

Eve O'Sullivan

Subject: FW: Cootehill Landfill H0020-01 - Unsolicited information
Attachments: appendix 1b. imported soil analysis.pdf; appendix 2a. cootehill to corranure.pdf; appendix 2b. cootehill to scotch corner.pdf; appendix 3 laser methane mini.pdf; validation report cootehill historic landfill.pdf; appendic 1a.excavated material analysis.pdf

From: Brona Keating <bkeating@cavancoco.ie>
Sent: 06 September 2019 13:06
To: Ewa Babiarczyk <E.Babiarczyk@epa.ie>
Subject: Validation Report

Hi Ewa

Attached please find the validation report for Cootehill landfill which will explain what recommendations from the Risk Assessment were actually employed. Apologies for not submitting as part of the original application but I have only just learned of its existence.

Should you require any additional information pleased don't hesitate to contact me.

Best Regards

Bróna Keating
Cavan County Council

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Comhairle Contae an Chabháin
Cavan County Council

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CAVAN COUNTY COUNCIL



COOTEHILL HISTORICAL LANDFILL RESTORATION PROJECT

VALIDATION REPORT

DECEMBER 2016



1. INTRODUCTION:

Cavan County Council have applied to the Environmental Protection Agency for a Certificate of Authorisation in respect of Cotehill Historical Landfill, Pottleboy, Cotehill, Co. Cavan under the Waste Management (Certification of historic unlicensed waste disposal and recovery activity) Regulations 2008. This has been given the reference H0020-01 by the Agency.

The site itself is located on Pottleboy, Cotehill, Co.Cavan.

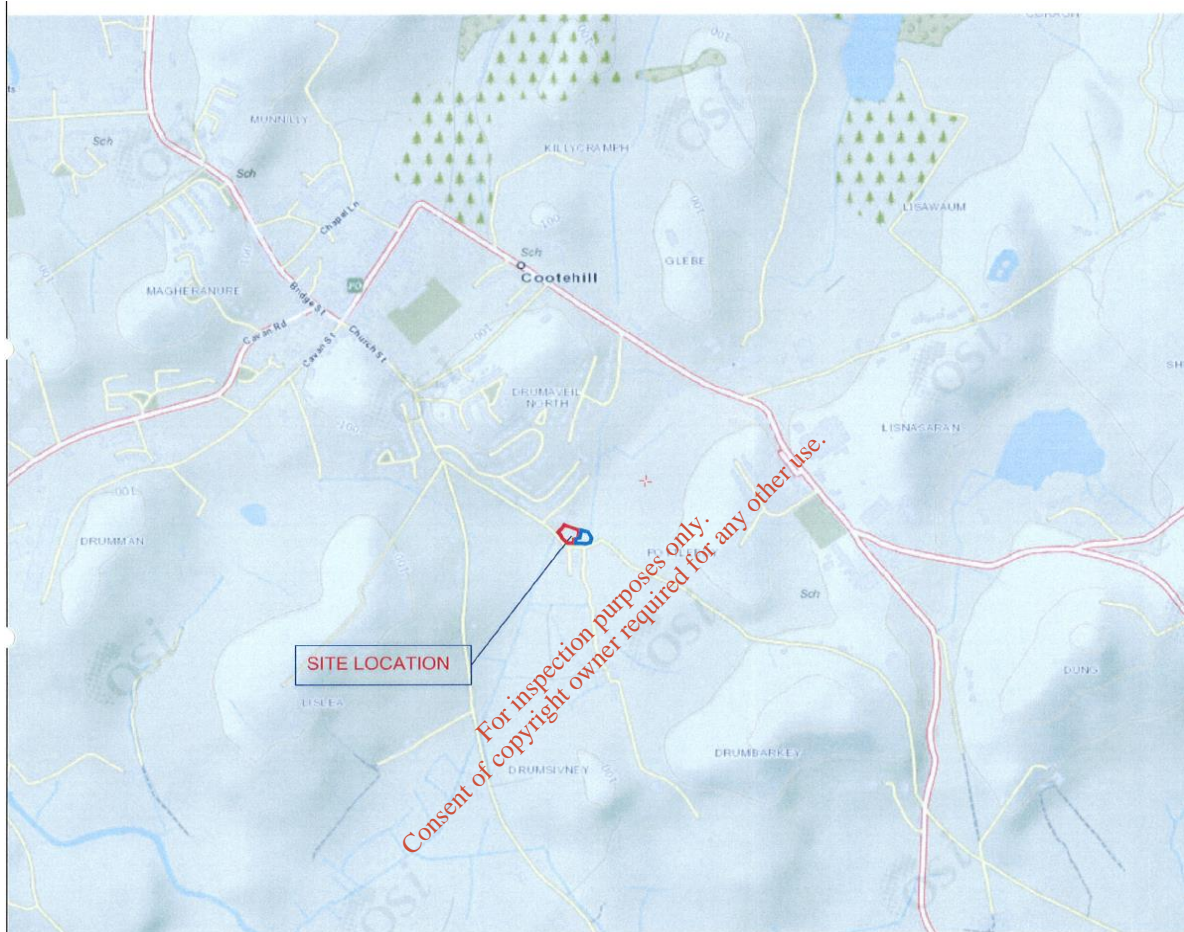


Figure 1 Site Location

The adjacent land use is a local roadway, a housing estate to the north of the site, a small cluster of housing to the south of the site and agricultural land to the west of the site and to the east of the site.

Cavan County Council and Traynor Environmental Ltd carried out a Tier 1 and Tier 2 Environmental Risk Assessment in early 2014. Following on from these a full Tier 3 Risk Assessment was undertaken in December 2014. This Tier 3 Assessment in addition to the earlier reports form the basis on which the remediation works were carried out.

Work commenced in July 2015 on the remediation of the Cotehill Historical Landfill Co. Cavan. This report details how this work was carried out in compliance with the recommendations of the Tier 3 Assessment. It should be read in conjunction with the Tier 3 Traynor report document.

2. SITE PREPARATION:

The initial preparation of the site comprised of securing the access points as a construction site. Safety fencing was erected where required and both on-site and off-site safety signage was erected. A full risk assessment was carried out by the contractor EMCA Ltd. and a safety file prepared and retained on site.

Further site clearance works included clearing bushes and shrubs from the site and preparing a safe access point at the south east corner of the site.

3. REMEDIATION WORKS:

The Traynor Tier 3 report recommends the following remediation measure:

'Following consideration of the positive and negative effects from the complete removal of the waste material, the Waste Management Section of Cavan County Council in conjunction with Traynor Environmental Ltd would recommend the complete dig out and removal of waste from Cootehill historic landfill. The site specific characteristics of Cootehill landfill and monitoring results from the tier 2 and tier 3 risk assessments indicate that, the small site area (0.18 ha), estimated volume of waste encountered, very low levels of landfill gas recorded, would justify the complete removal of the waste material from the site. This is considered to be the most appropriate remediation technique being mindful of cost considerations and environmental impact.

Based on a logistical programme, cost considerations and landfill gas levels/and concentrations, the removal of all of the historic waste, presents the most viable remedial option for the site.

The regrading of the site is vital to the overall remediation of the site and the potential re-use of the site by the local community. This re-grading will take place after remediation option 3.3.5 Removal of the Waste Material has been complete. The final contour plan for the site, prior to re-grading of the landform will be agreed with the Environmental Protection Agency (EPA)/Local Authority.

Subject to remediation measures being carried out, the risk rating for Cootehill Historic Landfill would be reduced from a Moderate Risk to a **Low Risk** site as all of the SPR linkages would have been broken. The SPR linkage diagrams for each option have been detailed under each section.

Taking into consideration the future costs of monitoring, maintenance and venting of landfill gas the removal of waste from the site represents a complete and comprehensive remediation option for the site.

The Traynor report has identified the nature and extent of the waste as follows:

Waste was encountered in 19 of the 25 trial holes excavated TH1, TH2, TH3, TH5, TH6, TH7, TH8, TH9, TH10, TH11, TH12, TH13, TH14, TH15, TH22, TH23, TH24, and TH25 as per drawing no. 14.248.115 trial Hole Locations in Appendix F of the Tier 2 Risk Assessment. There was no waste encountered in Trial Holes TH16, Th17, TH18, TH19, TH20, and TH21. The main body of waste is located at the centre of the Cavan County Council site which is elevated and sloping towards all the boundaries. The waste extends from the westerly boundary (TH1 & TH2) to the top of the slope (TH14 and TH15) in an easterly direction. Negligible quantities of waste were found outside this area. From soil sample results analysis it has been determined that trace amounts of hazardous

waste in the form of asbestos were found in TH10. The hazardous waste was deemed to be Chrysotile (white asbestos), a trace amount of 1 – 2 fibres.

The lateral extent of the waste is shown in Figure No 8 (repeated below) and covers an area of approximately 1700 m². From analysis of the vertical and lateral extent of the waste, using an average of 2.2 m of waste and a conversion factor of 1.0 it has been estimated that approximately 3740 tonnes of waste intermixed with clay, is deposited on the site. This area is hatched in red where the majority of waste is encountered. All areas hatched in green contained no historical waste.

From the trial hole investigation carried out it has been established that the waste material was intermixed with clay. The waste to clay ratio in the trial holes which contained waste, ranged from 15:85 in TH 6 to 95:5 in TH8.

