	2	0.005	0.003	0.007	<0.002	3
BH3/5	Dichloromethane mg/l	0.003	4	2	0.00412	0.003	0.006		0
BH3/6	Dichloromethane mg/l	0.003	4	2	0.00412	0.003	0.006		0
BH3/8	Dichloromethane mg/l	0.003	4	2	0.0045	0.003	0.006		0
BH3/9	Dichloromethane mg/l	0.003	4	2	0.0045	0.003	0.006		0
BH5/02	Dichloromethane mg/l	0.003	4	2	0.0045	0.003	0.006	<0.002	4
NACW203	Dichloromethane mg/l	0.003	4	2	0.00438	0.003	0.007	<0.002	4
NACW205	Dichloromethane mg/l	0.003	4	2	0.004	0.003	0.006	<0.002	4
NACW212	Dichloromethane mg/l	0.003	4	2	0.00438	0.003	0.006	<0.002	4
NACW219	Dichloromethane mg/l	0.003	4	2	0.0045	0.003	0.007		0

Quarterly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
NACW228	Dichloromethane mg/l	0.003	4	2	0.00425	0.003	0.006	<0.002	4
NACW229	Dichloromethane mg/l	0.003	4	2	0.00475	0.003	0.007		0
UD1	Dichloromethane mg/l	0.003	4	2	0.00425	0.003	0.006	<0.002	4
UD3	Dichloromethane mg/l	0.003	4	2	0.0045	0.003	0.007	<0.002	4
UD4	Dichloromethane mg/l	0.003	4	2	0.0045	0.003	0.006	<0.002	4
UD5	Dichloromethane mg/l	0.003	3	1	0.004	0.003	0.006	<0.002	3
BH208	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001	<0.003	0
BH3/2	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001		0
BH3/3	Diethyl phthalate mg/l	0.001	3	0	0.001	0.001	0.001		0
BH3/3	Diethyl phthalate mg/l	0.002	1	0	0.002	0.002	0.002		0
BH3/4	Diethyl phthalate mg/l	0.001	3	0	0.001	0.001	0.001	<0.003	0
BH3/5	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001		0
BH3/6	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001		0
BH3/8	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001		0
BH3/9	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001		0
BH5/02	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001	<0.003	0
NACW203	Diethyl phthalate mg/l	0.001	3	0	0.001	0.001	0.001	<0.003	0
NACW203	Diethyl phthalate mg/l	0.002	1	0	0.002	0.002	0.002	<0.003	0

Quarterly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
NACW205	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001	<0.003	0
NACW212	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001	<0.003	0
NACW219	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001		0
NACW228	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001	<0.003	0
NACW229	Diethyl phthalate mg/l	0.001	3	0	0.001	0.001	0.001		0
NACW229	Diethyl phthalate mg/l	0.002	1	0	0.002	0.002	0.002		0
UD1	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001	<0.003	0
UD3	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001	<0.003	0
UD4	Diethyl phthalate mg/l	0.001	4	0	0.001	0.001	0.001	<0.003	0
UD5	Diethyl phthalate mg/l	0.001	3	0	0.001	0.001	0.001	<0.003	0
BH208	Mecoprop mg/l	0.00004	4	0	0.00004	0.00004	0.00004	<0.000055	0
BH3/2	Mecoprop mg/l	0.00004	3	0	0.00004	0.00004	0.00004		0
BH3/2	Mecoprop mg/l	0.00008	1	0	0.00008	0.00008	0.00008		0
BH3/3	Mecoprop mg/l	0.00004	2	0	0.00004	0.00004	0.00004		0
BH3/3	Mecoprop mg/l	0.00008	1	0	0.00008	0.00008	0.00008		0
BH3/3	Mecoprop mg/l	0.0002	1	0	0.0002	0.0002	0.0002		0
BH3/4	Mecoprop mg/l	0.00004	3	0	0.00004	0.00004	0.00004	<0.000055	0
BH3/5	Mecoprop mg/l	0.00004	4	0	0.00004	0.00004	0.00004		0

Quarterly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
BH3/6	Mecoprop mg/l	0.00004	3	0	0.00004	0.00004	0.00004		0
BH3/6	Mecoprop mg/l	0.0002	1	0	0.0002	0.0002	0.0002		0
BH3/8	Mecoprop mg/l	0.00004	2	0	0.00004	0.00004	0.00004		0
BH3/8	Mecoprop mg/l	0.00008	2	0	0.00008	0.00008	0.00008		0
BH3/9	Mecoprop mg/l	0.00004	3	0	0.00004	0.00004	0.00004		0
BH3/9	Mecoprop mg/l	0.0002	1	0	0.0002	0.0002	0.0002		0
BH5/02	Mecoprop mg/l	0.00004	3	0	0.00004	0.00004	0.00004	<0.000055	0
BH5/02	Mecoprop mg/l	0.00008	1	0	0.00008	0.00008	0.00008	<0.000055	1
NACW203	Mecoprop mg/l	0.00004	4	0	0.00004	0.00004	0.00004	<0.000055	0
NACW205	Mecoprop mg/l	0.00004	3	0	0.00004	0.00004	0.00004	<0.000055	0
NACW205	Mecoprop mg/l	0.00008	1	0	0.00008	0.00008	0.00008	<0.000055	1
NACW212	Mecoprop mg/l	0.00004	4	0	0.00004	0.00004	0.00004	<0.000055	0
NACW219	Mecoprop mg/l	0.00004	4	0	0.00004	0.00004	0.00004		0
NACW228	Mecoprop mg/l	0.00004	4	2	0.00005	0.00004	6.63E-05	<0.000055	2
NACW229	Mecoprop mg/l	0.00004	3	0	0.00004	0.00004	0.00004		0
NACW229	Mecoprop mg/l	0.00008	1	0	0.00008	0.00008	0.00008		0
UD1	Mecoprop mg/l	0.00004	3	0	0.00004	0.00004	0.00004	<0.000055	0
UD1	Mecoprop mg/l	0.00008	1	0	0.00008	0.00008	0.00008	<0.000055	1

Quarterly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
UD3	Mecoprop mg/l	0.00004	4	0	0.00004	0.00004	0.00004	<0.000055	0
UD4	Mecoprop mg/l	0.00004	4	0	0.00004	0.00004	0.00004	<0.000055	0
UD5	Mecoprop mg/l	0.00004	3	0	0.00004	0.00004	0.00004	<0.000055	0
BH208	Nickel (filtered) mg/l	0.0004	4	1	0.00042	0.0004	0.00046	<0.02	0
BH3/2	Nickel (filtered) mg/l	0.0004	4	1	0.0005	0.0004	0.000784		0
BH3/3	Nickel (filtered) mg/l	0.0004	4	0	0.0004	0.0004	0.0004		0
BH3/4	Nickel (filtered) mg/l	0.0004	3	2	0.00375	0.0004	0.00608	<0.02	0
BH3/5	Nickel (filtered) mg/l	0.0004	4	1	0.00041	0.0004	0.000455		0
BH3/6	Nickel (filtered) mg/l	0.0004	4	2	0.00055	0.0004	0.000768		0
BH3/8	Nickel (filtered) mg/l	0.0004	4	3	0.00193	0.0004	0.0039		0
BH3/9	Nickel (filtered) mg/l	0.0004	4	2	0.00112	0.0004	0.0021		0
BH5/02	Nickel (filtered) mg/l	0.0004	4	0	0.0004	0.0004	0.0004	<0.02	0
NACW203	Nickel (filtered) mg/l	0.0004	4	1	0.00043	0.0004	0.000503	<0.02	0
NACW205	Nickel (filtered) mg/l	0.0004	4	0	0.0004	0.0004	0.0004	<0.02	0
NACW212	Nickel (filtered) mg/l	0.0004	4	2	0.00067	0.0004	0.00102	<0.037	0
NACW219	Nickel (filtered) mg/l	0.0004	4	4	0.00358	0.00144	0.00899		0
NACW228	Nickel (filtered) mg/l	0.0004	4	3	0.00359	0.0004	0.00697	<0.02	0
NACW229	Nickel (filtered) mg/l	0.0004	4	2	0.00115	0.0004	0.00236		0

Quarterly Monitoring									
Borehole	Determinand	LOD	N	N > LOD	Mean	Min	Max	Compliance Limit	No. of Exceedances
UD1	Nickel (filtered) mg/l	0.0004	4	2	0.00044	0.0004	0.000523	<0.02	0
UD3	Nickel (filtered) mg/l	0.0004	4	0	0.0004	0.0004	0.0004	<0.02	0
UD4	Nickel (filtered) mg/l	0.0004	4	2	0.00053	0.0004	0.00089	<0.02	0
UD5	Nickel (filtered) mg/l	0.0004	3	3	0.00068	0.000455	0.00114	<0.02	0

Table notes: N denotes 'Number of Results' and CL denotes 'Compliance Limit'

Table 4-6 - Summary of Monthly Perimeter Gas Monitoring for Methane, 2022

Borehole	Min	Max	N > 0	Limit	Number of exceedances
BH3/1	0	0	0	<1% v/v above background	0
BH3/10	0	0	0		0
BH3/11	0	0	0		0
BH3/2	0	0	0		0
BH3/3	0	0	0		0
BH3/4	0	0	0		0
BH3/5	0	0	0		0
BH3/6	0	0	0		0
BH3/8	0	0	0		0
BH3/9	0	0	0		0
NACW201	0	0	0		0
NACW202	0	0	0		0
NACW203	0	0	0		0
NACW204	0	0	0		0
NACW205	0	0	0		0
NACW212	0	0	0		0
NACW213	0	0	0		0
NACW215	0	0	0		0
NACW216	0	0	0		0
NACW219	0	0	0		0
NACW227	0	0	0		0
NACW228	0	0	0		0
NACW229	0	0	0		0
NACW230	0	0	0		0

Table notes: N denotes 'Number of Results'

Table 4-7 – Summary of Monthly Perimeter Gas Monitoring for Carbon Dioxide 2022

Borehole	Min	Max	N > 0	Limit	Number of exceedances
BH3/1	0.1	2.6	12	<3.5% v/v	0
BH3/10	0.2	3.3	12		0
BH3/11	0	3.2	11		0
BH3/2	0.1	3.2	12		0
BH3/3	0	2.5	6		0
BH3/4	0.3	2.6	12		0
BH3/5	0.1	2.8	12		0
BH3/6	0.1	3	12		0
BH3/8	0.1	2.4	12		0
BH3/9	0.1	1.2	12		0
NACW201	0.1	2.6	12		0
NACW202	0.1	3.1	12		0
NACW203	0.1	1.2	12		0
NACW204	0.1	1.7	12		0
NACW205	0.2	1.6	12		0
NACW212	0.2	3.3	12		0
NACW213	0.4	2.5	12		0
NACW215	0.2	3.1	12		0
NACW216	0.4	1.8	12		0
NACW219	0.1	1.9	12		0
NACW227	0.7	2.3	12		0
NACW228	0.1	2	12		0
NACW229	0.1	1.7	12		0
NACW230	0.1	0.7	12		0

Table notes: N denotes 'Number of Results'. BH3/3 was recorded as artesian during January, October and December 2022, therefore no readings could be taken.

Table 4-8 - Summary of Monthly Perimeter Gas Monitoring for Oxygen 2022

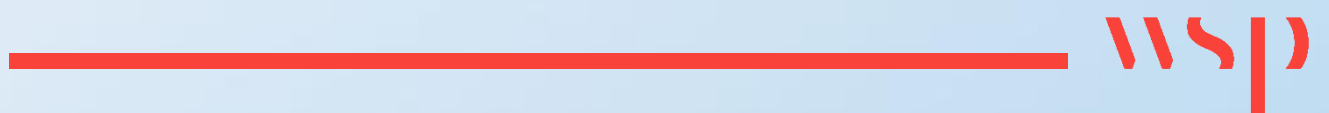
Borehole	Min	Max	N	Limit	Number of exceedances
BH3/1	20.7	22.2	12	None Set	0
BH3/10	15.6	22.5	12		0
BH3/11	17	23.3	12		0
BH3/2	14	22.4	12		0
BH3/3	19.4	22.2	8		0
BH3/4	16.9	21.5	12		0
BH3/5	15.8	22.3	12		0
BH3/6	19.7	23	12		0
BH3/8	18.3	22.3	12		0
BH3/9	17	22.5	12		0
NACW201	18.1	21.3	12		0
NACW202	18.5	21.7	12		0
NACW203	19.7	22.9	12		0
NACW204	20.2	23	12		0
NACW205	15.6	21.1	12		0
NACW212	18.4	23	12		0
NACW213	18	22.6	12		0
NACW215	14.6	21.5	12		0
NACW216	15.9	21.3	12		0
NACW219	18.1	21.9	12		0
NACW227	17.8	21.5	12		0
NACW228	18.5	22.5	12		0
NACW229	20.2	22.3	12		0
NACW230	21	22.4	12		0

Table notes: N denotes 'Number of Results'. BH3/3 was recorded as artesian during January, October and December 2022, therefore no readings could be taken.

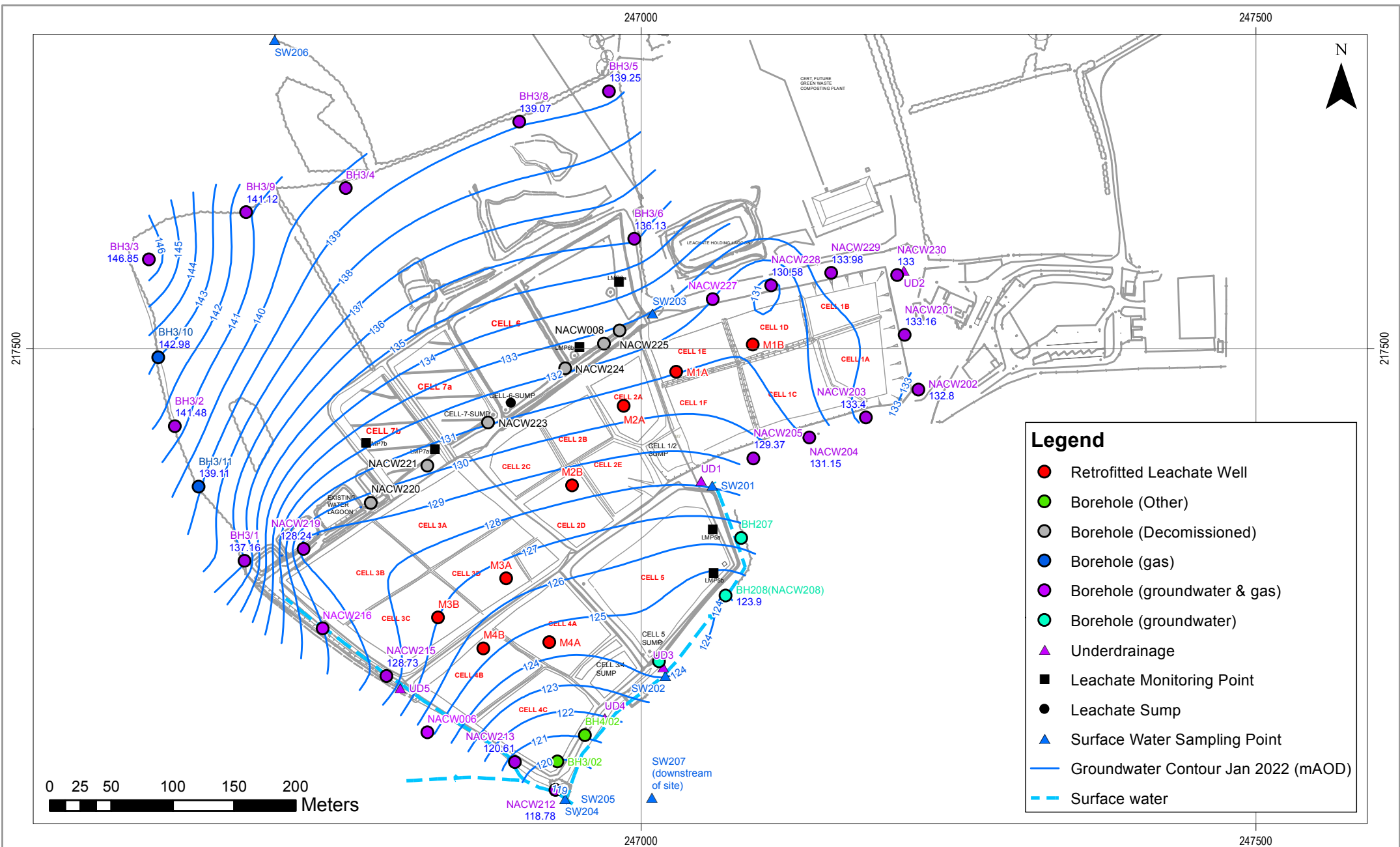
Table 4-9 - Schedule 6 Notices Issued in 2022

Date	Monitoring Location	Determinand	Recorded Concentration (mg/l)	Statutory Limit (mg/l)	Reason for Breach	Action taken
11/01/2022 24/10/2022	Cell 1/2 Sump	Mecoprop	Q1. 0.1080 Q4. 0.0986	0.0710	Unknown	Continued surveillance of Mecoprop concentrations in successive monitoring rounds, including in underdrainage and surface water. Leachates are continually pumped out into the lagoon whereupon they are removed for treatment offsite. Suggest short review of recent Mecoprop in different locations for the site to look for any trends.
11/01/2022 11/10/2022	NACW228	Mecoprop	Q1. 0.0663 Q4. 0.0587	0.0550	Unknown	Continued surveillance of Mecoprop concentrations in successive monitoring rounds, including in underdrainage and surface water. Leachates are continually pumped out into the lagoon whereupon they are removed for treatment offsite. Suggest short review of recent Mecoprop in different locations for the site to look for any trends.

FIGURES



FIGURES



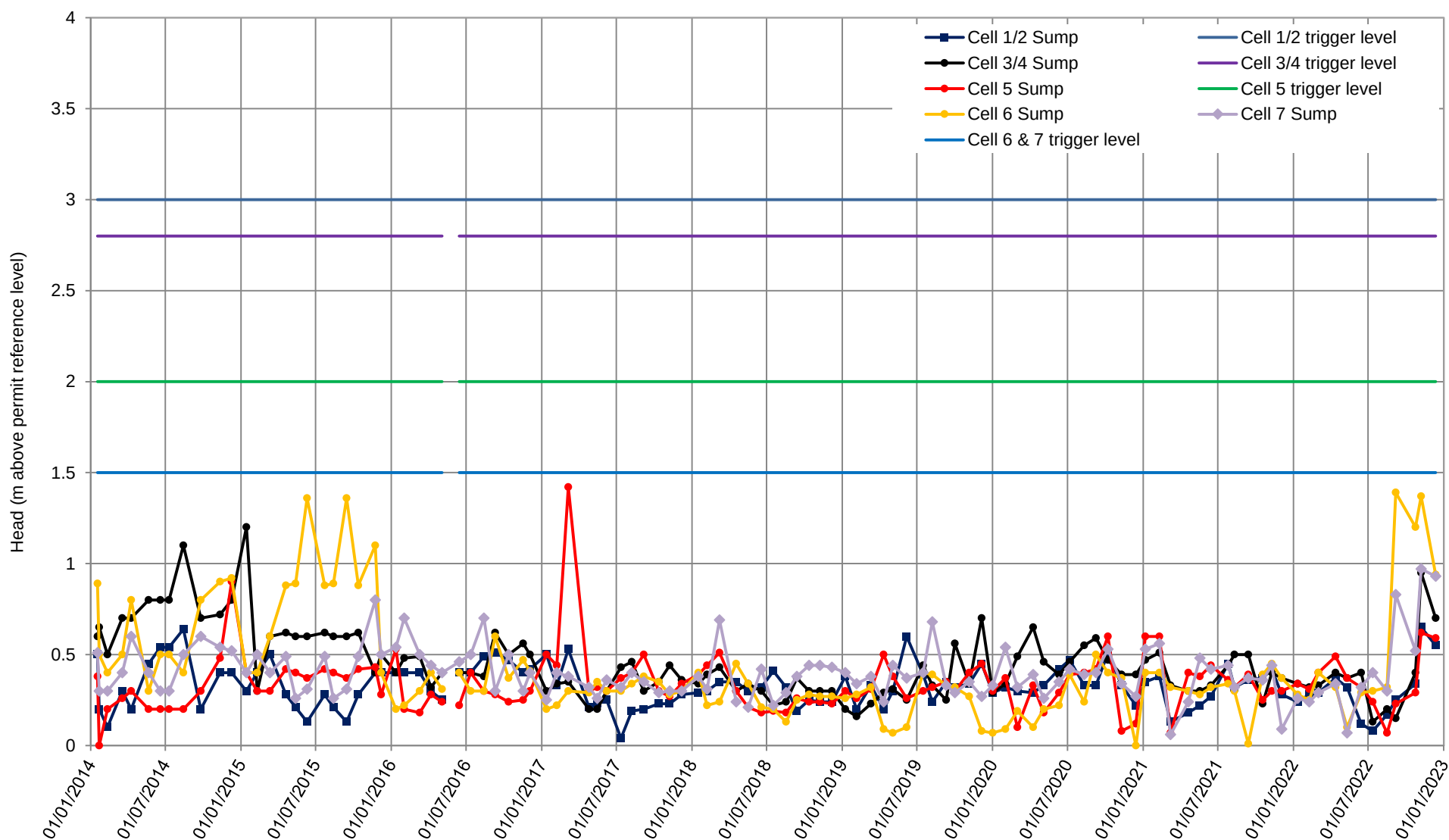
Contains Ordnance Survey data © Crown copyright and database right 2023.

Datum: OSGB 1936
Scale 1:4,000 at A4



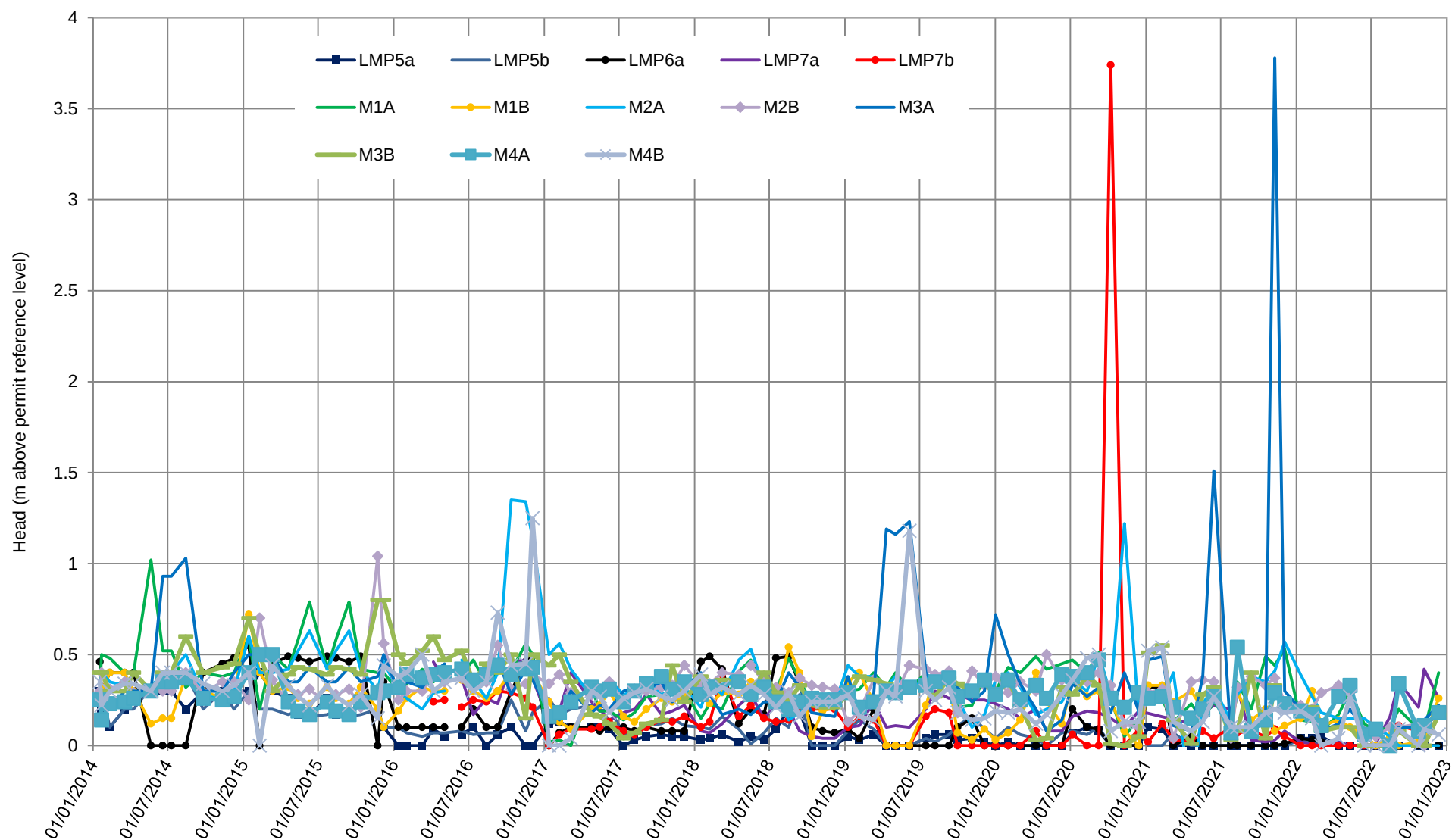
Groundwater configuration - January 2022

PROJECT:	Nantycaws Landfill	PROJECT NUMBER:	70071624
CLIENT:	CWM Environmental	DRAWING NUMBER	Figure 1
DRAWN:	ZK	CHECKED:	MC
		January 2023	



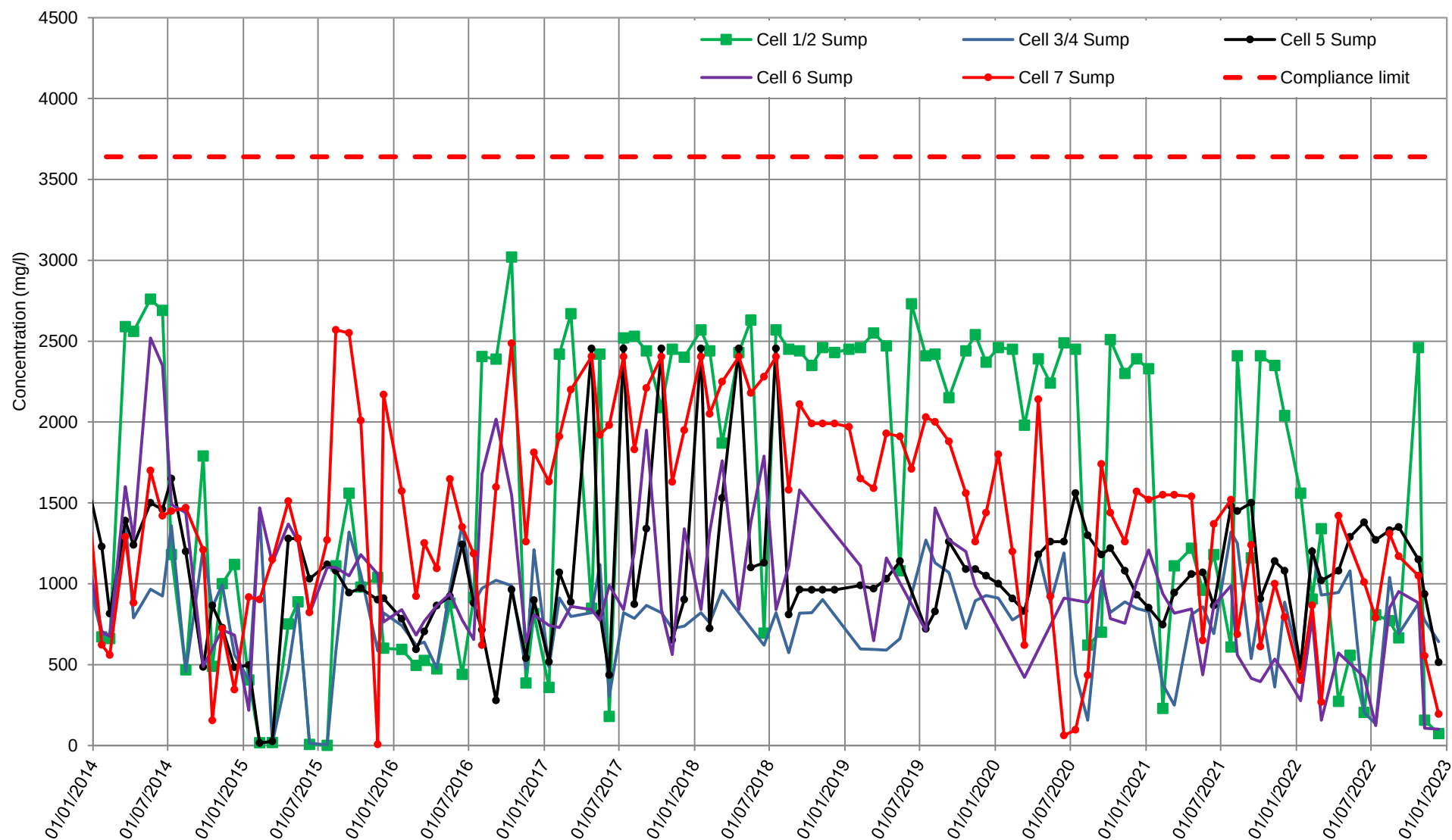
Observed Leachate Heads, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022
PROJ. NO:	70071624 R1	DRAWN:	ZK
DATE:	January 2023	CHECKED:	MC
		FIGURE:	2



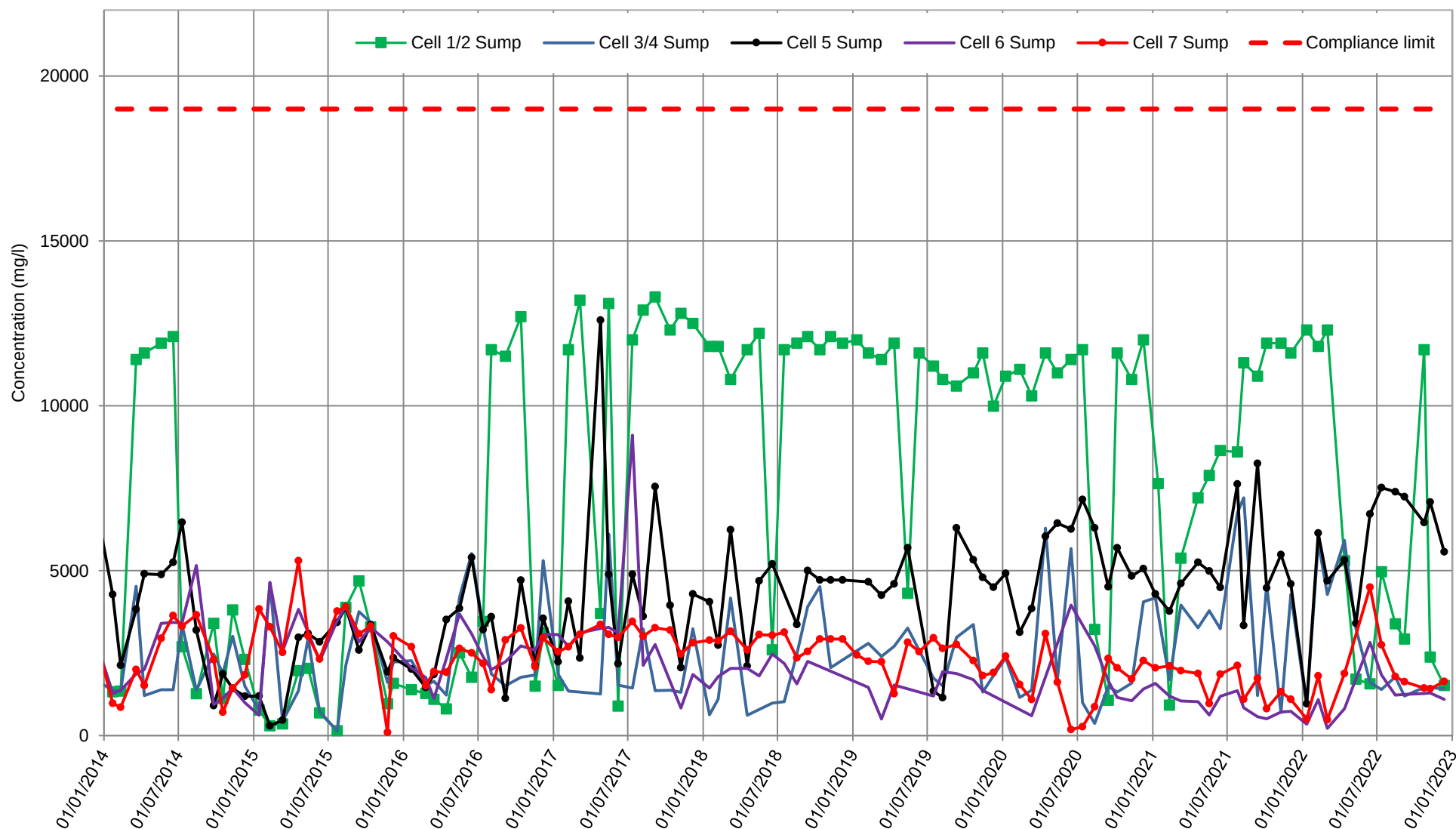
Leachate Heads above Base of In-waste Boreholes, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022
PROJ. NO:	70071624 R1	DRAWN:	ZK
DATE:	January 2023	CHECKED:	MC
		FIGURE:	3



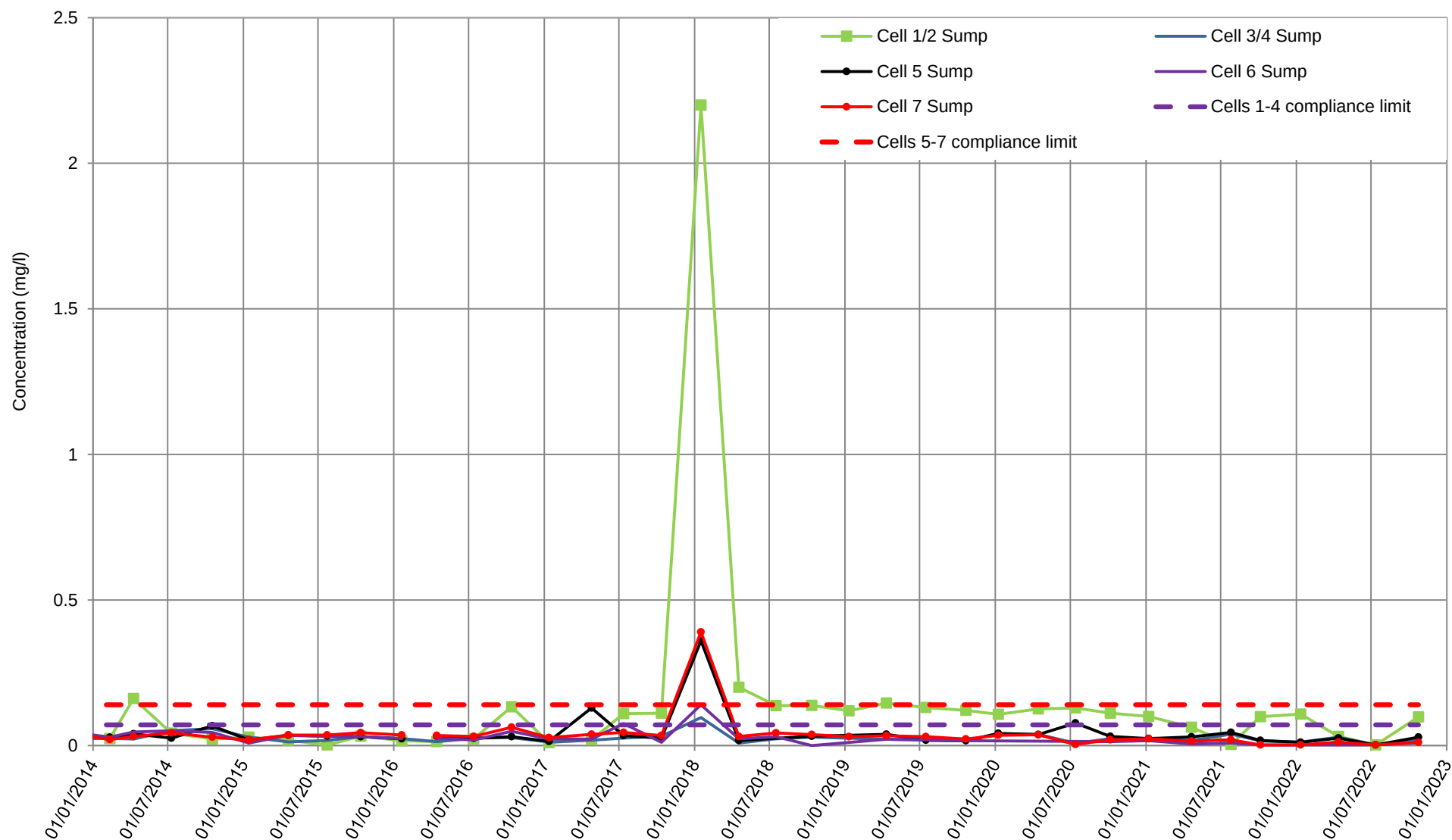
Recorded Concentrations of Ammoniacal Nitrogen in Site Leachates, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022	
PROJ. NO:	70071624 R1	DRAWN:	ZK	CHECKED: MC
DATE:	January 2023	FIGURE:	4	



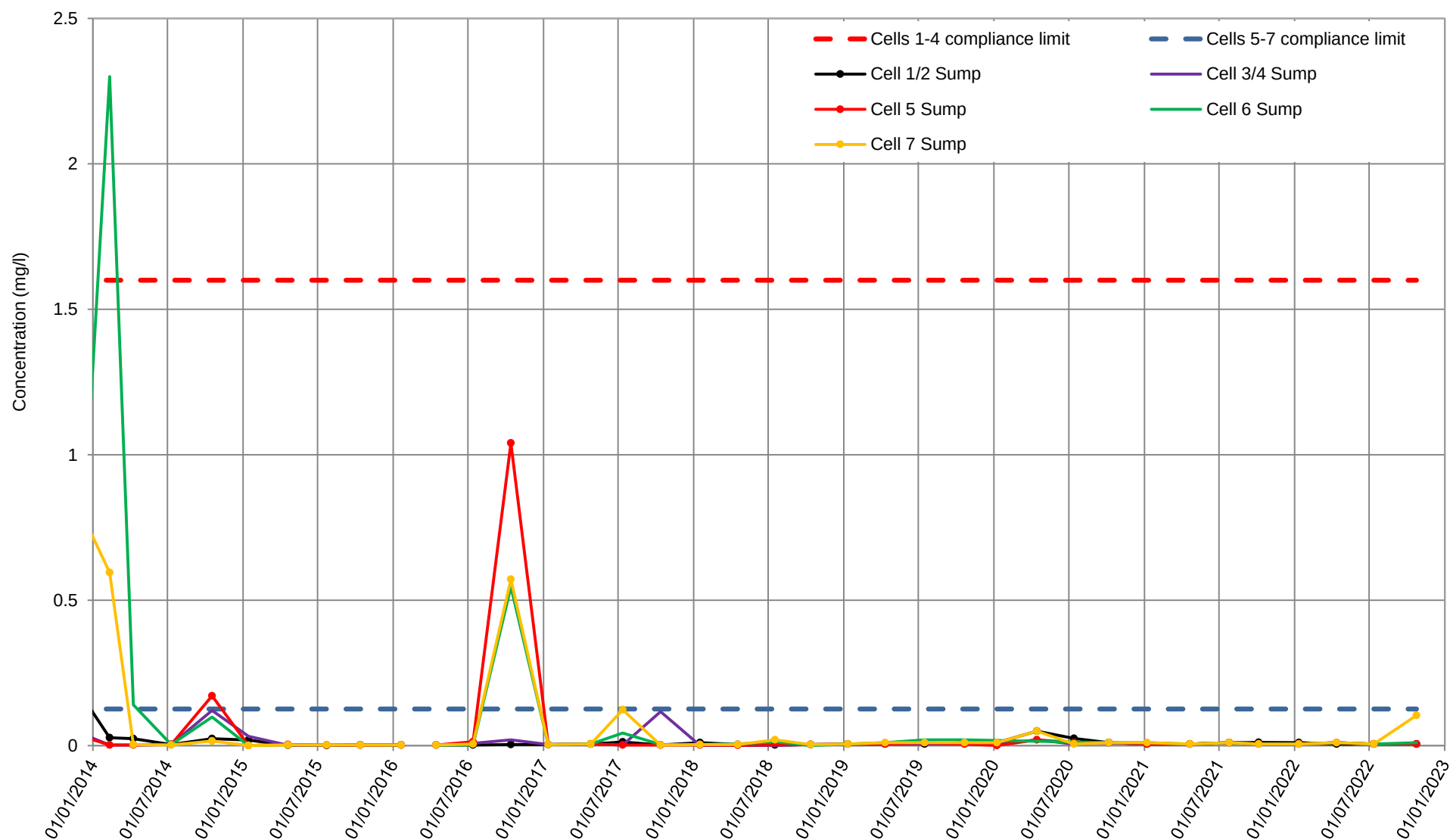
Recorded Concentrations of Chloride in Site Leachates, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022	
PROJ. NO:	70071624 R1	DRAWN:	ZK	CHECKED: SMcG
DATE:	January 2023	FIGURE:	5	



