

**Attachment 4.8.2 – Baseline Report**

**Organisation Name: \***

Knockharley Landfill Limited

**Application I.D.: \***

LA004307

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## **BASELINE ASSESSMENT REPORT**

### **KNOCKHARLEY LANDFILL**

#### **Prepared For: -**

Knockharley Landfill Ltd  
Knockharley Landfill  
Knockharley  
Co. Meath

#### **Prepared By: -**

O' Callaghan Moran & Associates  
Unit 15, Melbourne Business Park  
Model Farm Road  
Cork

**September 2019**

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Project	Baseline Assessment Report Knockharley Landfill			
Client	Knockharley Landfill Ltd			
Report No	Date	Status	Prepared By	Reviewed By
	10/07/2019	Draft	Billy Hamilton MSc	Jim O'Callaghan MSc
	10/08/2019			

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## 1. INTRODUCTION

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Knockharley Landfill Ltd (KLL) operates under an Industrial Emissions Licence (IE) (Reg No. W0146-02) issued by the Environmental Protection Agency (the Agency). The licence authorises the acceptance of 200,000 tonnes of non-hazardous waste annually for disposal and recovery.

It is proposed to increase the annual waste acceptance rate to 435,000 tonnes, which will comprise up to 150,000 tonnes of incinerator bottom ash (IBA), as well as municipal solid wastes, including organic fines, non-hazardous contaminated soils, construction and demolition (C&D) wastes and baled recyclables.

5,000 tonnes per annum of stable non-reactive hazardous waste will also be accepted for co-disposal with the non-hazardous wastes. The IBA will be pre-treated and temporarily stored in dedicated landfill cells. The residual organic fines will be treated in a new on-site biological treatment plant, with the treated solid outputs used as daily cover. A leachate treatment plant will be installed to pre-treat leachate from the non-hazardous waste cells, the IBA cells and the biological treatment plant.

The proposed change requires a revision of the IE licence. An review application for an activity that involves the use, production or release of relevant hazardous substances (as defined in Section 3 of the EPA Act 1992 as amended), may require the preparation of a 'Baseline Report' under Article 22(2) of Directive 2010/75/EU on industrial emissions 2014/C 136/03, the objective of which is to establish the status of the soil and groundwater conditions.

### 1.1 Methodology

OCM's assessment was based on information in the Environmental Impact Assessment Report (EIAR) prepared in support of the licence review application and an assessment of the quality of the leachate generated in the landfill and followed the guidance in Part 5 of the European Commission Guidance concerning baseline reports.

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## 2. STAGE 1 & 2 HAZARDOUS SUBSTANCES

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### 2.1 Stage 1: Hazardous Substances Currently Used, Produced and Released

Current operations involve the use of diesel fuelled mobile plant and equipment. Lubricating and hydraulic oils are used in plant maintenance. Diesel and lubricating oils are recognised hazardous substances. Leachate is generated in the landfill cells due to the infiltration of rain through the waste mass and it contains a wide range of organic and inorganic substances that are classified as hazardous. It is proposed to accept 5,000 tonnes of non-reactive hazardous waste that may contain hazardous substances.

### 2.2 Stage 2: Relevant Hazardous Substances

The diesel is stored in a 6,000 litre tank provided with a containment bund. The bund design meets the specification in Condition 3.11 (W0146-1). The lubricating oils (ca 400 litres) are stored in a banded pallet inside the plant maintenance shed.

KLL implements an operational procedure (EMS-OP-05 Fuel Storage and Distribution (Rev 004) to minimise the risk of accidental spills associated with diesel/oil handling and storage and to ensure that where such releases occur they are contained and cleaned up. This, in conjunction with the relatively small amounts onsite at any one time, means that diesel/oil are not relevant hazardous substances.

The stable non-reactive hazardous wastes, by their nature, will have the same leaching characteristic as the non-hazardous waste and therefore are not considered to be relevant hazardous substances.

Currently the leachate produced in each cell is collected and pumped to a holding lagoon pending removal off site in road tankers for treatment in municipal wastewater treatment plants. The leachate is classed as non-hazardous.