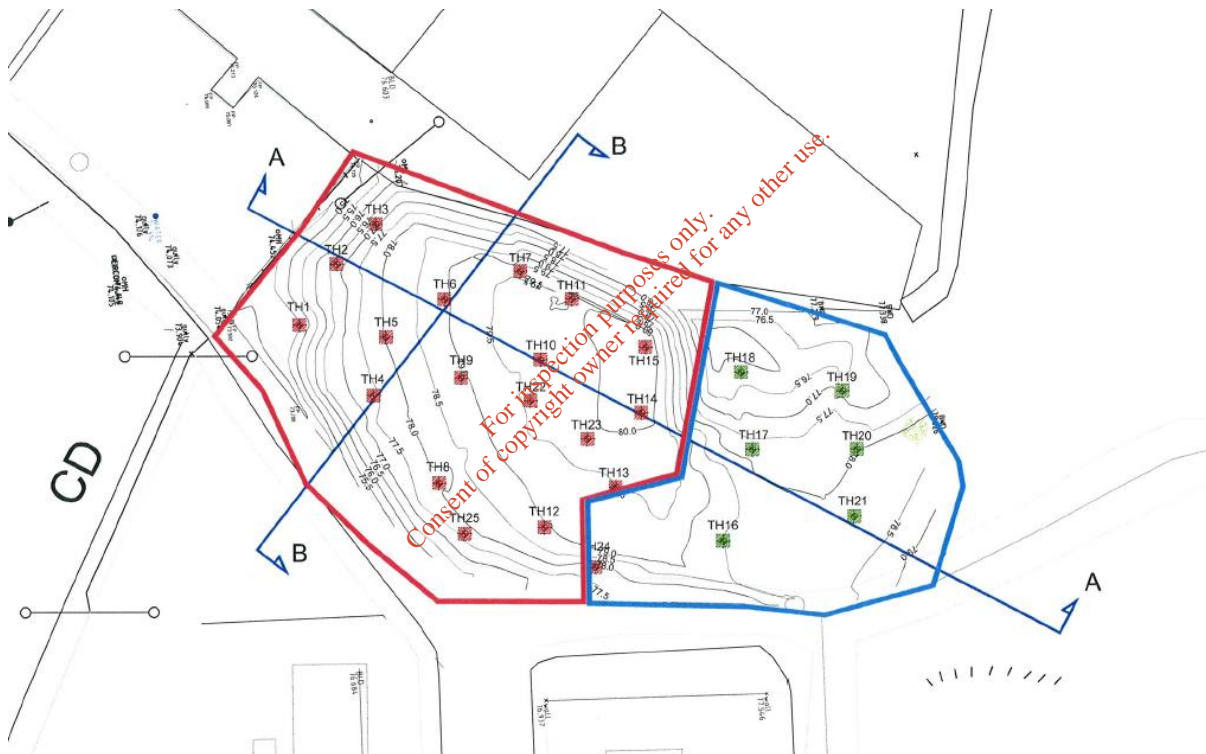


Figure 2. Trial Hole Locations.

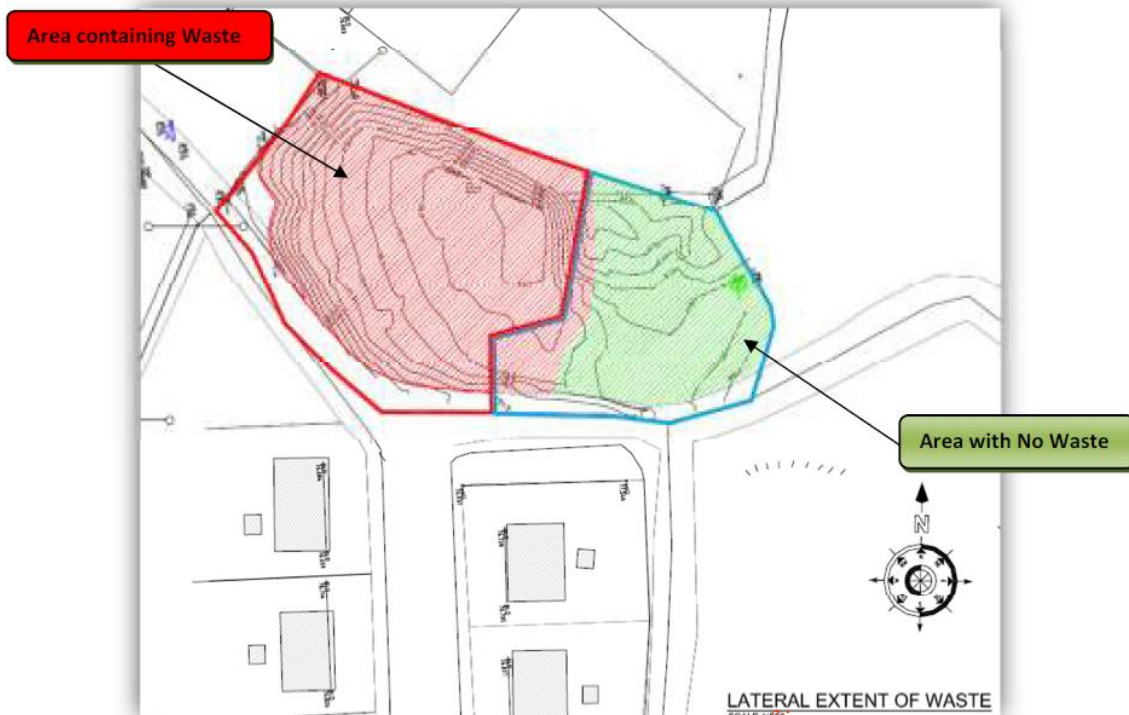


Figure 3 Extent of the Waste:

Based on the lateral extent of the waste detailed in the above drawing it was determined that the extent was 1700 m² with an average depth of 2.2 m of waste. Using a conversion factor of 1.0 the Traynor Report estimated that there was approximately 3740 tonnes of waste intermixed with clay deposited at the site.

Following a discussion of the remediation options it was decided by Cavan County Council to proceed with the preferred option as set out in the Traynor Report namely the complete dig out and removal of the waste. All excavated material would be screened and the recovered soil used as remediation material at Corranure Landfill EPA Licence W077-04 while any waste materials would be disposed of at Scotch Corner landfill Co. Monaghan EPA Licence W0020-02.

4. WORKS:

Phase 1 works comprised the securing of the site and the establishment of a grading and profiling of the site to ensure suitability for lining works. As per the Tier 3 Traynor report the contractor submitted a project (Construction Environmental Management Plan (CEMP) which addressed the issues such as wheel wash, refuelling, oil storage and waste management. Enviroguide Consulting carried out spot checks to ensure that the CEMP was being adhered to at all times.

A Powerscreen Trommel with 30mm mesh was located on site and all material excavated from the site was screened using this machine. The soil material was stockpiled for sampling and the waste was loaded into a closed contained (20 cubic yard skip) for transport to Scotch Corner landfill.

There were three stockpiles of soil on site following the bulk of the excavation and these were sampled and analysed for suitability to send to Corranure Landfill for remediation works. The Waste Acceptance Criteria (WAC) testing of this soil confirmed that it was suitable for this purpose.

Following the excavation additional soil was imported on to the site from a local greenfield site for the purposes of site remediation. This material was analysed for suitability and deemed suitable.



Photograph 1 Screening equipment used on site

Excavation works commenced in early August 2015 and were completed by mid-September 2015.

As previously stated all excavated material was screened and waste, metal and plastic material removed. The remaining material (soil) was classified following a visual inspection and Waste Acceptance Criteria (WAC) test as 17 05 04 – soil and stones and deemed acceptable to send to Corranure Landfill for remediation works.

The following quantities of materials were excavated from the site in total:

Soil and stones 17 05 04 - sent to Corranure Landfill (W077-04) 5821.17 tonnes.

Mixed Waste 20 03 01– sent to Scotch Corner Landfill (W022-02) 92.06 tonnes

Mixed Metals 20 01 40 – sent to Wilton Waste Recycling (WFP-CN-10-005-01) 90 tonnes.

This gives a total tonnage excavated from the site of 6003.23 tonnes.

This is in excess of the quantity estimated in the Traynor Report however this is due to the nature of the material which was considerably more soil than was originally estimated. If the factor of 1.5 (for clean soil) rather than 1.0 is applied to the 1700 square metres at 2.3 metres depth (slightly deeper than recommended by the Traynor report) then a total estimated tonnage of 5865 is obtained. This is very close in quantity to what was actually excavated from the site.

Once the material was excavated to the depth below that recommended by the Traynor Report namely 2.5 metres, the resulting excavation was backfilled in accordance with the recommendations of the report. A 400 mm layer of subsoil was placed and this was capped with a minimum 300mm of topsoil. In total the following quantities of soils were imported – 350 tonnes subsoil and 450 tonnes of topsoil. In addition approximately 150 tonnes of 3” down stone was used for drainage.

Grass planting was carried out following the completion of the filling works.

Following completion of site works a security fence was constructed around the perimeter of the site.



Photograph 2 Completed site viewed from Cootehill



Photograph 3: Completed site looking towards Cookehill.



Photograph 4 Completed site showing grass, slope of land and fence.

5. MONITORING:

Environmental monitoring was carried out throughout this project. This included odour assessments, landfill gas monitoring using laser methane mini recorder (LMM), soil testing on site and analysis of incoming soil for backfilling.

Odour: Regular odour monitoring was carried out by Enviroguide Consulting during the excavation phase of the project. At no time was offsite odour detected. A Laser Methane Mini was used daily during the excavation phase to test for fugitive methane but none was detected. Following the completion of works a full site walkover using the LMM analyser was carried out on 19th November 2015 and 14th December 2015. No methane readings above 100ppm were detected.

Soil Testing: Soil testing was carried out on the recovered soil to ensure suitability for Corranure. In addition topsoil and subsoil from a local source were tested prior to acceptance onto the site for backfilling. The material was deemed to be of good quality and entirely suitable for this purpose. The analysis of this material is attached in Appendix 1.

6. VALIDATION:

Validation is based on the following (as proposed in the Tier 3 Assessment report):

Landfill gas monitoring was carried out following the works. There was no evidence of landfill gas on site.

Waste management and disposal documents are appended in Appendix 2

Imported soil has been tested and deemed acceptable for use in the remediation works. The analyses were carried out by an approved Laboratory with a Quality Management System that has been designed to meet the requirements of BS EN ISO/IEC 17025 and MCERTS (Soil). The results are appended in Appendix 1

Photographic records are included as part of this report and an archive of additional photographs is maintained.

All works on site were overseen by Enviroguide Consulting who confirm that the works were carried out as proposed in the Tier 3 Assessment.

A final topographical survey will be carried out in due course.

7. SUMMARY:

Remediation works on the Cootehill Historic Landfill at Pottleboy, Co. Cavan were carried out in 2015. These works were carried out in compliance with the recommendations of the Tier 3 Risk Assessment carried out by Traynor Environmental and Cavan County Council. Records in the form of photographs, soil analysis and waste management are presented in this report.

APPENDIX 1

Analysis of excavated soil and imported soil

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APPENDIX 2

Weighbridge Records Scotch Corner Landfill and Corranure Landfill.