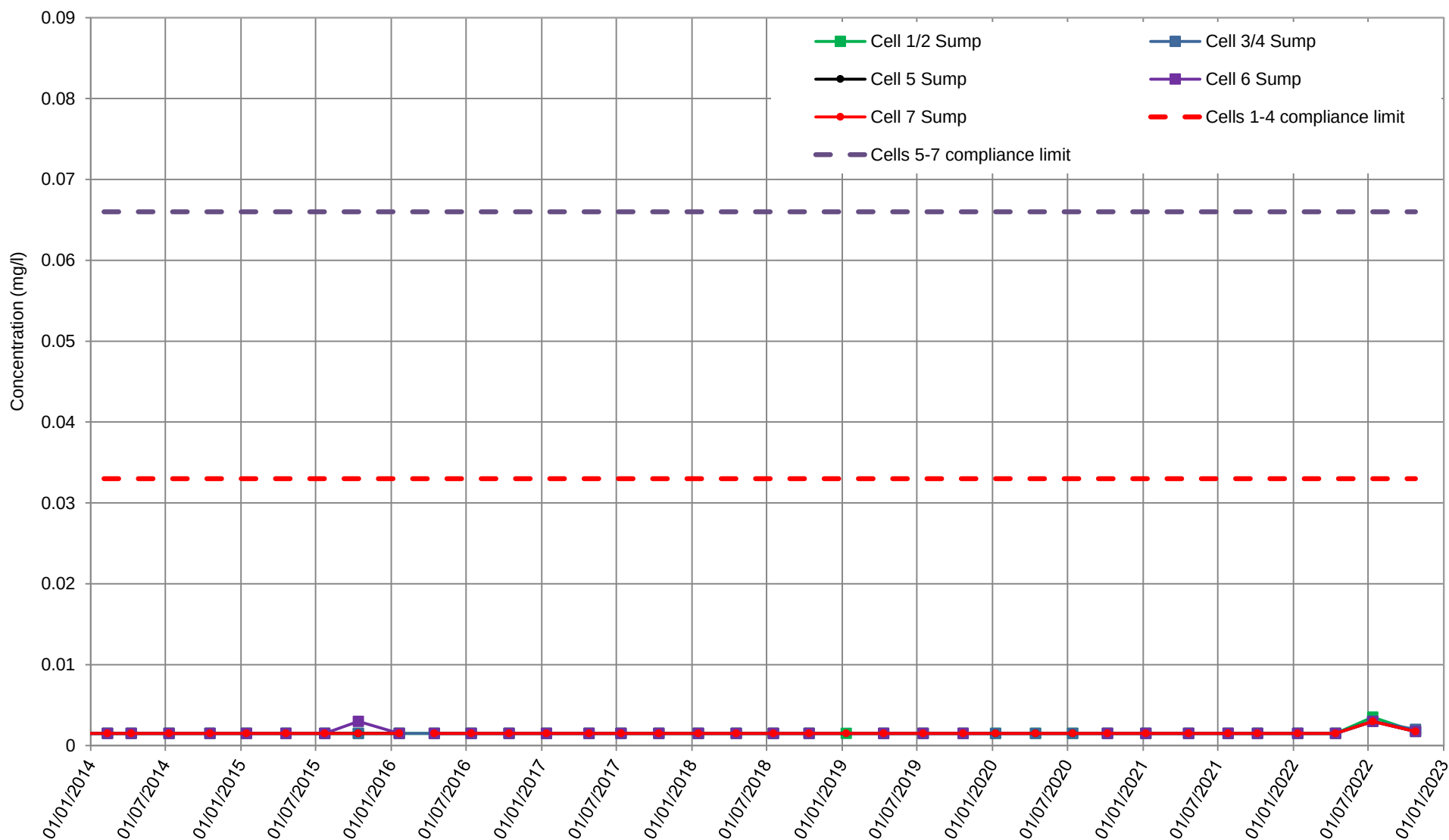
Recorded Concentrations of Mecoprop in Site Leachates, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022
PROJ. NO:	70071624 R1	DRAWN:	ZK
DATE:	January 2023	CHECKED:	MC
		FIGURE:	6



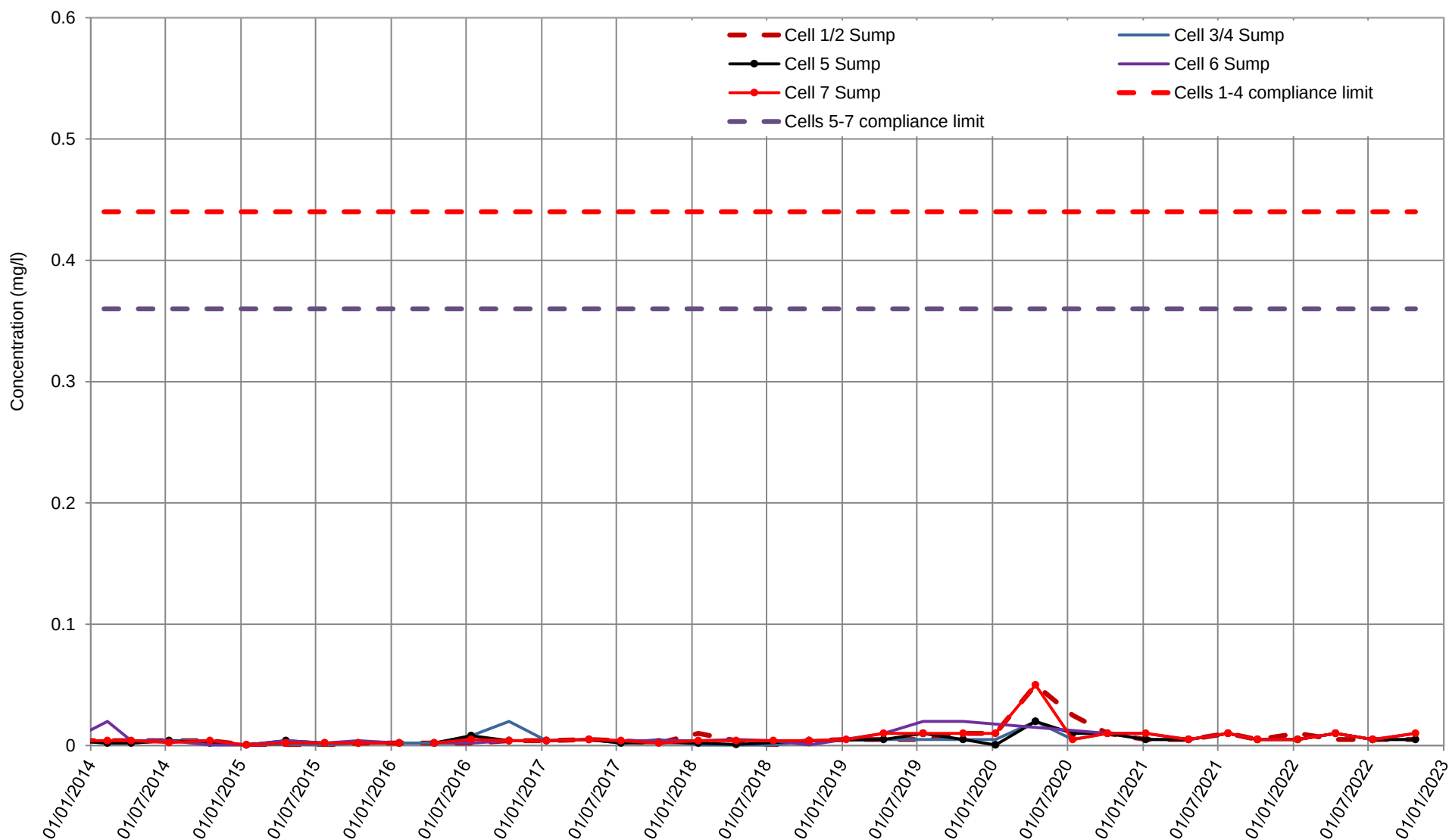
Recorded Concentrations of 4-methylphenol in Site Leachates, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022	
PROJ. NO:	70071624 R1	DRAWN:	ZK	CHECKED: MC
DATE:	January 2023	FIGURE:	7	



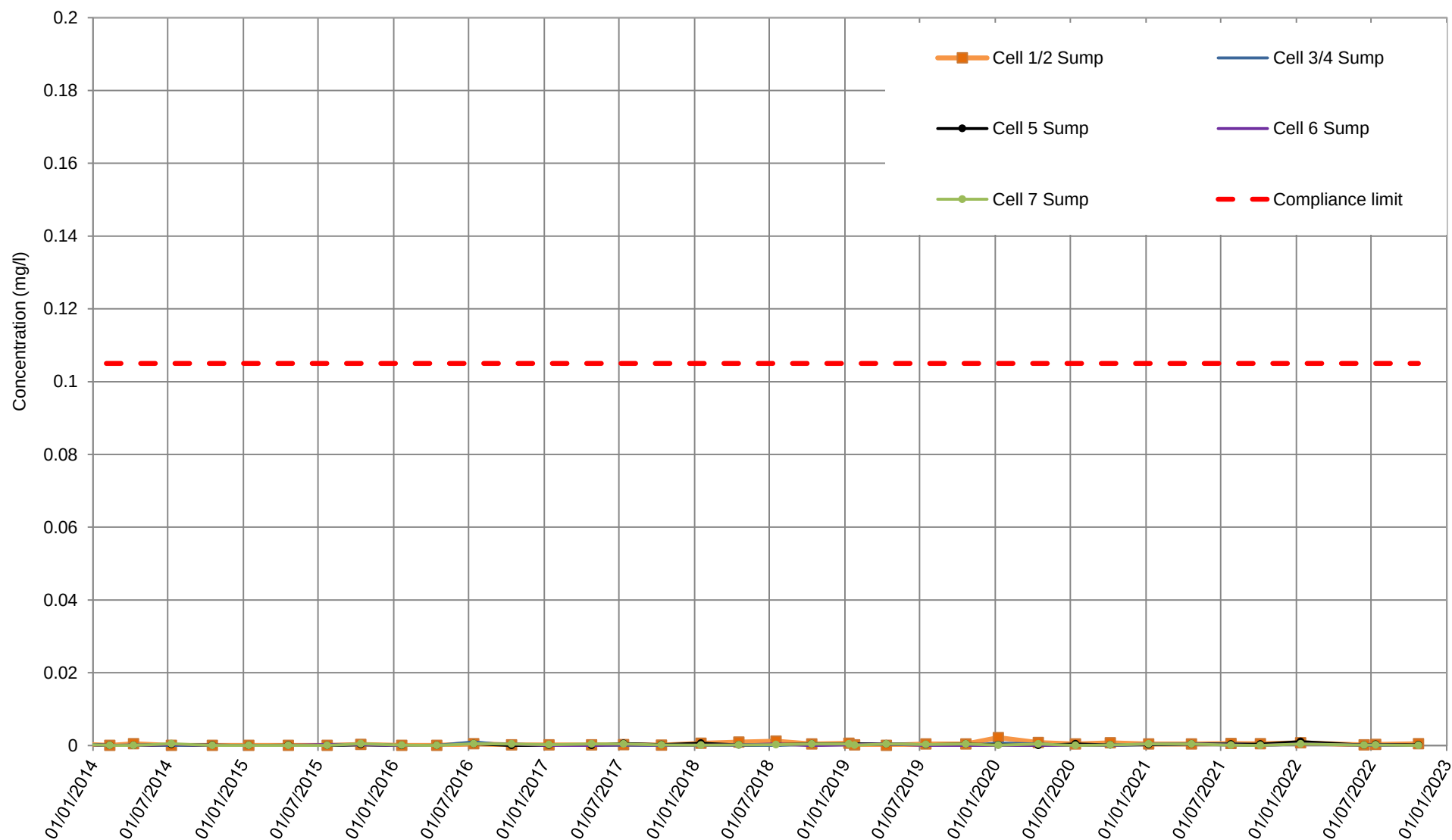
Recorded Concentrations of Dichloromethane in Leachates, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022
PROJ. NO:	70071624 R1	DRAWN:	ZK
DATE:	January 2023	CHECKED:	MC
		FIGURE:	8



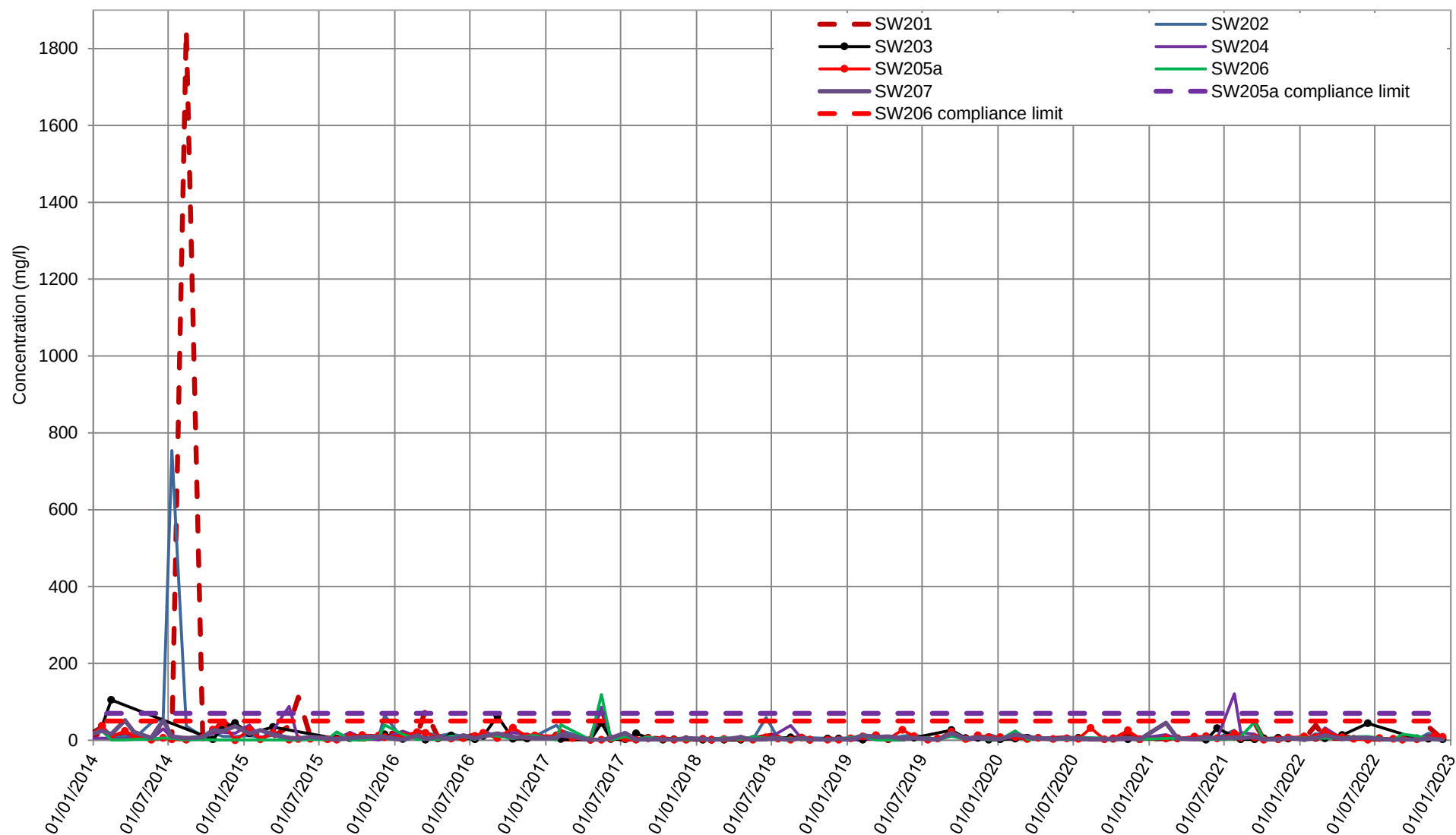
Recorded Concentrations of Diethylphthalate in Site Leachates, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022	
PROJ. NO:	70071624 R1	DRAWN:	ZK	CHECKED: MC
DATE:	January 2023	FIGURE:	9	



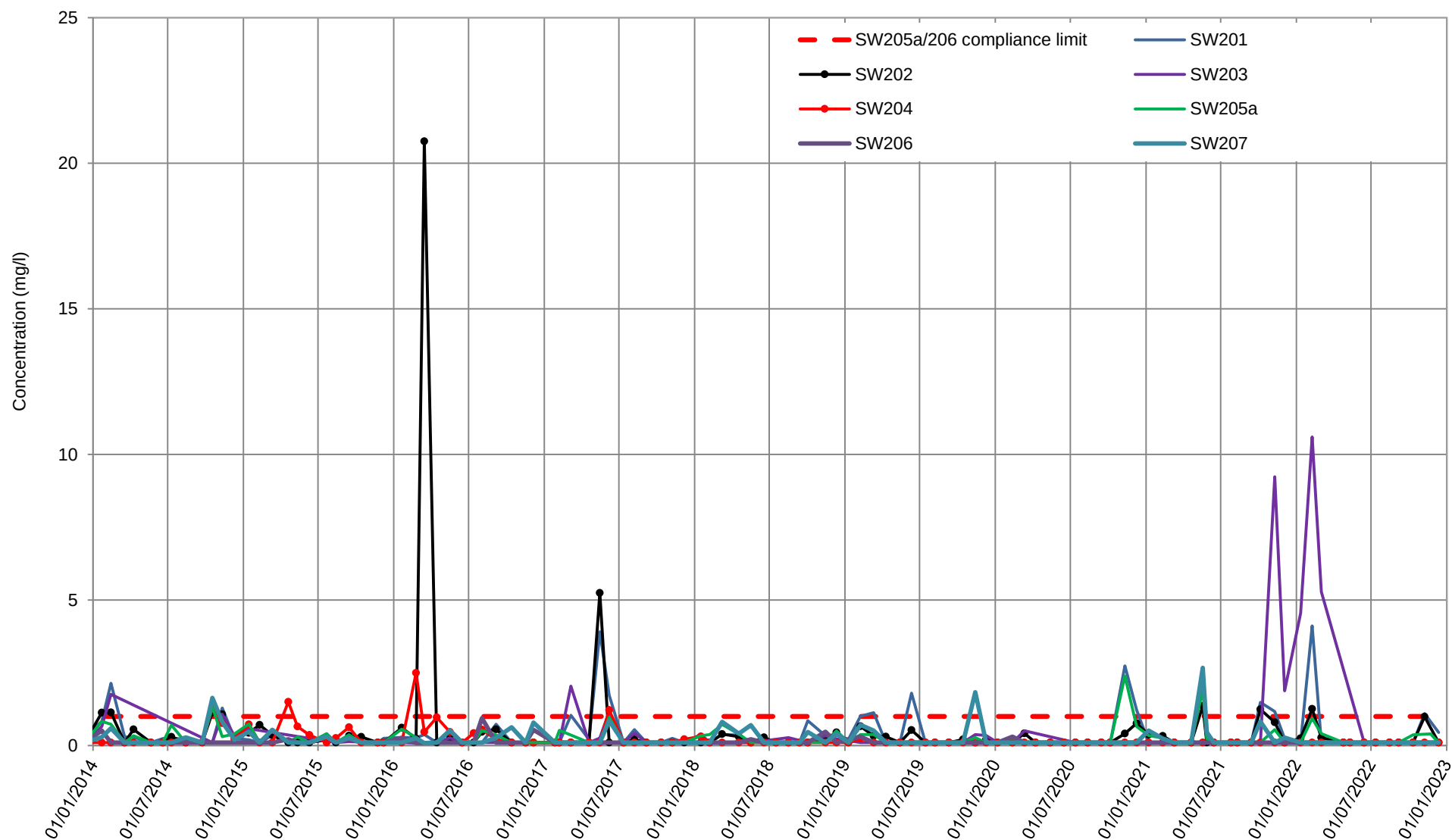
Recorded Concentrations of Cadmium in Site Leachates, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022	
PROJ. NO:	70071624 R1	DRAWN:	ZK	CHECKED: MC
DATE:	January 2023	FIGURE:	10	



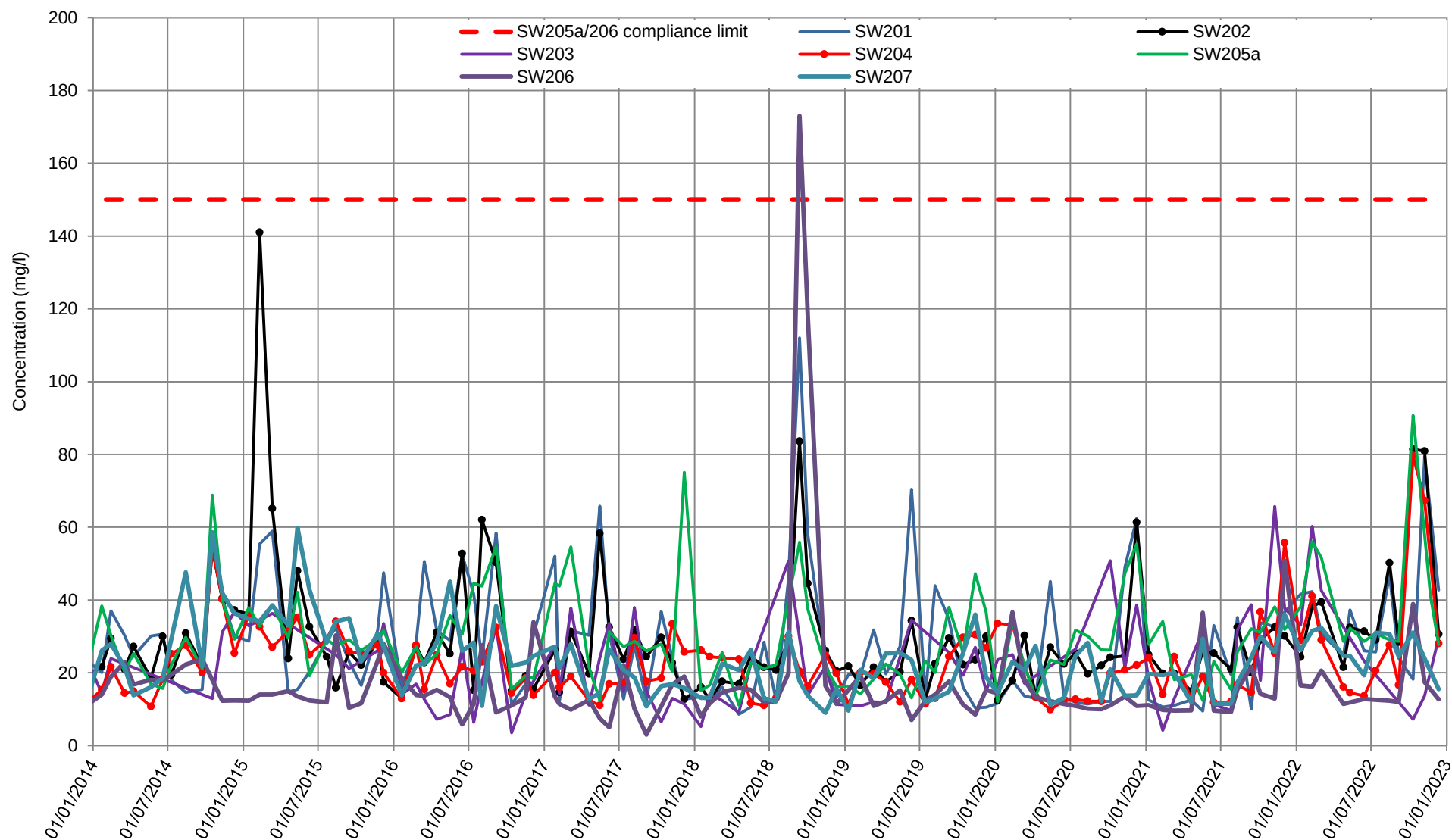
Recorded Concentrations of Suspended Solids in Surface Waters, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022
PROJ. NO:	70071624 R1	DRAWN:	ZK
DATE:	January 2023	CHECKED:	MC
		FIGURE:	11



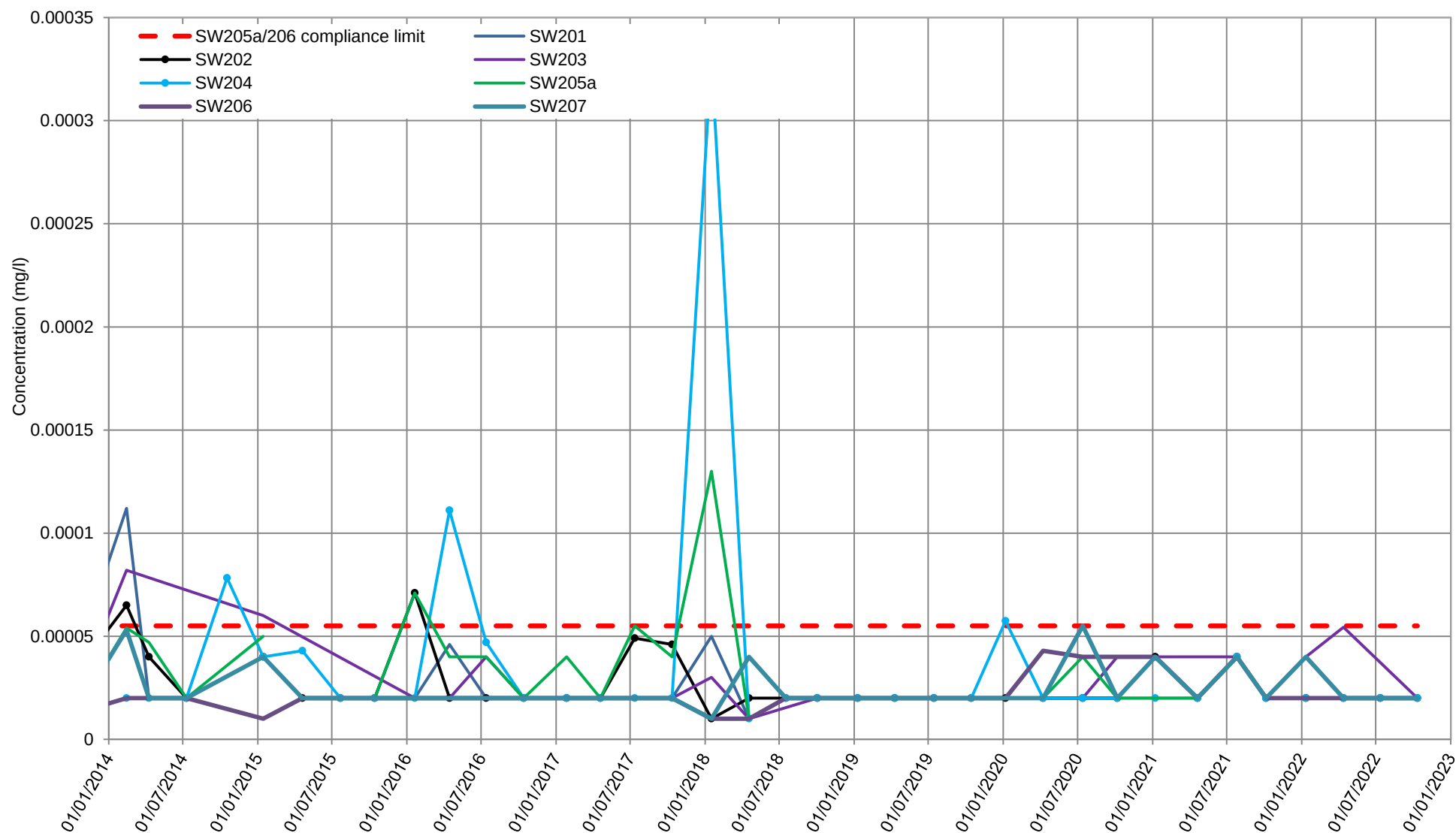
Recorded Concentrations of Ammoniacal Nitrogen in Surface Waters, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022
PROJ. NO:	70071624 R1	DRAWN:	ZK
DATE:	January 2023	CHECKED:	MC
		FIGURE:	12



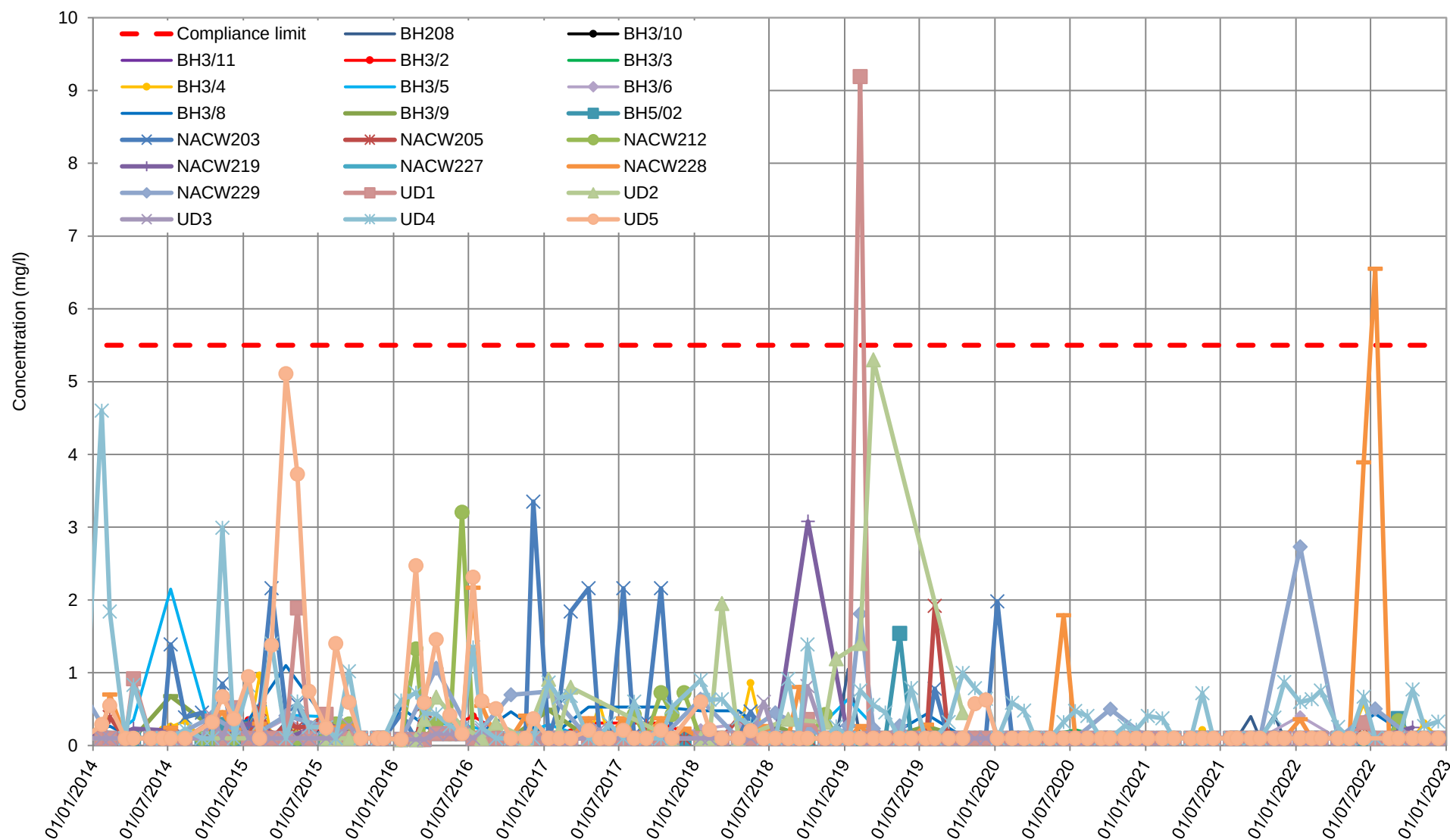
Recorded Concentrations of Chloride in Surface Water, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022
PROJ. NO:	70071624 R1	DRAWN:	ZK
DATE:	January 2023	CHECKED:	MC
		FIGURE:	13



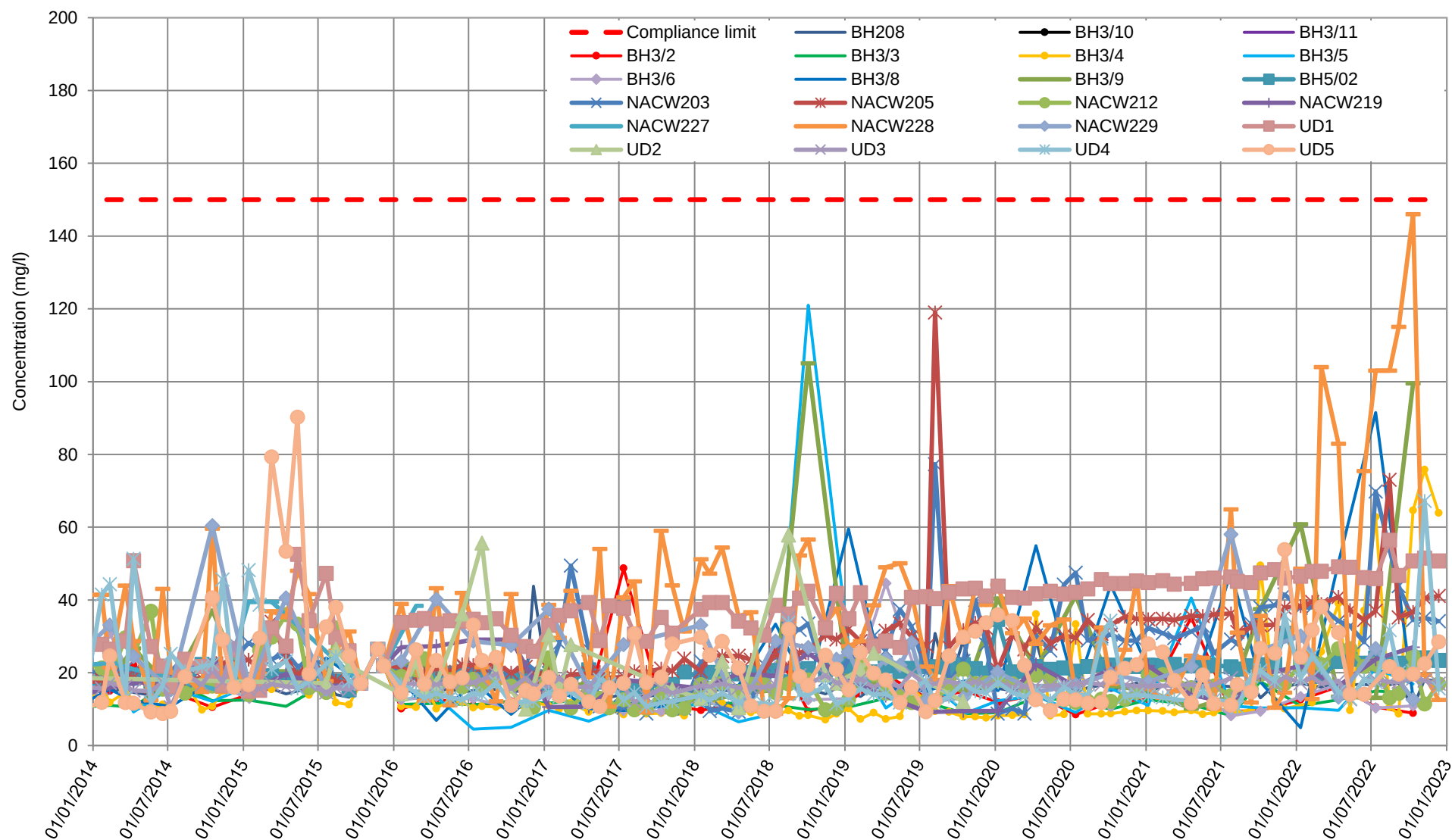
Recorded Concentrations of Mecoprop in Surface Waters, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022
PROJ. NO:	70071624 R1	DRAWN:	ZK
DATE:	January 2023	CHECKED:	MC
		FIGURE:	14



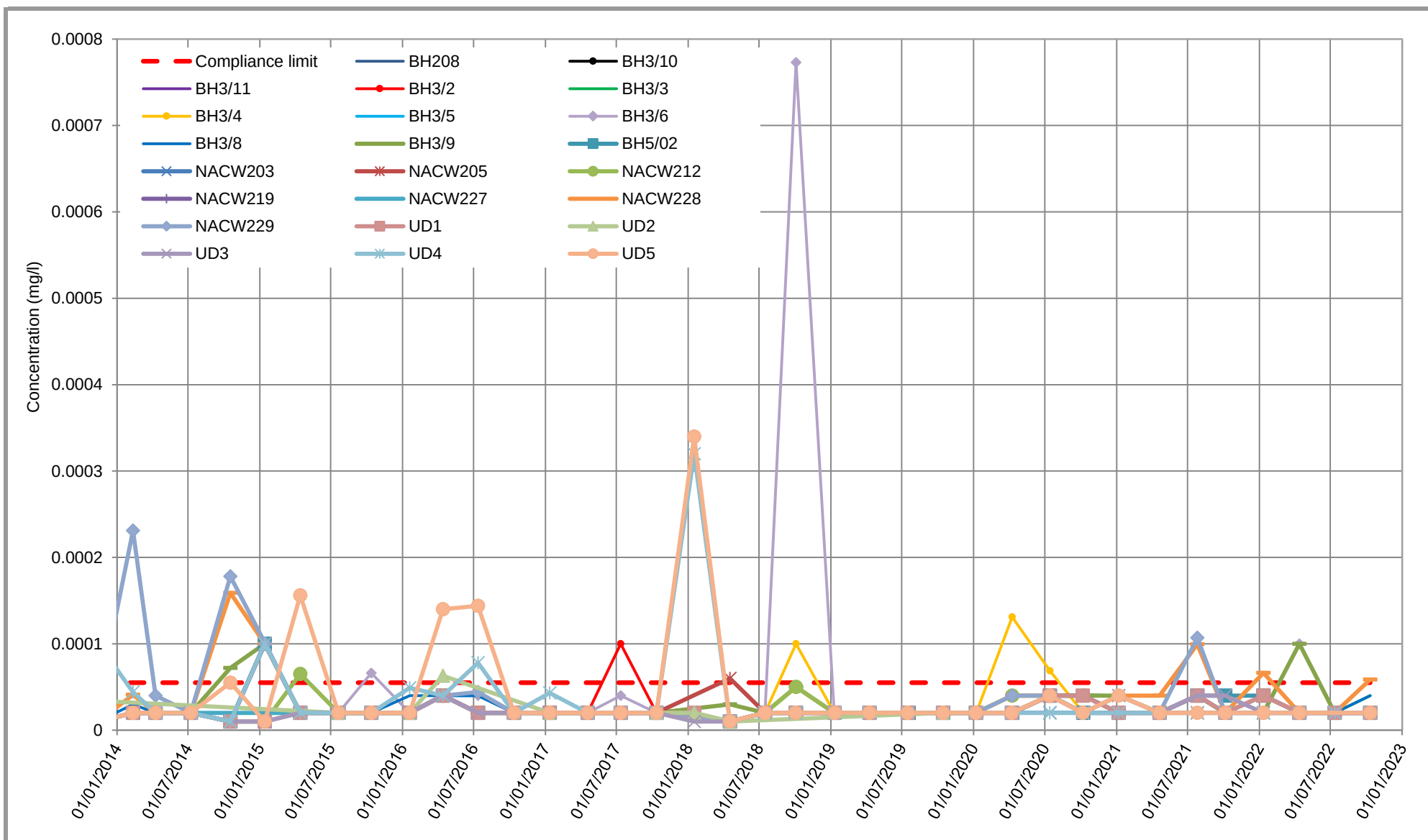
Recorded Concentrations of Ammoniacal Nitrogen in Groundwater and Under-drainage, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022
PROJ. NO:	70071624 R1	DRAWN:	ZK
DATE:	January 2023	CHECKED:	MC
		FIGURE:	15



Recorded Concentrations of Chloride in Groundwater and Under-drainage, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022	
PROJ. NO:	70071624 R1	DRAWN:	ZK	CHECKED: MC
DATE:	January 2023	FIGURE:	16	

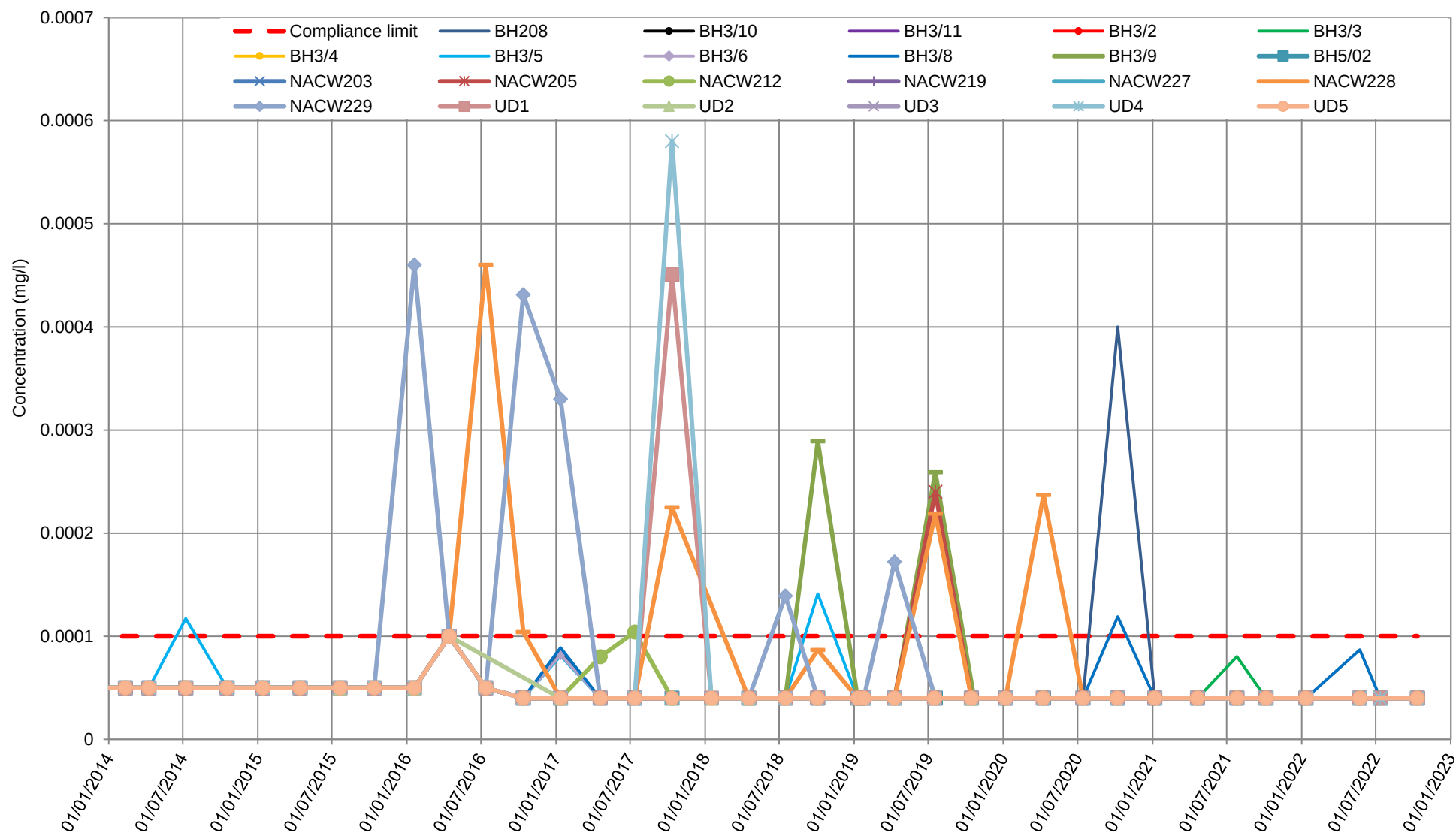


Note: Compliance limit only apply to NACW227, NACW228, NACW212, NACW203, NACW205, BH3/4, BH5/02, BH208, UD1, UD2, UD3 and UD4



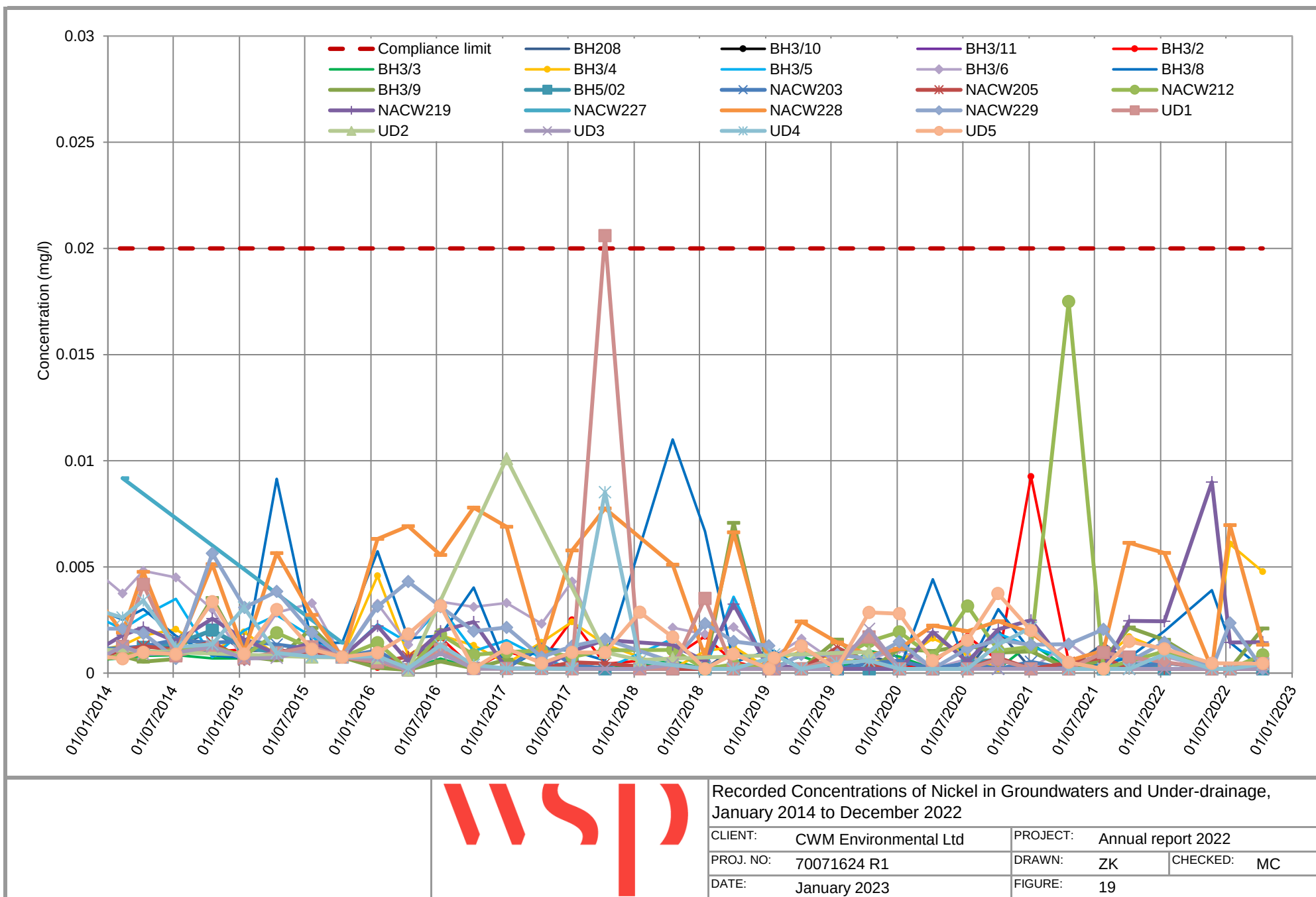
Recorded Concentrations of Mecoprop in Groundwater and Under-drainage, January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022	
PROJ. NO:	70071624 R1	DRAWN:	ZK	CHECKED: MC
DATE:	January 2023	FIGURE:	17	



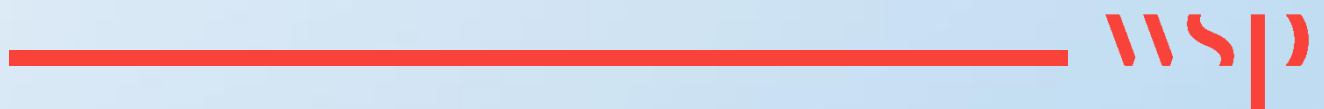
Recorded Concentrations of Cadmium in Groundwaters January 2014 to December 2022

CLIENT:	CWM Environmental Ltd	PROJECT:	Annual report 2022	
PROJ. NO:	70071624 R1	DRAWN:	ZK	CHECKED: MC
DATE:	January 2023	FIGURE:	18	



Appendix A

**LABORATORY CERTIFICATES
(MONTHLY AND QUARTERLY
MONITORING SUITES)**





Unit 7-8 Hawarden Business Park

Manor Road (off Manor Lane)

Hawarden

Deeside

CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation:	21 January 2022
Customer:	CWM Environmental Ltd
Sample Delivery Group (SDG):	220112-49
Your Reference:	
Location:	Nantyclaws Landfill
Report No:	630249
Order Number:	POR006183

We received 34 samples on Wednesday January 12, 2022 and 31 of these samples were scheduled for analysis which was completed on Friday January 21, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220112-49
Client Ref.:

Report Number: 630249
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25631362	BH 3/2			11/01/2022
25631364	BH 3/3			11/01/2022
25631377	BH 3/4			11/01/2022
25631365	BH 3/5			11/01/2022
25631366	BH 3/6			11/01/2022
25631368	BH 3/8			11/01/2022
25631369	BH 3/9			11/01/2022
25631345	BH208			11/01/2022
25631346	BH 5/02			11/01/2022
25631359	CELL 5 SUMP			11/01/2022
25631360	CELL 6 SUMP			11/01/2022
25631361	CELL 7 SUMP			11/01/2022
25631356	CELL 1/2 SUMP			11/01/2022
25631357	CELL 3/4 SUMP			11/01/2022
25631355	LEACHATE HOLDING LAGOON			11/01/2022
25631374	NACW203			11/01/2022
25631375	NACW205			11/01/2022
25631376	NACW212			11/01/2022
25631370	NACW219			11/01/2022
25631347	NACW227			11/01/2022
25631373	NACW228			11/01/2022
25631371	NACW229			11/01/2022
25631348	SW201			11/01/2022
25631349	SW202			11/01/2022
25631350	SW203			11/01/2022
25631351	SW204			11/01/2022
25631352	SW205			11/01/2022
25631353	SW206			11/01/2022
25631354	SW207			11/01/2022
25631340	UD1			11/01/2022
25631341	UD2			11/01/2022
25631342	UD3			11/01/2022
25631343	UD4			11/01/2022
25631344	UD5			11/01/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220112-49
Client Ref.:

Report Number: 630249
Location: Nantycaws Landfill

Superseded Report:

Results Legend

- X** Test
- N** No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Results Legend X Test N No Determination Possible Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)		25631355		25631374		25631375		25631376			
	Customer Sample Reference		LEACHATE HOLDING LAGOON		NACW203		NACW205		NACW212			
	AGS Reference											
	Depth (m)											
	Container		Vial (ALE297)	500ml Plastic (ALE208)	0.5l glass bottle (ALE227)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)
	Sample Type		LE	GW	GW	GW	GW	GW	GW	GW	GW	GW
			LE	GW	GW	GW	GW	GW	GW	GW	GW	GW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 31										
Alkalinity as CaCO3	All	NDPs: 0 Tests: 31										
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 31										
Anions by Kone (w)	All	NDPs: 1 Tests: 31										
BOD True Total	All	NDPs: 0 Tests: 6										
COD Unfiltered	All	NDPs: 0 Tests: 6										
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 31										
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 31										
Nitrite by Kone (w)	All	NDPs: 0 Tests: 25										
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 31										
VOC MS (W)	All	NDPs: 0 Tests: 31										

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 220112-49

Report Number: 630249

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
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UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Results Legend X Test N No Determination Possible Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)														25631348													25631349													25631350													25631351																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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CERTIFICATE OF ANALYSIS

Validated

SDG: 220112-49
Client Ref.:

Report Number: 630249
Location: Nantycaws Landfill

Superseded Report:

Results Legend			Customer Sample Ref.		NACW228	NACW229	SW201	SW202	SW203	SW204
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Ground Water (GW) 11/01/2022 12/01/2022 220112-49 25631373	Ground Water (GW) 11/01/2022 12/01/2022 220112-49 25631371	Surface Water (SW) 11/01/2022 12/01/2022 220112-49 25631348	Surface Water (SW) 11/01/2022 12/01/2022 220112-49 25631349	Surface Water (SW) 11/01/2022 12/01/2022 220112-49 25631350	Surface Water (SW) 11/01/2022 12/01/2022 220112-49 25631351
Component	LOD/Units	Method								
Ionic balance	% Diff	Calulation					-6.17	-6.05	-8.74	-6.41
Total Organic Carbon, as C*	<0.7 mg/l	SUB					1.3	3.8	12.9	12.4
Suspended solids, Total	<2 mg/l	TM022					4.34	<4	5.5	3.95
Alkalinity, Total as CaCO3	<2 mg/l	TM043			32.4	56	234	205	97	150
Alkalinity, Total as CaCO3 (diss.filt)	<2 mg/l	TM043			#	#	#	#	#	#
Alkalinity, Bicarbonate as CaCO3 (diss.filt)	<2 mg/l	TM043					234	204	102	152
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099			0.362	2.73	<0.2	0.244	4.55	<0.2
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120			0.317	0.222	0.537	0.446	0.329	0.415
Cadmium (diss.filt)	<0.08 µg/l	TM152			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Chromium (diss.filt)	<1 µg/l	TM152			<1	<1	<1	<1	<1	<1
Copper (diss.filt)	<0.3 µg/l	TM152			2.87	3.56	4.29	4.04	4.73	2.94
Lead (diss.filt)	<0.2 µg/l	TM152			0.543	0.76	1.79	0.994	1.35	0.716
Manganese (diss.filt)	<3 µg/l	TM152			35.6	148	30	29.8	189	29
Nickel (diss.filt)	<0.4 µg/l	TM152			5.66	1.45	1.34	0.908	2.05	1.03
Zinc (diss.filt)	<1 µg/l	TM152			92.8	128	19.6	11.8	112	9.51
Sodium (Dis.Filt)	<0.076 mg/l	TM152			16.8	10.2	9.52	10.9	12.1	9.49
Magnesium (Dis.Filt)	<0.036 mg/l	TM152			7.04	1.97	10.2	6.6	3.01	4.49
Potassium (Dis.Filt)	<0.2 mg/l	TM152			1.88	15.5	1.34	9.88	29	19.5
Calcium (Dis.Filt)	<0.2 mg/l	TM152			34	15.2	87.2	67.7	21.6	58.5
Iron (Dis.Filt)	<0.019 mg/l	TM152			0.0396	0.0563	0.0877	0.0818	0.255	0.154
Nitrite as NO2	<0.05 mg/l	TM184			<0.05	0.097	<0.05	0.071	0.176	<0.05
Sulphate	<2 mg/l	TM184			61.1	7.8	19	16.9	18.4	34.7
Chloride	<2 mg/l	TM184			48.6	30.1	41.6	24.3	33.1	28.9
Nitrate as NO3	<0.3 mg/l	TM184			0.742	1.11	7.92	9.52	7.91	12.3
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184			0.175	0.281	1.8	2.17	1.84	2.78
pH	<1 pH Units	TM256					7.38	7.24	7.71	7.85
Mecoprop	<0.04 µg/l	TM411			0.0663	<0.08	<0.04	<0.04	<0.08	<0.04



CERTIFICATE OF ANALYSIS

SDG: 220112-49
Client Ref.:Report Number: 630249
Location: Nantycaws Landfill

Superseded Report:

Results Legend		Customer Sample Ref. Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	SW205	SW206	SW207	UD1	UD3	UD4
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)	Surface Water (SW) 11/01/2022		Surface Water (SW) 11/01/2022	Surface Water (SW) 11/01/2022	Ground Water (GW) 11/01/2022	Ground Water (GW) 11/01/2022	Ground Water (GW) 11/01/2022	
Component	LOD/Units	Method						
Ionic balance	% Diff	Calulation	-3.6	-6.21	-1.34			
Total Organic Carbon, as C*	<0.7 mg/l	SUB	12.9	3.8	9.7			
Suspended solids, Total	<2 mg/l	TM022	9.85	5.65	<4			
Alkalinity, Total as CaCO3	<2 mg/l	TM043	215	102	119	246	188	242
Alkalinity,Total as CaCO3 (diss.filt)	<2 mg/l	TM043	211	101	118			
Alkalinity, Bicarbonate as CaCO3 (diss.filt)	<2 mg/l	TM043	211	101	118			
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	<0.2	<0.2	<0.2	<0.2	0.596
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	0.559	0.248	0.326	0.563	0.383	0.477
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Chromium (diss.filt)	<1 µg/l	TM152	1.38	<1	<1	<1	<1	1.65
Copper (diss.filt)	<0.3 µg/l	TM152	4.63	13.6	<0.3	1.27	1.1	4.97
Lead (diss.filt)	<0.2 µg/l	TM152	3.03	1.25	1.25	0.612	0.383	2.23
Manganese (diss.filt)	<3 µg/l	TM152	78.3	25.5	27.1	31.8	10.9	1040
Nickel (diss.filt)	<0.4 µg/l	TM152	2.05	0.469	1.6	0.523	<0.4	0.89
Zinc (diss.filt)	<1 µg/l	TM152	21	17.3	11.6	8.34	8.82	11.2
Sodium (Dis.Filt)	<0.076 mg/l	TM152	13.9	6.7	11.1	10.5	9.89	8.69
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	10	2.65	3.89	9.91	6.28	5.65
Potassium (Dis.Filt)	<0.2 mg/l	TM152	31.6	2.08	13.6	1.31	1.34	3.31
Calcium (Dis.Filt)	<0.2 mg/l	TM152	76.8	37.7	47.4	98.5	65.4	91
Iron (Dis.Filt)	<0.019 mg/l	TM152	0.303	0.178	0.178	0.0504	<0.019	27.2
Nitrite as NO2	<0.05 mg/l	TM184	0.201	<0.05	0.073	<0.05	<0.05	<0.05
Sulphate	<2 mg/l	TM184	43.6	8.2	14.4	13.2	11.3	12.4
Chloride	<2 mg/l	TM184	38.1	16.5	26.2	46.5	17.1	18.4
Nitrate as NO3	<0.3 mg/l	TM184	19.6	7.09	13.6	8.71	5.93	5.79
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	4.5	1.61	3.09	1.98	1.34	1.32
pH	<1 pH Units	TM256	8.02	7.91	7.85			
Mecoprop	<0.04 µg/l	TM411	<0.04	<0.04	<0.08	<0.08	<0.04	<0.04



CERTIFICATE OF ANALYSIS

Validated

SDG: 220112-49

Report Number: 630249

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Notification of NDPs (No determination possible)

Date Received : 12/01/2022 09:09:47

Sample No	Customer Sample Ref.	Depth (m)	Test	Comment
25631356	CELL 1/2 SUMP		Anions by Kone (w)	Sample too coloured



CERTIFICATE OF ANALYSIS

Validated

SDG: 220112-49
Client Ref.:

Report Number: 630249
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
Calculation		
SUB		Subcontracted Test
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220112-49
Client Ref.:

Report Number: 630249
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s) Customer Sample Ref.	25631345	25631362	25631364	25631365	25631366	25631368	25631369	25631346	25631359	25631360
AGS Ref.	BH208	BH 3/2	BH 3/3	BH 3/5	BH 3/6	BH 3/8	BH 3/9	BH 5/02	CELL 5 SUMP	CELL 6 SUMP
Depth										
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Land Leachate	Land Leachate
Acid Herbicides by GCMS	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022
Alkalinity as CaCO3	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	17-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022
Ammoniacal Nitrogen	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	18-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022
Anions by Kone (w)	18-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022
BOD True Total									19-Jan-2022	19-Jan-2022
COD Unfiltered									14-Jan-2022	15-Jan-2022
Conductivity (at 20 deg.C)	14-Jan-2022	14-Jan-2022	19-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022
Dissolved Metals by ICP-MS	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	17-Jan-2022	17-Jan-2022	17-Jan-2022	14-Jan-2022	18-Jan-2022	14-Jan-2022
Nitrite by Kone (w)	13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022		
SVOC MS (W) - Aqueous	18-Jan-2022	20-Jan-2022	20-Jan-2022	18-Jan-2022	18-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	17-Jan-2022	17-Jan-2022
Total Organic Carbon*									21-Jan-2022	21-Jan-2022
VOC MS (W)	14-Jan-2022	14-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	13-Jan-2022

Lab Sample No(s) Customer Sample Ref.	25631361	25631356	25631357	25631355	25631374	25631375	25631376	25631370	25631373	25631371
AGS Ref.	CELL 7 SUMP	CELL 1/2 SUMP	CELL 3/4 SUMP	LEACHATE HOLDIN G LAGOON	NACW203	NACW205	NACW212	NACW219	NACW228	NACW229
Depth										
Type	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Acid Herbicides by GCMS	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022
Alkalinity as CaCO3	14-Jan-2022	17-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022
Ammoniacal Nitrogen	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022
Anions by Kone (w)	19-Jan-2022	20-Jan-2022	19-Jan-2022	19-Jan-2022	18-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022
BOD True Total	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022						
COD Unfiltered	14-Jan-2022	14-Jan-2022	13-Jan-2022	14-Jan-2022						
Conductivity (at 20 deg.C)	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	19-Jan-2022	14-Jan-2022	19-Jan-2022	14-Jan-2022
Dissolved Metals by ICP-MS	14-Jan-2022	18-Jan-2022	18-Jan-2022	18-Jan-2022	17-Jan-2022	14-Jan-2022	17-Jan-2022	17-Jan-2022	17-Jan-2022	17-Jan-2022
Nitrite by Kone (w)					13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022
SVOC MS (W) - Aqueous	17-Jan-2022	17-Jan-2022	17-Jan-2022	17-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	18-Jan-2022
Total Organic Carbon*	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022						
VOC MS (W)	13-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	13-Jan-2022	14-Jan-2022	14-Jan-2022	13-Jan-2022

Lab Sample No(s) Customer Sample Ref.	25631348	25631349	25631350	25631351	25631352	25631353	25631354	25631340	25631342	25631343
AGS Ref.	SW201	SW202	SW203	SW204	SW205	SW206	SW207	UD1	UD3	UD4
Depth										
Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Ground Water	Ground Water	Ground Water
Acid Herbicides by GCMS	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022	20-Jan-2022
Alkalinity as CaCO3	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022
Alkalinity Filtered as CaCO3	17-Jan-2022	17-Jan-2022	17-Jan-2022	17-Jan-2022	17-Jan-2022	17-Jan-2022	17-Jan-2022			
Ammoniacal Nitrogen	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022
Anions by Kone (w)	19-Jan-2022	18-Jan-2022	18-Jan-2022	18-Jan-2022	18-Jan-2022	18-Jan-2022	18-Jan-2022	18-Jan-2022	18-Jan-2022	18-Jan-2022
Conductivity (at 20 deg.C)	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022
Dissolved Metals by ICP-MS	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	18-Jan-2022	17-Jan-2022	17-Jan-2022	17-Jan-2022
Ionic Balance	20-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022	19-Jan-2022			
Nitrite by Kone (w)	13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022	13-Jan-2022	14-Jan-2022	13-Jan-2022	13-Jan-2022
pH Value	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022			
Suspended Solids	15-Jan-2022	15-Jan-2022	16-Jan-2022	15-Jan-2022	15-Jan-2022	15-Jan-2022	15-Jan-2022			
SVOC MS (W) - Aqueous	17-Jan-2022	17-Jan-2022	18-Jan-2022	20-Jan-2022	18-Jan-2022	17-Jan-2022	17-Jan-2022	20-Jan-2022	20-Jan-2022	17-Jan-2022
Total Organic Carbon*	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022			
VOC MS (W)	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022	14-Jan-2022

Lab Sample No(s) Customer Sample Ref.	25631344
AGS Ref.	UD5
Depth	
Type	Ground Water
Acid Herbicides by GCMS	20-Jan-2022
Alkalinity as CaCO3	14-Jan-2022
Ammoniacal Nitrogen	14-Jan-2022
Anions by Kone (w)	18-Jan-2022
Conductivity (at 20 deg.C)	14-Jan-2022
Dissolved Metals by ICP-MS	14-Jan-2022
Nitrite by Kone (w)	13-Jan-2022
SVOC MS (W) - Aqueous	17-Jan-2022
VOC MS (W)	14-Jan-2022



ALS Environmental Ltd
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Coventry
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Ms SubCon Results
ALS Life Sciences Limited
ALS Hawarden
Unit 7-8 Hawarden Business Park
Manor Road
Flintshire CH5 3US

20 January 2022

Test Report: COV/2260148/2022

Dear Ms SubCon Results

Analysis of your sample(s) received on 14 January 2022 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.

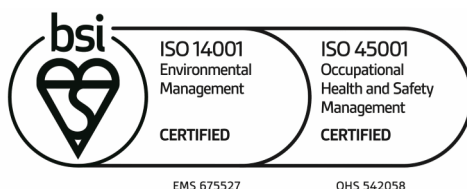
Thank you for using ALS Environmental Ltd and we look forward to receiving your next samples.

Yours Sincerely,

Signed: 

Name: P. Patel

Title: Inorganics Chemistry Manager



This communication has been sent to you by ALS Environmental Ltd. Registered in England and Wales. Registration No.02148934. Registered Office: ALS Environmental Limited, Torrington Avenue, Coventry, CV4 9GU.

Report Summary

ANALYSED BY

Ms Hawarden SubCon Results
ALS Life Sciences Limited
ALS Hawarden
Unit 7-8 Hawarden Business Park
Manor Road
Flintshire
CH5 3US



Date of Issue: **20 January 2022**

Report Number: **COV/2260148/2022**

Issue **1**

This issue replaces
all previous issues

Job Description: Main Quote 2022

Job Location: 220112-49

Number of Samples
included in this report **13**

Job Received: **14 January 2022**

Number of Test Results
included in this report **13**

Analysis Commenced: **14 January 2022**

Signed: 

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

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 and where relevant sampled.

Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.

This test report is not a statement of conformity to any specification or standard.

This communication has been sent to you by ALS Environmental Ltd. Registered in England and Wales. Registration No. 02148934. Registered Office: ALS Environmental Limited, Torrington Avenue, Coventry, CV4 9GU.

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Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240034**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25639635**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **1** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	608	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240034: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

ALS Environmental Ltd

Torrington Avenue, Coventry, CV4 9GU
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Page 2 of 17

Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240035**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25639674**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **2** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	206	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240035: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

ALS Environmental Ltd

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Page 3 of 17

Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240036**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25639656**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **3** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	203	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240036: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

ALS Environmental Ltd

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Page 4 of 17

Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240037**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25640010**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **4** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	103	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240037: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

ALS Environmental Ltd

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Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240038**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25640002**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **5** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	143	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240038: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

ALS Environmental Ltd

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Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240039**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25639618**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **6** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	190	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240039: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

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Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240040**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25639513**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **7** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	1.3	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240040: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

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Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240041**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25639521**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **8** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	3.8	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240041: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

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Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240042**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25639160**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **9** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	12.9	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240042: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

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Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240043**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25639166**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **10** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	12.4	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240043: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

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Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240044**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25639175**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **11** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	12.9	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240044: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

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Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240045**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25639338**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **12** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	3.8	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240045: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

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Certificate of Analysis

ANALYSED BY



Report Number: **COV/2260148/2022**
Laboratory Number: **21240046**
Sample Source: **ALS Life Sciences Limited**
Sample Point Description:
Sample Description: **25639322**
Sample Matrix: **Not In Project**
Sample Date/Time: **11 January 2022**
Sample Received: **14 January 2022**
Analysis Complete: **20 January 2022**

Issue **1**
Sample **13** of **13**

Test Description	Result	Units	Analysis Date	Accreditation	Method
TOC as C	9.7	mg/l	14/01/2022	N Cov	WAS005

Analyst Comments for 21240046: No Analyst Comment

This issue replaces all previous issues

Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.

Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), OTT = Otterbourne(SO21 2RU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel**

Date: **20 January 2022**

Title: **Inorganics Chemistry Manager**

ALS Environmental Ltd

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**ANALYST COMMENTS FOR REPORT COV/2260148/2022****Issue 1**This issue replaces
all previous issuesDate of Issue: **20 January 2022**

Sample No	Analysis Comments
21240034	
21240035	
21240036	
21240037	
21240038	
21240039	
21240040	
21240041	
21240042	
21240043	
21240044	
21240045	
21240046	

Signed:

Name: **P. Patel**Date: **20 January 2022**Title: **Inorganics Chemistry Manager**



DETERMINAND COMMENTS FOR REPORT COV/2260148/2022

Date of Issue: 20 January 2022

ISSUE 1

This issue replaces
all previous issues

Sample No	Description	Determinand	Comments

Signed: 	Name: P. Patel	Date: 20 January 2022
	Title: Inorganics Chemistry Manager	

Report Changes**Job Changes**

Field Changed	Before Value	After Value

Sample Changes

Sample Number	Field Changed	Before Value	After Value

Result Changes

Sample Number	Det	Before Value	After Value

Moved Samples

Sample Number	Added/Removed
21240034	Added
21240035	Added
21240036	Added
21240037	Added
21240038	Added
21240039	Added
21240040	Added
21240041	Added
21240042	Added
21240043	Added
21240044	Added
21240045	Added
21240046	Added



CERTIFICATE OF ANALYSIS

SDG:	220112-49	Client Reference:		Report Number:	630249
Location:	Nantycaws Landfill	Order Number:	POR006183	Superseded Report:	

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



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Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation:	23 February 2022
Customer:	CWM Environmental Ltd
Sample Delivery Group (SDG):	220209-24
Your Reference:	Monthly
Location:	Nantycaws Landfill
Report No:	634834
Order Number:	POR006541

This report has been revised and directly supersedes 634258 in its entirety.

We received 25 samples on Wednesday February 09, 2022 and 25 of these samples were scheduled for analysis which was completed on Wednesday February 23, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220209-24
Client Ref.: Monthly

Report Number: 634834
Location: Nantycaws Landfill

Superseded Report: 634258

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25785744	BH3/4			08/02/2022
25785746	BH208			08/02/2022
25785745	BH5/02			08/02/2022
25785761	CELL 5 SUMP			08/02/2022
25785762	CELL 6 SUMP			08/02/2022
25785763	CELL 7 SUMP			08/02/2022
25785759	CELL 1/2 SUMP			08/02/2022
25785760	CELL 3/4 SUMP			08/02/2022
25785758	LEACHATE HOLDING LAGOON			08/02/2022
25785742	NACW203			08/02/2022
25785743	NACW205			08/02/2022
25785741	NACW212			08/02/2022
25785739	NACW227			08/02/2022
25785740	NACW228			08/02/2022
25785751	SW201			08/02/2022
25785752	SW202			08/02/2022
25785753	SW203			08/02/2022
25785754	SW204			08/02/2022
25785755	SW205			08/02/2022
25785756	SW206			08/02/2022
25785757	SW207			08/02/2022
25785747	UD1			08/02/2022
25785748	UD3			08/02/2022
25785749	UD4			08/02/2022
25785750	UD5			08/02/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 220209-24

Report Number: 634834

Superseded Report: 634258

Client Ref.: Monthly

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 24

Anions by Kone (w)

All

NDPs: 0
Tests: 24

pH Value

All

NDPs: 0
Tests: 24

25785747

25785748

25785749

25785750

UD1

UD3

UD4

UD5

250ml BOD
(ALE212)

250ml BOD
(ALE212)

250ml BOD
(ALE212)

250ml BOD
(ALE212)

250ml BOD
(ALE212)

250ml BOD
(ALE212)

250ml BOD
(ALE212)

250ml BOD
(ALE212)

GW

GW

GW

GW

GW

GW

GW

GW

X

X

X

X

X

X

X

X

X

X

X

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 220209-24
Client Ref.: Monthly

Report Number: 634834
Location: Nantycaws Landfill

Superseded Report: 634258

Notification of NDPs (No determination possible)

Date Received : 09/02/2022 06:28:44

Sample No	Customer Sample Ref.	Depth (m)	Test	Comment
25785755	SW205		Acid Herbicides by GCMS	Insufficient Sample
25785755	SW205		Alkalinity Filtered as CaCO3	Insufficient Sample
25785755	SW205		Alkalinity as CaCO3	Insufficient Sample



CERTIFICATE OF ANALYSIS

Validated

SDG: 220209-24
Client Ref.: Monthly

Report Number: 634834
Location: Nantycaws Landfill

Superseded Report: 634258

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220209-24
Client Ref.: Monthly

Report Number: 634834
Location: Nantycaws Landfill

Superseded Report: 634258

Test Completion Dates

Lab Sample No(s)	25785746	25785744	25785745	25785761	25785762	25785763	25785759	25785760	25785758	25785742
Customer Sample Ref.	BH208	BH3/4	BH502	CELL 5 SUMP	CELL 6 SUMP	CELL 7 SUMP	CELL 1/2 SUMP	CELL 3/4 SUMP	LEACHATE HOLDIN G LAGOON	NACW203
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Ground Water
Ammoniacal Nitrogen	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022
Anions by Kone (w)	16-Feb-2022	16-Feb-2022	16-Feb-2022	16-Feb-2022	16-Feb-2022	16-Feb-2022	16-Feb-2022	16-Feb-2022	16-Feb-2022	16-Feb-2022
pH Value	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022

Lab Sample No(s)	25785743	25785741	25785740	25785751	25785752	25785753	25785754	25785755	25785756	25785757
Customer Sample Ref.	NACW205	NACW212	NACW228	SW201	SW202	SW203	SW204	SW205	SW206	SW207
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Ammoniacal Nitrogen	15-Feb-2022	15-Feb-2022	15-Feb-2022	23-Feb-2022	23-Feb-2022	23-Feb-2022	23-Feb-2022	15-Feb-2022	23-Feb-2022	23-Feb-2022
Anions by Kone (w)	16-Feb-2022	16-Feb-2022	16-Feb-2022	21-Feb-2022	21-Feb-2022	21-Feb-2022	21-Feb-2022	16-Feb-2022	21-Feb-2022	21-Feb-2022
Dissolved Metals by ICP-MS								15-Feb-2022		
Nitrite by Kone (w)								16-Feb-2022		
pH Value	15-Feb-2022	15-Feb-2022	15-Feb-2022	21-Feb-2022	21-Feb-2022	21-Feb-2022	21-Feb-2022	15-Feb-2022	21-Feb-2022	21-Feb-2022
Suspended Solids				23-Feb-2022	23-Feb-2022	23-Feb-2022	23-Feb-2022	15-Feb-2022	23-Feb-2022	23-Feb-2022
SVOC MS (W) - Aqueous								15-Feb-2022		
Total Organic and Inorganic Carbon								16-Feb-2022		

Lab Sample No(s)	25785747	25785748	25785749	25785750
Customer Sample Ref.	UD1	UD3	UD4	UD5
AGS Ref.				
Depth				
Type	Ground Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022
Anions by Kone (w)	16-Feb-2022	16-Feb-2022	16-Feb-2022	16-Feb-2022
pH Value	15-Feb-2022	15-Feb-2022	15-Feb-2022	15-Feb-2022



CERTIFICATE OF ANALYSIS

SDG:	220209-24	Client Reference:	Monthly	Report Number:	634834
Location:	Nantycaws Landfill	Order Number:	POR006541	Superseded Report:	634258

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park

Manor Road (off Manor Lane)

Hawarden

Deeside

CH5 3US

Tel: (01244) 528700

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email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 16 March 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 220303-75
Your Reference:
Location: Nantycaws Landfill
Report No: 637720
Order Number: POR006823

This report has been revised and directly supersedes 637084 in its entirety.