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APPENDIX 3

Laser Methane Mini

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Boylan Engineering
Main St
Mullagh
Co. Cavan

Attention: Brona Keating

CERTIFICATE OF ANALYSIS

Date: 29 August 2015
Customer: D_BOYLAN_CAV
Sample Delivery Group (SDG): 150820-94
Your Reference:
Location: Cootehill Landfill
Report No: 327511

We received 3 samples on Wednesday August 19, 2015 and 3 of these samples were scheduled for analysis which was completed on Saturday August 29, 2015. 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.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

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Approved By:

Sonia McWhan
Operations Manager



SDG: 150820-94
Job: D_BOYLAN_CAV-4
Client Reference:

Location: Cootehill Landfill
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 327511
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
11931809	CHL/WAC/001			18/08/2015
11931810	CHL/WAC/002			18/08/2015
11931811	CHL/WAC/003			18/08/2015

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

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SDG: 150820-94
 Job: D_BOYLAN_CAV-4
 Client Reference:

Location: Cootehill Landfill
 Customer: Boylan Engineering
 Attention: Brona Keating

Order Number:
 Report Number: 327511
 Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)	11931809	11931810	11931811	
	Customer Sample Reference	CHL/MAC/001	CHL/MAC/002	CHL/MAC/003	
	AGS Reference				
	Depth (m)				
	Container	250g Amber Jar (AL 1kg TUB 60g VOC (ALE215)	250g Amber Jar (AL 1kg TUB 60g VOC (ALE215)	250g Amber Jar (AL 1kg TUB 60g VOC (ALE215)	
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 3	X	X	X
Anions by Kone (w)	All	NDPs: 0 Tests: 3	X	X	X
CEN Readings	All	NDPs: 0 Tests: 3	X	X	X
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 3	X	X	X
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 3	X	X	X
Fluoride	All	NDPs: 0 Tests: 3	X	X	X
GRO by GC-FID (S)	All	NDPs: 0 Tests: 3	X	X	X
Loss on Ignition in soils	All	NDPs: 0 Tests: 3	X	X	X
Mercury Dissolved	All	NDPs: 0 Tests: 3	X	X	X
Mineral Oil	All	NDPs: 0 Tests: 3	X	X	X
PAH Value of soil	All	NDPs: 0 Tests: 3	X	X	X
PCBs by GCMS	All	NDPs: 0 Tests: 3	X	X	X
pH	All	NDPs: 0 Tests: 3	X	X	X
Phenols by HPLC (W)	All	NDPs: 0 Tests: 3	X	X	X
Sample description	All	NDPs: 0 Tests: 3	X	X	X

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CERTIFICATE OF ANALYSIS

Validated

SDG: 150820-94
Job: D_BOYLAN_CAV-4
Client Reference:

Location: Cootehill Landfill
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 327511
Superseded Report:

SOLID Results Legend <input checked="" type="checkbox"/> Test <input checked="" type="checkbox"/> No Determination Possible	Lab Sample No(s)	11931809	11931810	11931811	
	Customer Sample Reference	CHL/MAC/001	CHL/MAC/002	CHL/MAC/003	
	AGS Reference				
	Depth (m)				
	Container	250g Amber Jar (AL 1kg TUB 60g VOC (ALE215))	250g Amber Jar (AL 1kg TUB 60g VOC (ALE215))	250g Amber Jar (AL 1kg TUB 60g VOC (ALE215))	
Total Dissolved Solids	All	NDPs: 0 Tests: 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total Organic Carbon	All	NDPs: 0 Tests: 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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SDG: 150820-94
 Job: D_BOYLAN_CAV-4
 Client Reference:

Location: Cootehill Landfill
 Customer: Boylan Engineering
 Attention: Brona Keating

Order Number:
 Report Number: 327511
 Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
11931809	CHL/WAC/001		Dark Brown	Sandy Loam	0.1 - 2 mm	Vegetation	Stones
11931810	CHL/WAC/002		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	Vegetation
11931811	CHL/WAC/003		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

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 materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

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CERTIFICATE OF ANALYSIS

SDG: 150820-94
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Client Reference:

Location: Cootehill Landfill
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 327511
Superseded Report:

GRO by GC-FID (S)

Table with columns for Results Legend, Customer Sample R, CHL/WAC/001, CHL/WAC/002, CHL/WAC/003, Component, LOD/Units, Method, and detection results for various compounds like MTBE, Benzene, Toluene, etc.

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SDG: 150820-94
 Job: D_BOYLAN_CAV-4
 Client Reference:

Location: Cootehill Landfill
 Customer: Boylan Engineering
 Attention: Brona Keating

Order Number:
 Report Number: 327511
 Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.114
Mass of dry sample (kg)	0.175
Particle Size <4mm	>95%

Site Location	Cootehill Landfill
Natural Moisture Content (%)	26.6
Dry Matter Content (%)	79

Case	
SDG	150820-94
Lab Sample Number(s)	11931809
Sampled Date	18-Aug-2015
Customer Sample Ref.	CHL/WAC/001
Depth (m)	

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	<6 or >9	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	1.3
Loss on Ignition (%)	5.54
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	19.9
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	7.43
ANC to pH 6 (mol/kg)	0.0362
ANC to pH 4 (mol/kg)	0.0751

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.000681	<0.00012	0.00681	<0.0012	0.5	2	25
Barium	0.00921	<0.00003	0.0921	<0.0003	20	100	300
Cadmium	<0.0001	<0.0001	<0.001	<0.001	0.04	1	5
Chromium	0.00196	<0.00022	0.0196	<0.0022	0.5	10	70
Copper	0.00483	<0.00085	0.0483	<0.0085	2	50	100
Mercury Dissolved (CVAf)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00105	<0.00024	0.0105	<0.0024	0.5	10	30
Nickel	0.00132	<0.00015	0.0132	<0.0015	0.4	10	40
Lead	0.00147	<0.00002	0.0147	<0.0002	0.5	10	50
Antimony	0.000973	<0.00016	0.00973	<0.0016	0.06	0.7	5
Selenium	0.000482	<0.00039	0.00482	<0.0039	0.1	0.5	7
Zinc	0.00233	<0.00041	0.0233	<0.0041	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	49.1	<5	491	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	5.02	<3	50.2	<30	500	800	1000

Leach Test Information

Date Prepared	21-Aug-2015
pH (pH Units)	7.44
Conductivity (µS/cm)	54.50
Temperature (°C)	16.80
Volume Leachant (Litres)	0.876

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

29/08/2015 09:02:29
 09:02:22 29/08/2015

SDG: 150820-94	Location: Cootehill Landfill	Order Number:
Job: D_BOYLAN_CAV-4	Customer: Boylan Engineering	Report Number: 327511
Client Reference:	Attention: Brona Keating	Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		Site Location	Cootehill Landfill
Mass Sample taken (kg)	0.114	Natural Moisture Content (%)	26.6
Mass of dry sample (kg)	0.175	Dry Matter Content (%)	79
Particle Size <4mm	>95%		

Case	
SDG	150820-94
Lab Sample Number(s)	11931810
Sampled Date	18-Aug-2015
Customer Sample Ref.	CHL/WAC/002
Depth (m)	

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	<6 or >9	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	1.1
Loss on Ignition (%)	4.89
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	10.9
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	7.54
ANC to pH 6 (mol/kg)	0.0352
ANC to pH 4 (mol/kg)	0.0642

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.00068	<0.00012	0.0068	<0.0012	0.5	2	25
Barium	0.00828	<0.00003	0.0828	<0.0003	20	100	300
Cadmium	<0.0001	<0.0001	<0.001	<0.001	0.04	1	5
Chromium	0.00197	<0.00022	0.0197	<0.0022	0.5	10	70
Copper	0.0044	<0.00085	0.044	<0.0085	2	50	100
Mercury Dissolved (CVAf)	0.0000106	<0.00001	0.000106	<0.0001	0.01	0.2	2
Molybdenum	0.00141	<0.00024	0.0141	<0.0024	0.5	10	30
Nickel	0.0014	<0.00015	0.014	<0.0015	0.4	10	40
Lead	0.00136	<0.00002	0.0136	<0.0002	0.5	10	50
Antimony	0.0014	<0.00016	0.014	<0.0016	0.06	0.7	5
Selenium	0.000581	<0.00039	0.00581	<0.0039	0.1	0.5	7
Zinc	0.0139	<0.00041	0.139	<0.0041	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	45.5	<5	455	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	4.61	<3	46.1	<30	500	800	1000

Leach Test Information

Date Prepared	21-Aug-2015
pH (pH Units)	7.44
Conductivity (µS/cm)	54.50
Temperature (°C)	19.70
Volume Leachant (Litres)	0.876

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

29/08/2015 09:02:29
 09:02:22 29/08/2015

SDG: 150820-94	Location: Cootehill Landfill	Order Number:
Job: D_BOYLAN_CAV-4	Customer: Boylan Engineering	Report Number: 327511
Client Reference:	Attention: Brona Keating	Superseded Report:

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		Site Location	Cootehill Landfill
Mass Sample taken (kg)	0.106	Natural Moisture Content (%)	17.7
Mass of dry sample (kg)	0.175	Dry Matter Content (%)	85
Particle Size <4mm	>95%		

Case	
SDG	150820-94
Lab Sample Number(s)	11931811
Sampled Date	18-Aug-2015
Customer Sample Ref.	CHL/WAC/003
Depth (m)	

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	<6 or >9	-
-	-	-
-	-	-

Solid Waste Analysis	Result
Total Organic Carbon (%)	1.81
Loss on Ignition (%)	6.28
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	8.46
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	7.73
ANC to pH 6 (mol/kg)	0.0528
ANC to pH 4 (mol/kg)	0.106

Eluate Analysis	C2 Conc ⁿ in 10:1 eluate (mg/l)		A2 10:1 conc ⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.000933	<0.00012	0.00933	<0.0012	0.5	2	25
Barium	0.0133	<0.00003	0.133	<0.0003	20	100	300
Cadmium	<0.0001	<0.0001	<0.001	<0.001	0.04	1	5
Chromium	0.00107	<0.00022	0.0107	<0.0022	0.5	10	70
Copper	0.00621	<0.00085	0.0621	<0.0085	2	50	100
Mercury Dissolved (CVAf)	0.0000253	<0.00001	0.000253	<0.0001	0.01	0.2	2
Molybdenum	0.00681	<0.00024	0.0681	<0.0024	0.5	10	30
Nickel	0.00115	<0.00015	0.0115	<0.0015	0.4	10	40
Lead	0.000955	<0.00002	0.00955	<0.0002	0.5	10	50
Antimony	0.00471	<0.00016	0.0471	<0.0016	0.06	0.7	5
Selenium	0.000771	<0.00039	0.00771	<0.0039	0.1	0.5	7
Zinc	0.000847	<0.00041	0.00847	<0.0041	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	22.6	<2	226	<20	1000	20000	50000
Total Dissolved Solids	80.1	<5	801	<50	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	9.26	<3	92.6	<30	500	800	1000

Leach Test Information

Date Prepared	21-Aug-2015
pH (pH Units)	7.53
Conductivity (µS/cm)	94.80
Temperature (°C)	20.10
Volume Leachant (Litres)	0.884