We received 26 samples on Thursday March 03, 2022 and 26 of these samples were scheduled for analysis which was completed on Wednesday March 16, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220303-75
Client Ref.:

Report Number: 637720
Location: Nantycaws Landfill

Superseded Report: 637084

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25909949	BH3/4			02/03/2022
25909952	BH208			02/03/2022
25909951	BH5/02			02/03/2022
25909939	CELL 5 SUMP			02/03/2022
25909940	CELL 6 SUMP			02/03/2022
25909943	CELL 7 SUMP			02/03/2022
25909936	CELL 1/2 SUMP			02/03/2022
25909938	CELL 3/4 SUMP			02/03/2022
25909935	LEACHATE HOLDING LAGOON			02/03/2022
25952186	LEACHATE HOLDING LAGOON			10/03/2022
25909947	NACW203			02/03/2022
25909948	NACW205			02/03/2022
25909946	NACW212			02/03/2022
25909944	NACW228			02/03/2022
25909926	SW201			02/03/2022
25909928	SW202			02/03/2022
25909929	SW203			02/03/2022
25909930	SW204			02/03/2022
25909931	SW205			02/03/2022
25909933	SW206			02/03/2022
25909934	SW207			02/03/2022
25909953	UD1			02/03/2022
25909955	UD2			02/03/2022
25909956	UD3			02/03/2022
25909958	UD4			02/03/2022
25909960	UD5			02/03/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220303-75

Report Number: 637720

Superseded Report: 637084

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Results Legend	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		Sample Type	
	25909949		BH3/4						250ml BOD (ALE212)	GW	GW	
	25909952		BH208						250ml BOD (ALE212)	GW	GW	
	25909951		BH5/02						250ml BOD (ALE212)	GW	GW	
	25909939		CELL 5 SUMP						250ml BOD (ALE212)	LE	LE	
	25909940		CELL 6 SUMP						250ml BOD (ALE212)	LE	LE	
	25909943		CELL 7 SUMP						250ml BOD (ALE212)	LE	LE	
	25909936		CELL 1/2 SUMP						250ml BOD (ALE212)	LE	LE	
	25909938		CELL 3/4 SUMP						250ml BOD (ALE212)	LE	LE	
	25909935		LEACHATE HOLDING LAGOON						250ml BOD (ALE212)	LE	LE	
	25952186		LEACHATE HOLDING LAGOON						500ml Plastic (ALE208)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
Ammoniacal Nitrogen									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
Anions by Kone (w)									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
pH Value									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
Suspended Solids									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	
									H2SO4 (ALE244)	LE	LE	

25909934	SW207			250ml BOD (ALE212)	SW			X	X	X	
25909933	SW206			H2SO4 (ALE244)	SW	X					
				250ml BOD (ALE212)	SW			X			
25909931	SW205			H2SO4 (ALE244)	SW	X			X	X	X
				250ml BOD (ALE212)	SW			X	X		X
25909930	SW204			H2SO4 (ALE244)	SW	X					
				250ml BOD (ALE212)	SW			X	X		X
25909929	SW203			H2SO4 (ALE244)	SW	X					
				250ml BOD (ALE212)	SW			X	X		X
25909928	SW202			H2SO4 (ALE244)	SW	X			X	X	
				250ml BOD (ALE212)	SW			X	X		X
25909926	SW201			H2SO4 (ALE244)	SW	X					
				250ml BOD (ALE212)	SW			X			X
25909944	NACW228			H2SO4 (ALE244)	GW	X					
				250ml BOD (ALE212)	GW			X	X		
25909946	NACW212			H2SO4 (ALE244)	GW	X					
				250ml BOD (ALE212)	GW			X	X		
25909948	NACW205			H2SO4 (ALE244)	GW	X					
				250ml BOD (ALE212)	GW			X	X		
25909947	NACW203			H2SO4 (ALE244)	GW	X					
				250ml BOD (ALE212)	GW			X	X		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220303-75

Report Number: 637720

Superseded Report: 637084

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Ammoniacal Nitrogen

All

NDPs: 0
 Tests: 24

X

X

X

X

X

Anions by Kone (w)

All

NDPs: 1
 Tests: 24

X

X

X

X

pH Value

All

NDPs: 1
 Tests: 24

X

X

X

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 220303-75

Report Number: 637720

Superseded Report: 637084

Client Ref.:

Location: Nantycaws Landfill

Notification of NDPs (No determination possible)

Date Received : 03/03/2022 10:48:41

Sample No	Customer Sample Ref.	Depth (m)	Test	Comment
25909935	LEACHATE HOLDING LAGOON		Anions by Kone (w)	Insufficient Sample
25909935	LEACHATE HOLDING LAGOON		pH Value	Insufficient Sample



CERTIFICATE OF ANALYSIS

Validated

SDG: 220303-75

Report Number: 637720

Superseded Report: 637084

Client Ref.:

Location: Nantycaws Landfill

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220303-75
Client Ref.:

Report Number: 637720
Location: Nantycaws Landfill

Superseded Report: 637084

Test Completion Dates

Lab Sample No(s)	25909952	25909949	25909951	25909939	25909940	25909943	25909936	25909938	25909935	25952186
Customer Sample Ref.	BH208	BH3/4	BH502	CELL 5 SUMP	CELL 6 SUMP	CELL 7 SUMP	CELL 1/2 SUMP	CELL 3/4 SUMP	LEACHATE HOLDIN G LAGOON	LEACHATE HOLDIN G LAGOON
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate
Ammoniacal Nitrogen	10-Mar-2022	10-Mar-2022	10-Mar-2022	04-Mar-2022	10-Mar-2022	04-Mar-2022	04-Mar-2022	04-Mar-2022	09-Mar-2022	
Anions by Kone (w)	04-Mar-2022	04-Mar-2022	04-Mar-2022	07-Mar-2022	04-Mar-2022	07-Mar-2022	07-Mar-2022	07-Mar-2022		16-Mar-2022
pH Value	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022		14-Mar-2022

Lab Sample No(s)	25909947	25909948	25909946	25909944	25909926	25909928	25909929	25909930	25909931	25909933
Customer Sample Ref.	NACW203	NACW205	NACW212	NACW228	SW201	SW202	SW203	SW204	SW205	SW206
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Ammoniacal Nitrogen	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022
Anions by Kone (w)	04-Mar-2022	04-Mar-2022	04-Mar-2022	04-Mar-2022	04-Mar-2022	04-Mar-2022	04-Mar-2022	04-Mar-2022	04-Mar-2022	04-Mar-2022
pH Value	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022
Suspended Solids					10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022

Lab Sample No(s)	25909934	25909953	25909956	25909958	25909960
Customer Sample Ref.	SW207	UD1	UD3	UD4	UD5
AGS Ref.					
Depth					
Type	Surface Water	Ground Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022
Anions by Kone (w)	04-Mar-2022	04-Mar-2022	04-Mar-2022	04-Mar-2022	04-Mar-2022
pH Value	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022	08-Mar-2022
Suspended Solids	10-Mar-2022				



CERTIFICATE OF ANALYSIS

SDG:	220303-75	Client Reference:		Report Number:	637720
Location:	Nantycaws Landfill	Order Number:	POR006823	Superseded Report:	637084

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park

Manor Road (off Manor Lane)

Hawarden

Deeside

CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 26 April 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 220414-47
Your Reference:
Location: Nantycaws Landfill
Report No: 643770
Order Number: POR007337

We received 34 samples on Thursday April 14, 2022 and 32 of these samples were scheduled for analysis which was completed on Monday April 25, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220414-47
Client Ref.:

Report Number: 643770
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26136149	BH3/2			13/04/2022
26136150	BH3/3			13/04/2022
26136140	BH3/4			13/04/2022
26136152	BH3/5			13/04/2022
26136153	BH3/6			13/04/2022
26136154	BH3/8			13/04/2022
26136155	BH3/9			13/04/2022
26136142	BH208			13/04/2022
26136141	BH5/02			13/04/2022
26136131	CELL 5 SUMP			13/04/2022
26136132	CELL 6 SUMP			13/04/2022
26136133	CELL 7 SUMP			13/04/2022
26136129	CELL 1/2 SUMP			13/04/2022
26136130	CELL 3/4 SUMP			13/04/2022
26136128	LEACHATE HOLDING LAGOON			13/04/2022
26136138	NACW203			13/04/2022
26136139	NACW205			13/04/2022
26136136	NACW212			13/04/2022
26136156	NACW219			13/04/2022
26136134	NACW227			13/04/2022
26136135	NACW228			13/04/2022
26136158	NACW229			13/04/2022
26136118	SW201			13/04/2022
26136119	SW202			13/04/2022
26136121	SW203			13/04/2022
26136122	SW204			13/04/2022
26136124	SW205			13/04/2022
26136125	SW206			13/04/2022
26136126	SW207			13/04/2022
26136143	UD1			13/04/2022
26136144	UD2			13/04/2022
26136146	UD3			13/04/2022
26136147	UD4			13/04/2022
26136148	UD5			13/04/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220414-47

Report Number: 643770

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Acid Herbicides by GCMS

All

NDPs: 0
 Tests: 32

X

X

X

X

Alkalinity as CaCO3

All

NDPs: 0
 Tests: 32

X

X

X

X

Ammoniacal Nitrogen

All

NDPs: 0
 Tests: 25

X

X

X

X

Anions by Kone (w)

All

NDPs: 0
 Tests: 32

X

X

X

X

Nitrite by Kone (w)

All

NDPs: 0
 Tests: 19

X

X

X

X

pH Value

All

NDPs: 0
 Tests: 32

X

X

X

X

SVOC MS (W) - Aqueous

All

NDPs: 0
 Tests: 32

X

X

X

X

VOC MS (W)

All

NDPs: 0
 Tests: 32

X

X

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 220414-47

Report Number: 643770

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Acid Herbicides by GCMS

All

NDPs: 0
Tests: 32

X

X

X

X

Alkalinity as CaCO3

All

NDPs: 0
Tests: 32

X

X

X

X

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 25

X

X

X

X

Anions by Kone (w)

All

NDPs: 0
Tests: 32

X

X

X

X

BOD True Total

All

NDPs: 0
Tests: 6

X

X

X

COD Unfiltered

All

NDPs: 0
Tests: 6

X

X

X

Nitrite by Kone (w)

All

NDPs: 0
Tests: 19

X

pH Value

All

NDPs: 0
Tests: 32

X

X

X

X

SVOC MS (W) - Aqueous

All

NDPs: 0
Tests: 32

X

X

X

X

Total Organic and Inorganic Carbon

All

NDPs: 0
Tests: 13

X

X

X

VOC MS (W)

All

NDPs: 0
Tests: 32

X

X

X

[illegible]

CERTIFICATE OF ANALYSIS



CERTIFICATE OF ANALYSIS

Validated

SDG: 220414-47
Client Ref.:

Report Number: 643770
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220414-47
Client Ref.:

Report Number: 643770
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s) Customer Sample Ref.	26136142	26136149	26136150	26136140	26136152	26136153	26136154	26136155	26136141	26136131
AGS Ref.	BH208	BH3/2	BH3/3	BH3/4	BH3/5	BH3/6	BH3/8	BH3/9	BH5/02	CELL 5 SUMP
Depth										
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Land Leachate
Acid Herbicides by GCMS	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022
Alkalinity as CaCO ₃	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	22-Apr-2022	21-Apr-2022	22-Apr-2022
Ammoniacal Nitrogen	21-Apr-2022	21-Apr-2022	21-Apr-2022	20-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	20-Apr-2022
Anions by Kone (w)	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022
BOD True Total										20-Apr-2022
COD Unfiltered										23-Apr-2022
Nitrite by Kone (w)	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	
pH Value	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	20-Apr-2022
SVOC MS (W) - Aqueous	22-Apr-2022	23-Apr-2022	23-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	23-Apr-2022
Total Organic and Inorganic Carbon										20-Apr-2022
VOC MS (W)	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022

Lab Sample No(s) Customer Sample Ref.	26136132	26136133	26136129	26136130	26136128	26136138	26136139	26136136	26136156	26136135
AGS Ref.	CELL 6 SUMP	CELL 7 SUMP	CELL 1/2 SUMP	CELL 3/4 SUMP	LEACHATE HOLDIN G LAGOON	NACW203	NACW205	NACW212	NACW219	NACW228
Depth										
Type	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Acid Herbicides by GCMS	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022
Alkalinity as CaCO ₃	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	21-Apr-2022	22-Apr-2022	21-Apr-2022	22-Apr-2022	21-Apr-2022	21-Apr-2022
Ammoniacal Nitrogen	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022	21-Apr-2022	21-Apr-2022
Anions by Kone (w)	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	22-Apr-2022	25-Apr-2022	25-Apr-2022	22-Apr-2022	25-Apr-2022
BOD True Total	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022					
COD Unfiltered	23-Apr-2022	23-Apr-2022	23-Apr-2022	23-Apr-2022	22-Apr-2022					
Nitrite by Kone (w)						22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022
pH Value	21-Apr-2022	21-Apr-2022	21-Apr-2022	20-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	20-Apr-2022	21-Apr-2022
SVOC MS (W) - Aqueous	23-Apr-2022	23-Apr-2022	23-Apr-2022	23-Apr-2022	23-Apr-2022	22-Apr-2022	23-Apr-2022	23-Apr-2022	23-Apr-2022	23-Apr-2022
Total Organic and Inorganic Carbon	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022					
VOC MS (W)	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022

Lab Sample No(s) Customer Sample Ref.	26136158	26136118	26136119	26136121	26136122	26136124	26136125	26136126	26136143	26136146
AGS Ref.	NACW229	SW201	SW202	SW203	SW204	SW205	SW206	SW207	UD1	UD3
Depth										
Type	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Ground Water	Ground Water
Acid Herbicides by GCMS	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022
Alkalinity as CaCO ₃	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	22-Apr-2022	22-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022
Ammoniacal Nitrogen	21-Apr-2022								21-Apr-2022	20-Apr-2022
Anions by Kone (w)	22-Apr-2022	22-Apr-2022	25-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	25-Apr-2022	22-Apr-2022	25-Apr-2022	22-Apr-2022
Nitrite by Kone (w)	22-Apr-2022								22-Apr-2022	22-Apr-2022
pH Value	21-Apr-2022	21-Apr-2022	21-Apr-2022	21-Apr-2022	20-Apr-2022	20-Apr-2022	21-Apr-2022	20-Apr-2022	21-Apr-2022	21-Apr-2022
Suspended Solids		23-Apr-2022	23-Apr-2022	23-Apr-2022	23-Apr-2022	23-Apr-2022	23-Apr-2022	23-Apr-2022		
SVOC MS (W) - Aqueous	22-Apr-2022	22-Apr-2022	22-Apr-2022	23-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	22-Apr-2022	23-Apr-2022	22-Apr-2022
Total Organic and Inorganic Carbon		20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022	20-Apr-2022		
VOC MS (W)	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022	25-Apr-2022

Lab Sample No(s) Customer Sample Ref.	26136147	26136148
AGS Ref.	UD4	UD5
Depth		
Type	Ground Water	Ground Water
Acid Herbicides by GCMS	25-Apr-2022	25-Apr-2022
Alkalinity as CaCO ₃	22-Apr-2022	21-Apr-2022
Ammoniacal Nitrogen	21-Apr-2022	21-Apr-2022
Anions by Kone (w)	22-Apr-2022	22-Apr-2022
Nitrite by Kone (w)	22-Apr-2022	22-Apr-2022
pH Value	21-Apr-2022	21-Apr-2022
SVOC MS (W) - Aqueous	23-Apr-2022	23-Apr-2022
VOC MS (W)	25-Apr-2022	25-Apr-2022



CERTIFICATE OF ANALYSIS

SDG: 220414-47
Client Ref:

Report Number: 643770
Location: Nantycaws Landfill

Superseded Report:

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

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10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park

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Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation:	29 April 2022
Customer:	CWM Environmental Ltd
Sample Delivery Group (SDG):	220426-30
Your Reference:	
Location:	Nantycaws Landfill
Report No:	644245
Order Number:	POR007396

We received 6 samples on Tuesday April 26, 2022 and 6 of these samples were scheduled for analysis which was completed on Friday April 29, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager



CERTIFICATE OF ANALYSIS

Validated

SDG: 220426-30
Client Ref.:

Report Number: 644245
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26182529	SW 201			25/04/2022
26182530	SW 202			25/04/2022
26182531	SW 204			25/04/2022
26182532	SW 205			25/04/2022
26182533	SW 206			25/04/2022
26182534	SW 207			25/04/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220426-30

Report Number: 644245

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Alkalinity Filtered as CaCO3

All

NDPs: 0
Tests: 6

X

X

X

X

X

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 6

X

X

X

X

X

Anions by Kone (w)

All

NDPs: 0
Tests: 6

X

X

X

X

X

Dissolved Metals by ICP-MS

All

NDPs: 0
Tests: 6

X

X

X

X

X

Ionic Balance

All

NDPs: 0
Tests: 6

X

X

X

X

X

Nitrite by Kone (w)

All

NDPs: 0
Tests: 6

X

X

X

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 220426-30

Report Number: 644245

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Table of Results - Appendix

Method No	Reference	Description
Calculation		
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220426-30
Client Ref.:

Report Number: 644245
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)
Customer Sample Ref.

AGS Ref.
Depth
Type

	26182529	26182530	26182531	26182532	26182533	26182534
	SW 201	SW 202	SW 204	SW 205	SW 206	SW 207
	Unspecified Liq	Unspecified Liq	Unspecified Liq	Unspecified Liq	Unspecified Liq	Unspecified Liq
Alkalinity Filtered as CaCO ₃	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022
Ammoniacal Nitrogen	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022
Anions by Kone (w)	29-Apr-2022	29-Apr-2022	29-Apr-2022	29-Apr-2022	29-Apr-2022	29-Apr-2022
Dissolved Metals by ICP-MS	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022
Ionic Balance	29-Apr-2022	29-Apr-2022	29-Apr-2022	29-Apr-2022	29-Apr-2022	29-Apr-2022
Nitrite by Kone (w)	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022	28-Apr-2022



CERTIFICATE OF ANALYSIS

SDG: 220426-30
Client Ref:

Report Number: 644245
Location: Nantycaws Landfill

Superseded Report:

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



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Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 19 May 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 220512-101
Your Reference:
Location: Nantyclaws Landfill
Report No: 647036
Order Number: POR007669

We received 26 samples on Thursday May 12, 2022 and 26 of these samples were scheduled for analysis which was completed on Thursday May 19, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220512-101
Client Ref.:

Report Number: 647036
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26265568	BH3/4			11/05/2022
26265571	BH208			11/05/2022
26265570	BH5/02			11/05/2022
26265559	CELL 5 SUMP			11/05/2022
26265560	CELL 6 SUMP			
26265561	CELL 7 SUMP			
26265556	CELL 1/2 SUMP			11/05/2022
26265557	CELL 3/4 SUMP			11/05/2022
26265555	LEACHATE HOLDING LAGOON			11/05/2022
26265566	NACW203			11/05/2022
26265567	NACW205			11/05/2022
26265565	NACW212			11/05/2022
26265563	NACW227			
26265564	NACW228			11/05/2022
26265544	SW201			11/05/2022
26265546	SW202			11/05/2022
26265548	SW203			11/05/2022
26265550	SW204			11/05/2022
26265552	SW205			11/05/2022
26265553	SW206			11/05/2022
26265554	SW207			11/05/2022
26265573	UD1			11/05/2022
26265575	UD2			
26265576	UD3			11/05/2022
26265578	UD4			
26265579	UD5			11/05/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220512-101

Report Number: 647036

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 21

Anions by Kone (w)

All

NDPs: 0
Tests: 21

pH Value

All

NDPs: 0
Tests: 21

Suspended Solids

All

NDPs: 0
Tests: 6

26265565

NACW212

500ml Plastic
(ALE208)

GW

H2SO4 (ALE244)

GW

X

X

X

X

X

X

X

X

X

X

X

X

26265567

NACW205

500ml Plastic
(ALE208)

GW

H2SO4 (ALE244)

GW

X

X

X

X

X

X

X

X

X

X

X

X

26265570

BH5/02

500ml Plastic
(ALE208)

GW

H2SO4 (ALE244)

GW

X

X

X

X

X

X

X

X

X

X

X

X

26265571

BH208

500ml Plastic
(ALE208)

GW

H2SO4 (ALE244)

GW

X

X

X

X

X

X

X

X

X

X

X

X

26265568

BH3/4

500ml Plastic
(ALE208)

GW

H2SO4 (ALE244)

GW

X

X

X

X

X

X

X

X

X

X

X

X

26265559

CELL 5 SUMP

500ml Plastic
(ALE208)

LE

H2SO4 (ALE244)

LE

X

X

X

X

X

X

X

X

X

X

X

X

26265556

CELL 1/2 SUMP

500ml Plastic
(ALE208)

LE

H2SO4 (ALE244)

LE

X

X

X

X

X

X

X

X

X

X

X

X

26265557

CELL 3/4 SUMP

500ml Plastic
(ALE208)

LE

H2SO4 (ALE244)

LE

X

X

X

X

X

X

X

X

X

X

X

X

26265555

LEACHATE
HOLDING LAGOON

500ml Plastic
(ALE208)

LE

H2SO4 (ALE244)

LE

X

X

X

X

X

X

X

X

X

X

X

X

26265566

NACW203

500ml Plastic
(ALE208)

GW

H2SO4 (ALE244)

GW

X

X

X

X

X

X

X

X

X

X

X

X

26265578	UD4			H2SO4 (ALE244)	GW	X					
				500ml Plastic (ALE208)	GW						
26265576	UD3			H2SO4 (ALE244)	GW	X		X		X	
				500ml Plastic (ALE208)	GW						
26265573	UD1			H2SO4 (ALE244)	GW	X		X		X	
				500ml Plastic (ALE208)	GW						
26265564	SW207			H2SO4 (ALE244)	SW	X			X		
				500ml Plastic (ALE208)	SW						
26265553	SW206			H2SO4 (ALE244)	SW	X		X		X	
				500ml Plastic (ALE208)	SW						
26265552	SW205			H2SO4 (ALE244)	SW	X					
				500ml Plastic (ALE208)	SW						
26265550	SW204			H2SO4 (ALE244)	SW	X		X		X	
				500ml Plastic (ALE208)	SW						
26265546	SW202			H2SO4 (ALE244)	SW	X					
				500ml Plastic (ALE208)	SW						
26265544	SW201			H2SO4 (ALE244)	SW	X		X		X	
				500ml Plastic (ALE208)	SW						
26265564	NACW228			H2SO4 (ALE244)	GW	X		X		X	
				500ml Plastic (ALE208)	GW						
26265565	NACW212			H2SO4 (ALE244)	GW	X			X		
				500ml Plastic (ALE208)	GW						



CERTIFICATE OF ANALYSIS

Validated

SDG: 220512-101

Report Number: 647036

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

2626579

Customer
Sample Reference

UD5

AGS Reference

Depth (m)

Container

500ml Plastic
(ALE208)

H2SO4 (ALE244)

Sample Type

GW

GW

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 21

X

Anions by Kone (w)

All

NDPs: 0
Tests: 21

X

pH Value

All

NDPs: 0
Tests: 21

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 220512-101

Report Number: 647036

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220512-101
Client Ref.:

Report Number: 647036
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	26265571	26265568	26265570	26265559	26265556	26265557	26265555	26265566	26265567	26265565
Customer Sample Ref.	BH208	BH3/4	BH502	CELL 5 SUMP	CELL 1/2 SUMP	CELL 3/4 SUMP	LEACHATE HOLDIN G LAGOON	NACW203	NACW205	NACW212
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022
Anions by Kone (w)	16-May-2022	16-May-2022	16-May-2022	17-May-2022	17-May-2022	17-May-2022	16-May-2022	16-May-2022	16-May-2022	17-May-2022
pH Value	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022

Lab Sample No(s)	26265564	26265544	26265546	26265550	26265552	26265553	26265554	26265573	26265576	26265578
Customer Sample Ref.	NACW228	SW201	SW202	SW204	SW205	SW206	SW207	UD1	UD3	UD4
AGS Ref.										
Depth										
Type	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022
Anions by Kone (w)	16-May-2022	16-May-2022	16-May-2022	16-May-2022	16-May-2022	16-May-2022	16-May-2022	16-May-2022	16-May-2022	16-May-2022
pH Value	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022	17-May-2022
Suspended Solids		18-May-2022	19-May-2022	18-May-2022	18-May-2022	19-May-2022	18-May-2022			

Lab Sample No(s)	26265579
Customer Sample Ref.	UD5
AGS Ref.	
Depth	
Type	Ground Water
Ammoniacal Nitrogen	17-May-2022
Anions by Kone (w)	16-May-2022
pH Value	17-May-2022



CERTIFICATE OF ANALYSIS

SDG: 220512-101

Report Number: 647036

Superseded Report:

Client Ref:

Location: Nantycaws Landfill

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park

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Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation:	27 May 2022
Customer:	CWM Environmental Ltd
Sample Delivery Group (SDG):	220524-37
Your Reference:	
Location:	Nantycaws Landfill
Report No:	648286
Order Number:	POR007814

We received 31 samples on Tuesday May 24, 2022 and 20 of these samples were scheduled for analysis which was completed on Friday May 27, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220524-37
Client Ref.:

Report Number: 648286
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26332941	BH 3/2			23/05/2022
26332942	BH 3/3			23/05/2022
26332943	BH 3/4			23/05/2022
26332939	BH 3/5			23/05/2022
26332940	BH 3/6			23/05/2022
26332944	BH 3/8			23/05/2022
26332945	BH 3/9			23/05/2022
26332946	BH 208			23/05/2022
26332948	BH 5/02			23/05/2022
26332965	CELL 5			23/05/2022
26332967	CELL 6			23/05/2022
26332968	CELL 7			23/05/2022
26332963	CELL 1-2			23/05/2022
26332964	CELL 3-4			23/05/2022
26332970	HOLDING LAGOON			23/05/2022
26332930	NACW 203			23/05/2022
26332932	NACW 205			23/05/2022
26332934	NACW 212			23/05/2022
26332935	NACW 219			23/05/2022
26332936	NACW 228			23/05/2022
26332937	NACW 229			23/05/2022
26332955	SW 201			23/05/2022
26332956	SW 202			23/05/2022
26332957	SW 204			23/05/2022
26332958	SW 205			23/05/2022
26332959	SW 206			23/05/2022
26332961	SW 207			23/05/2022
26332949	UD1			23/05/2022
26332950	UD3			23/05/2022
26332952	UD4			23/05/2022
26332953	UD5			23/05/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220524-37

Report Number: 648286

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Table of Results - Appendix

Method No	Reference	Description
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220524-37
Client Ref.:

Report Number: 648286
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	26332946	26332941	26332942	26332943	26332939	26332940	26332944	26332945	26332948	26332930
Customer Sample Ref.	BH 208	BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8	BH 3/9	BH 5/02	NACW 203
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Dissolved Metals by ICP-MS	26-May-2022	26-May-2022	26-May-2022	26-May-2022	27-May-2022	26-May-2022	27-May-2022	26-May-2022	26-May-2022	27-May-2022

Lab Sample No(s)	26332932	26332934	26332935	26332936	26332937	26332949	26332950	26332952	26332953
Customer Sample Ref.	NACW 205	NACW 212	NACW 219	NACW 228	NACW 229	UD1	UD3	UD4	UD5
AGS Ref.									
Depth									
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Dissolved Metals by ICP-MS	26-May-2022	26-May-2022	27-May-2022	26-May-2022	27-May-2022	26-May-2022	27-May-2022	26-May-2022	26-May-2022



CERTIFICATE OF ANALYSIS

SDG: 220524-37
Client Ref:

Report Number: 648286
Location: Nantycaws Landfill

Superseded Report:

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



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Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation:	16 June 2022
Customer:	CWM Environmental Ltd
Sample Delivery Group (SDG):	220615-27
Your Reference:	
Location:	Nantyclaws Landfill
Report No:	650839
Order Number:	POR008064

We received 6 samples on Wednesday June 15, 2022 and 6 of these samples were scheduled for analysis which was completed on Thursday June 16, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager



CERTIFICATE OF ANALYSIS

Validated

SDG: 220615-27
Client Ref.:

Report Number: 650839
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26428760	Cell 2			14/06/2022
26428758	Cell 4			14/06/2022
26428756	Cell 5			14/06/2022
26428759	Cell 6			14/06/2022
26428754	Cell 7			14/06/2022
26428757	Leachate Holding Lagoon			14/06/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



Superseded Report:

Page 4 of 7



CERTIFICATE OF ANALYSIS

Validated

SDG: 220615-27
Client Ref.:

Report Number: 650839
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220615-27
Client Ref.:

Report Number: 650839
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	26428760	26428758	26428756	26428759	26428754	26428757
Customer Sample Ref.	Cell 2	Cell 4	Cell 5	Cell 6	Cell 7	Leachate Holding Lagoon
AGS Ref.						
Depth						
Type	Unspecified Liq	Unspecified Liq	Unspecified Liq	Unspecified Liq	Unspecified Liq	Unspecified Liq
Dissolved Metals by ICP-MS	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022



CERTIFICATE OF ANALYSIS

SDG: 220615-27
Client Ref:

Report Number: 650839
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 19 June 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 220615-27
Your Reference:
Location: Nantyclaws Landfill
Report No: 651201
Order Number: POR008064

This report has been revised and directly supersedes 650839 in its entirety.

We received 6 samples on Wednesday June 15, 2022 and 6 of these samples were scheduled for analysis which was completed on Thursday June 16, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220615-27
Client Ref.:

Report Number: 651201
Location: Nantycaws Landfill

Superseded Report: 650839

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26428756	Cell 5			14/06/2022
26428759	Cell 6			14/06/2022
26428754	Cell 7			14/06/2022
26428760	Cell 1/2			14/06/2022
26428758	Cell 3/4			14/06/2022
26428757	Leachate Holding Lagoon			14/06/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

SDG: 220615-27

Report Number: 651201

Superseded Report: 650839

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

- S - Soil/Solid
- UNS - Unspecified Solid
- GW - Ground Water
- SW - Surface Water
- LE - Land Leachate
- PL - Prepared Leachate
- PR - Process Water
- SA - Saline Water
- TE - Trade Effluent
- TS - Treated Sewage
- US - Untreated Sewage
- RE - Recreational Water
- DW - Drinking Water
- Non-regulatory
- UNL - Unspecified Liquid
- SL - Sludge
- G - Gas
- OTH - Other

Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	
26428757	Leachate Holding Lagoon			HNO3 Filtered (ALE204)	LE	X
26428758	Cell 3/4			HNO3 Filtered (ALE204)	LE	X
26428760	Cell 1/2			HNO3 Filtered (ALE204)	LE	X
26428754	Cell 7			HNO3 Filtered (ALE204)	LE	X
26428759	Cell 6			HNO3 Filtered (ALE204)	LE	X
26428756	Cell 5			HNO3 Filtered (ALE204)	LE	X
All		NDPs: 0 Tests: 6				



CERTIFICATE OF ANALYSIS

Validated

SDG: 220615-27
Client Ref.:

Report Number: 651201
Location: Nantycaws Landfill

Superseded Report: 650839

Table of Results - Appendix

Method No	Reference	Description
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220615-27
Client Ref.:

Report Number: 651201
Location: Nantycaws Landfill

Superseded Report: 650839

Test Completion Dates

Lab Sample No(s)
Customer Sample Ref.

AGS Ref.
Depth
Type

26428756	26428759	26428754	26428760	26428758	26428757
Cell 5	Cell 6	Cell 7	Cell 1/2	Cell 3/4	Leachate Holding Lagoon
Land	Land	Land	Land	Land	Land
Dissolved Metals by ICP-MS	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022

ALS Environmental, Land	QF.7.5.1 Data Amendments Form (Issue No. 4)
	Date: 03/03/2020
	Issued and Authorised by Quality Manager

SDG	Sample Event	Sample ID	Date Amended	Amendment Reason	Previous Reference	New Reference	Supersedes Report
220615-27	26428760	Cell 2	19/06/2022	Sample ID Change	Cell 2	Cell 1/2	650839
220615-27	26428760	Cell 4	19/06/2022	Sample ID Change	Cell 4	Cell 3/4	650839
220615-27	All Samples	All Samples	19/06/2022	Matrix Change	Unspecified Liquid	Landfill Leachate	650839



CERTIFICATE OF ANALYSIS

SDG: 220615-27

Report Number: 651201

Superseded Report: 650839

Client Ref:

Location: Nantycaws Landfill

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 21 June 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 220615-28
Your Reference:
Location: Nantyclaws Landfill
Report No: 651523
Order Number: POR008064

We received 24 samples on Wednesday June 15, 2022 and 24 of these samples were scheduled for analysis which was completed on Tuesday June 21, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220615-28
Client Ref.:

Report Number: 651523
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26428860	BH 3/4			14/06/2022
26428849	BH208			14/06/2022
26428848	BH 5/02			14/06/2022
26428840	Cell 5 Sump			14/06/2022
26428841	Cell 6 Sump			14/06/2022
26428837	Cell 7 Sump			14/06/2022
26428836	Cell 1/2 Sump			14/06/2022
26428839	Cell 3/4 Sump			14/06/2022
26428838	Leachate Holding Lagoon			14/06/2022
26428850	NACW203			14/06/2022
26428857	NACW205			14/06/2022
26428854	NACW212			14/06/2022
26428856	NACW228			14/06/2022
26428846	SW201			14/06/2022
26428847	SW202			14/06/2022
26428852	SW203			14/06/2022
26428853	SW204			14/06/2022
26428843	SW205			14/06/2022
26428842	SW206			14/06/2022
26428845	SW207			14/06/2022
26428851	UD1			14/06/2022
26428858	UD3			14/06/2022
26428855	UD4			14/06/2022
26428859	UD5			14/06/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220615-28

Report Number: 651523

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 US - Treated Sewage
 TS - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 24

Anions by Kone (w)

All

NDPs: 0
Tests: 24

pH Value

All

NDPs: 0
Tests: 24

Suspended Solids

All

NDPs: 0
Tests: 7

26428850

NACW203

250ml Plastic
(ALE212)

GW

26428838

Leachate Holding
Lagoon

H2SO4 (ALE244)

LE

26428839

Cell 3/4 Sump

H2SO4 (ALE244)

LE

26428836

Cell 1/2 Sump

H2SO4 (ALE244)

LE

26428837

Cell 7 Sump

H2SO4 (ALE244)

LE

26428841

Cell 6 Sump

H2SO4 (ALE244)

LE

26428840

Cell 5 Sump

H2SO4 (ALE244)

LE

26428849

BH208

H2SO4 (ALE244)

GW

26428848

BH 5/02

H2SO4 (ALE244)

GW

26428860

BH 3/4

H2SO4 (ALE244)

GW

26428860

BH 3/4

H2SO4 (ALE244)

GW

26428860

BH 3/4

H2SO4 (ALE244)

GW

26428845	SW207			H2SO4 (ALE244)	SW		X					
				500ml Plastic (ALE208)	SW							
				H2SO4 (ALE244)	SW		X		X		X	
				500ml Plastic (ALE208)	SW				X		X	
				H2SO4 (ALE244)	SW		X					X
26428843	SW205			500ml Plastic (ALE208)	SW							
				H2SO4 (ALE244)	SW		X					
				500ml Plastic (ALE208)	SW				X		X	
				H2SO4 (ALE244)	SW		X		X			X
				500ml Plastic (ALE208)	SW				X		X	
26428853	SW204			H2SO4 (ALE244)	SW		X					
				250ml BOD (ALE212)	SW				X		X	
				H2SO4 (ALE244)	SW							X
				250ml BOD (ALE212)	SW				X			
				250ml BOD (ALE212)	SW							
26428852	SW203			H2SO4 (ALE244)	SW		X					
				250ml BOD (ALE212)	SW				X			
				H2SO4 (ALE244)	SW							X
				250ml BOD (ALE212)	SW				X			
				250ml Plastic (ALE212)	SW							
26428847	SW202			H2SO4 (ALE244)	SW		X					
				250ml Plastic (ALE212)	SW				X			
				H2SO4 (ALE244)	SW							X
				250ml Plastic (ALE212)	SW				X			
				250ml plastic (ALE212)	SW							
26428846	SW201			H2SO4 (ALE244)	SW		X					
				250ml plastic (ALE212)	SW				X			
				H2SO4 (ALE244)	SW							X
				250ml plastic (ALE212)	SW				X			
				H2SO4 (ALE244)	SW							
26428856	NACW228			H2SO4 (ALE244)	GW		X					
				250ml BOD (ALE212)	GW				X			
				H2SO4 (ALE244)	GW							
				250ml BOD (ALE212)	GW				X			
				H2SO4 (ALE244)	GW		X					
26428854	NACW212			H2SO4 (ALE244)	GW		X					
				250ml BOD (ALE212)	GW				X			
				H2SO4 (ALE244)	GW							
				250ml BOD (ALE212)	GW				X			
				H2SO4 (ALE244)	GW							
26428857	NACW205			H2SO4 (ALE244)	GW		X					
				250ml BOD (ALE212)	GW				X			
				H2SO4 (ALE244)	GW							
				250ml BOD (ALE212)	GW				X			
				H2SO4 (ALE244)	GW							
26428850	NACW203			250ml BOD (ALE212)	GW				X			
				H2SO4 (ALE244)	GW		X					
				250ml BOD (ALE212)	GW							
				H2SO4 (ALE244)	GW							
				250ml BOD (ALE212)	GW							



CERTIFICATE OF ANALYSIS

Validated

SDG: 220615-28

Report Number: 651523

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 24

Anions by Kone (w)

All

NDPs: 0
Tests: 24

pH Value

All

NDPs: 0
Tests: 24

26428851

26428858

26428855

26428859

UD1

UD3

UD4

UD5

500ml Plastic (ALE208)

H2SO4 (ALE244)

250ml BOD (ALE212)

H2SO4 (ALE244)

250ml BOD (ALE212)

H2SO4 (ALE244)

250ml BOD (ALE212)

H2SO4 (ALE244)

250ml BOD (ALE212)

H2SO4 (ALE244)

250ml BOD (ALE212)

H2SO4 (ALE244)

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SDG: 220615-28
Client Ref.:

Report Number: 651523

Superseded Report:

Location: Nantycaws Landfill

[illegible]

SDG: 220615-28
Client Ref.:

Report Number: 651523

Superseded Report:

Location: Nantycaws Landfill

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 220615-28
Client Ref.:

Report Number: 651523
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 220615-28
Client Ref.:

Report Number: 651523
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	26428849	26428860	26428848	26428840	26428841	26428837	26428836	26428839	26428838	26428850
Customer Sample Ref.	BH208	BH 3/4	BH 5/02	Cell 5 Sump	Cell 6 Sump	Cell 7 Sump	Cell 1/2 Sump	Cell 3/4 Sump	Leachate Holding Lagoon	NACW203
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Ground Water
Ammoniacal Nitrogen	17-Jun-2022	17-Jun-2022	17-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	17-Jun-2022
Anions by Kone (w)	18-Jun-2022	17-Jun-2022	18-Jun-2022	18-Jun-2022	18-Jun-2022	18-Jun-2022	18-Jun-2022	18-Jun-2022	18-Jun-2022	17-Jun-2022
pH Value	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022

Lab Sample No(s)	26428857	26428854	26428856	26428846	26428847	26428852	26428853	26428843	26428842	26428845
Customer Sample Ref.	NACW205	NACW212	NACW228	SW201	SW202	SW203	SW204	SW205	SW206	SW207
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Ammoniacal Nitrogen	17-Jun-2022	17-Jun-2022	17-Jun-2022	17-Jun-2022	16-Jun-2022	16-Jun-2022	17-Jun-2022	17-Jun-2022	16-Jun-2022	17-Jun-2022
Anions by Kone (w)	18-Jun-2022	18-Jun-2022	17-Jun-2022	18-Jun-2022	17-Jun-2022	18-Jun-2022	18-Jun-2022	18-Jun-2022	18-Jun-2022	18-Jun-2022
pH Value	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022
Suspended Solids				21-Jun-2022	21-Jun-2022	21-Jun-2022	21-Jun-2022	21-Jun-2022	21-Jun-2022	21-Jun-2022

Lab Sample No(s)	26428851	26428858	26428855	26428859
Customer Sample Ref.	UD1	UD3	UD4	UD5
AGS Ref.				
Depth				
Type	Ground Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	17-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022
Anions by Kone (w)	18-Jun-2022	17-Jun-2022	17-Jun-2022	17-Jun-2022
pH Value	16-Jun-2022	16-Jun-2022	16-Jun-2022	16-Jun-2022



CERTIFICATE OF ANALYSIS

SDG: 220615-28
Client Ref:

Report Number: 651523
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 30 July 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 220713-39
Your Reference:
Location: Nantyclaws Landfill
Report No: 656160
Order Number: POR008417

We received 29 samples on Wednesday July 13, 2022 and 29 of these samples were scheduled for analysis which was completed on Saturday July 30, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220713-39
Client Ref.:

Report Number: 656160
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26579364	BH3-2			12/07/2022
26579365	BH3-3			12/07/2022
26579367	BH3-4			12/07/2022
26579368	BH3-5			12/07/2022
26579370	BH3-6			12/07/2022
26579371	BH3-8			12/07/2022
26579372	BH3-9			12/07/2022
26579378	BH 208			12/07/2022
26579379	BH5-02			12/07/2022
26579359	CELL 5 SUMP			12/07/2022
26579360	CELL 6 SUMP			12/07/2022
26579361	CELL 7 SUMP			12/07/2022
26579356	CELL 1-2 SUMP			12/07/2022
26579358	CELL 3-4 SUMP			12/07/2022
26579362	LEACHATE HOLDING LAGOON			12/07/2022
26579376	NACW 203			12/07/2022
26579377	NACW 205			12/07/2022
26579380	NACW 212			12/07/2022
26579381	NACW 219			12/07/2022
26579382	NACW 228			12/07/2022
26579383	NACW 229			12/07/2022
26579384	SW 201			12/07/2022
26579385	SW 202			12/07/2022
26579386	SW 204			12/07/2022
26579387	SW 205			12/07/2022
26579388	SW 207			12/07/2022
26579373	UD1			12/07/2022
26579374	UD3			12/07/2022
26579375	UD4			12/07/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220713-39

Report Number: 656160

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

			26579364		26579365		26579367		26579368
			BH3-2		BH3-3		BH3-4		BH3-5
			0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	0.5l glass bottle (ALE227)
			GW	GW	GW	GW	GW	GW	GW
			GW	GW	GW	GW	GW	GW	GW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 29	X			X		X	X
Alkalinity as CaCO ₃	All	NDPs: 0 Tests: 29		X			X		
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 29			X			X	
Anions by Kone (w)	All	NDPs: 0 Tests: 29	X			X		X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 29			X			X	
Nitrite by Kone (w)	All	NDPs: 0 Tests: 23			X			X	
pH Value	All	NDPs: 0 Tests: 29	X			X		X	
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 29	X			X		X	X
VOC MS (W)	All	NDPs: 0 Tests: 29			X			X	X



CERTIFICATE OF ANALYSIS

Validated

SDG: 220713-39

Report Number: 656160

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
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Results Legend X Test N No Determination Possible Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		Sample Type	
	26579372		BH3-9						HNO3 Filtered (ALE204)		LE	
	26579378		BH 208						H2SO4 (ALE244)		LE	
	26579379		BH5-02						500ml Plastic (ALE208)		LE	
									250ml BOD (ALE12)		LE	
									0.5l glass bottle (ALE227)		LE	
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
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								NaOH (ALE245)		GW		
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								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)		GW		
								0.5l glass bottle (ALE227)		GW		
								Vial (ALE297)		GW		
								NaOH (ALE245)		GW		
								HNO3 Filtered (ALE204)		GW		
								H2SO4 (ALE244)		GW		
								500ml Plastic (ALE208)				

SDG: 220713-39

Report Number: 656160

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)		Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type
26579317	NACW 205				H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227) Vial (ALE297)	GW
26579376	NACW 203				NaOH (ALE245) HNO3 Filtered (ALE204) H2SO4 (ALE244)	GW
26579362	LEACHATE HOLDING LAGOON				500ml Plastic (ALE208) 0.5l glass bottle (ALE227) Vial (ALE297) HNO3 Filtered (ALE204) H2SO4 (ALE244)	LE GW LE LE LE
26579358	CELL 3-4 SUMP				500ml Plastic (ALE208) HNO3 Filtered (ALE204) H2SO4 (ALE244) 0.5l glass bottle (ALE227) Vial (ALE297)	LE LE LE LE LE
All	NDPs: 0 Tests: 29			X		
All	NDPs: 0 Tests: 29	X			X	
All	NDPs: 0 Tests: 29		X			X
All	NDPs: 0 Tests: 29	X			X	
All	NDPs: 0 Tests: 6			X		
All	NDPs: 0 Tests: 6			X		
All	NDPs: 0 Tests: 29		X			X
All	NDPs: 0 Tests: 23				X	
All	NDPs: 0 Tests: 29	X			X	X
All	NDPs: 0 Tests: 29			X		X
All	NDPs: 0 Tests: 11		X		X	
All	NDPs: 0 Tests: 29			X		X



CERTIFICATE OF ANALYSIS

Validated

SDG: 220713-39

Report Number: 656160

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Acid Herbicides by GCMS

All

NDPs: 0
 Tests: 29

X

X

Alkalinity as CaCO₃

All

NDPs: 0
 Tests: 29

X

X

Ammoniacal Nitrogen

All

NDPs: 0
 Tests: 29

X

X

Anions by Kone (w)

All

NDPs: 0
 Tests: 29

X

X

Dissolved Metals by ICP-MS

All

NDPs: 0
 Tests: 29

X

X

Nitrite by Kone (w)

All

NDPs: 0
 Tests: 23

X

X

X

pH Value

All

NDPs: 0
 Tests: 29

X

X

SVOC MS (W) - Aqueous

All

NDPs: 0
 Tests: 29

X

X

VOC MS (W)

All

NDPs: 0
 Tests: 29

X

X

X

SDG: 220713-39
Client Ref.:

Report Number: 656160
Location: Nantycaws Landfill

Superseded Report:

[illegible]

SDG: 220713-39

Report Number: 656160

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

[illegible]

SDG: 220713-39

Report Number: 656160

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

[illegible]



CERTIFICATE OF ANALYSIS

SDG: 220713-39
Client Ref.:Report Number: 656160
Location: Nantycaws Landfill

Superseded Report:

Results Legend			Customer Sample Ref.		NACW 219	NACW 228	NACW 229	SW 201	SW 202	SW 204
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
M	mCERTS accredited.				12/07/2022	12/07/2022	12/07/2022	12/07/2022	12/07/2022	12/07/2022
aq	Aqueous / settled sample.				13/07/2022	13/07/2022	13/07/2022	13/07/2022	13/07/2022	13/07/2022
diss.filt	Dissolved / filtered sample.				220713-39	220713-39	220713-39	220713-39	220713-39	220713-39
tot.unfilt	Total / unfiltered sample.				26579381	26579382	26579383	26579384	26579385	26579386
* Subcontracted - refer to subcontractor report for accreditation status.										
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery										
(F) Trigger breach confirmed										
1-4*5@ Sample deviation (see appendix)										
Component	LOD/Units	Method								
Ionic balance	% Diff	Calulation						-3.21	-1.77	-1.77
Suspended solids, Total	<2 mg/l	TM022						2.05	2.2	4.95
Alkalinity, Total as CaCO3	<2 mg/l	TM043			195	360	165	215	211	177
Alkalinity, Total as CaCO3 (diss.filt)	<2 mg/l	TM043						220	220	180
Alkalinity, Bicarbonate as CaCO3 (diss.filt)	<2 mg/l	TM043						220	220	180
Organic Carbon, Total	<3 mg/l	TM090						<3	3.85	4.44
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099			<0.2	6.55	0.504	<0.2	<0.2	<0.2
Cadmium (diss.filt)	<0.08 µg/l	TM152			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Chromium (diss.filt)	<1 µg/l	TM152			<1	<1	<1	<1	<1	<1
Copper (diss.filt)	<0.3 µg/l	TM152			0.748	6.34	<0.3	1.47	4.5	6.96
Lead (diss.filt)	<0.2 µg/l	TM152			<0.2	0.844	<0.2	<0.2	<0.2	0.261
Manganese (diss.filt)	<3 µg/l	TM152			1790	847	5290	27.5	45.7	4.34
Nickel (diss.filt)	<0.4 µg/l	TM152			1.44	6.97	2.36	<0.4	0.675	0.889
Zinc (diss.filt)	<1 µg/l	TM152			3.97	11.3	8.49	4.26	9.79	12
Sodium (Dis.Filt)	<0.076 mg/l	TM152			11.5	39.9	18.2	9.88	13.1	9.79
Magnesium (Dis.Filt)	<0.036 mg/l	TM152			6.82	17.5	10.1	10.6	8.14	5.59
Potassium (Dis.Filt)	<0.2 mg/l	TM152			1.11	96.6	8.24	3.32	5.14	5.96
Calcium (Dis.Filt)	<0.2 mg/l	TM152			80.2	112	80.8	75.5	81.7	74.7
Iron (Dis.Filt)	<0.019 mg/l	TM152			1.78	0.125	1.67	<0.019	0.0216	<0.019
Nitrite as NO2	<0.05 mg/l	TM184			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	<2 mg/l	TM184			30.1	79	102	13.1	15.5	32.3
Chloride	<2 mg/l	TM184			23.7	103	26.7	25.7	29	20.6
Nitrate as NO3	<0.3 mg/l	TM184			0.688	4.22	<0.3	6.01	6.55	5.09
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184			0.155	0.953	<0.1	1.36	1.48	1.15
pH	<1 pH Units	TM256						8.1	8.11	8.09
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256			0.451	1.06	0.533	0.453	0.463	0.416
Mecoprop	<0.04 µg/l	TM411			<0.04	<0.04	<0.04	<0.04	<0.04	<0.04



CERTIFICATE OF ANALYSIS

SDG: 220713-39
Client Ref.:Report Number: 656160
Location: Nantycaws Landfill

Superseded Report:

Results Legend		Customer Sample Ref.	SW 205	SW 207	UD1	UD3	UD4	
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 12/07/2022 13/07/2022 220713-39 26579387	Surface Water (SW) 12/07/2022 13/07/2022 220713-39 26579388	Ground Water (GW) 12/07/2022 13/07/2022 220713-39 26579373	Ground Water (GW) 12/07/2022 13/07/2022 220713-39 26579374	Ground Water (GW) 12/07/2022 13/07/2022 220713-39 26579375	
Component	LOD/Units	Method						
Ionic balance	% Diff	Calulation	-3.17	-2.49				
Suspended solids, Total	<2 mg/l	TM022	5.25 #	3.65 #				
Alkalinity, Total as CaCO3	<2 mg/l	TM043	215 #	215 #	250 #	180 #	185 #	
Alkalinity, Total as CaCO3 (diss.filt)	<2 mg/l	TM043	215	215				
Alkalinity, Bicarbonate as CaCO3 (diss.filt)	<2 mg/l	TM043	215	215				
Organic Carbon, Total	<3 mg/l	TM090	3.3 ◆ #	7.64 ◆ #				
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2 #	<0.2 #	<0.2 #	<0.2 #	<0.2 #	
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08 #	<0.08 #	<0.08 #	<0.08 #	<0.08 #	
Chromium (diss.filt)	<1 µg/l	TM152	<1 #	<1 #	<1 #	<1 #	<1 #	
Copper (diss.filt)	<0.3 µg/l	TM152	4.69 #	1.87 #	1.3 #	0.45 #	3.64 #	
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2 #	<0.2 #	<0.2 #	<0.2 #	0.785 #	
Manganese (diss.filt)	<3 µg/l	TM152	67 #	66.5 #	24.4 #	<3 #	3.58 #	
Nickel (diss.filt)	<0.4 µg/l	TM152	0.895 #	<0.4 #	<0.4 #	<0.4 #	<0.4 #	
Zinc (diss.filt)	<1 µg/l	TM152	16.6 #	8.27 #	9.89 #	3.9 #	26.7 #	
Sodium (Dis.Filt)	<0.076 mg/l	TM152	12.2 #	12.1 #	12 #	11.7 #	11.1 #	
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	7.91 #	7.93 #	10.7 #	7.63 #	8.22 #	
Potassium (Dis.Filt)	<0.2 mg/l	TM152	4.97 #	4.88 #	1.65 #	0.99 #	1.22 #	
Calcium (Dis.Filt)	<0.2 mg/l	TM152	79.9 #	81.5 #	99.1 #	65.2 #	62.4 #	
Iron (Dis.Filt)	<0.019 mg/l	TM152	0.0247 #	0.0288 #	<0.019 #	<0.019 #	<0.019 #	
Nitrite as NO2	<0.05 mg/l	TM184	<0.05 #	<0.05 #	<0.05 #	<0.05 #	<0.05 #	
Sulphate	<2 mg/l	TM184	16.5 #	16 #	13.4 #	15 #	15.8 #	
Chloride	<2 mg/l	TM184	30.9 #	31 #	45.9 #	18.1 #	17.4 #	
Nitrate as NO3	<0.3 mg/l	TM184	7.83	8.57	8.87	5.91	5.45	
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	1.77 #	1.94 #	2 #	1.33 #	1.23 #	
pH	<1 pH Units	TM256	8.16 #	8.19 #				
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.473 #	0.477 #	0.574 #	0.386 #	0.383 #	
Mecoprop	<0.04 µg/l	TM411	<0.04	<0.04	<0.04	<0.04	<0.04	



CERTIFICATE OF ANALYSIS

Validated

SDG: 220713-39
Client Ref.:

Report Number: 656160
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
Calculation		
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 220713-39
Client Ref.:

Report Number: 656160
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s) Customer Sample Ref.	26579364	26579365	26579367	26579368	26579370	26579371	26579372	26579379	26579378	26579359
AGS Ref.	BH3-2	BH3-3	BH3-4	BH3-5	BH3-6	BH3-8	BH3-9	BH5-02	BH 208	CELL 5 SUMP
Depth										
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Land Leachate
Acid Herbicides by GCMS	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022
Alkalinity as CaCO ₃	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022
Ammoniacal Nitrogen	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022
Anions by Kone (w)	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022
BOD True Total										20-Jul-2022
COD Unfiltered										20-Jul-2022
Dissolved Metals by ICP-MS	25-Jul-2022	22-Jul-2022	22-Jul-2022	25-Jul-2022	22-Jul-2022	21-Jul-2022	22-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022
Nitrite by Kone (w)	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	
pH Value	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022
SVOC MS (W) - Aqueous	19-Jul-2022	20-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022
Total Organic and Inorganic Carbon										22-Jul-2022
VOC MS (W)	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022

Lab Sample No(s) Customer Sample Ref.	26579356	26579360	26579361	26579358	26579362	26579377	26579376	26579380	26579381	26579382
AGS Ref.	CELL 1-2 SUMP	CELL 6 SUMP	CELL 7 SUMP	CELL 3-4 SUMP	LEACHATE HOLDIN G LAGOON	NACW 205	NACW 203	NACW 212	NACW 219	NACW 228
Depth										
Type	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Acid Herbicides by GCMS	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022
Alkalinity as CaCO ₃	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022
Ammoniacal Nitrogen	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022
Anions by Kone (w)	19-Jul-2022	19-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	16-Jul-2022	16-Jul-2022	16-Jul-2022
BOD True Total	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022					
COD Unfiltered	20-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022					
Dissolved Metals by ICP-MS	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	22-Jul-2022	22-Jul-2022	25-Jul-2022	22-Jul-2022	25-Jul-2022
Nitrite by Kone (w)						15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022
pH Value	19-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022
SVOC MS (W) - Aqueous	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	20-Jul-2022	19-Jul-2022
Total Organic and Inorganic Carbon	22-Jul-2022	21-Jul-2022	21-Jul-2022	22-Jul-2022	22-Jul-2022					
VOC MS (W)	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022

Lab Sample No(s) Customer Sample Ref.	26579383	26579384	26579385	26579386	26579387	26579388	26579373	26579374	26579375
AGS Ref.	NACW 229	SW 201	SW 202	SW 204	SW 205	SW 207	UD1	UD3	UD4
Depth									
Type	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Ground Water	Ground Water	Ground Water
Acid Herbicides by GCMS	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022	30-Jul-2022
Alkalinity as CaCO ₃	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022
Alkalinity Filtered as CaCO ₃		20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022			
Ammoniacal Nitrogen	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022
Anions by Kone (w)	18-Jul-2022	16-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	16-Jul-2022	18-Jul-2022	18-Jul-2022
Dissolved Metals by ICP-MS	25-Jul-2022	25-Jul-2022	22-Jul-2022	22-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	22-Jul-2022	22-Jul-2022
Ionic Balance		25-Jul-2022	22-Jul-2022	22-Jul-2022	21-Jul-2022	21-Jul-2022			
Nitrite by Kone (w)	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022	15-Jul-2022
pH Value	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022	18-Jul-2022
Suspended Solids		20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022	20-Jul-2022			
SVOC MS (W) - Aqueous	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022	19-Jul-2022
Total Organic and Inorganic Carbon		22-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	22-Jul-2022			
VOC MS (W)	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022	21-Jul-2022



CERTIFICATE OF ANALYSIS

SDG: 220713-39
Client Ref:

Report Number: 656160
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 22 August 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 220816-19
Your Reference:
Location: Nantyclaws Landfill
Report No: 658556
Order Number: POL008810

We received 23 samples on Tuesday August 16, 2022 and 23 of these samples were scheduled for analysis which was completed on Monday August 22, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220816-19
Client Ref.:

Report Number: 658556
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26734525	BH 3/4			15/08/2022
26734519	BH 208			15/08/2022
26734520	BH 5/02			15/08/2022
26734423	CELL 5 SUMP			15/08/2022
26734424	CELL 6 SUMP			15/08/2022
26734425	CELL 7 SUMP			15/08/2022
26734421	CELL 1-2 SUMP			15/08/2022
26734422	CELL 3-4 SUMP			15/08/2022
26734426	LEACHEATE HOLDING LAGOON			15/08/2022
26734523	NACW 2/2			15/08/2022
26734517	NACW 203			15/08/2022
26734518	NACW 205			15/08/2022
26734524	NACW 228			15/08/2022
26734506	SW 201			15/08/2022
26734507	SW 202			15/08/2022
26734508	SW 204			15/08/2022
26734509	SW 205			15/08/2022
26734511	SW 206			15/08/2022
26734512	SW 207			15/08/2022
26734513	UD 1			15/08/2022
26734514	UD 3			15/08/2022
26734515	UD 4			15/08/2022
26734516	UD 5			15/08/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220816-19

Report Number: 658556

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 US - Untreated Sewage
 TS - Treated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Results Legend	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		Sample Type	
	26734523	NACW 2/2							250ml BOD (ALE212)	GW		
	26734426	LEACHATE HOLDING LAGOON							H2SO4 (ALE244)	LE		
	26734422	CELL 3-4 SUMP							250ml BOD (ALE212)	LE		
	26734421	CELL 1-2 SUMP							H2SO4 (ALE244)	LE		
	26734425	CELL 7 SUMP							250ml BOD (ALE212)	LE		
	26734424	CELL 6 SUMP							H2SO4 (ALE244)	LE		
	26734423	CELL 5 SUMP							250ml BOD (ALE212)	LE		
	26734520	BH 5/02							H2SO4 (ALE244)	GW		
	26734519	BH 208							250ml BOD (ALE212)	GW		
	26734525	BH 3/4							H2SO4 (ALE244)	GW		
									250ml BOD (ALE212)	GW		
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 23										
Anions by Kone (w)	All	NDPs: 0 Tests: 23										
pH Value	All	NDPs: 0 Tests: 23										
Suspended Solids	All	NDPs: 0 Tests: 6										

26734513	UD 1			H2SO4 (ALE244)	GW	X				
				250ml BOD (ALE212)	GW					
26734512	SW 207			H2SO4 (ALE244)	SW	X	X	X		
				250ml BOD (ALE212)	SW		X	X		
26734511	SW 206			H2SO4 (ALE244)	SW	X				X
				250ml BOD (ALE212)	SW		X	X		
26734509	SW 205			H2SO4 (ALE244)	SW	X				X
				250ml BOD (ALE212)	SW		X	X		
26734508	SW 204			H2SO4 (ALE244)	SW	X				X
				250ml BOD (ALE212)	SW		X	X		
26734507	SW 202			H2SO4 (ALE244)	SW	X				X
				250ml BOD (ALE212)	SW		X	X		
26734506	SW 201			H2SO4 (ALE244)	SW	X				X
				250ml BOD (ALE212)	SW		X	X		
26734524	NACW 228			H2SO4 (ALE244)	GW	X				
				250ml BOD (ALE212)	GW		X	X		
26734518	NACW 205			H2SO4 (ALE244)	GW	X				
				250ml BOD (ALE212)	GW		X	X		
26734517	NACW 203			H2SO4 (ALE244)	GW	X				
				250ml BOD (ALE212)	GW		X	X		
26734523	NACW 212			H2SO4 (ALE244)	GW	X				
				250ml BOD (ALE212)	GW		X	X		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220816-19

Report Number: 658556

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

26734514

26734515

26734516

UD 3

UD 4

UD 5

250ml BOD (ALE212)

H2SO4 (ALE244)

250ml BOD (ALE212)

H2SO4 (ALE244)

250ml BOD (ALE212)

H2SO4 (ALE244)

GW

GW

GW

GW

GW

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 23

X

X

X

Anions by Kone (w)

All

NDPs: 0
Tests: 23

X

X

X

pH Value

All

NDPs: 0
Tests: 23

X

X

X



Superseded Report:

Location: Nantycaws Landfill

Page 6 of 12



Superseded Report:

Page 7 of 12

SDG: 220816-19
Client Ref.:

Report Number: 658556
Location: Nantycaws Landfill

Superseded Report:

[illegible]



Superseded Report:

Location: Nantycaws Landfill

Page 9 of 12



CERTIFICATE OF ANALYSIS

Validated

SDG: 220816-19
Client Ref.:

Report Number: 658556
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 220816-19
Client Ref.:

Report Number: 658556
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	26734519	26734525	26734520	26734423	26734424	26734425	26734421	26734422	26734426	26734523
Customer Sample Ref.	BH 208	BH 3/4	BH 5/02	CELL 5 SUMP	CELL 6 SUMP	CELL 7 SUMP	CELL 1-2 SUMP	CELL 3-4 SUMP	LEACHATE HOLDI NG LAGOON	NACW 2/2
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Ground Water
Ammoniacal Nitrogen	19-Aug-2022	19-Aug-2022	19-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	19-Aug-2022
Anions by Kone (w)	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022
pH Value	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022

Lab Sample No(s)	26734517	26734518	26734524	26734506	26734507	26734508	26734509	26734511	26734512	26734513
Customer Sample Ref.	NACW 203	NACW 205	NACW 228	SW 201	SW 202	SW 204	SW 205	SW 206	SW 207	UD 1
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Ground Water
Ammoniacal Nitrogen	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022	19-Aug-2022
Anions by Kone (w)	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022
pH Value	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022	18-Aug-2022
Suspended Solids				22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	22-Aug-2022	

Lab Sample No(s)	26734514	26734515	26734516
Customer Sample Ref.	UD 3	UD 4	UD 5
AGS Ref.			
Depth			
Type	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	19-Aug-2022	19-Aug-2022	19-Aug-2022
Anions by Kone (w)	18-Aug-2022	18-Aug-2022	18-Aug-2022
pH Value	18-Aug-2022	18-Aug-2022	18-Aug-2022



CERTIFICATE OF ANALYSIS

SDG: 220816-19
Client Ref:

Report Number: 658556
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



CWM Environmental Ltd
Nantycaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 13 September 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 220907-38
Your Reference:
Location: Nantycaws Landfill
Report No: 661045
Order Number: POR009079

We received 23 samples on Wednesday September 07, 2022 and 23 of these samples were scheduled for analysis which was completed on Tuesday September 13, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220907-38
Client Ref.:

Report Number: 661045
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26836878	BH 3/4			06/09/2022
26836874	BH 208			06/09/2022
26836875	BH 5/02			06/09/2022
26836858	CELL 5 SUMP			06/09/2022
26836859	CELL 6 SUMP			06/09/2022
26836860	CELL 7 SUMP			06/09/2022
26836856	CELL 1-2 SUMP			06/09/2022
26836857	CELL 3-4 SUMP			06/09/2022
26836861	LEACHATE HOLDING LAGOON			06/09/2022
26836876	NACW 2/2			06/09/2022
26836872	NACW 203			06/09/2022
26836873	NACW 205			06/09/2022
26836877	NACW 228			06/09/2022
26836866	SW 201			06/09/2022
26836867	SW 202			06/09/2022
26836868	SW 204			06/09/2022
26836869	SW 205			06/09/2022
26836870	SW 206			06/09/2022
26836871	SW 207			06/09/2022
26836862	UD 1			06/09/2022
26836863	UD 3			06/09/2022
26836864	UD 4			06/09/2022
26836865	UD 5			06/09/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220907-38

Report Number: 661045

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 US - Treated Sewage
 TS - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Results Legend X Test N No Determination Possible	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
							26836876	NACW 2/2			500ml Plastic (ALE208)	GW																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

26836862	UD 1			H2SO4 (ALE244)	GW	X				
				500ml Plastic (ALE208)	GW					
				H2SO4 (ALE244)	SW	X	X	X		
				250ml BOD (ALE212)	SW		X	X	X	X
				H2SO4 (ALE244)	SW	X				
26836870	SW 206			250ml BOD (ALE212)	SW					
				H2SO4 (ALE244)	SW	X				
				250ml BOD (ALE212)	SW		X			
				H2SO4 (ALE244)	SW	X		X	X	X
				250ml BOD (ALE212)	SW		X	X		
26836869	SW 205			H2SO4 (ALE244)	SW	X				
				250ml BOD (ALE212)	SW		X			
				H2SO4 (ALE244)	SW			X	X	X
				250ml BOD (ALE212)	SW			X		
				H2SO4 (ALE244)	SW	X				
26836868	SW 204			H2SO4 (ALE244)	SW					
				250ml BOD (ALE212)	SW		X			
				H2SO4 (ALE244)	SW	X		X	X	X
				250ml BOD (ALE212)	SW		X			
				H2SO4 (ALE244)	SW			X		
26836867	SW 202			H2SO4 (ALE244)	SW	X				
				250ml BOD (ALE212)	SW		X			
				H2SO4 (ALE244)	SW			X	X	X
				250ml BOD (ALE212)	SW			X		
				H2SO4 (ALE244)	SW	X				
26836866	SW 201			H2SO4 (ALE244)	SW					
				250ml BOD (ALE212)	SW		X			
				H2SO4 (ALE244)	SW	X		X		
				250ml BOD (ALE212)	SW			X		X
				H2SO4 (ALE244)	SW					
26836877	NACW 228			H2SO4 (ALE244)	GW	X				
				500ml Plastic (ALE208)	GW		X			
				H2SO4 (ALE244)	GW			X	X	
				250ml BOD (ALE212)	GW					
				H2SO4 (ALE244)	GW					
26836873	NACW 205			H2SO4 (ALE244)	GW	X				
				500ml Plastic (ALE208)	GW		X			
				H2SO4 (ALE244)	GW			X	X	
				250ml BOD (ALE212)	GW		X			
				H2SO4 (ALE244)	GW					
26836872	NACW 203			H2SO4 (ALE244)	GW	X				
				250ml BOD (ALE212)	GW			X		
				H2SO4 (ALE244)	GW				X	
				250ml BOD (ALE212)	GW		X			
				H2SO4 (ALE244)	GW					
26836876	NACW 212			H2SO4 (ALE244)	GW	X				
				250ml BOD (ALE212)	GW		X		X	
				H2SO4 (ALE244)	GW			X		
				250ml BOD (ALE212)	GW					
				H2SO4 (ALE244)	GW					



CERTIFICATE OF ANALYSIS

Validated

SDG: 220907-38

Report Number: 661045

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test


No Determination
Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer
Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 23

Anions by Kone (w)

All

NDPs: 0
Tests: 23

pH Value

All

NDPs: 0
Tests: 23

26836863

26836864

26836865

UD 3

UD 4

UD 5

250ml BOD
(ALE212)

H2SO4 (ALE244)

250ml BOD
(ALE212)

H2SO4 (ALE244)

500ml Plastic
(ALE208)

H2SO4 (ALE244)

GW

GW

GW

GW

GW

GW

X

X

X

X

X

X

X

X

X

SDG: 220907-38

Report Number: 661045

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

[illegible]

SDG: 220907-38

Report Number: 661045

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

[illegible]



Superseded Report:

Page 8 of 12



CERTIFICATE OF ANALYSIS

Validated

SDG: 220907-38
Client Ref.:

Report Number: 661045
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 220907-38
Client Ref.:

Report Number: 661045
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	26836874	26836878	26836875	26836858	26836859	26836860	26836856	26836857	26836861	26836876
Customer Sample Ref.	BH 208	BH 3/4	BH 5/02	CELL 5 SUMP	CELL 6 SUMP	CELL 7 SUMP	CELL 1-2 SUMP	CELL 3-4 SUMP	LEACHATE HOLDIN G LAGOON	NACW 2/2
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Ground Water
Ammoniacal Nitrogen	08-Sep-2022	08-Sep-2022	13-Sep-2022	08-Sep-2022	08-Sep-2022	08-Sep-2022	08-Sep-2022	08-Sep-2022	08-Sep-2022	13-Sep-2022
Anions by Kone (w)	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022
pH Value	09-Sep-2022	09-Sep-2022	09-Sep-2022	12-Sep-2022	12-Sep-2022	12-Sep-2022	12-Sep-2022	12-Sep-2022	12-Sep-2022	09-Sep-2022

Lab Sample No(s)	26836872	26836873	26836877	26836866	26836867	26836868	26836869	26836870	26836871	26836862
Customer Sample Ref.	NACW 203	NACW 205	NACW 228	SW 201	SW 202	SW 204	SW 205	SW 206	SW 207	UD 1
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Ground Water
Ammoniacal Nitrogen	08-Sep-2022	08-Sep-2022	08-Sep-2022	13-Sep-2022	08-Sep-2022	08-Sep-2022	08-Sep-2022	08-Sep-2022	08-Sep-2022	08-Sep-2022
Anions by Kone (w)	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022	07-Sep-2022
pH Value	12-Sep-2022	12-Sep-2022	09-Sep-2022	09-Sep-2022	12-Sep-2022	09-Sep-2022	09-Sep-2022	09-Sep-2022	12-Sep-2022	09-Sep-2022
Suspended Solids				13-Sep-2022	13-Sep-2022	13-Sep-2022	13-Sep-2022	13-Sep-2022	13-Sep-2022	

Lab Sample No(s)	26836863	26836864	26836865
Customer Sample Ref.	UD 3	UD 4	UD 5
AGS Ref.			
Depth			
Type	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	08-Sep-2022	08-Sep-2022	08-Sep-2022
Anions by Kone (w)	07-Sep-2022	07-Sep-2022	07-Sep-2022
pH Value	09-Sep-2022	09-Sep-2022	09-Sep-2022



CERTIFICATE OF ANALYSIS

SDG: 220907-38
Client Ref:

Report Number: 661045
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 21 October 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 221012-26
Your Reference:
Location: Nantyclaws Landfill
Report No: 665509
Order Number: POR 009510

We received 7 samples on Wednesday October 12, 2022 and 7 of these samples were scheduled for analysis which was completed on Friday October 21, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27002193	SW 201			11/10/2022
27002194	SW 202			11/10/2022
27002195	SW 203			11/10/2022
27002196	SW 204			11/10/2022
27002197	SW 205			11/10/2022
27002198	SW 206			11/10/2022
27002199	SW 207			11/10/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Results Legend X Test N No Determination Possible Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)		27002193																27002194																27002195																27002196															
	Customer Sample Reference		SW 201																SW 202																SW 203																SW 204															
	AGS Reference																																																																	
	Depth (m)																																																																	
	Container		0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)																																		
	Sample Type		SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW																																		
	Acid Herbicides by GCMS	All	NDPs: 0 Tests: 7	X						X												X											X																																	
Alkalinity as CaCO3	All	NDPs: 0 Tests: 7		X											X							X																																												
Alkalinity Filtered as CaCO3	All	NDPs: 0 Tests: 7		X											X							X																																												
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 7			X											X						X																																												
Anions by Kone (w)	All	NDPs: 0 Tests: 7		X											X							X																																												
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 7				X											X						X																																											
Ionic Balance	All	NDPs: 0 Tests: 7		X												X																																																		
Nitrite by Kone (w)	All	NDPs: 0 Tests: 7					X											X						X																																										
pH Value	All	NDPs: 0 Tests: 7		X											X																																																			
Suspended Solids	All	NDPs: 0 Tests: 7		X												X																																																		
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 7	X											X								X										X																																		
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 7			X												X						X																																											
VOC MS (W)	All	NDPs: 0 Tests: 7											X												X						X																																			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

27002199

Customer
Sample Reference

SW 207

AGS Reference

Depth (m)

Container

NaOH (ALE245)

Vial (ALE297)

Sample Type

SW

SW

Nitrite by Kone (w)

All

NDPs: 0
Tests: 7

X

VOC MS (W)

All

NDPs: 0
Tests: 7

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Results Legend			Customer Sample Ref.		SW 201	SW 202	SW 203	SW 204	SW 205	SW 206
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022
Component	LOD/Units	Method								
Ionic balance	% Diff	Calulation			1.78	0.631	-1.52	0.358	1.13	0.76
Suspended solids, Total	<2 mg/l	TM022			<2	2.2	4.95	2.9	2.2	10.6
Alkalinity, Total as CaCO3	<2 mg/l	TM043			139	198	23.7	181	259	174
Alkalinity, Total as CaCO3 (diss.filt)	<2 mg/l	TM043			138	198	24.1	181	261	175
Alkalinity, Bicarbonate as CaCO3 (diss.filt)	<2 mg/l	TM043			138	198	24.1	181	256	175
Organic Carbon, Total	<3 mg/l	TM090			5.42	25.8	8.86	25.5	24.9	11.4
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099			<0.2	<0.2	<0.2	<0.2	0.37	<0.2
Cadmium (diss.filt)	<0.08 µg/l	TM152			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Chromium (diss.filt)	<1 µg/l	TM152			<1	<1	<1	<1	<1	<1
Copper (diss.filt)	<0.3 µg/l	TM152			1.42	6.78	0.763	6.66	7.87	3.77
Lead (diss.filt)	<0.2 µg/l	TM152			<0.2	<0.2	0.299	<0.2	<0.2	<0.2
Manganese (diss.filt)	<3 µg/l	TM152			20.3	28	8.11	20.4	37.6	25.7
Nickel (diss.filt)	<0.4 µg/l	TM152			0.729	3.45	<0.4	3.16	4.11	1.88
Zinc (diss.filt)	<1 µg/l	TM152			3.97	8.37	3.92	2.77	5.07	8.95
Sodium (Dis.Filt)	<0.076 mg/l	TM152			10.2	23.2	4.01	21	29.1	15.6
Magnesium (Dis.Filt)	<0.036 mg/l	TM152			4.71	9.88	0.759	9.05	12.7	7.08
Potassium (Dis.Filt)	<0.2 mg/l	TM152			5.66	43.6	1.12	41.3	58.2	21.4
Calcium (Dis.Filt)	<0.2 mg/l	TM152			60.3	122	8.01	118	132	80.1
Iron (Dis.Filt)	<0.019 mg/l	TM152			0.0422	0.0542	0.0668	0.0586	0.0504	0.0429
Nitrite as NO2	<0.05 mg/l	TM184			<0.05	0.075	<0.05	<0.05	0.215	0.074
Sulphate	<2 mg/l	TM184			21.5	122	<2	125	102	45.3
Chloride	<2 mg/l	TM184			18.2	81.4	7.2	79.7	90.7	38.9
Nitrate as NO3	<0.3 mg/l	TM184			7.27	8.59	<0.3	5.98	18.2	10.7
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184			1.64	1.96	<0.1	1.35	4.18	2.43
pH	<1 pH Units	TM256			8.27	8.14	7.4	8.07	8.26	8.13
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256			0.343	0.795	0.0689	0.766	0.899	0.514
Dinitro-o-cresol	<0.1 µg/l	TM411			0.2	0.46	0.354	0.16	<0.1	0.394
Clpyralid	<0.04 µg/l	TM411			<0.04	0.133	<0.04	0.14	0.153	0.0948
MCPA	<0.05 µg/l	TM411			<0.05	<0.05	<0.05	0.0588	<0.05	<0.05
Mecoprop	<0.04 µg/l	TM411			<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Dicamba	<0.04 µg/l	TM411			<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
MCPB	<0.05 µg/l	TM411			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2,4-DB	<0.1 µg/l	TM411			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1



Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 221012-26
Client Ref.:Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Results Legend		Customer Sample Ref.					
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		SW 207 Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002199			
Component	LOD/Units	Method					
Ionic balance	% Diff	Calulation	1.13				
Suspended solids, Total	<2 mg/l	TM022	<2	#			
Alkalinity, Total as CaCO3	<2 mg/l	TM043	125	#			
Alkalinity, Total as CaCO3 (diss.filt)	<2 mg/l	TM043	125				
Alkalinity, Bicarbonate as CaCO3 (diss.filt)	<2 mg/l	TM043	125				
Organic Carbon, Total	<3 mg/l	TM090	15.3	#			
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	#			
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	#			
Chromium (diss.filt)	<1 µg/l	TM152	<1	#			
Copper (diss.filt)	<0.3 µg/l	TM152	5.11	#			
Lead (diss.filt)	<0.2 µg/l	TM152	0.386	#			
Manganese (diss.filt)	<3 µg/l	TM152	17.7	#			
Nickel (diss.filt)	<0.4 µg/l	TM152	2.07	#			
Zinc (diss.filt)	<1 µg/l	TM152	16.3	#			
Sodium (Dis.Filt)	<0.076 mg/l	TM152	14.2	#			
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	5.62	#			
Potassium (Dis.Filt)	<0.2 mg/l	TM152	15.9	#			
Calcium (Dis.Filt)	<0.2 mg/l	TM152	58.4	#			
Iron (Dis.Filt)	<0.019 mg/l	TM152	0.114	#			
Nitrite as NO2	<0.05 mg/l	TM184	0.201	#			
Sulphate	<2 mg/l	TM184	35.9	#			
Chloride	<2 mg/l	TM184	31.1	#			
Nitrate as NO3	<0.3 mg/l	TM184	11.1	#			
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	2.56	#			
pH	<1 pH Units	TM256	8.02	#			
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.393	#			
Dinitro-o-cresol	<0.1 µg/l	TM411	0.16				
Clopyralid	<0.04 µg/l	TM411	<0.04				
MCPA	<0.05 µg/l	TM411	0.11				
Mecoprop	<0.04 µg/l	TM411	<0.04				
Dicamba	<0.04 µg/l	TM411	<0.04				
MCPB	<0.05 µg/l	TM411	<0.05				
2,4-DB	<0.1 µg/l	TM411	<0.1				