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

29/08/2015 09:02:29
 09:02:22 29/08/2015



SDG: 150820-94
Job: D_BOYLAN_CAV-4
Client Reference:

Location: Cootehill Landfill
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 327511
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step		
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
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		
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser		
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils		
TM182	CEN/TC 292 - WI 292046-characterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM213	In-house Method	Rapid Determination of PAHs by GC-FID		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

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SDG: 150820-94
Job: D_BOYLAN_CAV-4
Client Reference:

Location: Cootehill Landfill
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 327511
Superseded Report:

Test Completion Dates

Lab Sample No(s)	11931809	11931810	11931811
Customer Sample Ref.	CHL/WAC/001	CHL/WAC/002	CHL/WAC/003
AGS Ref.			
Depth			
Type	SOLID	SOLID	SOLID
ANC at pH4 and ANC at pH 6	24-Aug-2015	24-Aug-2015	24-Aug-2015
Anions by Kone (w)	25-Aug-2015	25-Aug-2015	25-Aug-2015
CEN 10:1 Leachate (1 Stage)	21-Aug-2015	21-Aug-2015	21-Aug-2015
CEN Readings	24-Aug-2015	24-Aug-2015	24-Aug-2015
Dissolved Metals by ICP-MS	29-Aug-2015	29-Aug-2015	29-Aug-2015
Dissolved Organic/Inorganic Carbon	25-Aug-2015	25-Aug-2015	25-Aug-2015
Fluoride	25-Aug-2015	25-Aug-2015	25-Aug-2015
GRO by GC-FID (S)	25-Aug-2015	25-Aug-2015	25-Aug-2015
Loss on Ignition in soils	24-Aug-2015	24-Aug-2015	24-Aug-2015
Mercury Dissolved	25-Aug-2015	25-Aug-2015	25-Aug-2015
Mineral Oil	25-Aug-2015	25-Aug-2015	25-Aug-2015
PAH Value of soil	24-Aug-2015	24-Aug-2015	24-Aug-2015
PCBs by GCMS	25-Aug-2015	25-Aug-2015	25-Aug-2015
pH	24-Aug-2015	24-Aug-2015	24-Aug-2015
Phenols by HPLC (W)	25-Aug-2015	25-Aug-2015	25-Aug-2015
Sample description	21-Aug-2015	21-Aug-2015	21-Aug-2015
Total Dissolved Solids	24-Aug-2015	24-Aug-2015	24-Aug-2015
Total Organic Carbon	25-Aug-2015	25-Aug-2015	25-Aug-2015

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SDG: 150820-94
Job: D_BOYLAN_CAV-4
Client Reference:

Location: Cootehill Landfill
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 327511
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. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. 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. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. 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.

5. 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.

6. 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. The quantity of asbestos present is not determined unless specifically requested.

7. 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.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

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

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **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%, they are generally wider for volatiles analysis, 50-150%. 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.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

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

18. 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.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. 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.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. 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.

23. 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.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

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 Alcontrol Laboratories (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 Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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.

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.



Boylan Engineering
Main St
Mullagh
Co. Cavan

Attention: Brona Keating

CERTIFICATE OF ANALYSIS

Date:	15 October 2015
Customer:	D_BOYLAN_CAV
Sample Delivery Group(SDG):	151026-47
Your Reference:	Not Specified
Location:	Not Specified
Report No:	285827

We received 2 samples on Tuesday October 6, 2015 and 2 of these samples were scheduled for analysis which was completed on Tuesday October 15, 2015. 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.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

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Approved By:

Sonia McWhan
Operations Manager



SDG: 151026-47
Job: D_BOYLAN_CAV-2
Client Reference: Not Specified

Location: Not Specified
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 285827
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
8238183	Sample 1		0.00	04/10/2015
8238185	Sample 2		0.00	04/10/2015

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

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SDG: 151026-47
 Job: D_BOYLAN_CAV-2
 Client Reference: Not Specified

Location: Not Specified
 Customer: Boylan Engineering
 Attention: Brona Keating

Order Number:
 Report Number: 285827
 Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		8238183	8238185
	Customer Sample Reference		Sample 1	Sample 2
	AGS Reference			
	Depth (m)		0.00	0.00
	Container		1kg TUB 250g Amber Jar (AL 60g VOC (ALE215)	1kg TUB 250g Amber Jar (AL 60g VOC (ALE215)
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 2	X	X
Anions by Kone (w)	All	NDPs: 0 Tests: 2	X	X
CEN 2:1 Readings	All	NDPs: 0 Tests: 2	X	X
CEN 8:1 Readings	All	NDPs: 0 Tests: 2	X	X
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 2	X	X
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 2	X	X
Fluoride	All	NDPs: 0 Tests: 2	X	X
GRO by GC-FID (S)	All	NDPs: 0 Tests: 2	X	X
Loss on Ignition in soils	All	NDPs: 0 Tests: 2	X	X
Mercury Dissolved	All	NDPs: 0 Tests: 2	X	X
Mineral Oil	All	NDPs: 0 Tests: 2	X	X
PAH Value of soil	All	NDPs: 0 Tests: 2	X	X
PCBs by GCMS	All	NDPs: 0 Tests: 2	X	X
pH	All	NDPs: 0 Tests: 2	X	X
Phenols by HPLC (W)	All	NDPs: 0 Tests: 2	X	X

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CERTIFICATE OF ANALYSIS

Validated

SDG: 151026-47
Job: D_BOYLAN_CAV-2
Client Reference: Not Specified

Location: Not Specified
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 285827
Superseded Report:

SOLID Results Legend Test No Determination Possible	Lab Sample No(s)		8238183	8238185
	Customer Sample Reference		Sample 1	Sample 2
	AGS Reference			
	Depth (m)		0.00	0.00
	Container		250g Amber Jar (AL 1kg TUB)	60g VOC (ALE215) 250g Amber Jar (AL 1kg TUB)
Sample description	All	NDPs: 0 Tests: 2		
Total Dissolved Solids	All	NDPs: 0 Tests: 2		
Total Organic Carbon	All	NDPs: 0 Tests: 2		

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SDG: 151026-47
Job: D_BOYLAN_CAV-2
Client Reference: Not Specified

Location: Not Specified
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 285827
Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
-----------	----------	------	-----------------	--------	-------------	--------	------------	-------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
238183	Sample 1	0.00	Dark Brown	Silty Clay Loam	0.063 - 0.1 mm	Stones	N/A
238185	Sample 2	0.00	Dark Brown	Silty Clay Loam	0.063 - 0.1 mm	Stones	N/A

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

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 materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

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SDG: 151027-49
Job: D_BOYLAN_CAV-2
Client Reference: Not Specified

Location: Not Specified
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 285827
Superseded Report:

Results Legend		Customer Sample R	Sample 1	Sample 2				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00	0.00				
M	mCERTS accredited.		Soil/Solid	Soil/Solid				
aq	Aqueous /settled sample.		04/10/2013	04/10/2013				
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-48*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Loss on ignition	<0.7 %	TM018	7.07	2.99				
			M	M				
Mineral oil >C10-C40	<1 mg/kg	TM061	22.7	15.8				
			#	#				
Organic Carbon, Total	<0.2 %	TM132	1.84	0.585				
			#	#				
pH	1 pH Units	TM133	7.49	7.54				
			M	M				
PCB congener 28	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 52	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 101	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 118	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 138	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 153	<3 µg/kg	TM168	<3	<3				
			M	M				
PCB congener 180	<3 µg/kg	TM168	<3	<3				
			M	M				
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21	<21				
ANC @ pH 4	<0.03 mol/kg	TM182	0.0891	0.0463				
ANC @ pH 6	<0.03 mol/kg	TM182	<0.03	<0.03				
Polyaromatic hydrocarbons, Total 17	<10 mg/kg	TM213	<10	<10				

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CERTIFICATE OF ANALYSIS

Validated

SDG: 151027-47
Job: D_BOYLAN_CAV-2
Client Reference: Not Specified

Location: Not Specified
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 285827
Superseded Report:

GRO by GC-FID(S)

Table with columns: Results Legend, Customer Sample R, Sample 1, Sample 2, Component, LOD/Units, Method. Rows include GRO Surrogate % recovery, Methyl tertiary butyl ether (MTBE), Benzene, Toluene, Ethylbenzene, m,p-Xylene, o-Xylene, and sum of detected compounds.

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SDG: 151026-47
 Job: D_BOYLAN_CAV-2
 Client Reference: Not Specified

Location: Not Specified
 Customer: Boylan Engineering
 Attention: Brona Keating

Order Number:
 Report Number: 285827
 Superseded Report:

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/3

Client Reference	
Mass Sample taken (kg)	0.237
Mass of dry sample (kg)	0.175
Particle Size <4mm	>95%

Site Location	Not Specified
Moisture Content Ratio (%)	35.6
Dry Matter Content Ratio (%)	73.7

Case	
SDG	151026-47
Lab Sample Number(s)	238183
Sampled Date	04-Oct-2015
Customer Sample Ref.	Sample 1
Depth (m)	0.00

Landfill Waste Acceptance Criteria Limits

Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
3	5	6
-	-	10
6	-	-
1	-	-
500	-	-
100	-	-
-	<6 or >9	-
-	-	-
-	-	-

Solid Waste Analysis

Total Organic Carbon (%)	1.84
Loss on Ignition (%)	7.07
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	22.7
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	7.49
ANC to pH 6 (mol/kg)	<0.03
ANC to pH 4 (mol/kg)	0.0891

Eluate Analysis

	C2	C8	A2	A2-10	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Conc ⁿ in 2:1 eluate	Conc ⁿ in 8:1 eluate	2:1 conc ⁿ leached	Cumulative conc ⁿ leached			
	mg/l		mg/kg				
Arsenic	0.00116	0.00131	0.00233	0.0129	0.5	2	25
Barium	0.0148	0.00876	0.0296	0.0949	20	100	300
Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
Chromium	0.00318	0.00237	0.00637	0.0247	0.5	10	70
Copper	0.0126	0.00616	0.0252	0.0694	2	50	100
Mercury Dissolved (CVAf)	0.0000106	0.000014	0.0000212	0.000136	0.01	0.2	2
Molybdenum	0.00141	0.00136	0.00282	0.0136	0.5	10	30
Nickel	0.00149	0.00094	0.00299	0.0101	0.4	10	40
Lead	0.000311	0.000853	0.000623	0.00788	0.5	10	50
Antimony	0.00054	0.00217	0.00108	0.0198	0.06	0.7	5
Selenium	0.00103	0.000581	0.00207	0.00635	0.1	0.5	7
Zinc	0.00188	0.00147	0.00376	0.0152	4	50	200
Chloride	2.4	<2	4.8	<20	800	15000	25000
Fluoride	<0.5	<0.5	<1	<5	10	150	500
Sulphate (soluble)	<2	<2	<4	<20	1000	20000	50000
Total Dissolved Solids	143	68.7	287	776	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.032	<0.16	1	-	-
Dissolved Organic Carbon	20.9	8.67	41.8	101	500	800	1000