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	SW 201	SW 202	SW 203	SW 204	SW 205	SW 206
# ISO17025 accredited.									
M mCERTS accredited.									
aq Aqueous / settled sample.									
diss.flit Dissolved / filtered sample.									
tot.unfilt Total / unfiltered sample.									
Subcontracted - refer to subcontractor report for accreditation status.									
% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F) Trigger breach confirmed									
1-4*§ Sample deviation (see appendix)									
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2,4-Dichlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2,4-Dimethylphenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2-Chloronaphthalene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2-Chlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2-Methylnaphthalene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2-Methylphenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2-Nitroaniline (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2-Nitrophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
3-Nitroaniline (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
4-Bromophenylphenylether (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
4-Chloroaniline (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
4-Methylphenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
4-Nitroaniline (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
4-Nitrophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Azobenzene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Acenaphthylene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Acenaphthene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Anthracene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176		<2	<2	<2	<2	<2	<2
					#	#	#	#	#
Butylbenzyl phthalate (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Benzo(a)anthracene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	SW 201	SW 202	SW 203	SW 204	SW 205	SW 206
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery. (F) Trigger breach confirmed 1-4* Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022 221012-26 27002193	Surface Water (SW) 11/10/2022 221012-26 27002194	Surface Water (SW) 11/10/2022 221012-26 27002195	Surface Water (SW) 11/10/2022 221012-26 27002196	Surface Water (SW) 11/10/2022 221012-26 27002197	Surface Water (SW) 11/10/2022 221012-26 27002198
Component	LOD/Units	Method							
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Carbazole (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Chrysene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Dibenzofuran (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Diethyl phthalate (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Dimethyl phthalate (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<5	<5	<5	<5	<5	<5
					#	#	#	#	#
Fluoranthene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Fluorene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Hexachlorobenzene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Pentachlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Hexachloroethane (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Nitrobenzene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Naphthalene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Isophorone (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenanthrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Pyrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	SW 207				
# ISO17025 accredited. M mCERES accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002199				
Component	LOD/Units	Method					
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<2	#			
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<2	#			
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<2	#			
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<2	#			
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<2	#			
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<2	#			
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<2	#			
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<2	#			
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<2	#			
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<2	#			
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<2	#			
2-Chlorophenol (aq)	<1 µg/l	TM176	<2	#			
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<2	#			
2-Methylphenol (aq)	<1 µg/l	TM176	<2	#			
2-Nitroaniline (aq)	<1 µg/l	TM176	<2	#			
2-Nitrophenol (aq)	<1 µg/l	TM176	<2	#			
3-Nitroaniline (aq)	<1 µg/l	TM176	<2				
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<2	#			
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<2	#			
4-Chloroaniline (aq)	<1 µg/l	TM176	<2				
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<2	#			
4-Methylphenol (aq)	<1 µg/l	TM176	<2	#			
4-Nitroaniline (aq)	<1 µg/l	TM176	<2	#			
4-Nitrophenol (aq)	<1 µg/l	TM176	<2				
Azobenzene (aq)	<1 µg/l	TM176	<2	#			
Acenaphthylene (aq)	<1 µg/l	TM176	<2	#			
Acenaphthene (aq)	<1 µg/l	TM176	<2	#			
Anthracene (aq)	<1 µg/l	TM176	<2	#			
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<2	#			
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<2	#			
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<4	#			
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<2	#			
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<2	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	SW 207				
# ISO17025 accredited. M mCERTS accredited. aq. Aqueous / settled sample. dis.filt. Dissolved / filtered sample. tot.unfilt. Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4# Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002199				
Component	LOD/Units	Method					
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<2	#			
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<2	#			
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<2	#			
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<2	#			
Carbazole (aq)	<1 µg/l	TM176	<2	#			
Chrysene (aq)	<1 µg/l	TM176	<2	#			
Dibenzofuran (aq)	<1 µg/l	TM176	<2	#			
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<2	#			
Diethyl phthalate (aq)	<1 µg/l	TM176	<2	#			
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<2	#			
Dimethyl phthalate (aq)	<1 µg/l	TM176	<2	#			
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<10	#			
Fluoranthene (aq)	<1 µg/l	TM176	<2	#			
Fluorene (aq)	<1 µg/l	TM176	<2	#			
Hexachlorobenzene (aq)	<1 µg/l	TM176	<2	#			
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<2	#			
Pentachlorophenol (aq)	<1 µg/l	TM176	<2				
Phenol (aq)	<1 µg/l	TM176	<2				
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<2	#			
Hexachloroethane (aq)	<1 µg/l	TM176	<2	#			
Nitrobenzene (aq)	<1 µg/l	TM176	<2	#			
Naphthalene (aq)	<1 µg/l	TM176	<2	#			
Isophorone (aq)	<1 µg/l	TM176	<2	#			
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<2				
Phenanthrene (aq)	<1 µg/l	TM176	<2	#			
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<2	#			
Pyrene (aq)	<1 µg/l	TM176	<2	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend			Customer Sample Ref.		SW 201	SW 202	SW 203	SW 204	SW 205	SW 206
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.fltr Dissolved / filtered sample. tot.unfltr Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002193	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002194	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002195	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002196	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002197	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002198
Component	LOD/Units	Method								
Dibromofluoromethane**	%	TM208			112	114	115	116	111	111
Toluene-d8**	%	TM208			101	99.8	102	101	100	102
4-Bromofluorobenzene**	%	TM208			96.9	95.1	96.5	96.3	98.1	96.5
Dichlorodifluoromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Vinyl chloride	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromomethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Carbon disulphide	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Dichloromethane	<3 µg/l	TM208			<4	<5	<3.5	<5	<4.5	<5
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromochloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloroform	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Carbontetrachloride	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Benzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Trichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Dibromomethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromodichloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Toluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	SW 201	SW 202	SW 203	SW 204	SW 205	SW 206
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4# Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	SW 201 Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002193	SW 202 Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002194	SW 203 Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002195	SW 204 Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002196	SW 205 Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002197	SW 206 Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002198
Component	LOD/Units	Method							
Tetrachloroethene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
Dibromochloromethane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,2-Dibromoethane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
Chlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
Ethylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
m,p-Xylene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
o-Xylene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
Styrene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
Bromofom	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
Isopropylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,2,3-Trichloropropane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
Bromobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
Propylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
2-Chlorotoluene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
4-Chlorotoluene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
tert-Butylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,2,4-Trimethylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
sec-Butylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
4-iso-Propyltoluene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,3-Dichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,4-Dichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
n-Butylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,2-Dichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
Hexachlorobutadiene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
Naphthalene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
				#	#	#	#	#	#
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend		Customer Sample Ref.	SW 207				
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002199				
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM208	118				
Toluene-d8**	%	TM208	100				
4-Bromofluorobenzene**	%	TM208	95.9				
Dichlorodifluoromethane	<1 µg/l	TM208	<1	#			
Chloromethane	<1 µg/l	TM208	<1	#			
Vinyl chloride	<1 µg/l	TM208	<1	#			
Bromomethane	<1 µg/l	TM208	<1	#			
Chloroethane	<1 µg/l	TM208	<1	#			
Trichlorofluoromethane	<1 µg/l	TM208	<1	#			
1,1-Dichloroethene	<1 µg/l	TM208	<1	#			
Carbon disulphide	<1 µg/l	TM208	<1	#			
Dichloromethane	<3 µg/l	TM208	<5.5	#			
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	#			
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	#			
1,1-Dichloroethane	<1 µg/l	TM208	<1	#			
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	#			
2,2-Dichloropropane	<1 µg/l	TM208	<1				
Bromochloromethane	<1 µg/l	TM208	<1	#			
Chloroform	<1 µg/l	TM208	<1	#			
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	#			
1,1-Dichloropropene	<1 µg/l	TM208	<1	#			
Carbontetrachloride	<1 µg/l	TM208	<1	#			
1,2-Dichloroethane	<1 µg/l	TM208	<1	#			
Benzene	<1 µg/l	TM208	<1	#			
Trichloroethene	<1 µg/l	TM208	<1	#			
1,2-Dichloropropane	<1 µg/l	TM208	<1	#			
Dibromomethane	<1 µg/l	TM208	<1	#			
Bromodichloromethane	<1 µg/l	TM208	<1	#			
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	#			
Toluene	<1 µg/l	TM208	<1	#			
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	#			
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	#			
1,3-Dichloropropane	<1 µg/l	TM208	<1	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	SW 207				
# ISO17025 accredited. M mCERTS accredited. aq. Aqueous / settled sample. dis.filt. Dissolved / filtered sample. tot.unfilt. Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4#@@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002199				
Component	LOD/Units	Method					
Tetrachloroethene	<1 µg/l	TM208	<1	#			
Dibromochloromethane	<1 µg/l	TM208	<1	#			
1,2-Dibromoethane	<1 µg/l	TM208	<1	#			
Chlorobenzene	<1 µg/l	TM208	<1	#			
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	#			
Ethylbenzene	<1 µg/l	TM208	<1	#			
m,p-Xylene	<1 µg/l	TM208	<1	#			
o-Xylene	<1 µg/l	TM208	<1	#			
Styrene	<1 µg/l	TM208	<1	#			
Bromofom	<1 µg/l	TM208	<1	#			
Isopropylbenzene	<1 µg/l	TM208	<1	#			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	#			
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	#			
Bromobenzene	<1 µg/l	TM208	<1	#			
Propylbenzene	<1 µg/l	TM208	<1	#			
2-Chlorotoluene	<1 µg/l	TM208	<1	#			
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	#			
4-Chlorotoluene	<1 µg/l	TM208	<1	#			
tert-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	#			
sec-Butylbenzene	<1 µg/l	TM208	<1	#			
4-iso-Propyltoluene	<1 µg/l	TM208	<1	#			
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	#			
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	#			
n-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	#			
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1				
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	#			
Hexachlorobutadiene	<1 µg/l	TM208	<1	#			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	#			
Naphthalene	<1 µg/l	TM208	<1	#			
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	#			
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1				



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
Calculation		
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

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Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)
Customer Sample Ref.

AGS Ref.
Depth
Type

	27002193	27002194	27002195	27002196	27002197	27002198	27002199
	SW 201	SW 202	SW 203	SW 204	SW 205	SW 206	SW 207
	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Acid Herbicides by GCMS	21-Oct-2022	21-Oct-2022	21-Oct-2022	17-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022
Alkalinity as CaCO ₃	19-Oct-2022	18-Oct-2022	18-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	18-Oct-2022
Alkalinity Filtered as CaCO ₃	18-Oct-2022	18-Oct-2022	19-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022
Ammoniacal Nitrogen	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022
Anions by Kone (w)	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022
Dissolved Metals by ICP-MS	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022
Ionic Balance	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022
Nitrite by Kone (w)	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	14-Oct-2022	15-Oct-2022
pH Value	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022
Suspended Solids	19-Oct-2022	18-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	18-Oct-2022	18-Oct-2022
SVOC MS (W) - Aqueous	18-Oct-2022	18-Oct-2022	19-Oct-2022	18-Oct-2022	17-Oct-2022	18-Oct-2022	19-Oct-2022
Total Organic and Inorganic Carbon	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022
VOC MS (W)	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022



CERTIFICATE OF ANALYSIS

SDG: 221012-26
Client Ref:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park

Manor Road (off Manor Lane)

Hawarden

Deeside

CH5 3US

Tel: (01244) 528777

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 21 October 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 221012-29
Your Reference:
Location: Nantyclaws Landfill
Report No: 665511
Order Number: POR 009510

We received 7 samples on Wednesday October 12, 2022 and 7 of these samples were scheduled for analysis which was completed on Friday October 21, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27002352	BH 3/9			11/10/2022
27002353	NACW 228			11/10/2022
27002354	NACW 229			11/10/2022
27002355	UD 1			11/10/2022
27002356	UD 3			11/10/2022
27002357	UD 4			11/10/2022
27002358	UD 5			11/10/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29

Report Number: 665511

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

27002358

Customer
Sample Reference

UD 5

AGS Reference

Depth (m)

Container

NaOH (ALE245)

Vial (ALE297)

Sample Type

GW

GW

Nitrite by Kone (w)

All

NDPs: 0
Tests: 7

X

VOC MS (W)

All

NDPs: 0
Tests: 7

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	BH 3/9	NACW 228	NACW 229	UD 1	UD 3	UD 4	
#	ISO17025 accredited.			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
M	mCERTS accredited.				11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022
aq	Aqueous / settled sample.									
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted - refer to subcontractor report for accreditation status.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F)	Trigger breach confirmed									
1-4**5@	Sample deviation (see appendix)									
Component	LOD/Units	Method								
Alkalinity, Total as CaCO3	<2 mg/l	TM043	24.4	41.1	97.2	246	186	242		
			#	#	#	#	#	#		
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	<0.2	<0.2	<0.2	<0.2	0.772		
			#	#	#	#	#	#		
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08		
			#	#	#	#	#	#		
Chromium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1	<1	<1		
			#	#	#	#	#	#		
Copper (diss.filt)	<0.3 µg/l	TM152	2.12	1.21	0.836	0.889	0.603	0.751		
			#	#	#	#	#	#		
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	<0.2	<0.2	<0.2	<0.2	0.331		
			#	#	#	#	#	#		
Manganese (diss.filt)	<3 µg/l	TM152	<3	<3	4.27	37.5	<3	203		
			#	#	#	#	#	#		
Nickel (diss.filt)	<0.4 µg/l	TM152	2.1	1.33	<0.4	0.445	<0.4	0.43		
			#	#	#	#	#	#		
Zinc (diss.filt)	<1 µg/l	TM152	3.41	1.91	1.58	4.61	4.9	2.19		
			#	#	#	#	#	#		
Sodium (Dis.Filt)	<0.076 mg/l	TM152	56.1	37.2	6.69	13.6	12.4	11.3		
			#	#	#	#	#	#		
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	19.9	35.3	3.74	10.4	6.7	5.87		
			#	#	#	#	#	#		
Potassium (Dis.Filt)	<0.2 mg/l	TM152	9.02	1.36	0.565	1.54	1.5	3.92		
			#	#	#	#	#	#		
Calcium (Dis.Filt)	<0.2 mg/l	TM152	143	103	36.7	109	71.7	96.7		
			#	#	#	#	#	#		
Iron (Dis.Filt)	<0.019 mg/l	TM152	<0.019	<0.019	<0.019	<0.019	<0.019	0.583		
			#	#	#	#	#	#		
Nitrite as NO2	<0.05 mg/l	TM184	<0.05	<0.05	<0.05	<0.05	<0.05	0.065		
			#	#	#	#	#	#		
Sulphate	<2 mg/l	TM184	420	222	7	14.6	13.2	18		
			#	#	#	#	#	#		
Chloride	<2 mg/l	TM184	99.5	146	12.6	50.7	18.4	20.5		
			#	#	#	#	#	#		
Nitrate as NO3	<0.3 mg/l	TM184	5.27	1.24	<0.3	9.81	6.23	4.97		
			#	#	#	#	#	#		
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	1.19	0.28	<0.1	2.22	1.41	1.14		
			#	#	#	#	#	#		
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	1.02	0.868	0.222	0.598	0.405	0.507		
			#	#	#	#	#	#		
Dinitro-o-cresol	<0.1 µg/l	TM411	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Clopyralid	<0.04 µg/l	TM411	0.142	0.158	0.527	<0.04	<0.04	<0.04		
MCPA	<0.05 µg/l	TM411	<0.05	0.0943	<0.05	<0.05	<0.05	<0.05		
Mecoprop	<0.04 µg/l	TM411	<0.04	0.0587	<0.04	<0.04	<0.04	<0.04		
Dicamba	<0.04 µg/l	TM411	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		
MCPB	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
2,4-DB	<0.1 µg/l	TM411	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Dichlorprop	<0.1 µg/l	TM411	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Triclopyr	<0.05 µg/l	TM411	0.0798	0.192	0.939	<0.05	<0.05	<0.05		
Fenoprop (Silvex)	<0.1 µg/l	TM411	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

Results Legend		Customer Sample Ref.	UD 5				
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002358				
Component	LOD/Units	Method					
Alkalinity, Total as CaCO3	<2 mg/l	TM043	196	#			
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	#			
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	#			
Chromium (diss.filt)	<1 µg/l	TM152	<1	#			
Copper (diss.filt)	<0.3 µg/l	TM152	1.04	#			
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	#			
Manganese (diss.filt)	<3 µg/l	TM152	<3	#			
Nickel (diss.filt)	<0.4 µg/l	TM152	0.455	#			
Zinc (diss.filt)	<1 µg/l	TM152	9.87	#			
Sodium (Dis.Filt)	<0.076 mg/l	TM152	12.3	#			
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	7.22	#			
Potassium (Dis.Filt)	<0.2 mg/l	TM152	1.49	#			
Calcium (Dis.Filt)	<0.2 mg/l	TM152	75.4	#			
Iron (Dis.Filt)	<0.019 mg/l	TM152	<0.019	#			
Nitrite as NO2	<0.05 mg/l	TM184	<0.05	#			
Sulphate	<2 mg/l	TM184	13.2	#			
Chloride	<2 mg/l	TM184	19.6	#			
Nitrate as NO3	<0.3 mg/l	TM184	7.52	#			
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	1.7	#			
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.426	#			
Dinitro-o-cresol	<0.1 µg/l	TM411	<0.1				
Clopyralid	<0.04 µg/l	TM411	<0.04				
MCPA	<0.05 µg/l	TM411	<0.05				
Mecoprop	<0.04 µg/l	TM411	<0.04				
Dicamba	<0.04 µg/l	TM411	<0.04				
MCPB	<0.05 µg/l	TM411	<0.05				
2,4-DB	<0.1 µg/l	TM411	<0.1				
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<0.05				
Dichlorprop	<0.1 µg/l	TM411	<0.1				
Triclopyr	<0.05 µg/l	TM411	<0.05				
Fenoprop (Silvex)	<0.1 µg/l	TM411	<0.1				
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05				
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05				



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29

Report Number: 665511

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	BH 3/9	NACW 228	NACW 229	UD 1	UD 3	UD 4
# ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	M mCERTS accredited. aq Aqueous / settled sample. diss.filter Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)		Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002352	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002353	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002354	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002355	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002356	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002357
Component	LOD/Units	Method							
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Chlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Methylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Nitrophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
3-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	<1
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Chloroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	<1
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Methylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	<1
Azobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Acenaphthylene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Acenaphthene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Anthracene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2 #	<2 #	<2 #	<2 #	<2 #	<2 #	<2 #
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	BH 3/9	NACW 228	NACW 229	UD 1	UD 3	UD 4
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4# Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 221012-29 27002352	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002353	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002354	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002355	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002356	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002357
Component	LOD/Units	Method							
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbazole (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chrysene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibenzofuran (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Diethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dimethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<5 #	<5 #	<5 #	<5 #	<5 #	<5 #
Fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Fluorene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Pentachlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachloroethane (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Nitrobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Isophorone (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenanthrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29

Report Number: 665511

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	UD 5				
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002358				
Component	LOD/Units	Method					
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#			
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#			
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1	#			
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1	#			
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#			
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#			
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1	#			
2-Chlorophenol (aq)	<1 µg/l	TM176	<1	#			
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1	#			
2-Methylphenol (aq)	<1 µg/l	TM176	<1	#			
2-Nitroaniline (aq)	<1 µg/l	TM176	<1	#			
2-Nitrophenol (aq)	<1 µg/l	TM176	<1	#			
3-Nitroaniline (aq)	<1 µg/l	TM176	<1				
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1	#			
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1	#			
4-Chloroaniline (aq)	<1 µg/l	TM176	<1				
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1	#			
4-Methylphenol (aq)	<1 µg/l	TM176	<1	#			
4-Nitroaniline (aq)	<1 µg/l	TM176	<1	#			
4-Nitrophenol (aq)	<1 µg/l	TM176	<1				
Azobenzene (aq)	<1 µg/l	TM176	<1	#			
Acenaphthylene (aq)	<1 µg/l	TM176	<1	#			
Acenaphthene (aq)	<1 µg/l	TM176	<1	#			
Anthracene (aq)	<1 µg/l	TM176	<1	#			
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1	#			
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1	#			
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2	#			
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	#			
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	UD 5				
# ISO17025 accredited. M mCERTS accredited. aq. Aqueous / settled sample. dis.filt. Dissolved / filtered sample. tot.unfilt. Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*% Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002358				
Component	LOD/Units	Method					
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<1	#			
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1	#			
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<1	#			
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<1	#			
Carbazole (aq)	<1 µg/l	TM176	<1	#			
Chrysene (aq)	<1 µg/l	TM176	<1	#			
Dibenzofuran (aq)	<1 µg/l	TM176	<1	#			
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<1	#			
Diethyl phthalate (aq)	<1 µg/l	TM176	<1	#			
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<1	#			
Dimethyl phthalate (aq)	<1 µg/l	TM176	<1	#			
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<5	#			
Fluoranthene (aq)	<1 µg/l	TM176	<1	#			
Fluorene (aq)	<1 µg/l	TM176	<1	#			
Hexachlorobenzene (aq)	<1 µg/l	TM176	<1	#			
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<1	#			
Pentachlorophenol (aq)	<1 µg/l	TM176	<1				
Phenol (aq)	<1 µg/l	TM176	<1				
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<1	#			
Hexachloroethane (aq)	<1 µg/l	TM176	<1	#			
Nitrobenzene (aq)	<1 µg/l	TM176	<1	#			
Naphthalene (aq)	<1 µg/l	TM176	<1	#			
Isophorone (aq)	<1 µg/l	TM176	<1	#			
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<1				
Phenanthrene (aq)	<1 µg/l	TM176	<1	#			
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<1	#			
Pyrene (aq)	<1 µg/l	TM176	<1	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29

Report Number: 665511

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend			Customer Sample Ref.	BH 3/9	NACW 228	NACW 229	UD 1	UD 3	UD 4
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM208		118	112	118	113	113	118
Toluene-d8**	%	TM208		102	99.6	102	101	100	100
4-Bromofluorobenzene**	%	TM208		93.8	99.2	98.7	95.4	93.3	93.8
Dichlorodifluoromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Vinyl chloride	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromomethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Trichlorofluoromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbon disulphide	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dichloromethane	<3 µg/l	TM208		<6 #	<5 #	<7 #	<5 #	<5 #	<6 #
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
trans-1,2-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,2-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,2-Dichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloroform	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1-Trichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbontetrachloride	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Trichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibromomethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromodichloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,3-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Toluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
trans-1,3-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,2-Trichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	BH 3/9	NACW 228	NACW 229	UD 1	UD 3	UD 4
# ISO17025 accredited.	M mCERTS accredited.	sq Aqueous / settled sample.	Depth (m)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
dis.filt Dissolved / filtered sample.			Sample Type	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022
tot.unfilt Total / unfiltered sample.			Date Sampled	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022
* Subcontracted - refer to subcontractor report for accreditation status.			Sample Time	221012-29	221012-29	221012-29	221012-29	221012-29	221012-29
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			Date Received	27002352	27002353	27002354	27002355	27002356	27002357
(F) Trigger breach confirmed			SDG Ref						
1-4* Sample deviation (see appendix)			Lab Sample No.(s)						
AGS Reference									
Component	LOD/Units	Method							
Tetrachloroethene	<1 µg/l	TM208	<1	#	#	#	#	#	#
Dibromochloromethane	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,2-Dibromoethane	<1 µg/l	TM208	<1	#	#	#	#	#	#
Chlorobenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	#	#	#	#	#	#
Ethylbenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
m,p-Xylene	<1 µg/l	TM208	<1	#	#	#	#	#	#
o-Xylene	<1 µg/l	TM208	<1	#	#	#	#	#	#
Styrene	<1 µg/l	TM208	<1	#	#	#	#	#	#
Bromoforn	<1 µg/l	TM208	<1	#	#	#	#	#	#
Isopropylbenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	#	#	#	#	#	#
Bromobenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
Propylbenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
2-Chlorotoluene	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
4-Chlorotoluene	<1 µg/l	TM208	<1	#	#	#	#	#	#
tert-Butylbenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
sec-Butylbenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
4-iso-Propyltoluene	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
n-Butylbenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1						
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
Hexachlorobutadiene	<1 µg/l	TM208	<1	#	#	#	#	#	#
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	#	#	#	#	#	#
Naphthalene	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	#	#	#	#	#	#
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1						



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29

Report Number: 665511

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend		Customer Sample Ref.	UD 5				
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002358				
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM208	113				
Toluene-d8**	%	TM208	102				
4-Bromofluorobenzene**	%	TM208	100				
Dichlorodifluoromethane	<1 µg/l	TM208	<1	#			
Chloromethane	<1 µg/l	TM208	<1	#			
Vinyl chloride	<1 µg/l	TM208	<1	#			
Bromomethane	<1 µg/l	TM208	<1	#			
Chloroethane	<1 µg/l	TM208	<1	#			
Trichlorofluoromethane	<1 µg/l	TM208	<1	#			
1,1-Dichloroethene	<1 µg/l	TM208	<1	#			
Carbon disulphide	<1 µg/l	TM208	<1	#			
Dichloromethane	<3 µg/l	TM208	<6	#			
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	#			
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	#			
1,1-Dichloroethane	<1 µg/l	TM208	<1	#			
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	#			
2,2-Dichloropropane	<1 µg/l	TM208	<1				
Bromochloromethane	<1 µg/l	TM208	<1	#			
Chloroform	<1 µg/l	TM208	<1	#			
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	#			
1,1-Dichloropropene	<1 µg/l	TM208	<1	#			
Carbontetrachloride	<1 µg/l	TM208	<1	#			
1,2-Dichloroethane	<1 µg/l	TM208	<1	#			
Benzene	<1 µg/l	TM208	<1	#			
Trichloroethene	<1 µg/l	TM208	<1	#			
1,2-Dichloropropane	<1 µg/l	TM208	<1	#			
Dibromomethane	<1 µg/l	TM208	<1	#			
Bromodichloromethane	<1 µg/l	TM208	<1	#			
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	#			
Toluene	<1 µg/l	TM208	<1	#			
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	#			
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	#			
1,3-Dichloropropane	<1 µg/l	TM208	<1	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	UD 5				
# ISO17025 accredited. M mCERTS accredited. aq. Aqueous / settled sample. dis.filt. Dissolved / filtered sample. tot.unfilt. Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4-§@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002358				
Component	LOD/Units	Method					
Tetrachloroethene	<1 µg/l	TM208	<1	#			
Dibromochloromethane	<1 µg/l	TM208	<1	#			
1,2-Dibromoethane	<1 µg/l	TM208	<1	#			
Chlorobenzene	<1 µg/l	TM208	<1	#			
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	#			
Ethylbenzene	<1 µg/l	TM208	<1	#			
m,p-Xylene	<1 µg/l	TM208	<1	#			
o-Xylene	<1 µg/l	TM208	<1	#			
Styrene	<1 µg/l	TM208	<1	#			
Bromoform	<1 µg/l	TM208	<1	#			
Isopropylbenzene	<1 µg/l	TM208	<1	#			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	#			
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	#			
Bromobenzene	<1 µg/l	TM208	<1	#			
Propylbenzene	<1 µg/l	TM208	<1	#			
2-Chlorotoluene	<1 µg/l	TM208	<1	#			
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	#			
4-Chlorotoluene	<1 µg/l	TM208	<1	#			
tert-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	#			
sec-Butylbenzene	<1 µg/l	TM208	<1	#			
4-iso-Propyltoluene	<1 µg/l	TM208	<1	#			
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	#			
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	#			
n-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	#			
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1				
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	#			
Hexachlorobutadiene	<1 µg/l	TM208	<1	#			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	#			
Naphthalene	<1 µg/l	TM208	<1	#			
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	#			
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1				



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)
Customer Sample Ref.

AGS Ref.
Depth
Type

	27002352	27002353	27002354	27002355	27002356	27002357	27002358
	BH 3/9	NACW 228	NACW 229	UD 1	UD 3	UD 4	UD 5
	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Acid Herbicides by GCMS	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022
Alkalinity as CaCO ₃	19-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022
Ammoniacal Nitrogen	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022
Anions by Kone (w)	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022
Dissolved Metals by ICP-MS	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022
Nitrite by Kone (w)	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	14-Oct-2022	15-Oct-2022
pH Value	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022
SVOC MS (W) - Aqueous	17-Oct-2022	17-Oct-2022	18-Oct-2022	17-Oct-2022	14-Oct-2022	17-Oct-2022	14-Oct-2022
VOC MS (W)	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022



CERTIFICATE OF ANALYSIS

SDG: 221012-29
Client Ref:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



CWM Environmental Ltd
Nantycaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 21 October 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 221012-31
Your Reference:
Location: Nantycaws Landfill
Report No: 665512
Order Number: POR 009510

We received 12 samples on Wednesday October 12, 2022 and 12 of these samples were scheduled for analysis which was completed on Friday October 21, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27002496	BH 3/2			11/10/2022
27002497	BH 3/3			11/10/2022
27002498	BH 3/4			11/10/2022
27002499	BH 3/5			11/10/2022
27002500	BH 3/6			11/10/2022
27002501	BH 3/8			11/10/2022
27002492	BH 208			11/10/2022
27002493	BH 5/02			11/10/2022
27002490	NACW 203			11/10/2022
27002491	NACW 205			11/10/2022
27002494	NACW 212			11/10/2022
27002495	NACW 219			11/10/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31

Report Number: 665512

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Acid Herbicides by GCMS

All

NDPs: 0
 Tests: 12

X

X

X

Alkalinity as CaCO3

All

NDPs: 0
 Tests: 12

X

X

X

Ammoniacal Nitrogen

All

NDPs: 0
 Tests: 12

X

X

X

Anions by Kone (w)

All

NDPs: 0
 Tests: 12

X

X

X

Dissolved Metals by ICP-MS

All

NDPs: 0
 Tests: 12

X

X

X

Nitrite by Kone (w)

All

NDPs: 0
 Tests: 12

X

X

X

X

pH Value

All

NDPs: 0
 Tests: 12

X

X

X

SVOC MS (W) - Aqueous

All

NDPs: 0
 Tests: 12

X

X

X

VOC MS (W)

All

NDPs: 0
 Tests: 12

X

X

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

Results Legend			Customer Sample Ref.		BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8
# ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Method	Ground Water (GW)	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022
M mCERTS accredited.										
aq Aqueous / settled sample.										
diss.filt Dissolved / filtered sample.										
tot.unfilt Total / unfiltered sample.										
* Subcontracted - refer to subcontractor report for accreditation status.	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		Ground Water (GW)	12/10/2022	221012-31	27002496	12/10/2022	221012-31	27002497	12/10/2022
** Trigger breach confirmed										
1-4* Sample deviation (see appendix)										
Component	LOD/Units	Method	Ground Water (GW)	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022
Alkalinity, Total as CaCO3	<2 mg/l	TM043	68.7	#	135	#	175	#	130	#
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	#	<0.2	#	<0.2	#	<0.2	#
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	#	<0.08	#	<0.08	#	<0.08	#
Chromium (diss.filt)	<1 µg/l	TM152	<1	#	<1	#	<1	#	<1	#
Copper (diss.filt)	<0.3 µg/l	TM152	4.32	#	0.498	#	6.91	#	1.16	#
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	#	<0.2	#	<0.2	#	0.7	#
Manganese (diss.filt)	<3 µg/l	TM152	4.64	#	13.4	#	68.9	#	3.64	#
Nickel (diss.filt)	<0.4 µg/l	TM152	0.784	#	<0.4	#	4.78	#	0.455	#
Zinc (diss.filt)	<1 µg/l	TM152	3.43	#	1.18	#	1.4	#	2.68	#
Sodium (Dis.Filt)	<0.076 mg/l	TM152	3.36	#	10.7	#	19.5	#	11.1	#
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	2.09	#	5.59	#	11.4	#	5.33	#
Potassium (Dis.Filt)	<0.2 mg/l	TM152	4.93	#	1.1	#	15.5	#	0.769	#
Calcium (Dis.Filt)	<0.2 mg/l	TM152	27.3	#	59.3	#	84.4	#	62.8	#
Iron (Dis.Filt)	<0.019 mg/l	TM152	<0.019	#	<0.019	#	<0.019	#	<0.019	#
Nitrite as NO2	<0.05 mg/l	TM184	0.062	#	<0.05	#	<0.05	#	<0.05	#
Sulphate	<2 mg/l	TM184	<2	#	29.3	#	53	#	46.3	#
Chloride	<2 mg/l	TM184	8.9	#	14.4	#	64.6	#	16.9	#
Nitrate as NO3	<0.3 mg/l	TM184	4.27	#	9.66	#	<0.3	#	1.74	#
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	0.984	#	2.18	#	<0.1	#	0.394	#
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.166	#	0.346	#	0.565	#	0.352	#
Dinitro-o-cresol	<0.1 µg/l	TM411	<0.1	#	<0.2	#	0.193	#	0.181	#
Clopyralid	<0.04 µg/l	TM411	<0.1	#	<0.2	#	0.22	#	1.77	#
MCPA	<0.05 µg/l	TM411	<0.05	#	<0.1	#	<0.05	#	0.0594	#
Mecoprop	<0.04 µg/l	TM411	<0.04	#	<0.08	#	<0.04	#	<0.04	#
Dicamba	<0.04 µg/l	TM411	<0.04	#	<0.08	#	<0.04	#	<0.04	#
MCPB	<0.05 µg/l	TM411	<0.05	#	<0.1	#	<0.05	#	<0.05	#
2,4-DB	<0.1 µg/l	TM411	<0.1	#	<0.2	#	<0.1	#	<0.1	#
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<0.05	#	<0.1	#	<0.05	#	<0.05	#
Dichlorprop	<0.1 µg/l	TM411	<0.1	#	<0.2	#	<0.1	#	<0.1	#
Triclopyr	<0.05 µg/l	TM411	<0.05	#	0.139	#	0.395	#	1.78	#
Fenoprop (Silvex)	<0.1 µg/l	TM411	<0.1	#	<0.2	#	<0.1	#	<0.1	#
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05	#	<0.1	#	<0.05	#	<0.05	#
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05	#	<0.1	#	<0.05	#	<0.05	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

Results Legend		Customer Sample Ref. Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	BH 208	BH 5/02	NACW 203	NACW 205	NACW 212	NACW 219
# ISO17025 accredited.			Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
M mCERTS accredited.			11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022
aq Aqueous / settled sample.								
diss.filt Dissolved / filtered sample.								
tot.unfilt Total / unfiltered sample.								
* Subcontracted - refer to subcontractor report for accreditation status.								
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F) Trigger breach confirmed								
1-4*5@ Sample deviation (see appendix)								
Component	LOD/Units	Method						
Alkalinity, Total as CaCO3	<2 mg/l	TM043	75	225	180	215	138	195
			#	#	#	#	#	#
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	<0.2	<0.2	<0.2	<0.2	0.249
			#	#	#	#	#	#
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
			#	#	#	#	#	#
Chromium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1	<1	<1
			#	#	#	#	#	#
Copper (diss.filt)	<0.3 µg/l	TM152	1.38	0.601	<0.3	0.735	4.18	0.612
			#	#	#	#	#	#
Lead (diss.filt)	<0.2 µg/l	TM152	0.229	<0.2	<0.2	<0.2	<0.2	<0.2
			#	#	#	#	#	#
Manganese (diss.filt)	<3 µg/l	TM152	<3	<3	<3	<3	<3	993
			#	#	#	#	#	#
Nickel (diss.filt)	<0.4 µg/l	TM152	<0.4	<0.4	<0.4	<0.4	0.856	1.46
			#	#	#	#	#	#
Zinc (diss.filt)	<1 µg/l	TM152	3.28	3.93	<1	4.15	8.02	5.86
			#	#	#	#	#	#
Sodium (Dis.Filt)	<0.076 mg/l	TM152	4.55	11.5	11.6	11.4	11.8	13.8
			#	#	#	#	#	#
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	2.82	8.43	8.74	8.55	5.36	6.67
			#	#	#	#	#	#
Potassium (Dis.Filt)	<0.2 mg/l	TM152	3.84	1.32	1.14	1.11	5.64	1.21
			#	#	#	#	#	#
Calcium (Dis.Filt)	<0.2 mg/l	TM152	26.6	87	72.4	103	67.5	87.7
			#	#	#	#	#	#
Iron (Dis.Filt)	<0.019 mg/l	TM152	<0.019	<0.019	<0.019	<0.019	<0.019	0.205
			#	#	#	#	#	#
Nitrite as NO2	<0.05 mg/l	TM184	<0.05	0.1	<0.05	<0.05	<0.05	<0.05
			#	#	#	#	#	#
Sulphate	<2 mg/l	TM184	<2	13.3	13.2	12.6	40.3	41.5
			#	#	#	#	#	#
Chloride	<2 mg/l	TM184	10.4	23	34.5	36.7	24.7	27
			#	#	#	#	#	#
Nitrate as NO3	<0.3 mg/l	TM184	7.38	8.61	8.08	11.2	5.81	1.44
			#	#	#	#	#	#
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	1.67	1.97	1.82	2.53	1.31	0.325
			#	#	#	#	#	#
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.177	0.473	0.427	0.542	0.393	0.479
			#	#	#	#	#	#
Dinitro-o-cresol	<0.1 µg/l	TM411	<0.1	0.134	<0.1	<0.1	0.169	<0.1
Clopyralid	<0.04 µg/l	TM411	<0.04	<0.1	0.198	<0.1	0.193	<0.04
MCPA	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mecoprop	<0.04 µg/l	TM411	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Dicamba	<0.04 µg/l	TM411	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
MCPB	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2,4-DB	<0.1 µg/l	TM411	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorprop	<0.1 µg/l	TM411	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Triclopyr	<0.05 µg/l	TM411	0.0515	<0.05	0.172	<0.05	0.142	<0.05
Fenoprop (Silvex)	<0.1 µg/l	TM411	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31

Report Number: 665512

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.		BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8
# ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	M mCERTS accredited. aq Aqueous / settled sample. diss.flit Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§ Sample deviation (see appendix)			Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022
					12/10/2022 221012-31 27002496	12/10/2022 221012-31 27002497	12/10/2022 221012-31 27002498	12/10/2022 221012-31 27002499	12/10/2022 221012-31 27002500	12/10/2022 221012-31 27002501
Component	LOD/Units	Method								
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Chlorophenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Methylphenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Nitroaniline (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Nitrophenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
3-Nitroaniline (aq)	<1 µg/l	TM176	<1		<1		<1		<1	
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
4-Chloroaniline (aq)	<1 µg/l	TM176	<1		<1		<1		<1	
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
4-Methylphenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
4-Nitroaniline (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
4-Nitrophenol (aq)	<1 µg/l	TM176	<1		<1		<1		<1	
Azobenzene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
Acenaphthylene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
Acenaphthene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
Anthracene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2	#	<2	#	<2	#	<2	#
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4**@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 221012-31 27002496	Ground Water (GW) 11/10/2022 221012-31 27002497	Ground Water (GW) 11/10/2022 221012-31 27002498	Ground Water (GW) 11/10/2022 221012-31 27002499	Ground Water (GW) 11/10/2022 221012-31 27002500	Ground Water (GW) 11/10/2022 221012-31 27002501
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbazole (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chrysene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibenzofuran (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Diethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dimethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<5 #	<5 #	<5 #	<5 #	<5 #	<5 #
Fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Fluorene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Pentachlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachloroethane (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Nitrobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Isophorone (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenanthrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #

SDG: 221012-31

Report Number: 665512

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	BH 208	BH 5/02	NACW 203	NACW 205	NACW 212	NACW 219
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4**@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 221012-31 27002492	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002493	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002490	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002491	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002494	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002495
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbazole (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chrysene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibenzofuran (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Diethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dimethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<5 #	<5 #	<5 #	<5 #	<5 #	<5 #
Fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Fluorene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Pentachlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachloroethane (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Nitrobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Isophorone (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenanthrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

SDG: 221012-31

Report Number: 665512

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend			Customer Sample Ref.	BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8
# ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002496	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002497	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002498	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002499	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002500	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002501	
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM208	115	115	110	112	113	113	
Toluene-d8**	%	TM208	102	102	101	101	102	100	
4-Bromofluorobenzene**	%	TM208	97.9	95.8	93.8	98.4	98.2	96.8	
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Chloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Vinyl chloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Bromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Chloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Carbon disulphide	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Dichloromethane	<3 µg/l	TM208	<5	<5.5	<5	<4.5	<4.5	<6	
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Bromochloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Chloroform	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Carbontetrachloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,2-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Benzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Trichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Dibromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Bromodichloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Toluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,3-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4**@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 221012-31 27002496	Ground Water (GW) 11/10/2022 221012-31 27002497	Ground Water (GW) 11/10/2022 221012-31 27002498	Ground Water (GW) 11/10/2022 221012-31 27002499	Ground Water (GW) 11/10/2022 221012-31 27002500	Ground Water (GW) 11/10/2022 221012-31 27002501
Tetrachloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromoethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
m,p-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
o-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Styrene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromofom	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Isopropylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Propylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
sec-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-iso-Propyltoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,4-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

SDG: 221012-31

Report Number: 665512

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend			Customer Sample Ref.		BH 208	BH 5/02	NACW 203	NACW 205	NACW 212	NACW 219
# ISO17025 accredited. M mCERES accredited. aq Aqueous / settled sample. diss.fltr Dissolved / filtered sample. tot.unfltr Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002492	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002493	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002490	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002491	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002494	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002495
Component	LOD/Units	Method								
Dibromofluoromethane**	%	TM208	114	112	116	113	113	113	113	113
Toluene-d8**	%	TM208	100	101	100	103	99.9	103	103	103
4-Bromofluorobenzene**	%	TM208	95.6	94.6	94	96	92.8	97.3	97.3	97.3
Dichlorodifluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Vinyl chloride	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Trichlorofluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbon disulphide	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dichloromethane	<3 µg/l	TM208	<5.5 #	<6 #	<4.5 #	<4 #	<5.5 #	<5 #	<5 #	<5 #
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloroform	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbontetrachloride	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Trichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromodichloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Toluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,2-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	BH 208	BH 5/02	NACW 203	NACW 205	NACW 212	NACW 219
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4**@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 221012-31 27002492	Ground Water (GW) 11/10/2022 221012-31 27002493	Ground Water (GW) 11/10/2022 221012-31 27002490	Ground Water (GW) 11/10/2022 221012-31 27002491	Ground Water (GW) 11/10/2022 221012-31 27002494	Ground Water (GW) 11/10/2022 221012-31 27002495
Tetrachloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromoethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
m,p-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
o-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Styrene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromofom	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Isopropylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Propylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
sec-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-iso-Propyltoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,4-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	27002492	27002496	27002497	27002498	27002499	27002500	27002501	27002493	27002490	27002491
Customer Sample Ref.	BH 208	BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8	BH 5/02	NACW 203	NACW 205
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Acid Herbicides by GCMS	21-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	21-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022
Alkalinity as CaCO ₃	19-Oct-2022	19-Oct-2022	18-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022
Ammoniacal Nitrogen	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022
Anions by Kone (w)	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022
Dissolved Metals by ICP-MS	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022
Nitrite by Kone (w)	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022
pH Value	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022
SVOC MS (W) - Aqueous	17-Oct-2022	17-Oct-2022	19-Oct-2022	17-Oct-2022	18-Oct-2022	17-Oct-2022	19-Oct-2022	18-Oct-2022	19-Oct-2022	19-Oct-2022
VOC MS (W)	14-Oct-2022	14-Oct-2022	14-Oct-2022	18-Oct-2022	14-Oct-2022	14-Oct-2022	18-Oct-2022	18-Oct-2022	14-Oct-2022	14-Oct-2022

Lab Sample No(s)	27002494	27002495
Customer Sample Ref.	NACW 212	NACW 219
AGS Ref.		
Depth		
Type	Ground Water	Ground Water
Acid Herbicides by GCMS	17-Oct-2022	21-Oct-2022
Alkalinity as CaCO ₃	18-Oct-2022	19-Oct-2022
Ammoniacal Nitrogen	13-Oct-2022	13-Oct-2022
Anions by Kone (w)	18-Oct-2022	18-Oct-2022
Dissolved Metals by ICP-MS	19-Oct-2022	19-Oct-2022
Nitrite by Kone (w)	14-Oct-2022	15-Oct-2022
pH Value	17-Oct-2022	17-Oct-2022
SVOC MS (W) - Aqueous	17-Oct-2022	18-Oct-2022
VOC MS (W)	14-Oct-2022	14-Oct-2022



CERTIFICATE OF ANALYSIS

SDG: 221012-31
Client Ref:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



CWM Environmental Ltd
Nantycaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 14 November 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 221109-35
Your Reference:
Location: Nantycaws Landfill
Report No: 668403
Order Number:

We received 6 samples on Wednesday November 09, 2022 and 6 of these samples were scheduled for analysis which was completed on Monday November 14, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 221109-35
Client Ref.:

Report Number: 668403
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27134139	CELL 4 SUMP			08/11/2022
27134141	CELL 5 SUMP			08/11/2022
27134142	CELL 6 SUMP			08/11/2022
27134143	CELL 7 SUMP			08/11/2022
27134138	CELL 1-2 SUMP			08/11/2022
27134144	LEACHATE HOLDING LAGOON			08/11/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 221109-35

Report Number: 668403

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test


No Determination
Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)	27134139	27134141	27134142	27134143	27134138	27134144
Customer Sample Reference	CELL 4 SUMP	CELL 5 SUMP	CELL 6 SUMP	CELL 7 SUMP	CELL 1-2 SUMP	LEACHATE HOLDING LAGOON
AGS Reference						
Depth (m)						
Container	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	500ml Plastic (ALE208)
Sample Type	LE	LE	LE	LE	LE	LE
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 6				
Anions by Kone (w)	All	NDPs: 0 Tests: 6				
pH Value	All	NDPs: 0 Tests: 6				

SDG: 221109-35

Report Number: 668403

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 221109-35
Client Ref.:

Report Number: 668403
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 221109-35
Client Ref.:

Report Number: 668403
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	27134139	27134141	27134142	27134143	27134138	27134144
Customer Sample Ref.	CELL 4 SUMP	CELL 5 SUMP	CELL 6 SUMP	CELL 7 SUMP	CELL 1-2 SUMP	LEACHATE HOLDIN G LAGOON
AGS Ref.						
Depth						
Type	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate
Ammoniacal Nitrogen	14-Nov-2022	14-Nov-2022	14-Nov-2022	14-Nov-2022	14-Nov-2022	14-Nov-2022
Anions by Kone (w)	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022
pH Value	11-Nov-2022	11-Nov-2022	11-Nov-2022	11-Nov-2022	11-Nov-2022	11-Nov-2022



CERTIFICATE OF ANALYSIS

SDG: 221109-35
Client Ref:

Report Number: 668403
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

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5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

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13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

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General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 16 November 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 221109-39
Your Reference:
Location: Nantyclaws Landfill
Report No: 668590
Order Number: POR009935

We received 7 samples on Wednesday November 09, 2022 and 7 of these samples were scheduled for analysis which was completed on Wednesday November 16, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 221109-39
Client Ref.:

Report Number: 668590
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27134230	3/4			08/11/2022
27134226	BH 208			08/11/2022
27134227	BH 5/02			08/11/2022
27134223	NACW 203			08/11/2022
27134225	NACW 205			08/11/2022
27134228	NACW 212			08/11/2022
27134229	NACW 228			08/11/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

SDG: 221109-39
Client Ref.:

Superseded Report:

Location: Nantycaws Landfill

08:34:38 16/11/2022



CERTIFICATE OF ANALYSIS

Validated

SDG: 221109-39
Client Ref.:

Report Number: 668590
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 221109-39
Client Ref.:

Report Number: 668590
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	27134230	27134226	27134227	27134223	27134225	27134228	27134229
Customer Sample Ref.	3/4	BH 208	BH 5/02	NACW 203	NACW 205	NACW 212	NACW 228
AGS Ref.							
Depth							
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	16-Nov-2022	16-Nov-2022	16-Nov-2022	16-Nov-2022	16-Nov-2022	16-Nov-2022	16-Nov-2022
Anions by Kone (w)	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022
pH Value	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022



CERTIFICATE OF ANALYSIS

SDG: 221109-39
Client Ref:

Report Number: 668590
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

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5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

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12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

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General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



CWM Environmental Ltd
Nantycaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 16 November 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 221109-40
Your Reference:
Location: Nantycaws Landfill
Report No: 668645
Order Number: POR009935

We received 11 samples on Wednesday November 09, 2022 and 11 of these samples were scheduled for analysis which was completed on Wednesday November 16, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 221109-40
Client Ref.:

Report Number: 668645
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27134270	SW 201			08/11/2022
27134272	SW 202			08/11/2022
27134274	SW 203			08/11/2022
27134275	SW 204			08/11/2022
27134276	SW 205			08/11/2022
27134277	SW 206			08/11/2022
27134278	SW 207			08/11/2022
27134279	UD 1			08/11/2022
27134281	UD 3			08/11/2022
27134282	UD 4			08/11/2022
27134283	UD 5			08/11/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

27134283	UD 5			H2SO4 (ALE244)	GW		X												
				500ml Plastic (ALE208)	GW			X											
27134282	UD 4			H2SO4 (ALE244)	GW		X												

SDG: 221109-40
Client Ref.:

Report Number: 668645

Superseded Report:

Location: Nantycaws Landfill

[illegible]

SDG: 221109-40
Client Ref.:

Report Number: 668645

Superseded Report:

Location: Nantycaws Landfill

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 221109-40
Client Ref.:

Report Number: 668645
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 221109-40
Client Ref.:

Report Number: 668645
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	27134270	27134272	27134274	27134275	27134276	27134277	27134278	27134279	27134281	27134282
Customer Sample Ref.	SW 201	SW 202	SW 203	SW 204	SW 205	SW 206	SW 207	UD 1	UD 3	UD 4
AGS Ref.										
Depth										
Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	11-Nov-2022	16-Nov-2022	11-Nov-2022	11-Nov-2022	16-Nov-2022	16-Nov-2022	11-Nov-2022	16-Nov-2022	11-Nov-2022	16-Nov-2022
Anions by Kone (w)	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022
pH Value	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022	10-Nov-2022
Suspended Solids	14-Nov-2022	14-Nov-2022	15-Nov-2022	14-Nov-2022	14-Nov-2022	14-Nov-2022	14-Nov-2022			

Lab Sample No(s)	27134283
Customer Sample Ref.	UD 5
AGS Ref.	
Depth	
Type	Ground Water
Ammoniacal Nitrogen	11-Nov-2022
Anions by Kone (w)	10-Nov-2022
pH Value	10-Nov-2022



CERTIFICATE OF ANALYSIS

SDG: 221109-40
Client Ref:

Report Number: 668645
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528777

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantycaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 20 December 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 221213-52
Your Reference:
Location: Nantycaws Landfill
Report No: 672871
Order Number: POR010439

We received 24 samples on Tuesday December 13, 2022 and 24 of these samples were scheduled for analysis which was completed on Tuesday December 20, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 221213-52
Client Ref.:

Report Number: 672871
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27302544	CELL 5 SUMP			12/12/2022
27302546	CELL 6 SUMP			12/12/2022
27302547	CELL 7 SUMP			12/12/2022
27302542	CELL 1-2 SUMP			12/12/2022
27302543	CELL 3-4 SUMP			12/12/2022
27302548	LEACHATE HOLDING LAGOON			12/12/2022
27302538	NACW 3/4			12/12/2022
27302535	NACW 203			12/12/2022
27302537	NACW 205			12/12/2022
27302539	NACW 208			12/12/2022
27302541	NACW 212			12/12/2022
27302550	NACW 228			12/12/2022
27302540	NACW 5/02			12/12/2022
27302523	SW 201			12/12/2022
27302524	SW 202			12/12/2022
27302525	SW 203			12/12/2022
27302526	SW 204			12/12/2022
27302528	SW 205			12/12/2022
27302529	SW 206			12/12/2022
27302530	SW 207			12/12/2022
27302531	UD 1			12/12/2022
27302532	UD 3			12/12/2022
27302533	UD 4			12/12/2022
27302534	UD 5			12/12/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 221213-52

Report Number: 672871

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Results Legend	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		Sample Type	
	27302539		NACW 208						500ml Plastic (ALE208)		GW	
	27302537		NACW 205						500ml Plastic (ALE208)		GW	
	27302535		NACW 203						500ml Plastic (ALE208)		GW	
	27302538		NACW 3/4						500ml Plastic (ALE208)		GW	
	27302548		LEACHATE HOLDING LAGOON						500ml Plastic (ALE208)		GW	
	27302543		CELL 3-4 SUMP						500ml Plastic (ALE208)		LE	
	27302542		CELL 1-2 SUMP						500ml Plastic (ALE208)		LE	
	27302547		CELL 7 SUMP						500ml Plastic (ALE208)		LE	
	27302546		CELL 6 SUMP						500ml Plastic (ALE208)		LE	
	27302544		CELL 5 SUMP						500ml Plastic (ALE208)		LE	
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 24										
Anions by Kone (w)	All	NDPs: 0 Tests: 24										
pH Value	All	NDPs: 0 Tests: 24										
Suspended Solids	All	NDPs: 0 Tests: 7										

27302530	SW 207			H2SO4 (ALE244)	SW	X				
				500ml Plastic (ALE208)	SW					
27302529	SW 206			H2SO4 (ALE244)	SW	X		X	X	X
				500ml Plastic (ALE208)	SW					
27302528	SW 205			H2SO4 (ALE244)	SW	X		X	X	X
				500ml Plastic (ALE208)	SW					
27302526	SW 204			H2SO4 (ALE244)	SW	X		X	X	X
				500ml Plastic (ALE208)	SW					
27302525	SW 203			H2SO4 (ALE244)	SW	X		X	X	X
				500ml Plastic (ALE208)	SW					
27302524	SW 202			H2SO4 (ALE244)	SW	X		X	X	X
				500ml Plastic (ALE208)	SW					
27302523	SW 201			H2SO4 (ALE244)	SW	X		X	X	X
				500ml Plastic (ALE208)	SW					
27302540	NACW 5/02			H2SO4 (ALE244)	GW	X				
				500ml Plastic (ALE208)	GW					
27302550	NACW 228			H2SO4 (ALE244)	GW	X		X	X	
				500ml Plastic (ALE208)	GW					
27302541	NACW 212			H2SO4 (ALE244)	GW	X		X	X	
				500ml Plastic (ALE208)	GW					
27302539	NACW 208			H2SO4 (ALE244)	GW	X				
				500ml Plastic (ALE208)	GW		X	X		



CERTIFICATE OF ANALYSIS

Validated

SDG: 221213-52

Report Number: 672871

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 24

Anions by Kone (w)

All

NDPs: 0
Tests: 24

pH Value

All

NDPs: 0
Tests: 24

27302531

UD 1

27302532

UD 3

27302533

UD 4

27302534

UD 5

500ml Plastic
(ALE208)

500ml Plastic
(ALE208)

500ml Plastic
(ALE208)

500ml Plastic
(ALE208)

500ml Plastic
(ALE208)

500ml Plastic
(ALE208)

500ml Plastic
(ALE208)

GW

GW

GW

GW

GW

GW

GW

X

X

X

X

X

X

X

X

X

X

X

X

SDG: 221213-52

Report Number: 672871

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

[illegible]

SDG: 221213-52

Report Number: 672871

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

[illegible]



Superseded Report:

Location: Nantycaws Landfill

Page 8 of 12



Superseded Report:

Location: Nantycaws Landfill

Page 9 of 12



CERTIFICATE OF ANALYSIS

Validated

SDG: 221213-52
Client Ref.:

Report Number: 672871
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 221213-52
Client Ref.:

Report Number: 672871
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	27302544	27302546	27302547	27302542	27302543	27302548	27302535	27302537	27302539	27302538
Customer Sample Ref.	CELL 5 SUMP	CELL 6 SUMP	CELL 7 SUMP	CELL 1-2 SUMP	CELL 3-4 SUMP	LEACHATE HOLDIN G LAGOON	NACW 203	NACW 205	NACW 208	NACW 3/4
AGS Ref.										
Depth										
Type	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Land Leachate	Ground Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	20-Dec-2022	15-Dec-2022	20-Dec-2022	15-Dec-2022	20-Dec-2022	20-Dec-2022	15-Dec-2022	15-Dec-2022	15-Dec-2022	15-Dec-2022
Anions by Kone (w)	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022
pH Value	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022

Lab Sample No(s)	27302541	27302550	27302540	27302523	27302524	27302525	27302526	27302528	27302529	27302530
Customer Sample Ref.	NACW 212	NACW 228	NACW 502	SW 201	SW 202	SW 203	SW 204	SW 205	SW 206	SW 207
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Ammoniacal Nitrogen	15-Dec-2022	15-Dec-2022	15-Dec-2022	15-Dec-2022	15-Dec-2022	15-Dec-2022	15-Dec-2022	15-Dec-2022	15-Dec-2022	15-Dec-2022
Anions by Kone (w)	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022
pH Value	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022
Suspended Solids				19-Dec-2022	19-Dec-2022	19-Dec-2022	19-Dec-2022	19-Dec-2022	19-Dec-2022	19-Dec-2022

Lab Sample No(s)	27302531	27302532	27302533	27302534
Customer Sample Ref.	UD 1	UD 3	UD 4	UD 5
AGS Ref.				
Depth				
Type	Ground Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	15-Dec-2022	15-Dec-2022	15-Dec-2022	15-Dec-2022
Anions by Kone (w)	14-Dec-2022	14-Dec-2022	14-Dec-2022	14-Dec-2022
pH Value	16-Dec-2022	16-Dec-2022	16-Dec-2022	16-Dec-2022



CERTIFICATE OF ANALYSIS

SDG: 221213-52
Client Ref:

Report Number: 672871
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

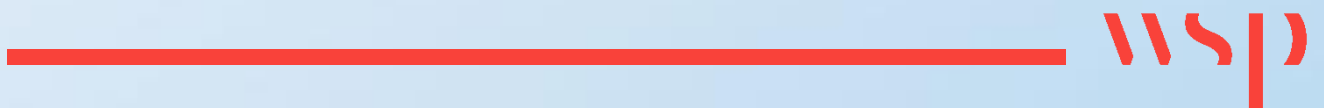
Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix B

**NOTE ON ANNUAL MONITORING
SUITES AND “PROPOSED
HAZARDOUS LIST 1 SUBSTANCES
SCREEN”**



**NANTYCAWS LANDFILL SITE
NOTE ON ANNUAL MONITORING SUITES AND PROPOSED 'LIST 1 SCREEN'**

Introduction

The following note has been prepared by WSP on behalf of CWM Environmental (CWM). It proposes which parameters should be included within the Hazardous 'List 1' Substances screen required to be undertaken at the monitoring locations at Nantycaws Landfill Site (the site) on an annual frequency. The recommendations made are based on review of the results of previous List 1 screens, undertaken annually between 2010 and 2022.

It should be noted that not all the analysis listed below was completed in 2022 due to a misunderstanding and change in management at the laboratory. This is discussed in the accompanying annual report. The monitoring samples for all monitoring locations submitted in January 2023 will undergo the analysis listed herein and the results provided to the regulator in due course.

List I Screen

The existing Environmental Permit for the site (Ref CP3735PB v.004, 23 September 2009) states that a 'List I screen' is to be undertaken on an annual basis at all leachates, groundwater and surface water monitoring locations included within the permit. It further states that the analysis to be included within the Hazardous List 1 Substances screen is to be defined through liaison with the Environment Agency.

In 2022 the following parameter groupings were included within the Hazardous List 1 Substances screen as detailed below. These are based on the suites analysed by AlControl (now ALS), the existing certified laboratory:

Leachate and Underdrainage

- Metals (including cadmium);
- Petroleum hydrocarbons, comprising:
 - speciated total petroleum hydrocarbons (TPH); and
 - benzene, ethylbenzene, toluene and xylenes (BTEX);
- Semi-volatile organic compounds (SVOCs), including 4-methylphenol and speciated polycyclic aromatic hydrocarbons (PAH);
- Phenylurea herbicides;
- Phenoxyacid herbicides;
- Polychlorinated biphenyls (PCBs);
- Phenols (including 4-methylphenol);
- Volatile organic hydrocarbons (VOCs), including BTEX;
- Cyanides; and
- Organochlorine pesticides (OCPS).

Groundwater

- Metals (including cadmium);
- Petroleum hydrocarbons, comprising:
 - banded total petroleum hydrocarbons (TPH); and (if detected)
 - benzene, ethylbenzene, toluene and xylenes (BTEX);
- Speciated polycyclic aromatic hydrocarbons (PAH);
- Phenoxyacid herbicides;
- Phenols (including 4-methylphenol);
- BTEX(as a screen for VOCs) *

Surface water

- Metals (including cadmium);
- Benzene, ethylbenzene, toluene and xylenes (BTEX);
- Speciated polycyclic aromatic hydrocarbons (PAH);
- Phenoxyacid herbicides;

NANTYCAWS LANDFILL SITE
NOTE ON ANNUAL MONITORING SUITES AND PROPOSED 'LIST 1 SCREEN'

- Phenols (including 4-methylphenol);
- BTEX (as a screen for VOCs)*

* Should detections of any of the excluded suites in groundwater be recorded in any of the underdrainage samples, confirmatory analysis will be undertaken.

Proposed List 1 Screen

The following analytical suites are proposed for inclusion in the Hazardous List 1 Substances screen for 2023, based on review of the analytical results undertaken between 2010 and 2022. The results are summarised in Table 1 and Table 2 below.

This is identical to that undertaken in 2022.

NANTYCAWS LANDFILL SITE
NOTE ON ANNUAL MONITORING SUITES AND PROPOSED 'LIST 1 SCREEN'

Table 1 2022 monitoring suite

Suites	Leachate	Under drainage	Ground water / Surface water	Comment
Cyanides	Y	Y	N	Occasionally detected in source but not detected in underdrainage, groundwater or surface water since 2009.
Physiochemical Parameters	Y	Y	Y	Most physiochemical parameters to be kept with the exception of TOC and COD
Major ions / Nutrients	Y	Y	Y	Major ions to be kept as per current annual suite
Metals	Y	Y	Y	All metals to be kept as per current annual suite
Alkaline and alkali earth metals plus iron	Y	Y	Y	
Phenols	Y	Y	Y	Including 4-methylphenol, a COC. Included as List I screen for all media
Phenoxyacid herbicides	Y	Y	Y	Includes mecoprop, a COC. Included as List I screen for all media
Phenylurea herbicides	Y	Y	N	Substances commonly detected in leachate, however not detected as principal risk drivers. No detections of these substances in underdrainage, groundwater or surface water since 2009
PCBs	Y	Y	N	PCBs were detected in the leachate in 2011 and in 2013. PCBs are included in the revised HRA with PCB congener 28 as an indicator / surrogate No detections in 2014 but some detections in leachate in 2013.
SVOCs (inc PAH)	Y	Y	N*	SVOC suite TM176 to be included for leachates and underdrainage samples. *Groundwater samples to be run for PAHs (TM178) only. 4-methylphenol to be covered by phenol suite (TM205)
TPH	Y	Y	N*	Speciated TPH to be retained within List I suite for leachate provided no evidence of free phase is recorded. *Banded TPH to be used for groundwater, followed by BTEX analysis if detected.
VOC (Target List)	Y	Y	N*	Leachate and underdrainage to be analysed for full VOC suite (TM208). *Groundwater boreholes only to be analysed for BTEX (TM208) where TPH detections confirmed by banded TPH screen

Appendix C

LABORATORY CERTIFICATES (ANNUAL MONITORING)





Unit 7-8 Hawarden Business Park

Manor Road (off Manor Lane)

Hawarden

Deeside

CH5 3US

Tel: (01244) 528777

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 21 October 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 221012-26
Your Reference:
Location: Nantyclaws Landfill
Report No: 665509
Order Number: POR 009510

We received 7 samples on Wednesday October 12, 2022 and 7 of these samples were scheduled for analysis which was completed on Friday October 21, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27002193	SW 201			11/10/2022
27002194	SW 202			11/10/2022
27002195	SW 203			11/10/2022
27002196	SW 204			11/10/2022
27002197	SW 205			11/10/2022
27002198	SW 206			11/10/2022
27002199	SW 207			11/10/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

			27002193	27002194	27002195	27002196
			SW 201	SW 202	SW 203	SW 204
			0.5l glass bottle (ALE227)	0.5l glass bottle (ALE227)	0.5l glass bottle (ALE227)	0.5l glass bottle (ALE227)
			SW	SW	SW	SW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 7	X	X	X	X
Alkalinity as CaCO ₃	All	NDPs: 0 Tests: 7	X	X	X	
Alkalinity Filtered as CaCO ₃	All	NDPs: 0 Tests: 7	X	X	X	
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 7		X	X	
Anions by Kone (w)	All	NDPs: 0 Tests: 7	X	X	X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 7		X	X	
Ionic Balance	All	NDPs: 0 Tests: 7	X	X	X	
Nitrite by Kone (w)	All	NDPs: 0 Tests: 7		X	X	
pH Value	All	NDPs: 0 Tests: 7	X	X	X	
Suspended Solids	All	NDPs: 0 Tests: 7	X	X	X	
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 7	X	X	X	X
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 7		X	X	
VOC MS (W)	All	NDPs: 0 Tests: 7		X	X	X



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

27002199

Customer
Sample Reference

SW 207

AGS Reference

Depth (m)

Container

NaOH (ALE245)

Vial (ALE297)

Sample Type

SW

SW

Nitrite by Kone (w)

All

NDPs: 0
Tests: 7

X

VOC MS (W)

All

NDPs: 0
Tests: 7

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Results Legend			Customer Sample Ref.		SW 201	SW 202	SW 203	SW 204	SW 205	SW 206
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022	Surface Water (SW) 11/10/2022
Component	LOD/Units	Method								
Ionic balance	% Diff	Calulation			1.78	0.631	-1.52	0.358	1.13	0.76
Suspended solids, Total	<2 mg/l	TM022			<2	2.2	4.95	2.9	2.2	10.6
Alkalinity, Total as CaCO3	<2 mg/l	TM043			139	198	23.7	181	259	174
Alkalinity, Total as CaCO3 (diss.filt)	<2 mg/l	TM043			138	198	24.1	181	261	175
Alkalinity, Bicarbonate as CaCO3 (diss.filt)	<2 mg/l	TM043			138	198	24.1	181	256	175
Organic Carbon, Total	<3 mg/l	TM090			5.42	25.8	8.86	25.5	24.9	11.4
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099			<0.2	<0.2	<0.2	<0.2	0.37	<0.2
Cadmium (diss.filt)	<0.08 µg/l	TM152			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Chromium (diss.filt)	<1 µg/l	TM152			<1	<1	<1	<1	<1	<1
Copper (diss.filt)	<0.3 µg/l	TM152			1.42	6.78	0.763	6.66	7.87	3.77
Lead (diss.filt)	<0.2 µg/l	TM152			<0.2	<0.2	0.299	<0.2	<0.2	<0.2
Manganese (diss.filt)	<3 µg/l	TM152			20.3	28	8.11	20.4	37.6	25.7
Nickel (diss.filt)	<0.4 µg/l	TM152			0.729	3.45	<0.4	3.16	4.11	1.88
Zinc (diss.filt)	<1 µg/l	TM152			3.97	8.37	3.92	2.77	5.07	8.95
Sodium (Dis.Filt)	<0.076 mg/l	TM152			10.2	23.2	4.01	21	29.1	15.6
Magnesium (Dis.Filt)	<0.036 mg/l	TM152			4.71	9.88	0.759	9.05	12.7	7.08
Potassium (Dis.Filt)	<0.2 mg/l	TM152			5.66	43.6	1.12	41.3	58.2	21.4
Calcium (Dis.Filt)	<0.2 mg/l	TM152			60.3	122	8.01	118	132	80.1
Iron (Dis.Filt)	<0.019 mg/l	TM152			0.0422	0.0542	0.0668	0.0586	0.0504	0.0429
Nitrite as NO2	<0.05 mg/l	TM184			<0.05	0.075	<0.05	<0.05	0.215	0.074
Sulphate	<2 mg/l	TM184			21.5	122	<2	125	102	45.3
Chloride	<2 mg/l	TM184			18.2	81.4	7.2	79.7	90.7	38.9
Nitrate as NO3	<0.3 mg/l	TM184			7.27	8.59	<0.3	5.98	18.2	10.7
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184			1.64	1.96	<0.1	1.35	4.18	2.43
pH	<1 pH Units	TM256			8.27	8.14	7.4	8.07	8.26	8.13
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256			0.343	0.795	0.0689	0.766	0.899	0.514
Dinitro-o-cresol	<0.1 µg/l	TM411			0.2	0.46	0.354	0.16	<0.1	0.394
Clpyralid	<0.04 µg/l	TM411			<0.04	0.133	<0.04	0.14	0.153	0.0948
MCPA	<0.05 µg/l	TM411			<0.05	<0.05	<0.05	0.0588	<0.05	<0.05
Mecoprop	<0.04 µg/l	TM411			<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Dicamba	<0.04 µg/l	TM411			<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
MCPB	<0.05 µg/l	TM411			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2,4-DB	<0.1 µg/l	TM411			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Results Legend		Customer Sample Ref.	SW 207				
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002199				
Component	LOD/Units	Method					
Ionic balance	% Diff	Calulation	1.13				
Suspended solids, Total	<2 mg/l	TM022	<2	#			
Alkalinity, Total as CaCO3	<2 mg/l	TM043	125	#			
Alkalinity, Total as CaCO3 (diss.filt)	<2 mg/l	TM043	125				
Alkalinity, Bicarbonate as CaCO3 (diss.filt)	<2 mg/l	TM043	125				
Organic Carbon, Total	<3 mg/l	TM090	15.3	#			
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	#			
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	#			
Chromium (diss.filt)	<1 µg/l	TM152	<1	#			
Copper (diss.filt)	<0.3 µg/l	TM152	5.11	#			
Lead (diss.filt)	<0.2 µg/l	TM152	0.386	#			
Manganese (diss.filt)	<3 µg/l	TM152	17.7	#			
Nickel (diss.filt)	<0.4 µg/l	TM152	2.07	#			
Zinc (diss.filt)	<1 µg/l	TM152	16.3	#			
Sodium (Dis.Filt)	<0.076 mg/l	TM152	14.2	#			
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	5.62	#			
Potassium (Dis.Filt)	<0.2 mg/l	TM152	15.9	#			
Calcium (Dis.Filt)	<0.2 mg/l	TM152	58.4	#			
Iron (Dis.Filt)	<0.019 mg/l	TM152	0.114	#			
Nitrite as NO2	<0.05 mg/l	TM184	0.201	#			
Sulphate	<2 mg/l	TM184	35.9	#			
Chloride	<2 mg/l	TM184	31.1	#			
Nitrate as NO3	<0.3 mg/l	TM184	11.1	#			
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	2.56	#			
pH	<1 pH Units	TM256	8.02	#			
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.393	#			
Dinitro-o-cresol	<0.1 µg/l	TM411	0.16				
Clopyralid	<0.04 µg/l	TM411	<0.04				
MCPA	<0.05 µg/l	TM411	0.11				
Mecoprop	<0.04 µg/l	TM411	<0.04				
Dicamba	<0.04 µg/l	TM411	<0.04				
MCPB	<0.05 µg/l	TM411	<0.05				
2,4-DB	<0.1 µg/l	TM411	<0.1				



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.		SW 201	SW 202	SW 203	SW 204	SW 205	SW 206
# ISO17025 accredited.	M mCERTS accredited.	aq Aqueous / settled sample.	Depth (m)	Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
diss.filter Dissolved / filtered sample.		tot.unfilt Total / unfiltered sample.	Date Sampled	Sample Time	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022
* Subcontracted - refer to subcontractor report for accreditation status.			Date Received	SDG Ref	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			Lab Sample No.(s)	AGS Reference	221012-26	221012-26	221012-26	221012-26	221012-26	221012-26
(F) Trigger breach confirmed					27002193	27002194	27002195	27002196	27002197	27002198
1-4*§ Sample deviation (see appendix)										
Component	LOD/Units	Method								
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2,4-Dichlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2,4-Dimethylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2-Chloronaphthalene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2-Chlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2-Methylnaphthalene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2-Methylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2-Nitroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
2-Nitrophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
3-Nitroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
4-Bromophenylphenylether (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
4-Chloroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
4-Methylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
4-Nitroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
4-Nitrophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
Azobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
Acenaphthylene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
Acenaphthene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
Anthracene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176			<2	<2	<2	<2	<2	<2
						#	#	#	#	#
Butylbenzyl phthalate (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#
Benzo(a)anthracene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
						#	#	#	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	SW 201	SW 202	SW 203	SW 204	SW 205	SW 206
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4* Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002193	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002194	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002195	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002196	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002197	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002198
Component	LOD/Units	Method							
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Carbazole (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Chrysene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Dibenzofuran (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Diethyl phthalate (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Dimethyl phthalate (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<5	<5	<5	<5	<5	<5
					#	#	#	#	#
Fluoranthene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Fluorene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Hexachlorobenzene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Pentachlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Hexachloroethane (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Nitrobenzene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Naphthalene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Isophorone (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenanthrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Pyrene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
					#	#	#	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	SW 207				
# ISO17025 accredited. M mCERES accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002199				
Component	LOD/Units	Method					
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<2	#			
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<2	#			
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<2	#			
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<2	#			
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<2	#			
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<2	#			
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<2	#			
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<2	#			
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<2	#			
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<2	#			
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<2	#			
2-Chlorophenol (aq)	<1 µg/l	TM176	<2	#			
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<2	#			
2-Methylphenol (aq)	<1 µg/l	TM176	<2	#			
2-Nitroaniline (aq)	<1 µg/l	TM176	<2	#			
2-Nitrophenol (aq)	<1 µg/l	TM176	<2	#			
3-Nitroaniline (aq)	<1 µg/l	TM176	<2				
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<2	#			
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<2	#			
4-Chloroaniline (aq)	<1 µg/l	TM176	<2				
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<2	#			
4-Methylphenol (aq)	<1 µg/l	TM176	<2	#			
4-Nitroaniline (aq)	<1 µg/l	TM176	<2	#			
4-Nitrophenol (aq)	<1 µg/l	TM176	<2				
Azobenzene (aq)	<1 µg/l	TM176	<2	#			
Acenaphthylene (aq)	<1 µg/l	TM176	<2	#			
Acenaphthene (aq)	<1 µg/l	TM176	<2	#			
Anthracene (aq)	<1 µg/l	TM176	<2	#			
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<2	#			
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<2	#			
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<4	#			
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<2	#			
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<2	#			



CERTIFICATE OF ANALYSIS

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	SW 207				
# ISO17025 accredited. M mCERTS accredited. aq. Aqueous / settled sample. dis.filt. Dissolved / filtered sample. tot.unfilt. Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4#@@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002199				
Component	LOD/Units	Method					
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<2	#			
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<2	#			
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<2	#			
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<2	#			
Carbazole (aq)	<1 µg/l	TM176	<2	#			
Chrysene (aq)	<1 µg/l	TM176	<2	#			
Dibenzofuran (aq)	<1 µg/l	TM176	<2	#			
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<2	#			
Diethyl phthalate (aq)	<1 µg/l	TM176	<2	#			
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<2	#			
Dimethyl phthalate (aq)	<1 µg/l	TM176	<2	#			
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<10	#			
Fluoranthene (aq)	<1 µg/l	TM176	<2	#			
Fluorene (aq)	<1 µg/l	TM176	<2	#			
Hexachlorobenzene (aq)	<1 µg/l	TM176	<2	#			
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<2	#			
Pentachlorophenol (aq)	<1 µg/l	TM176	<2				
Phenol (aq)	<1 µg/l	TM176	<2				
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<2	#			
Hexachloroethane (aq)	<1 µg/l	TM176	<2	#			
Nitrobenzene (aq)	<1 µg/l	TM176	<2	#			
Naphthalene (aq)	<1 µg/l	TM176	<2	#			
Isophorone (aq)	<1 µg/l	TM176	<2	#			
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<2				
Phenanthrene (aq)	<1 µg/l	TM176	<2	#			
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<2	#			
Pyrene (aq)	<1 µg/l	TM176	<2	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend			Customer Sample Ref.		SW 201	SW 202	SW 203	SW 204	SW 205	SW 206
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.fltr Dissolved / filtered sample. tot.unfltr Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002193	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002194	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002195	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002196	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002197	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002198
Component	LOD/Units	Method								
Dibromofluoromethane**	%	TM208			112	114	115	116	111	111
Toluene-d8**	%	TM208			101	99.8	102	101	100	102
4-Bromofluorobenzene**	%	TM208			96.9	95.1	96.5	96.3	98.1	96.5
Dichlorodifluoromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Vinyl chloride	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromomethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Carbon disulphide	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Dichloromethane	<3 µg/l	TM208			<4	<5	<3.5	<5	<4.5	<5
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromochloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloroform	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Carbontetrachloride	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Benzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Trichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Dibromomethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromodichloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Toluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	SW 201	SW 202	SW 203	SW 204	SW 205	SW 206
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4**@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	SW 201	SW 202	SW 203	SW 204	SW 205	SW 206
Tetrachloroethene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Dibromochloromethane	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,2-Dibromoethane	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Chlorobenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Ethylbenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
m,p-Xylene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
o-Xylene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Styrene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Bromofom	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Isopropylbenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,2,3-Trichloropropane	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Bromobenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Propylbenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
2-Chlorotoluene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,3,5-Trimethylbenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
4-Chlorotoluene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
tert-Butylbenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,2,4-Trimethylbenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
sec-Butylbenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
4-iso-Propyltoluene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,3-Dichlorobenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,4-Dichlorobenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
n-Butylbenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,2-Dichlorobenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Hexachlorobutadiene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
Naphthalene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,2,3-Trichlorobenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1
					#	#	#	#	#
1,3,5-Trichlorobenzene	<1 µg/l	TM208	Surface Water (SW) 11/10/2022	<1	<1	<1	<1	<1	<1



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26

Report Number: 665509

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend		Customer Sample Ref.	SW 207				
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.fltr Dissolved / filtered sample. tot.unfltr Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002199				
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM208	118				
Toluene-d8**	%	TM208	100				
4-Bromofluorobenzene**	%	TM208	95.9				
Dichlorodifluoromethane	<1 µg/l	TM208	<1	#			
Chloromethane	<1 µg/l	TM208	<1	#			
Vinyl chloride	<1 µg/l	TM208	<1	#			
Bromomethane	<1 µg/l	TM208	<1	#			
Chloroethane	<1 µg/l	TM208	<1	#			
Trichlorofluoromethane	<1 µg/l	TM208	<1	#			
1,1-Dichloroethene	<1 µg/l	TM208	<1	#			
Carbon disulphide	<1 µg/l	TM208	<1	#			
Dichloromethane	<3 µg/l	TM208	<5.5	#			
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	#			
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	#			
1,1-Dichloroethane	<1 µg/l	TM208	<1	#			
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	#			
2,2-Dichloropropane	<1 µg/l	TM208	<1				
Bromochloromethane	<1 µg/l	TM208	<1	#			
Chloroform	<1 µg/l	TM208	<1	#			
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	#			
1,1-Dichloropropene	<1 µg/l	TM208	<1	#			
Carbontetrachloride	<1 µg/l	TM208	<1	#			
1,2-Dichloroethane	<1 µg/l	TM208	<1	#			
Benzene	<1 µg/l	TM208	<1	#			
Trichloroethene	<1 µg/l	TM208	<1	#			
1,2-Dichloropropane	<1 µg/l	TM208	<1	#			
Dibromomethane	<1 µg/l	TM208	<1	#			
Bromodichloromethane	<1 µg/l	TM208	<1	#			
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	#			
Toluene	<1 µg/l	TM208	<1	#			
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	#			
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	#			
1,3-Dichloropropane	<1 µg/l	TM208	<1	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	SW 207				
# ISO17025 accredited. M mCERTS accredited. aq. Aqueous / settled sample. dis.filt. Dissolved / filtered sample. tot.unfilt. Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4#@@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 11/10/2022 12/10/2022 221012-26 27002199				
Component	LOD/Units	Method					
Tetrachloroethene	<1 µg/l	TM208	<1	#			
Dibromochloromethane	<1 µg/l	TM208	<1	#			
1,2-Dibromoethane	<1 µg/l	TM208	<1	#			
Chlorobenzene	<1 µg/l	TM208	<1	#			
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	#			
Ethylbenzene	<1 µg/l	TM208	<1	#			
m,p-Xylene	<1 µg/l	TM208	<1	#			
o-Xylene	<1 µg/l	TM208	<1	#			
Styrene	<1 µg/l	TM208	<1	#			
Bromofom	<1 µg/l	TM208	<1	#			
Isopropylbenzene	<1 µg/l	TM208	<1	#			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	#			
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	#			
Bromobenzene	<1 µg/l	TM208	<1	#			
Propylbenzene	<1 µg/l	TM208	<1	#			
2-Chlorotoluene	<1 µg/l	TM208	<1	#			
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	#			
4-Chlorotoluene	<1 µg/l	TM208	<1	#			
tert-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	#			
sec-Butylbenzene	<1 µg/l	TM208	<1	#			
4-iso-Propyltoluene	<1 µg/l	TM208	<1	#			
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	#			
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	#			
n-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	#			
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1				
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	#			
Hexachlorobutadiene	<1 µg/l	TM208	<1	#			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	#			
Naphthalene	<1 µg/l	TM208	<1	#			
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	#			
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1				



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
Calculation		
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-26
Client Ref.:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Test Completion Dates

Lab Sample No(s)
Customer Sample Ref.