Leach Test Information

	2:1	8:1
Date Prepared	09-Oct-2015	10-Oct-2015
pH (pH Units)	8.163	8.014
Conductivity (µS/cm)	166.40	75.30
Temperature (°C)	20.60	19.10
Volume Leachant (Litres)	0.288	1.400
Volume of Eluate VE1 (Litres)	0.210	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

15/10/2013 14:42:26

14:42:19 15/10/2015

SDG: 151026-47
 Job: D_BOYLAN_CAV-2
 Client Reference: Not Specified

Location: Not Specified
 Customer: Boylan Engineering
 Attention: Brona Keating

Order Number:
 Report Number: 285827
 Superseded Report:

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/3

Client Reference	
Mass Sample taken (kg)	0.224
Mass of dry sample (kg)	0.175
Particle Size <4mm	>95%

Site Location	Not Specified
Moisture Content Ratio (%)	27.9
Dry Matter Content Ratio (%)	78.2

Case	
SDG	131009-42
Lab Sample Number(s)	238185
Sampled Date	04-Oct-2015
Customer Sample Ref.	Sample 2
Depth (m)	0.00

Landfill Waste Acceptance Criteria Limits

	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
	3	5	6
	-	-	10
	6	-	-
	1	-	-
	500	-	-
	100	-	-
	-	<6 or >9	-
	-	-	-
	-	-	-

Solid Waste Analysis

Total Organic Carbon (%)	0.585
Loss on Ignition (%)	2.99
Sum of BTEX (mg/kg)	<0.024
Sum of 7 PCBs (mg/kg)	<0.021
Mineral Oil (mg/kg)	15.8
PAH Sum of 17 (mg/kg)	<10
pH (pH Units)	7.54
ANC to pH 6 (mol/kg)	<0.03
ANC to pH 4 (mol/kg)	0.0463

Eluate Analysis

	C2	C8	A2	A2-10	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Conc ⁿ in 2:1 eluate	Conc ⁿ in 8:1 eluate	2:1 conc ⁿ leached	Cumulative conc ⁿ leached			
	mg/l				mg/kg		
Arsenic	0.00051	0.000381	0.00102	0.00396	0.5	2	25
Barium	0.0358	0.00579	0.0716	0.0922	20	100	300
Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
Chromium	0.00228	0.00429	0.00456	0.0141	0.5	10	70
Copper	0.00586	0.00237	0.0117	0.0277	2	50	100
Mercury Dissolved (CVAf)	<0.00001	0.0000132	<0.00002	0.000117	0.01	0.2	2
Molybdenum	0.000749	0.000712	0.0015	0.00716	0.5	10	30
Nickel	0.00126	0.000679	0.00251	0.00745	0.4	10	40
Lead	0.000175	0.000212	0.00035	0.00208	0.5	10	50
Antimony	0.00064	0.000712	0.00128	0.00704	0.06	0.7	5
Selenium	<0.00039	<0.00039	<0.00078	<0.0039	0.1	0.5	7
Zinc	0.00125	0.00261	0.0025	0.0245	4	50	200
Chloride	2.1	<2	4.2	<20	800	15000	25000
Fluoride	<0.5	<0.5	<1	<5	10	150	500
Sulphate (soluble)	<2	<2	<4	<20	1000	20000	50000
Total Dissolved Solids	116	38.6	232	474	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.032	<0.16	1	-	-
Dissolved Organic Carbon	12.4	4.75	24.9	56.3	500	800	1000

Leach Test Information

	2:1	8:1
Date Prepared	09-Oct-2015	10-Oct-2015
pH (pH Units)	8.129	7.888
Conductivity (µS/cm)	118.90	27.20
Temperature (°C)	20.20	19.10
Volume Leachant (Litres)	0.301	1.400
Volume of Eluate VE1 (Litres)	0.200	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepancies with current legislation
 Mcerts Certification does not apply to leachates

15/10/2013 14:42:26

14:42:19 15/10/2015

SDG: 151026-47
Job: D_BOYLAN_CAV-2
Client Reference: Not Specified

Location: Not Specified
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 285827
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
PM114		Leaching Procedure for CEN Two Stage Batch Test 2:1/8:1 Cumulative		
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
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		
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser		
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990; BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils		
TM182	CEN/TC 292 - WI 292046-characterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM213	In-house Method	Rapid Determination of PAHs by GC-FID		
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

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SDG: 151026-47
Job: D_BOYLAN_CAV-2
Client Reference: Not Specified

Location: Not Specified
Customer: Boylan Engineering
Attention: Brona Keating

Order Number:
Report Number: 285827
Superseded Report:

Test Completion Dates

Lab Sample No(s)	238183	238185
Customer Sample Ref.	Sample 1	Sample 2
AGS Ref.		
Depth	0.00	0.00
Type	SOLID	SOLID
ANC at pH4 and ANC at pH 6	14-Oct-2015	14-Oct-2015
Anions by Kone (w)	14-Oct-2015	14-Oct-2015
CEN 2:1 Leachate (2 Stage)	09-Oct-2015	09-Oct-2015
CEN 2:1 Readings	11-Oct-2015	11-Oct-2015
CEN 8:1 Leachate (2 Stage)	11-Oct-2015	11-Oct-2015
CEN 8:1 Readings	11-Oct-2015	11-Oct-2015
Dissolved Metals by ICP-MS	15-Oct-2015	15-Oct-2015
Dissolved Organic/Inorganic Carbon	14-Oct-2015	14-Oct-2015
Fluoride	14-Oct-2015	14-Oct-2015
GRO by GC-FID (S)	11-Oct-2015	11-Oct-2015
Loss on Ignition in soils	14-Oct-2015	14-Oct-2015
Mercury Dissolved	15-Oct-2015	15-Oct-2015
Mineral Oil	15-Oct-2015	15-Oct-2015
PAH Value of soil	14-Oct-2015	14-Oct-2015
PCBs by GCMS	13-Oct-2015	13-Oct-2015
pH	14-Oct-2015	14-Oct-2015
Phenols by HPLC (W)	15-Oct-2015	15-Oct-2015
Sample description	09-Oct-2015	09-Oct-2015
Total Dissolved Solids	14-Oct-2015	14-Oct-2015
Total Organic Carbon	15-Oct-2015	15-Oct-2015

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SDG: 151026-47	Location: Not Specified	Order Number:
Job: D_BOYLAN_CAV-2	Customer: Boylan Engineering	Report Number: 285827
Client Reference: Not Specified	Attention: Brona Keating	Superseded Report:

Appendix General

- 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.
- Samples will be run in duplicate upon request, but an additional charge may be incurred.
- 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 2 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. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.
- 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.
- 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.
- 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. The quantity of asbestos present is not determined unless specifically requested.
- 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.
- If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.
- NDP -No determination possible due to insufficient/unsuitable sample.
- Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.
- Results relate only to the items tested.
- LODs for wet tests reported on a dry weight basis are not corrected for moisture content.
- Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.
- Product analyses** -Organic analyses on products can only be semi -quantitative due to the matrix effects and high dilution factors employed.
- Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).
- Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).
- Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
- 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.
- Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

- 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.
- For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.
- 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.
- 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.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Sampled on date not provided
6	Sample holding time exceeded in laboratory
7	Sample holding time exceeded due to sampled on date
8	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

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 Alcontrol Laboratories (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 Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	WhiteAsbestos
Amosite	BrownAsbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
FibrousAnthophyllite	-
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.

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.

Customer Source Location Report

Date Range - from :01 Apr 2015 00:00 untill 01 Nov 2015 00:00

Customer	Source	Date	Ticket Vehicle	Product	Nett
CCC CAVAN COUNTY COUNCIL					
CCC CAVAN COUNTY COUNCIL					
		Date	Ticket Vehicle	Product	Nett
		12-Sep-15 8:31	7,459 05MN2565	36 SOIL & STONES EWC 17 05 04	20,360
		11-Sep-15 9:34	7,420 05MN2565	36 SOIL & STONES EWC 17 05 04	21,080
		11-Sep-15 10:43	7,432 05MN2565	36 SOIL & STONES EWC 17 05 04	21,120
		11-Sep-15 8:43	7,415 05MN2565	36 SOIL & STONES EWC 17 05 04	21,620
		12-Sep-15 9:21	7,467 05MN2565	36 SOIL & STONES EWC 17 05 04	22,880
		11-Sep-15 13:05	7,442 05MN2565	36 SOIL & STONES EWC 17 05 04	24,440
		11-Sep-15 15:52	7,454 05MN2565	36 SOIL & STONES EWC 17 05 04	25,940
		12-Sep-15 10:25	7,473 05MN2565	36 SOIL & STONES EWC 17 05 04	25,940
		14-Sep-15 9:47	7,493 05MN2565	36 SOIL & STONES EWC 17 05 04	29,220
		14-Sep-15 8:51	7,486 05MN2565	36 SOIL & STONES EWC 17 05 04	29,640
		11-Sep-15 14:48	7,449 05MN2565	36 SOIL & STONES EWC 17 05 04	30,240
		12-Sep-15 9:03	7,464 06CN2712	36 SOIL & STONES EWC 17 05 04	14,160
		11-Sep-15 15:50	7,453 06CN2712	36 SOIL & STONES EWC 17 05 04	14,720
		12-Sep-15 11:47	7,479 06CN2712	36 SOIL & STONES EWC 17 05 04	14,860
		11-Sep-15 11:30	7,434 07CN2142	36 SOIL & STONES EWC 17 05 04	13,680
		11-Sep-15 8:57	7,418 07CN2142	36 SOIL & STONES EWC 17 05 04	14,200
		11-Sep-15 10:19	7,430 07CN2142	36 SOIL & STONES EWC 17 05 04	14,200
		11-Sep-15 12:57	7,440 07CN2142	36 SOIL & STONES EWC 17 05 04	14,240
		14-Sep-15 10:11	7,496 07CN2142	36 SOIL & STONES EWC 17 05 04	14,680
		12-Sep-15 8:49	7,462 07CN2142	36 SOIL & STONES EWC 17 05 04	15,360
		11-Sep-15 15:12	7,452 07CN2142	36 SOIL & STONES EWC 17 05 04	15,920
		11-Sep-15 16:32	7,456 07CN2142	36 SOIL & STONES EWC 17 05 04	15,940
		14-Sep-15 8:53	7,487 07CN2142	36 SOIL & STONES EWC 17 05 04	16,200
		12-Sep-15 12:33	7,484 07CN2142	36 SOIL & STONES EWC 17 05 04	16,720

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12-Sep-15 11:11	7,476 07CN2142	36 SOIL & STONES EWC 17 05 04	17,020
12-Sep-15 9:57	7,468 07CN2142	36 SOIL & STONES EWC 17 05 04	18,040
14-Sep-15 9:06	7,491 07CN2791	36 SOIL & STONES EWC 17 05 04	15,140
11-Sep-15 10:15	7,429 08CN1176	36 SOIL & STONES EWC 17 05 04	16,180
11-Sep-15 8:49	7,417 08CN1176	36 SOIL & STONES EWC 17 05 04	16,560
14-Sep-15 9:09	7,489 08CN2239	36 SOIL & STONES EWC 17 05 04	15,380
12-Sep-15 8:54	7,463 08CN2239	36 SOIL & STONES EWC 17 05 04	16,220
12-Sep-15 12:39	7,485 08CN2239	36 SOIL & STONES EWC 17 05 04	17,620
12-Sep-15 11:15	7,478 08CN2239	36 SOIL & STONES EWC 17 05 04	18,800
12-Sep-15 10:04	7,470 08CN2239	36 SOIL & STONES EWC 17 05 04	18,900
11-Sep-15 12:04	7,436 08MN2565	36 SOIL & STONES EWC 17 05 04	23,280
12-Sep-15 10:21	7,472 08CN2712	36 SOIL & STONES EWC 17 05 04	14,120
10-Sep-15 11:32	7,398 09CN229	36 SOIL & STONES EWC 17 05 04	27,430
10-Sep-15 11:34	7,399 09CN229	36 SOIL & STONES EWC 17 05 04	27,520
11-Sep-15 10:50	7,433 09CN229	36 SOIL & STONES EWC 17 05 04	28,500
10-Sep-15 12:32	7,402 09CN229	36 SOIL & STONES EWC 17 05 04	28,600
10-Sep-15 11:36	7,400 09CN229	36 SOIL & STONES EWC 17 05 04	28,680
12-Sep-15 8:25	7,458 09CN229	36 SOIL & STONES EWC 17 05 04	29,220
10-Sep-15 14:52	7,409 09CN229	36 SOIL & STONES EWC 17 05 04	29,260
11-Sep-15 8:31	7,416 09CN229	36 SOIL & STONES EWC 17 05 04	29,520
11-Sep-15 14:51	7,450 09CN229	36 SOIL & STONES EWC 17 05 04	30,040
12-Sep-15 9:18	7,466 09CN229	36 SOIL & STONES EWC 17 05 04	30,160
14-Sep-15 8:31	7,483 09CN229	36 SOIL & STONES EWC 17 05 04	30,560
11-Sep-15 11:53	7,435 09CN229	36 SOIL & STONES EWC 17 05 04	30,680
10-Sep-15 16:02	7,412 09CN229	36 SOIL & STONES EWC 17 05 04	30,700
11-Sep-15 9:55	7,426 09CN229	36 SOIL & STONES EWC 17 05 04	31,080
14-Sep-15 9:28	7,492 09CN229	36 SOIL & STONES EWC 17 05 04	31,200
11-Sep-15 12:58	7,441 09CN229	36 SOIL & STONES EWC 17 05 04	31,360
11-Sep-15 16:00	7,455 09CN229	36 SOIL & STONES EWC 17 05 04	31,420
10-Sep-15 13:34	7,405 09CN229	36 SOIL & STONES EWC 17 05 04	31,980
12-Sep-15 11:13	7,477 09CN229	36 SOIL & STONES EWC 17 05 04	32,560
12-Sep-15 12:09	7,481 09CN229	36 SOIL & STONES EWC 17 05 04	35,060
12-Sep-15 10:11	7,471 09CN229	36 SOIL & STONES EWC 17 05 04	35,560
15-Sep-15 9:56	7,545 05MN2565	36 SOIL & STONES EWC 17 05 04	26,060
17-Sep-15 16:26	7,699 05MN2565	36 SOIL & STONES EWC 17 05 04	26,980
16-Sep-15 14:16	7,629 05MN2565	36 SOIL & STONES EWC 17 05 04	27,160
16-Sep-15 12:36	7,620 05MN2565	36 SOIL & STONES EWC 17 05 04	27,220
15-Sep-15 13:48	7,565 05MN2565	36 SOIL & STONES EWC 17 05 04	27,280
15-Sep-15 16:29	7,585 05MN2565	36 SOIL & STONES EWC 17 05 04	27,320
17-Sep-15 12:28	7,674 05MN2565	36 SOIL & STONES EWC 17 05 04	27,780
17-Sep-15 11:36	7,668 05MN2565	36 SOIL & STONES EWC 17 05 04	27,980
17-Sep-15 14:30	7,682 05MN2565	36 SOIL & STONES EWC 17 05 04	28,180

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15-Sep-15 12:05	7,560	05MN2565	36 SOIL & STONES EWC 17 05 04	28,240
14-Sep-15 10:47	7,502	05MN2565	36 SOIL & STONES EWC 17 05 04	28,420
16-Sep-15 10:26	7,607	05MN2565	36 SOIL & STONES EWC 17 05 04	28,700
14-Sep-15 12:44	7,516	05MN2565	36 SOIL & STONES EWC 17 05 04	28,720
18-Sep-15 8:48	7,708	05MN2565	36 SOIL & STONES EWC 17 05 04	28,720
16-Sep-15 9:31	7,598	05MN2565	36 SOIL & STONES EWC 17 05 04	28,980
14-Sep-15 11:49	7,507	05MN2565	36 SOIL & STONES EWC 17 05 04	29,000
15-Sep-15 15:38	7,581	05MN2565	36 SOIL & STONES EWC 17 05 04	29,040
17-Sep-15 8:28	7,646	05MN2565	36 SOIL & STONES EWC 17 05 04	29,120
16-Sep-15 15:34	7,639	05MN2565	36 SOIL & STONES EWC 17 05 04	29,140
14-Sep-15 14:40	7,523	05MN2565	36 SOIL & STONES EWC 17 05 04	29,240
15-Sep-15 8:52	7,542	05MN2565	36 SOIL & STONES EWC 17 05 04	29,300
15-Sep-15 14:38	7,573	05MN2565	36 SOIL & STONES EWC 17 05 04	29,300
16-Sep-15 16:28	7,643	05MN2565	36 SOIL & STONES EWC 17 05 04	29,380
17-Sep-15 15:26	7,691	05MN2565	36 SOIL & STONES EWC 17 05 04	29,440
15-Sep-15 10:59	7,556	05MN2565	36 SOIL & STONES EWC 17 05 04	29,880
17-Sep-15 9:32	7,651	05MN2565	36 SOIL & STONES EWC 17 05 04	30,220
16-Sep-15 8:28	7,588	05MN2565	36 SOIL & STONES EWC 17 05 04	30,360
17-Sep-15 10:29	7,663	05MN2565	36 SOIL & STONES EWC 17 05 04	30,520
18-Sep-15 9:43	7,714	05MN2565	36 SOIL & STONES EWC 17 05 04	31,320
16-Sep-15 11:45	7,614	05MN2565	36 SOIL & STONES EWC 17 05 04	31,880
14-Sep-15 15:46	7,532	05MN2565	36 SOIL & STONES EWC 17 05 04	32,340
29-Sep-15 8:47	7,875	05MN2565	36 SOIL & STONES EWC 17 05 04	35,480
17-Sep-15 9:37	7,652	06CN2600	36 SOIL & STONES EWC 17 05 04	30,160
16-Sep-15 10:12	7,603	07CN2142	36 SOIL & STONES EWC 17 05 04	13,040
15-Sep-15 16:26	7,584	07CN2142	36 SOIL & STONES EWC 17 05 04	13,620
17-Sep-15 15:13	7,685	07CN2142	36 SOIL & STONES EWC 17 05 04	13,780
17-Sep-15 16:28	7,700	07CN2142	36 SOIL & STONES EWC 17 05 04	13,780
17-Sep-15 12:05	7,672	07CN2142	36 SOIL & STONES EWC 17 05 04	13,880
18-Sep-15 8:59	7,710	07CN2142	36 SOIL & STONES EWC 17 05 04	13,880
16-Sep-15 13:48	7,624	07CN2142	36 SOIL & STONES EWC 17 05 04	14,000
17-Sep-15 8:54	7,648	07CN2142	36 SOIL & STONES EWC 17 05 04	14,020
18-Sep-15 16:13	7,749	07CN2142	36 SOIL & STONES EWC 17 05 04	14,100
14-Sep-15 14:57	7,524	07CN2142	36 SOIL & STONES EWC 17 05 04	14,160
14-Sep-15 12:40	7,514	07CN2142	36 SOIL & STONES EWC 17 05 04	14,640
15-Sep-15 8:57	7,543	07CN2142	36 SOIL & STONES EWC 17 05 04	14,700
14-Sep-15 16:14	7,534	07CN2142	36 SOIL & STONES EWC 17 05 04	14,780
15-Sep-15 12:01	7,559	07CN2142	36 SOIL & STONES EWC 17 05 04	14,820
15-Sep-15 15:11	7,576	07CN2142	36 SOIL & STONES EWC 17 05 04	15,100
15-Sep-15 10:50	7,554	07CN2142	36 SOIL & STONES EWC 17 05 04	15,140
15-Sep-15 14:01	7,568	07CN2142	36 SOIL & STONES EWC 17 05 04	15,380
16-Sep-15 11:29	7,611	07CN2142	36 SOIL & STONES EWC 17 05 04	15,560