AGS Ref.
Depth
Type

	27002193	27002194	27002195	27002196	27002197	27002198	27002199
	SW 201	SW 202	SW 203	SW 204	SW 205	SW 206	SW 207
	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Acid Herbicides by GCMS	21-Oct-2022	21-Oct-2022	21-Oct-2022	17-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022
Alkalinity as CaCO ₃	19-Oct-2022	18-Oct-2022	18-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	18-Oct-2022
Alkalinity Filtered as CaCO ₃	18-Oct-2022	18-Oct-2022	19-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022
Ammoniacal Nitrogen	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022
Anions by Kone (w)	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022
Dissolved Metals by ICP-MS	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022
Ionic Balance	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022
Nitrite by Kone (w)	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	14-Oct-2022	15-Oct-2022
pH Value	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022
Suspended Solids	19-Oct-2022	18-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	18-Oct-2022	18-Oct-2022
SVOC MS (W) - Aqueous	18-Oct-2022	18-Oct-2022	19-Oct-2022	18-Oct-2022	17-Oct-2022	18-Oct-2022	19-Oct-2022
Total Organic and Inorganic Carbon	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022
VOC MS (W)	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022	14-Oct-2022



CERTIFICATE OF ANALYSIS

SDG: 221012-26
Client Ref:

Report Number: 665509
Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park

Manor Road (off Manor Lane)

Hawarden

Deeside

CH5 3US

Tel: (01244) 528777

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 21 October 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 221012-29
Your Reference:
Location: Nantyclaws Landfill
Report No: 665511
Order Number: POR 009510

We received 7 samples on Wednesday October 12, 2022 and 7 of these samples were scheduled for analysis which was completed on Friday October 21, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27002352	BH 3/9			11/10/2022
27002353	NACW 228			11/10/2022
27002354	NACW 229			11/10/2022
27002355	UD 1			11/10/2022
27002356	UD 3			11/10/2022
27002357	UD 4			11/10/2022
27002358	UD 5			11/10/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

SDG: 221012-29

Report Number: 665511

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

- S - Soil/Solid
- UNS - Unspecified Solid
- GW - Ground Water
- SW - Surface Water
- LE - Land Leachate
- PL - Prepared Leachate
- PR - Process Water
- SA - Saline Water
- TE - Trade Effluent
- TS - Treated Sewage
- US - Untreated Sewage
- RE - Recreational Water
- DW - Drinking Water Non-regulatory
- UNL - Unspecified Liquid
- SL - Sludge
- G - Gas
- OTH - Other

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29

Report Number: 665511

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

27002358

Customer
Sample Reference

UD 5

AGS Reference

Depth (m)

Container

NaOH (ALE245)

Vial (ALE297)

Sample Type

GW

GW

Nitrite by Kone (w)

All

NDPs: 0
Tests: 7

X

VOC MS (W)

All

NDPs: 0
Tests: 7

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	BH 3/9	NACW 228	NACW 229	UD 1	UD 3	UD 4
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4**@ Sample deviation (see appendix)				Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022
				12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022
				221012-29	221012-29	221012-29	221012-29	221012-29	221012-29
				27002352	27002353	27002354	27002355	27002356	27002357
Component	LOD/Units	Method							
Alkalinity, Total as CaCO3	<2 mg/l	TM043	24.4	41.1	97.2	246	186	242	
			#	#	#	#	#	#	
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	<0.2	<0.2	<0.2	<0.2	0.772	
			#	#	#	#	#	#	
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	
			#	#	#	#	#	#	
Chromium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1	<1	<1	
			#	#	#	#	#	#	
Copper (diss.filt)	<0.3 µg/l	TM152	2.12	1.21	0.836	0.889	0.603	0.751	
			#	#	#	#	#	#	
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	<0.2	<0.2	<0.2	<0.2	0.331	
			#	#	#	#	#	#	
Manganese (diss.filt)	<3 µg/l	TM152	<3	<3	4.27	37.5	<3	203	
			#	#	#	#	#	#	
Nickel (diss.filt)	<0.4 µg/l	TM152	2.1	1.33	<0.4	0.445	<0.4	0.43	
			#	#	#	#	#	#	
Zinc (diss.filt)	<1 µg/l	TM152	3.41	1.91	1.58	4.61	4.9	2.19	
			#	#	#	#	#	#	
Sodium (Dis.Filt)	<0.076 mg/l	TM152	56.1	37.2	6.69	13.6	12.4	11.3	
			#	#	#	#	#	#	
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	19.9	35.3	3.74	10.4	6.7	5.87	
			#	#	#	#	#	#	
Potassium (Dis.Filt)	<0.2 mg/l	TM152	9.02	1.36	0.565	1.54	1.5	3.92	
			#	#	#	#	#	#	
Calcium (Dis.Filt)	<0.2 mg/l	TM152	143	103	36.7	109	71.7	96.7	
			#	#	#	#	#	#	
Iron (Dis.Filt)	<0.019 mg/l	TM152	<0.019	<0.019	<0.019	<0.019	<0.019	0.583	
			#	#	#	#	#	#	
Nitrite as NO2	<0.05 mg/l	TM184	<0.05	<0.05	<0.05	<0.05	<0.05	0.065	
			#	#	#	#	#	#	
Sulphate	<2 mg/l	TM184	420	222	7	14.6	13.2	18	
			#	#	#	#	#	#	
Chloride	<2 mg/l	TM184	99.5	146	12.6	50.7	18.4	20.5	
			#	#	#	#	#	#	
Nitrate as NO3	<0.3 mg/l	TM184	5.27	1.24	<0.3	9.81	6.23	4.97	
			#	#	#	#	#	#	
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	1.19	0.28	<0.1	2.22	1.41	1.14	
			#	#	#	#	#	#	
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	1.02	0.868	0.222	0.598	0.405	0.507	
			#	#	#	#	#	#	
Dinitro-o-cresol	<0.1 µg/l	TM411	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Clopyralid	<0.04 µg/l	TM411	0.142	0.158	0.527	<0.04	<0.04	<0.04	
MCPA	<0.05 µg/l	TM411	<0.05	0.0943	<0.05	<0.05	<0.05	<0.05	
Mecoprop	<0.04 µg/l	TM411	<0.04	0.0587	<0.04	<0.04	<0.04	<0.04	
Dicamba	<0.04 µg/l	TM411	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	
MCPB	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
2,4-DB	<0.1 µg/l	TM411	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Dichlorprop	<0.1 µg/l	TM411	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Triclopyr	<0.05 µg/l	TM411	0.0798	0.192	0.939	<0.05	<0.05	<0.05	
Fenoprop (Silvex)	<0.1 µg/l	TM411	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

Results Legend		Customer Sample Ref.	UD 5				
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002358				
Component	LOD/Units	Method					
Alkalinity, Total as CaCO ₃	<2 mg/l	TM043	196	#			
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	#			
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	#			
Chromium (diss.filt)	<1 µg/l	TM152	<1	#			
Copper (diss.filt)	<0.3 µg/l	TM152	1.04	#			
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	#			
Manganese (diss.filt)	<3 µg/l	TM152	<3	#			
Nickel (diss.filt)	<0.4 µg/l	TM152	0.455	#			
Zinc (diss.filt)	<1 µg/l	TM152	9.87	#			
Sodium (Dis.Filt)	<0.076 mg/l	TM152	12.3	#			
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	7.22	#			
Potassium (Dis.Filt)	<0.2 mg/l	TM152	1.49	#			
Calcium (Dis.Filt)	<0.2 mg/l	TM152	75.4	#			
Iron (Dis.Filt)	<0.019 mg/l	TM152	<0.019	#			
Nitrite as NO ₂	<0.05 mg/l	TM184	<0.05	#			
Sulphate	<2 mg/l	TM184	13.2	#			
Chloride	<2 mg/l	TM184	19.6	#			
Nitrate as NO ₃	<0.3 mg/l	TM184	7.52	#			
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	1.7	#			
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.426	#			
Dinitro-o-cresol	<0.1 µg/l	TM411	<0.1				
Clopyralid	<0.04 µg/l	TM411	<0.04				
MCPA	<0.05 µg/l	TM411	<0.05				
Mecoprop	<0.04 µg/l	TM411	<0.04				
Dicamba	<0.04 µg/l	TM411	<0.04				
MCPB	<0.05 µg/l	TM411	<0.05				
2,4-DB	<0.1 µg/l	TM411	<0.1				
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<0.05				
Dichlorprop	<0.1 µg/l	TM411	<0.1				
Triclopyr	<0.05 µg/l	TM411	<0.05				
Fenoprop (Silvex)	<0.1 µg/l	TM411	<0.1				
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05				
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05				



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29

Report Number: 665511

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	BH 3/9	NACW 228	NACW 229	UD 1	UD 3	UD 4
# ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	M mCERTS accredited. aq Aqueous / settled sample. diss.filter Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)		Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002352	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002353	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002354	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002355	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002356	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002357
Component	LOD/Units	Method							
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Chlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Methylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Nitrophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
3-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	<1
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Chloroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	<1
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Methylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	<1
Azobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Acenaphthylene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Acenaphthene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Anthracene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2 #	<2 #	<2 #	<2 #	<2 #	<2 #	<2 #
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #

SDG: 221012-29
Client Ref.:

Report Number: 665511

Superseded Report:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29

Report Number: 665511

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	UD 5				
# ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002358				
M mCERTS accredited.							
aq Aqueous / settled sample.							
diss.filt Dissolved / filtered sample.							
tot.unfilt Total / unfiltered sample.							
* Subcontracted - refer to subcontractor report for accreditation status.							
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F) Trigger breach confirmed							
1-4*§@ Sample deviation (see appendix)							
Component	LOD/Units	Method					
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#			
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#			
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1	#			
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1	#			
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#			
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#			
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1	#			
2-Chlorophenol (aq)	<1 µg/l	TM176	<1	#			
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1	#			
2-Methylphenol (aq)	<1 µg/l	TM176	<1	#			
2-Nitroaniline (aq)	<1 µg/l	TM176	<1	#			
2-Nitrophenol (aq)	<1 µg/l	TM176	<1	#			
3-Nitroaniline (aq)	<1 µg/l	TM176	<1				
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1	#			
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1	#			
4-Chloroaniline (aq)	<1 µg/l	TM176	<1				
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1	#			
4-Methylphenol (aq)	<1 µg/l	TM176	<1	#			
4-Nitroaniline (aq)	<1 µg/l	TM176	<1	#			
4-Nitrophenol (aq)	<1 µg/l	TM176	<1				
Azobenzene (aq)	<1 µg/l	TM176	<1	#			
Acenaphthylene (aq)	<1 µg/l	TM176	<1	#			
Acenaphthene (aq)	<1 µg/l	TM176	<1	#			
Anthracene (aq)	<1 µg/l	TM176	<1	#			
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1	#			
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1	#			
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2	#			
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	#			
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	UD 5				
# ISO17025 accredited. M mCERTS accredited. aq. Aqueous / settled sample. dis.filt. Dissolved / filtered sample. tot.unfilt. Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*% Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	. Ground Water (GW) 11/10/2022 . 12/10/2022 221012-29 27002358				
Component	LOD/Units	Method					
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<1	#			
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1	#			
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<1	#			
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<1	#			
Carbazole (aq)	<1 µg/l	TM176	<1	#			
Chrysene (aq)	<1 µg/l	TM176	<1	#			
Dibenzofuran (aq)	<1 µg/l	TM176	<1	#			
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<1	#			
Diethyl phthalate (aq)	<1 µg/l	TM176	<1	#			
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<1	#			
Dimethyl phthalate (aq)	<1 µg/l	TM176	<1	#			
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<5	#			
Fluoranthene (aq)	<1 µg/l	TM176	<1	#			
Fluorene (aq)	<1 µg/l	TM176	<1	#			
Hexachlorobenzene (aq)	<1 µg/l	TM176	<1	#			
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<1	#			
Pentachlorophenol (aq)	<1 µg/l	TM176	<1				
Phenol (aq)	<1 µg/l	TM176	<1				
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<1	#			
Hexachloroethane (aq)	<1 µg/l	TM176	<1	#			
Nitrobenzene (aq)	<1 µg/l	TM176	<1	#			
Naphthalene (aq)	<1 µg/l	TM176	<1	#			
Isophorone (aq)	<1 µg/l	TM176	<1	#			
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<1				
Phenanthrene (aq)	<1 µg/l	TM176	<1	#			
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<1	#			
Pyrene (aq)	<1 µg/l	TM176	<1	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29

Report Number: 665511

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend			Customer Sample Ref.	BH 3/9	NACW 228	NACW 229	UD 1	UD 3	UD 4
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022	Ground Water (GW) 11/10/2022
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM208		118	112	118	113	113	118
Toluene-d8**	%	TM208		102	99.6	102	101	100	100
4-Bromofluorobenzene**	%	TM208		93.8	99.2	98.7	95.4	93.3	93.8
Dichlorodifluoromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Vinyl chloride	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromomethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Trichlorofluoromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbon disulphide	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dichloromethane	<3 µg/l	TM208		<6 #	<5 #	<7 #	<5 #	<5 #	<6 #
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
trans-1,2-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,2-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,2-Dichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloroform	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1-Trichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbontetrachloride	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Trichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibromomethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromodichloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,3-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Toluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
trans-1,3-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,2-Trichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	BH 3/9	NACW 228	NACW 229	UD 1	UD 3	UD 4
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4**@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 221012-29 27002352	Ground Water (GW) 11/10/2022 221012-29 27002353	Ground Water (GW) 11/10/2022 221012-29 27002354	Ground Water (GW) 11/10/2022 221012-29 27002355	Ground Water (GW) 11/10/2022 221012-29 27002356	Ground Water (GW) 11/10/2022 221012-29 27002357
Tetrachloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromoethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
m,p-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
o-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Styrene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromofom	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Isopropylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Propylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
sec-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-iso-Propyltoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,4-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29

Report Number: 665511

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend		Customer Sample Ref.	UD 5				
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 12/10/2022 221012-29 27002358				
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM208	113				
Toluene-d8**	%	TM208	102				
4-Bromofluorobenzene**	%	TM208	100				
Dichlorodifluoromethane	<1 µg/l	TM208	<1	#			
Chloromethane	<1 µg/l	TM208	<1	#			
Vinyl chloride	<1 µg/l	TM208	<1	#			
Bromomethane	<1 µg/l	TM208	<1	#			
Chloroethane	<1 µg/l	TM208	<1	#			
Trichlorofluoromethane	<1 µg/l	TM208	<1	#			
1,1-Dichloroethene	<1 µg/l	TM208	<1	#			
Carbon disulphide	<1 µg/l	TM208	<1	#			
Dichloromethane	<3 µg/l	TM208	<6	#			
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	#			
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	#			
1,1-Dichloroethane	<1 µg/l	TM208	<1	#			
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	#			
2,2-Dichloropropane	<1 µg/l	TM208	<1				
Bromochloromethane	<1 µg/l	TM208	<1	#			
Chloroform	<1 µg/l	TM208	<1	#			
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	#			
1,1-Dichloropropene	<1 µg/l	TM208	<1	#			
Carbontetrachloride	<1 µg/l	TM208	<1	#			
1,2-Dichloroethane	<1 µg/l	TM208	<1	#			
Benzene	<1 µg/l	TM208	<1	#			
Trichloroethene	<1 µg/l	TM208	<1	#			
1,2-Dichloropropane	<1 µg/l	TM208	<1	#			
Dibromomethane	<1 µg/l	TM208	<1	#			
Bromodichloromethane	<1 µg/l	TM208	<1	#			
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	#			
Toluene	<1 µg/l	TM208	<1	#			
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	#			
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	#			
1,3-Dichloropropane	<1 µg/l	TM208	<1	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-29
Client Ref.:

Report Number: 665511
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	UD 5				
# ISO17025 accredited. M mCERTS accredited. sq. Aqueous / settled sample. dis.filt. Dissolved / filtered sample. tot.unfilt. Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery. (F) Trigger breach confirmed 1-4-9@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	. Ground Water (GW) 11/10/2022 . 12/10/2022 221012-29 27002358				
Component	LOD/Units	Method					
Tetrachloroethene	<1 µg/l	TM208	<1	#			
Dibromochloromethane	<1 µg/l	TM208	<1	#			
1,2-Dibromoethane	<1 µg/l	TM208	<1	#			
Chlorobenzene	<1 µg/l	TM208	<1	#			
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	#			
Ethylbenzene	<1 µg/l	TM208	<1	#			
m,p-Xylene	<1 µg/l	TM208	<1	#			
o-Xylene	<1 µg/l	TM208	<1	#			
Styrene	<1 µg/l	TM208	<1	#			
Bromofom	<1 µg/l	TM208	<1	#			
Isopropylbenzene	<1 µg/l	TM208	<1	#			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	#			
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	#			
Bromobenzene	<1 µg/l	TM208	<1	#			
Propylbenzene	<1 µg/l	TM208	<1	#			
2-Chlorotoluene	<1 µg/l	TM208	<1	#			
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	#			
4-Chlorotoluene	<1 µg/l	TM208	<1	#			
tert-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	#			
sec-Butylbenzene	<1 µg/l	TM208	<1	#			
4-iso-Propyltoluene	<1 µg/l	TM208	<1	#			
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	#			
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	#			
n-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	#			
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1				
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	#			
Hexachlorobutadiene	<1 µg/l	TM208	<1	#			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	#			
Naphthalene	<1 µg/l	TM208	<1	#			
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	#			
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1				



CERTIFICATE OF ANALYSIS

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SDG: 221012-29
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Report Number: 665511
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Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

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SDG: 221012-29
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Report Number: 665511
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Superseded Report:

Test Completion Dates

Lab Sample No(s)	27002352	27002353	27002354	27002355	27002356	27002357	27002358
Customer Sample Ref.	BH 3/9	NACW 228	NACW 229	UD 1	UD 3	UD 4	UD 5
AGS Ref.							
Depth							
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Acid Herbicides by GCMS	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022
Alkalinity as CaCO ₃	19-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022
Ammoniacal Nitrogen	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022
Anions by Kone (w)	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022
Dissolved Metals by ICP-MS	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022
Nitrite by Kone (w)	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	14-Oct-2022	15-Oct-2022
pH Value	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022
SVOC MS (W) - Aqueous	17-Oct-2022	17-Oct-2022	18-Oct-2022	17-Oct-2022	14-Oct-2022	17-Oct-2022	14-Oct-2022
VOC MS (W)	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022



CERTIFICATE OF ANALYSIS

SDG: 221012-29
Client Ref:

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Location: Nantycaws Landfill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



CWM Environmental Ltd
Nantyclaws Landfill Site
Llanddarg Road
Carmarthen
Carmarthenshire
SA32 8BG

Attention: Darren Sanders

CERTIFICATE OF ANALYSIS

Date of report Generation: 21 October 2022
Customer: CWM Environmental Ltd
Sample Delivery Group (SDG): 221012-31
Your Reference:
Location: Nantyclaws Landfill
Report No: 665512
Order Number: POR 009510

We received 12 samples on Wednesday October 12, 2022 and 12 of these samples were scheduled for analysis which was completed on Friday October 21, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27002496	BH 3/2			11/10/2022
27002497	BH 3/3			11/10/2022
27002498	BH 3/4			11/10/2022
27002499	BH 3/5			11/10/2022
27002500	BH 3/6			11/10/2022
27002501	BH 3/8			11/10/2022
27002492	BH 208			11/10/2022
27002493	BH 5/02			11/10/2022
27002490	NACW 203			11/10/2022
27002491	NACW 205			11/10/2022
27002494	NACW 212			11/10/2022
27002495	NACW 219			11/10/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31

Report Number: 665512

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Acid Herbicides by GCMS

All

NDPs: 0
 Tests: 12

X

X

X

Alkalinity as CaCO3

All

NDPs: 0
 Tests: 12

X

X

X

Ammoniacal Nitrogen

All

NDPs: 0
 Tests: 12

X

X

X

Anions by Kone (w)

All

NDPs: 0
 Tests: 12

X

X

X

Dissolved Metals by ICP-MS

All

NDPs: 0
 Tests: 12

X

X

X

Nitrite by Kone (w)

All

NDPs: 0
 Tests: 12

X

X

X

X

pH Value

All

NDPs: 0
 Tests: 12

X

X

X

SVOC MS (W) - Aqueous

All

NDPs: 0
 Tests: 12

X

X

X

VOC MS (W)

All

NDPs: 0
 Tests: 12

X

X

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

Results Legend			Customer Sample Ref.	BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002496		Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002497	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002498	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002499	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002500	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002501	
Component	LOD/Units	Method							
Alkalinity, Total as CaCO3	<2 mg/l	TM043		68.7	135	175	130	70	95
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cadmium (diss.filt)	<0.08 µg/l	TM152		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Chromium (diss.filt)	<1 µg/l	TM152		<1	<1	<1	<1	<1	<1
Copper (diss.filt)	<0.3 µg/l	TM152		4.32	0.498	6.91	1.16	3.18	0.548
Lead (diss.filt)	<0.2 µg/l	TM152		<0.2	<0.2	<0.2	0.7	<0.2	<0.2
Manganese (diss.filt)	<3 µg/l	TM152		4.64	13.4	68.9	3.64	<3	<3
Nickel (diss.filt)	<0.4 µg/l	TM152	0.784	<0.4	4.78	0.455	0.629	<0.4	
Zinc (diss.filt)	<1 µg/l	TM152	3.43	1.18	1.4	2.68	1.71	1.18	
Sodium (Dis.Filt)	<0.076 mg/l	TM152	3.36	10.7	19.5	11.1	4.27	8.77	
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	2.09	5.59	11.4	5.33	3.12	1.71	
Potassium (Dis.Filt)	<0.2 mg/l	TM152	4.93	1.1	15.5	0.769	0.599	0.307	
Calcium (Dis.Filt)	<0.2 mg/l	TM152	27.3	59.3	84.4	62.8	27	38.5	
Iron (Dis.Filt)	<0.019 mg/l	TM152	<0.019	<0.019	<0.019	<0.019	0.0216	<0.019	
Nitrite as NO2	<0.05 mg/l	TM184	0.062	<0.05	<0.05	<0.05	<0.05	<0.05	
Sulphate	<2 mg/l	TM184	<2	29.3	53	46.3	<2	5.9	
Chloride	<2 mg/l	TM184	8.9	14.4	64.6	16.9	10.9	13.1	
Nitrate as NO3	<0.3 mg/l	TM184	4.27	9.66	<0.3	1.74	<0.3	3.6	
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	0.984	2.18	<0.1	0.394	<0.1	0.812	
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.166	0.346	0.565	0.352	0.163	0.223	
Dinitro-o-cresol	<0.1 µg/l	TM411	<0.1	<0.2	0.193	0.181	<0.1	<0.2	
Clopyralid	<0.04 µg/l	TM411	<0.1	<0.2	0.22	1.77	0.137	0.248	
MCPA	<0.05 µg/l	TM411	<0.05	<0.1	<0.05	0.0594	<0.05	<0.1	
Mecoprop	<0.04 µg/l	TM411	<0.04	<0.08	<0.04	<0.04	<0.04	<0.08	
Dicamba	<0.04 µg/l	TM411	<0.04	<0.08	<0.04	<0.04	<0.04	<0.08	
MCPB	<0.05 µg/l	TM411	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	
2,4-DB	<0.1 µg/l	TM411	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2	
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	
Dichlorprop	<0.1 µg/l	TM411	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2	
Triclopyr	<0.05 µg/l	TM411	<0.05	0.139	0.395	1.78	0.197	0.453	
Fenoprop (Silvex)	<0.1 µg/l	TM411	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2	
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	



Superseded Report:

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CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

Results Legend			Customer Sample Ref.		BH 208	BH 5/02	NACW 203	NACW 205	NACW 212	NACW 219
# ISO17025 accredited.			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
M mCERTS accredited.					11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022
aq Aqueous / settled sample.										
diss.filt Dissolved / filtered sample.										
tot.unfilt Total / unfiltered sample.										
* Subcontracted - refer to subcontractor report for accreditation status.					12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery					221012-31	221012-31	221012-31	221012-31	221012-31	221012-31
(F) Trigger breach confirmed					27002492	27002493	27002490	27002491	27002494	27002495
1-4*5@ Sample deviation (see appendix)										
Component	LOD/Units	Method								
Alkalinity, Total as CaCO3	<2 mg/l	TM043			75	225	180	215	138	195
					#	#	#	#	#	#
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099			<0.2	<0.2	<0.2	<0.2	<0.2	0.249
					#	#	#	#	#	#
Cadmium (diss.filt)	<0.08 µg/l	TM152			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
					#	#	#	#	#	#
Chromium (diss.filt)	<1 µg/l	TM152			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Copper (diss.filt)	<0.3 µg/l	TM152			1.38	0.601	<0.3	0.735	4.18	0.612
					#	#	#	#	#	#
Lead (diss.filt)	<0.2 µg/l	TM152			0.229	<0.2	<0.2	<0.2	<0.2	<0.2
					#	#	#	#	#	#
Manganese (diss.filt)	<3 µg/l	TM152			<3	<3	<3	<3	<3	993
					#	#	#	#	#	#
Nickel (diss.filt)	<0.4 µg/l	TM152			<0.4	<0.4	<0.4	<0.4	0.856	1.46
					#	#	#	#	#	#
Zinc (diss.filt)	<1 µg/l	TM152			3.28	3.93	<1	4.15	8.02	5.86
					#	#	#	#	#	#
Sodium (Dis.Filt)	<0.076 mg/l	TM152			4.55	11.5	11.6	11.4	11.8	13.8
					#	#	#	#	#	#
Magnesium (Dis.Filt)	<0.036 mg/l	TM152			2.82	8.43	8.74	8.55	5.36	6.67
					#	#	#	#	#	#
Potassium (Dis.Filt)	<0.2 mg/l	TM152			3.84	1.32	1.14	1.11	5.64	1.21
					#	#	#	#	#	#
Calcium (Dis.Filt)	<0.2 mg/l	TM152			26.6	87	72.4	103	67.5	87.7
					#	#	#	#	#	#
Iron (Dis.Filt)	<0.019 mg/l	TM152			<0.019	<0.019	<0.019	<0.019	<0.019	0.205
					#	#	#	#	#	#
Nitrite as NO2	<0.05 mg/l	TM184			<0.05	0.1	<0.05	<0.05	<0.05	<0.05
					#	#	#	#	#	#
Sulphate	<2 mg/l	TM184			<2	13.3	13.2	12.6	40.3	41.5
					#	#	#	#	#	#
Chloride	<2 mg/l	TM184			10.4	23	34.5	36.7	24.7	27
					#	#	#	#	#	#
Nitrate as NO3	<0.3 mg/l	TM184			7.38	8.61	8.08	11.2	5.81	1.44
					#	#	#	#	#	#
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184			1.67	1.97	1.82	2.53	1.31	0.325
					#	#	#	#	#	#
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256			0.177	0.473	0.427	0.542	0.393	0.479
					#	#	#	#	#	#
Dinitro-o-cresol	<0.1 µg/l	TM411			<0.1	0.134	<0.1	<0.1	0.169	<0.1
Clopyralid	<0.04 µg/l	TM411			<0.04	<0.1	0.198	<0.1	0.193	<0.04
MCPA	<0.05 µg/l	TM411			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mecoprop	<0.04 µg/l	TM411			<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Dicamba	<0.04 µg/l	TM411			<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
MCPB	<0.05 µg/l	TM411			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2,4-DB	<0.1 µg/l	TM411			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,3,6-Trichlorobenzoic acid	<0.05 µg/l	TM411			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichloroprop	<0.1 µg/l	TM411			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Triclopyr	<0.05 µg/l	TM411			0.0515	<0.05	0.172	<0.05	0.142	<0.05
Fenoprop (Silvex)	<0.1 µg/l	TM411			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dichlorophenoxyacetic acid	<0.05 µg/l	TM411			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2,4,5-Trichlorophenoxyacetic acid	<0.05 µg/l	TM411			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05



Superseded Report:

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CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31

Report Number: 665512

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.		BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8
# ISO17025 accredited.	M mCERTS accredited.	aq Aqueous / settled sample.	Depth (m)	Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
diss.filter Dissolved / filtered sample.		tot.unfilt Total / unfiltered sample.	Date Sampled	Date Received	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022
* Subcontracted - refer to subcontractor report for accreditation status.			Sample Time	SDG Ref	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			Date Received	221012-31	221012-31	221012-31	221012-31	221012-31	221012-31	221012-31
(F) Trigger breach confirmed			Lab Sample No.(s)	27002496	27002497	27002498	27002499	27002500	27002501	27002501
1-4*§ Sample deviation (see appendix)			AGS Reference							
Component	LOD/Units	Method								
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2,4-Dichlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2,4-Dimethylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2-Chloronaphthalene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2-Chlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2-Methylnaphthalene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2-Methylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2-Nitroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2-Nitrophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
3-Nitroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
4-Bromophenylphenylether (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
4-Chloroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
4-Methylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
4-Nitroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
4-Nitrophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
Azobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Acenaphthylene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Acenaphthene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Anthracene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176			<2	<2	<2	<2	<2	<2
					#	#	#	#	#	#
Butylbenzyl phthalate (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Benzo(a)anthracene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4**@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 221012-31 27002496	Ground Water (GW) 11/10/2022 221012-31 27002497	Ground Water (GW) 11/10/2022 221012-31 27002498	Ground Water (GW) 11/10/2022 221012-31 27002499	Ground Water (GW) 11/10/2022 221012-31 27002500	Ground Water (GW) 11/10/2022 221012-31 27002501
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbazole (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chrysene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibenzofuran (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Diethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dimethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<5 #	<5 #	<5 #	<5 #	<5 #	<5 #
Fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Fluorene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Pentachlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachloroethane (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Nitrobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Isophorone (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenanthrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31

Report Number: 665512

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.		BH 208	BH 5/02	NACW 203	NACW 205	NACW 212	NACW 219
# ISO17025 accredited.	M mCERTS accredited.	aq Aqueous / settled sample.	Depth (m)	Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
diss.filter Dissolved / filtered sample.		tot.unfilt Total / unfiltered sample.	Date Sampled	Sample Time	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022
* Subcontracted - refer to subcontractor report for accreditation status.			Date Received	SDG Ref	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			Lab Sample No.(s)	AGS Reference	221012-31	221012-31	221012-31	221012-31	221012-31	221012-31
(F) Trigger breach confirmed					27002492	27002493	27002490	27002491	27002494	27002495
1-4*§ Sample deviation (see appendix)										
Component	LOD/Units	Method								
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Chlorophenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Methylphenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Nitroaniline (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
2-Nitrophenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
3-Nitroaniline (aq)	<1 µg/l	TM176	<1		<1		<1		<1	
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
4-Chloroaniline (aq)	<1 µg/l	TM176	<1		<1		<1		<1	
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
4-Methylphenol (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
4-Nitroaniline (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
4-Nitrophenol (aq)	<1 µg/l	TM176	<1		<1		<1		<1	
Azobenzene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
Acenaphthylene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
Acenaphthene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
Anthracene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2	#	<2	#	<2	#	<2	#
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1	#	<1	#	<1	#	<1	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	BH 208	BH 5/02	NACW 203	NACW 205	NACW 212	NACW 219
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4+5@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 221012-31 27002492	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002493	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002490	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002491	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002494	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002495
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(a)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbazole (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chrysene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibenzofuran (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Dibutyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Diethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dimethyl phthalate (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Dioctyl phthalate (aq)	<5 µg/l	TM176		<5 #	<5 #	<5 #	<5 #	<5 #	<5 #
Fluoranthene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Fluorene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Pentachlorophenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenol (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachloroethane (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Nitrobenzene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Isophorone (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176		<1	<1	<1	<1	<1	<1
Phenanthrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Pyrene (aq)	<1 µg/l	TM176		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31

Report Number: 665512

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend			Customer Sample Ref.	BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8
# ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002496	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002497	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002498	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002499	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002500	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002501	
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM208	115	115	110	112	113	113	
Toluene-d8**	%	TM208	102	102	101	101	102	100	
4-Bromofluorobenzene**	%	TM208	97.9	95.8	93.8	98.4	98.2	96.8	
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Chloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Vinyl chloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Bromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Chloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Carbon disulphide	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Dichloromethane	<3 µg/l	TM208	<5	<5.5	<5	<4.5	<4.5	<6	
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Bromochloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Chloroform	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Carbontetrachloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,2-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Benzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Trichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Dibromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Bromodichloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
Toluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	
1,3-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4**@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 221012-31 27002496	Ground Water (GW) 11/10/2022 221012-31 27002497	Ground Water (GW) 11/10/2022 221012-31 27002498	Ground Water (GW) 11/10/2022 221012-31 27002499	Ground Water (GW) 11/10/2022 221012-31 27002500	Ground Water (GW) 11/10/2022 221012-31 27002501
Tetrachloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromoethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
m,p-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
o-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Styrene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromofom	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Isopropylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Propylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
sec-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-iso-Propyltoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,4-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31

Report Number: 665512

Superseded Report:

Client Ref.:

Location: Nantycaws Landfill

VOC MS (W)

Results Legend			Customer Sample Ref.		BH 208	BH 5/02	NACW 203	NACW 205	NACW 212	NACW 219
# ISO17025 accredited. M mCERES accredited. aq Aqueous / settled sample. diss.fltr Dissolved / filtered sample. tot.unfltr Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002492	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002493	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002490	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002491	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002494	Ground Water (GW) 11/10/2022 12/10/2022 221012-31 27002495
Component	LOD/Units	Method								
Dibromofluoromethane**	%	TM208	114	112	116	113	113	113	113	113
Toluene-d8**	%	TM208	100	101	100	103	99.9	103	103	103
4-Bromofluorobenzene**	%	TM208	95.6	94.6	94	96	92.8	97.3	97.3	97.3
Dichlorodifluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Vinyl chloride	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Trichlorofluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbon disulphide	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dichloromethane	<3 µg/l	TM208	<5.5 #	<6 #	<4.5 #	<4 #	<5.5 #	<5 #	<5 #	<5 #
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chloroform	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Carbontetrachloride	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Trichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromodichloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Toluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,2-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	BH 208	BH 5/02	NACW 203	NACW 205	NACW 212	NACW 219
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / settled sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4**@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Ground Water (GW) 11/10/2022 221012-31 27002492	Ground Water (GW) 11/10/2022 221012-31 27002493	Ground Water (GW) 11/10/2022 221012-31 27002490	Ground Water (GW) 11/10/2022 221012-31 27002491	Ground Water (GW) 11/10/2022 221012-31 27002494	Ground Water (GW) 11/10/2022 221012-31 27002495
Tetrachloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Dibromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromoethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Chlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
m,p-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
o-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Styrene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromofom	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Isopropylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Bromobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Propylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
2-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-Chlorotoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trimethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
sec-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
4-iso-Propyltoluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,4-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
n-Butylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Hexachlorobutadiene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Naphthalene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 221012-31
Client Ref.:

Report Number: 665512
Location: Nantycaws Landfill

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM411	Acid_Herbs_GCMS	Acid Herbs in Water by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

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Superseded Report:

Test Completion Dates

Lab Sample No(s)	27002492	27002496	27002497	27002498	27002499	27002500	27002501	27002493	27002490	27002491
Customer Sample Ref.	BH 208	BH 3/2	BH 3/3	BH 3/4	BH 3/5	BH 3/6	BH 3/8	BH 5/02	NACW 203	NACW 205
AGS Ref.										
Depth										
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Acid Herbicides by GCMS	21-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	21-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022
Alkalinity as CaCO ₃	19-Oct-2022	19-Oct-2022	18-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022
Ammoniacal Nitrogen	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022	13-Oct-2022
Anions by Kone (w)	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022	18-Oct-2022
Dissolved Metals by ICP-MS	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022	19-Oct-2022
Nitrite by Kone (w)	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022	15-Oct-2022
pH Value	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022	17-Oct-2022
SVOC MS (W) - Aqueous	17-Oct-2022	17-Oct-2022	19-Oct-2022	17-Oct-2022	18-Oct-2022	17-Oct-2022	19-Oct-2022	18-Oct-2022	19-Oct-2022	19-Oct-2022
VOC MS (W)	14-Oct-2022	14-Oct-2022	14-Oct-2022	18-Oct-2022	14-Oct-2022	14-Oct-2022	18-Oct-2022	18-Oct-2022	14-Oct-2022	14-Oct-2022

Lab Sample No(s)	27002494	27002495
Customer Sample Ref.	NACW 212	NACW 219
AGS Ref.		
Depth		
Type	Ground Water	Ground Water
Acid Herbicides by GCMS	17-Oct-2022	21-Oct-2022
Alkalinity as CaCO ₃	18-Oct-2022	19-Oct-2022
Ammoniacal Nitrogen	13-Oct-2022	13-Oct-2022
Anions by Kone (w)	18-Oct-2022	18-Oct-2022
Dissolved Metals by ICP-MS	19-Oct-2022	19-Oct-2022
Nitrite by Kone (w)	14-Oct-2022	15-Oct-2022
pH Value	17-Oct-2022	17-Oct-2022
SVOC MS (W) - Aqueous	17-Oct-2022	18-Oct-2022
VOC MS (W)	14-Oct-2022	14-Oct-2022



CERTIFICATE OF ANALYSIS

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Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix D

LIMITATIONS



REPORT LIMITATIONS - GROUND AND WATER

GENERAL

1. WSP UK Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.
2. Unless explicitly agreed otherwise, in writing, this report has been prepared under WSP UK Limited standard Terms and Conditions as included within our proposal to the Client.
3. Project specific appointment documents may be agreed at our discretion and a charge may be levied for both the time to review and finalise appointments documents and also for associated changes to the appointment terms. WSP UK Limited reserves the right to amend the fee should any changes to the appointment terms create an increase risk to WSP UK Limited.
4. The report needs to be considered in the light of the WSP UK Limited proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

PHASE 1 GEO ENVIRONMENTAL AND PRELIMINARY RISK ASSESSMENTS

Coverage: *This section covers reports with the following titles or combination of titles: phase 1; desk top study; geo environmental assessment; development appraisal; preliminary environmental risk assessment; constraints report; due diligence report; geotechnical development review; environmental statement; environmental chapter; project scope summary report (PSSR), program environmental impact report (PEIR), geotechnical development risk register; and, baseline environmental assessment.*

5. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. WSP UK Limited cannot be held responsible for any disclosures that are provided post production of our report and will not automatically update our report.
6. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP UK Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.
7. It should be noted that any risks identified in this report are perceived risks based on the information reviewed. Actual risks can only be assessed following intrusive investigations of the site.
8. WSP UK Limited does not warrant work / data undertaken / provided by others.

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

INTRUSIVE INVESTIGATION REPORTS

Coverage: *The following report titles (or combination) may cover this category of work: geo environmental site investigation; geotechnical assessment; GIR (Ground Investigation reports); preliminary environmental and geotechnical risk assessment; and, geotechnical risk register.*

9. The investigation has been undertaken to provide information concerning either:
 - i. The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or
 - ii. Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.
10. The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.
11. For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.
12. For geotechnical investigations the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.
13. The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.
14. The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.
15. The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, WSP UK Limited has used reasonable skill and care to extrapolate conditions between these points based upon assumptions to develop our interpretation and conclusions. The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation. Conditions can change between investigation points and these interpretations should be considered indicative.
16. The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values. Specific assumptions associated

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

with the WSP UK Limited risk assessment process have been outlined within the body or associated appendix of the report.

17. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.
18. Where soil contamination concentrations recorded as part of this investigation are used for commentary on potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed.
19. The results of the asbestos testing are factually reported and interpretation given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and / or trace loose asbestos fibres within the soil matrix at the site.
20. If costs have been included in relation to additional site works, and / or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

EUROCODE 7: GEOTECHNICAL DESIGN

21. On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.
22. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIAL STRATEGY REPORTS

23. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected on the basis of the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.



REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

- 24. The outputs of the Detailed Quantitative Risk Assessments are based upon WSP UK Limited manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.
- 25. Prior to adoption on site they will need discussing and agreeing with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatory Authority engagement are not within the control of WSP UK Limited. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.

GEOTECHNICAL DESIGN REPORT (GDR)

- 26. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.

MONITORING (INCLUDING REMEDIATION MONITORING REPORTS)

- 27. These reports are factual in nature and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of an earthworks or remedial works.
- 28. The data is presented and will be compared with assessment criteria.



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