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14-Sep-15 11:24	7,505 07CN2142	36 SOIL & STONES EWC 17 05 04	15,620
16-Sep-15 8:48	7,590 07CN2142	36 SOIL & STONES EWC 17 05 04	15,780
18-Sep-15 14:39	7,737 07CN2142	36 SOIL & STONES EWC 17 05 04	15,780
29-Sep-15 9:02	7,877 07CN2142	36 SOIL & STONES EWC 17 05 04	16,220
16-Sep-15 15:16	7,636 07CN2142	36 SOIL & STONES EWC 17 05 04	16,620
17-Sep-15 10:26	7,661 07CN2142	36 SOIL & STONES EWC 17 05 04	16,700
29-Sep-15 8:55	7,876 07CN2600	36 SOIL & STONES EWC 17 05 04	28,320
16-Sep-15 15:22	7,638 07CN2600	36 SOIL & STONES EWC 17 05 04	28,560
16-Sep-15 9:24	7,596 07CN2600	36 SOIL & STONES EWC 17 05 04	28,740
16-Sep-15 16:22	7,641 07CN2600	36 SOIL & STONES EWC 17 05 04	28,760
18-Sep-15 9:26	7,713 07CN2600	36 SOIL & STONES EWC 17 05 04	29,100
17-Sep-15 8:24	7,645 07CN2600	36 SOIL & STONES EWC 17 05 04	29,180
17-Sep-15 11:46	7,670 07CN2600	36 SOIL & STONES EWC 17 05 04	29,900
18-Sep-15 11:49	7,728 07CN2600	36 SOIL & STONES EWC 17 05 04	30,080
18-Sep-15 11:01	7,723 07CN2600	36 SOIL & STONES EWC 17 05 04	30,120
17-Sep-15 16:34	7,702 07CN2600	36 SOIL & STONES EWC 17 05 04	30,880
16-Sep-15 11:26	7,610 07CN2600	36 SOIL & STONES EWC 17 05 04	31,000
17-Sep-15 10:43	7,664 07CN2600	36 SOIL & STONES EWC 17 05 04	31,240
16-Sep-15 10:19	7,605 07CN2600	36 SOIL & STONES EWC 17 05 04	31,440
17-Sep-15 12:33	7,676 07CN2600	36 SOIL & STONES EWC 17 05 04	31,620
17-Sep-15 14:31	7,683 07CN2600	36 SOIL & STONES EWC 17 05 04	31,680
18-Sep-15 8:26	7,705 07CN2600	36 SOIL & STONES EWC 17 05 04	31,720
16-Sep-15 14:13	7,628 07CN2600	36 SOIL & STONES EWC 17 05 04	31,900
17-Sep-15 15:43	7,694 07CN2600	36 SOIL & STONES EWC 17 05 04	32,100
18-Sep-15 16:11	7,748 07CN2600	36 SOIL & STONES EWC 17 05 04	32,580
16-Sep-15 12:19	7,618 07CN2600	36 SOIL & STONES EWC 17 05 04	33,020
18-Sep-15 15:03	7,738 07CN2600	36 SOIL & STONES EWC 17 05 04	33,320
18-Sep-15 13:34	7,731 07CN2600	36 SOIL & STONES EWC 17 05 04	35,040
15-Sep-15 12:10	7,561 07CN2791	36 SOIL & STONES EWC 17 05 04	13,060
18-Sep-15 10:45	7,719 07CN2791	36 SOIL & STONES EWC 17 05 04	13,140
15-Sep-15 15:31	7,580 07CN2791	36 SOIL & STONES EWC 17 05 04	13,540
14-Sep-15 14:59	7,525 07CN2791	36 SOIL & STONES EWC 17 05 04	13,560
15-Sep-15 10:53	7,552 07CN2791	36 SOIL & STONES EWC 17 05 04	13,780
14-Sep-15 11:32	7,506 07CN2791	36 SOIL & STONES EWC 17 05 04	13,940
14-Sep-15 12:42	7,515 07CN2791	36 SOIL & STONES EWC 17 05 04	14,260
15-Sep-15 8:44	7,540 07CN2791	36 SOIL & STONES EWC 17 05 04	14,420
14-Sep-15 10:50	7,503 07CN2791	36 SOIL & STONES EWC 17 05 04	14,860
15-Sep-15 14:17	7,571 07CN2791	36 SOIL & STONES EWC 17 05 04	14,860
14-Sep-15 16:27	7,537 07CN2791	36 SOIL & STONES EWC 17 05 04	15,280
17-Sep-15 15:47	7,695 07CN2791	36 SOIL & STONES EWC 17 05 04	15,340
17-Sep-15 14:20	7,679 07CN2791	36 SOIL & STONES EWC 17 05 04	17,180
17-Sep-15 9:05	7,650 07CN2791	36 SOIL & STONES EWC 17 05 04	17,640

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18-Sep-15 16:17	7,750 07CN2791	36 SOIL & STONES EWC 17 05 04	17,640
18-Sep-15 9:03	7,711 07CN2791	36 SOIL & STONES EWC 17 05 04	17,820
18-Sep-15 13:31	7,730 07CN2791	36 SOIL & STONES EWC 17 05 04	17,880
16-Sep-15 11:57	7,615 07CN2791	36 SOIL & STONES EWC 17 05 04	18,640
17-Sep-15 11:35	7,667 07CN2791	36 SOIL & STONES EWC 17 05 04	18,860
16-Sep-15 9:02	7,594 07CN2791	36 SOIL & STONES EWC 17 05 04	19,060
16-Sep-15 10:24	7,606 07CN2791	36 SOIL & STONES EWC 17 05 04	19,460
16-Sep-15 15:19	7,637 07CN2791	36 SOIL & STONES EWC 17 05 04	19,800
29-Sep-15 9:04	7,878 07CN2791	36 SOIL & STONES EWC 17 05 04	20,460
16-Sep-15 16:24	7,642 08CN2238	36 SOIL & STONES EWC 17 05 04	18,200
16-Sep-15 10:15	7,604 08CN2239	36 SOIL & STONES EWC 17 05 04	14,400
15-Sep-15 16:11	7,582 08CN2239	36 SOIL & STONES EWC 17 05 04	14,600
17-Sep-15 14:58	7,684 08CN2239	36 SOIL & STONES EWC 17 05 04	14,900
14-Sep-15 12:53	7,517 08CN2239	36 SOIL & STONES EWC 17 05 04	14,960
15-Sep-15 8:48	7,541 08CN2239	36 SOIL & STONES EWC 17 05 04	15,040
16-Sep-15 14:48	7,630 08CN2239	36 SOIL & STONES EWC 17 05 04	15,080
16-Sep-15 13:43	7,623 08CN2239	36 SOIL & STONES EWC 17 05 04	15,380
15-Sep-15 13:51	7,566 08CN2239	36 SOIL & STONES EWC 17 05 04	15,500
14-Sep-15 11:51	7,508 08CN2239	36 SOIL & STONES EWC 17 05 04	15,600
18-Sep-15 15:39	7,743 08CN2239	36 SOIL & STONES EWC 17 05 04	15,600
15-Sep-15 11:50	7,558 08CN2239	36 SOIL & STONES EWC 17 05 04	15,780
17-Sep-15 11:57	7,671 08CN2239	36 SOIL & STONES EWC 17 05 04	15,980
18-Sep-15 13:44	7,733 08CN2239	36 SOIL & STONES EWC 17 05 04	15,980
14-Sep-15 15:10	7,528 08CN2239	36 SOIL & STONES EWC 17 05 04	16,100
17-Sep-15 16:16	7,697 08CN2239	36 SOIL & STONES EWC 17 05 04	16,140
18-Sep-15 9:54	7,715 08CN2239	36 SOIL & STONES EWC 17 05 04	16,260
16-Sep-15 8:51	7,591 08CN2239	36 SOIL & STONES EWC 17 05 04	16,280
16-Sep-15 11:37	7,612 08CN2239	36 SOIL & STONES EWC 17 05 04	16,360
15-Sep-15 10:53	7,555 08CN2239	36 SOIL & STONES EWC 17 05 04	16,620
14-Sep-15 16:16	7,535 08CN2239	36 SOIL & STONES EWC 17 05 04	16,660
18-Sep-15 8:40	7,707 08CN2239	36 SOIL & STONES EWC 17 05 04	16,740
17-Sep-15 10:17	7,658 08CN2239	36 SOIL & STONES EWC 17 05 04	17,220
18-Sep-15 11:12	7,725 08CN2239	36 SOIL & STONES EWC 17 05 04	17,260
14-Sep-15 10:27	7,499 08CN2239	36 SOIL & STONES EWC 17 05 04	17,280
17-Sep-15 8:48	7,647 08CN2239	36 SOIL & STONES EWC 17 05 04	17,460
14-Sep-15 11:19	7,504 09CN229	36 SOIL & STONES EWC 17 05 04	30,080
15-Sep-15 11:34	7,557 09CN229	36 SOIL & STONES EWC 17 05 04	30,740
15-Sep-15 14:20	7,572 09CN229	36 SOIL & STONES EWC 17 05 04	30,940
15-Sep-15 8:29	7,539 09CN229	36 SOIL & STONES EWC 17 05 04	31,000
15-Sep-15 15:25	7,579 09CN229	36 SOIL & STONES EWC 17 05 04	31,180
14-Sep-15 12:22	7,511 09CN229	36 SOIL & STONES EWC 17 05 04	31,500
14-Sep-15 10:25	7,498 09CN229	36 SOIL & STONES EWC 17 05 04	31,520

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15-Sep-15 16:20	7,583 09CN229	36 SOIL & STONES EWC 17 05 04	32,080
14-Sep-15 14:09	7,519 09CN229	36 SOIL & STONES EWC 17 05 04	32,240
15-Sep-15 10:39	7,549 09CN229	36 SOIL & STONES EWC 17 05 04	32,760
14-Sep-15 16:05	7,533 09CN229	36 SOIL & STONES EWC 17 05 04	32,940
15-Sep-15 12:30	7,563 09CN229	36 SOIL & STONES EWC 17 05 04	33,560
15-Sep-15 9:25	7,544 09CN229	36 SOIL & STONES EWC 17 05 04	34,100
14-Sep-15 15:01	7,526 09CN229	36 SOIL & STONES EWC 17 05 04	34,360
29-Sep-15 8:42	7,874 09CN229	36 SOIL & STONES EWC 17 05 04	39,700
15-Sep-15 15:02	7,574 09CN2239	36 SOIL & STONES EWC 17 05 04	15,720
30-Sep-15 14:42	7,980 05MN2565	36 SOIL & STONES EWC 17 05 04	27,180
29-Sep-15 15:52	7,939 05MN2565	36 SOIL & STONES EWC 17 05 04	29,080
29-Sep-15 12:49	7,914 05MN2565	36 SOIL & STONES EWC 17 05 04	29,700
29-Sep-15 14:56	7,925 05MN2565	36 SOIL & STONES EWC 17 05 04	31,400
29-Sep-15 11:53	7,904 05MN2565	36 SOIL & STONES EWC 17 05 04	31,640
29-Sep-15 12:24	7,910 05MN2565	36 SOIL & STONES EWC 17 05 04	32,040
30-Sep-15 13:46	7,975 05MN2565	36 SOIL & STONES EWC 17 05 04	32,200
30-Sep-15 12:55	7,973 05MN2565	36 SOIL & STONES EWC 17 05 04	32,720
29-Sep-15 9:41	7,881 05MN2565	36 SOIL & STONES EWC 17 05 04	34,220
30-Sep-15 14:46	7,981 07CN2142	36 SOIL & STONES EWC 17 05 04	13,960
29-Sep-15 12:07	7,906 07CN2142	36 SOIL & STONES EWC 17 05 04	14,240
30-Sep-15 8:46	7,949 07CN2142	36 SOIL & STONES EWC 17 05 04	14,520
30-Sep-15 10:07	7,954 07CN2142	36 SOIL & STONES EWC 17 05 04	15,400
30-Sep-15 12:41	7,972 07CN2142	36 SOIL & STONES EWC 17 05 04	15,420
29-Sep-15 15:25	7,932 07CN2142	36 SOIL & STONES EWC 17 05 04	16,280
29-Sep-15 15:50	7,938 07CN2600	36 SOIL & STONES EWC 17 05 04	23,740
29-Sep-15 12:52	7,915 07CN2600	36 SOIL & STONES EWC 17 05 04	24,060
30-Sep-15 14:53	7,982 07CN2600	36 SOIL & STONES EWC 17 05 04	25,040
29-Sep-15 14:53	7,924 07CN2600	36 SOIL & STONES EWC 17 05 04	25,140
29-Sep-15 11:55	7,905 07CN2600	36 SOIL & STONES EWC 17 05 04	25,440
30-Sep-15 8:40	7,947 07CN2600	36 SOIL & STONES EWC 17 05 04	25,480
30-Sep-15 12:59	7,974 07CN2600	36 SOIL & STONES EWC 17 05 04	26,060
30-Sep-15 9:38	7,950 07CN2600	36 SOIL & STONES EWC 17 05 04	26,280
29-Sep-15 12:28	7,911 07CN2600	36 SOIL & STONES EWC 17 05 04	26,760
29-Sep-15 9:51	7,882 07CN2600	36 SOIL & STONES EWC 17 05 04	27,540
30-Sep-15 13:54	7,976 07CN2600	36 SOIL & STONES EWC 17 05 04	30,640
30-Sep-15 11:05	7,965 07CN2600	36 SOIL & STONES EWC 17 05 04	30,760
29-Sep-15 16:12	7,943 07CN2791	36 SOIL & STONES EWC 17 05 04	13,820
30-Sep-15 14:28	7,977 07CN2791	36 SOIL & STONES EWC 17 05 04	15,340
30-Sep-15 8:34	7,946 07CN2791	36 SOIL & STONES EWC 17 05 04	16,640
29-Sep-15 13:22	7,918 07CN2791	36 SOIL & STONES EWC 17 05 04	17,160
29-Sep-15 12:10	7,907 07CN2791	36 SOIL & STONES EWC 17 05 04	17,200
29-Sep-15 14:50	7,922 07CN2791	36 SOIL & STONES EWC 17 05 04	17,320

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30-Sep-15 12:37	7,971 07CN2791	36 SOIL & STONES EWC 17 05 04	17,900
30-Sep-15 9:55	7,953 07CN2791	36 SOIL & STONES EWC 17 05 04	18,280
29-Sep-15 11:06	7,894 07CN2791	36 SOIL & STONES EWC 17 05 04	19,380
29-Sep-15 11:13	7,897 07CN2791	36 SOIL & STONES EWC 17 05 04	19,380
29-Sep-15 12:17	7,909 07CCN2142	36 SOIL & STONES EWC 17 05 04	17,140
30-Sep-15 11:11	7,968 09CN229	36 SOIL & STONES EWC 17 05 04	30,860
29-Sep-15 12:57	7,916 09CN229	36 SOIL & STONES EWC 17 05 04	31,280
30-Sep-15 15:22	7,988 09CN229	36 SOIL & STONES EWC 17 05 04	31,660
30-Sep-15 8:44	7,948 09CN229	36 SOIL & STONES EWC 17 05 04	33,060
29-Sep-15 16:07	7,942 09CN229	36 SOIL & STONES EWC 17 05 04	33,440
29-Sep-15 14:49	7,921 09CN229	36 SOIL & STONES EWC 17 05 04	33,600
29-Sep-15 11:04	7,893 09CN229	36 SOIL & STONES EWC 17 05 04	33,700
29-Sep-15 12:39	7,913 09CN229	36 SOIL & STONES EWC 17 05 04	33,980
29-Sep-15 11:51	7,903 09CN229	36 SOIL & STONES EWC 17 05 04	36,380
30-Sep-15 9:40	7,951 09CN229	36 SOIL & STONES EWC 17 05 04	36,460

Total from Source: CAVAN COUNTY COUNCIL for this customer €5,821,170.00

Total for Customer: CAVAN COUNTY COUNCIL: €5,821,170.00 249 load

5821.170Tonne

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Report : Transaction Listing by Waste Account

Waste Account : 116

CAVAN CO CO

Date	Txn No	Dkt No	Waste Haulier	Waste Type	Charge (Inc VAT)	Levy Amt (Inc VAT)	VAT Total (Included)	VAT %	Nett Kg	
01/10/2015	110081	109542	235	JOE BRADY CONTRACTOR	200301MMWCMMW COOTEHILL CCC	483.96	0.00	57.56	13.50%	10660 kg
01/10/2015	110088	109550	235	JOE BRADY CONTRACTOR	200301MMWCMMW COOTEHILL CCC	1,091.42	0.00	129.82	13.50%	24040 kg
01/10/2015	110107	109570	235	JOE BRADY CONTRACTOR	200301MMWCMMW COOTEHILL CCC	1,020.59	0.00	121.39	13.50%	22480 kg
01/10/2015	110112	109571	235	JOE BRADY CONTRACTOR	200301MMWCMMW COOTEHILL CCC	1,583.55	0.00	188.35	13.50%	34880 kg
Waste Account : 116					Totals :	4,179.52	0.00	497.12		92060 kg

Total Transactions : 4

End of Report

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Laser Methane Mini

Methane Detection at a Distance



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- Visual and audible alarms
- Lightweight and portable
- Bluetooth connection
- Data logging capabilities



Laser Methane Mini

Remote Methane Gas Detection

When lives and property are at risk and you need gas detection equipment that is totally reliable, you need Crowcon. For over 40 years Crowcon has been developing and manufacturing high quality products with a reputation for reliability and technical innovation.

Crowcon provides both single gas and multigas monitors for personal and portable safety applications providing protection against a wide range of industrial gas hazards.



Choosing a portable gas detector for your needs

Laser Methane mini (LMm) is a compact handheld detector that can detect methane gas from a safe distance. Utilising laser technology, methane leaks can be quickly confirmed by pointing the laser beam towards the suspected leak, or along the survey line. This revolutionary technology removes the need to access elevated places, under floor or other hard to reach areas. It is also ideal for surveying large open spaces e.g. landfills or along pipelines.

NEW! LMm is now available with a green laser guide light, which is more visible especially under strong sunlight. The Laser Methane Mini-Green (LMm-G) combines the benefit of LMm with additional data storage functions and comes with Bluetooth capability, which can be connected to any android device (through the Gasviewer app) for a variety of data storage functions. Important data like location, gas levels and time can also be saved or emailed to a central point.

LMm and LMm-G are easy to operate and require little maintenance. An automatic self check and calibration ensures consistent performance and reliability every time the units are turned on.

User friendly

Point and shoot technology	Requires little or no training and is easy to use
Compact and lightweight	Truly portable
Green/Red guide laser light	Clear visibility of where you are surveying
Wide organic electroluminescence display	Clear and bright readout on screen

Reliability

No moving parts	Little maintenance required
Self-check and automatic calibration start up	Ensure accurate and reliable reading

Records

Data storage	Full data logging capabilities
Bluetooth and Gasviewer app	Connectivity to android devices
Location service in Gasviewer app	Display and save value as well as location and time on map



LMm



LMm-G



Gasviewer App

Measurement principles:

Methane absorbs a specific wavelength of infrared rays. The laser diode emits infrared laser, receives the diffused light back and measures the absorption of the light. A reflective surface is required for proper measurement of methane gas. The laser beam from LMm can penetrate opaque surfaces, for example, glass or perspex.

The LMm and LMm-G measure the average methane gas density between the detector and target readings are reported in ppm-m as it is the product of concentration of methane cloud (ppm) and path length (m).

LMm:

LMm-G:

Size	70 x 179 x 42mm, (2.8 x 7 x 1.6 inches) WxDxH	70 x 179 x 42mm, (2.8 x 7 x 1.6 inches) WxDxH
Weight	600g (including Ni-MH battery pack)	530g (including Ni-MH battery pack)
Operating time	Approx. 6 hours	Approx. 4.5 hours
Operating temperature range	-17 - +50°C	-10 - +50°C
Target gas	Methane (CH ₄) and methane -containing gases	Methane (CH ₄) and methane-containing gases
Detection limits	1-50,000 ppm-m (%LEL or % Vol available)	1-50,000 ppm-m (%LEL or % Vol available)
Accuracy of detection	±10%	±10%
Detection distance (standard)	0.5m - 30m	0.5m - 100m (using an optional reflect sheet)
Ingress protection	IP65	IP65
Guide laser light colour	Red	Green
Certificate	Class 2:1mW CE (ATEX & EMC)	Class 3R: 5mW CE (R&TTE)
Best Application	Hazardous areas	Outdoors under strong sunshine

Applications:

- Industrial and commercial property surveys
- Emergency call out
- Gas plants
- Landfill gas monitoring
- Road surface survey
- Pipeline survey



New products available within the fixed and portable range are:



Crowcon F-Gas Detector
Refrigerant Gas and SF₆ Detector



Gasmaster
1-4 channel
control system



Detective+ and Detective Net
Transportable wireless area
gas monitor



Gas-Pro PID
5 gas VOC monitor

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Crowcon reserves the right to change the design or specification of the product without notice.
Check www.crowcon.com for updates

www.crowcon.com

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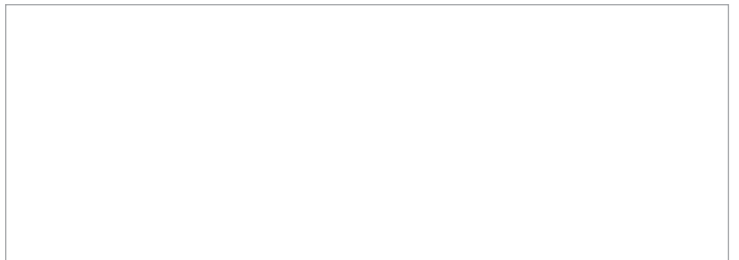
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 **CROWCON**
Detecting Gas Saving Lives