In 2018 KLL undertook an assessment of the quality of the leachate arising at the installation to confirm it was suitable for treatment at an Irish Water municipal wastewater treatment plant. The assessment was based on the results of the routine analysis conducted in accordance with the licence requirements and additional parameters requested by Irish Water to identify and quantify 'priority substances'. The report on the assessment is in Appendix 1. While hazardous substances were detected, the levels were so low they do not present any significant environmental risk and therefore leachate is not considered to be a relevant hazardous substance.

**APPENDIX 1**

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## LEACHATE ASSESSMENT

## KNOCKHARLEY LANDFILL

### Prepared For: -

Knockharley Landfill Ltd,  
Knockharley Landfill,  
Knockharley,  
Co. Meath

### Prepared By: -

O' Callaghan Moran & Associates,  
Unit 15 Melbourne Business Park,  
Model Farm Road,  
Cork.

**11 May 2018**



Project	Knockharley Landfill Leachate Suitability Assessment			
Client	Knockharley Landfill Ltd W0146-02			
Report No.	Date	Status	Prepared By	Reviewed By
2110401	04/05/2018	Draft	Neil Sandes PGeo	Jim O'Callaghan MSc
	11/05/2018	Final		

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**APPENDIX 1**

**Routine Leachate Monitoring Results**

**APPENDIX 2**

**Laboratory Report: Priority Substances**

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# 1 1 INTRODUCTION

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Knockharley Landfill Limited (KLL) appointed O’Callaghan Moran & Associates (OCM) to undertake an assessment of the quality of the leachate arising at the Knockharley Landfill in the context of the proposal to consign the leachate to an Irish Water municipal wastewater treatment plant for treatment.

## 1.1 1.1 Methodology

The assessment was based on the results of the laboratory analysis of representative samples of the leachate carried out in compliance with the EPA licence requirements additional analysis conducted in response to a request by Irish Water to identify and quantify ‘priority substances’. The assessment took into consideration the following publications:

- **EPA Research Report No. 214** ‘Suitability of Municipal Wastewater Treatment Plants for the Treatment of Landfill Leachate’ and
- **EPA** ‘Guidance on the Screening for Priority Substances for Waste Water Discharge Licences’

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## 2 LEACHATE ANALYSIS

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### 2.1 Landfill Development

Knockharley Landfill is a non-hazardous residual landfill that opened in 2004 and has been developed in a series of phases comprising engineered landfill cells. Once the final levels have been reached in the cells in each phase they are covered with a low permeability capping layer to minimise leachate generation. The capping sequence is as follows:

Phase 1: 2009

Phase 2: 2012

Phase 3: 2012 to 2013

Phase 4: 2016

Phase 5: 2017.

### 2.2 Leachate Management System

Leachate produced within each landfill cell is collected in a sump from where it is pumped to a lined and covered holding lagoon. The lagoon acts as an equalising tank, where leachate from all of the different landfill cells are mixed.

### 2.3 Leachate Quality

The IE Licence requires regular monitoring of the leachate for the parameters specified in Table D5.1. The results of the monitoring carried out on the leachate from the landfill cells and the lagoon between Q1 2017 and Q2 2018 are in Appendix 1. The results indicate that the leachate in the lagoon falls into the Young Classification.<sup>1</sup>

### 2.4 Priority Substances

The monitoring carried out in accordance with the licence requirements does not include all of the substances listed in the EPA document 'Guidance on the Screening for Priority Substances for Waste Water Discharge Licences.' Therefore further analysis was carried out for the parameters listed in Table 2.1.

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<sup>1</sup> EPA Research Report No. 214 'Suitability of Municipal Wastewater Treatment Plants for the Treatment of Landfill Leachate'

**Table 2.1 Parameters to be screened for Wastewater Discharges<sup>2</sup>**

Parameter Required	Group	Parameter Required	Group
Benzene	VOCs	Linuron	Pesticides
Carbon tetrachloride		Dichlobenil	
1,2-Dichloroethane		2,6-Dichlorobenzamide	
Dichloromethane		PCBs	PCBs
Tetrachloroethylene		Phenols (as Total C)	Phenols
Trichloroethylene		Lead	Metals
Trichlorobenzenes		Arsenic	
Trichloromethane		Copper	
Xylenes (all isomers):		Zinc	
Ethyl Benzene		Cadmium	
Toluene		Mercury	
Naphthlene		Chromium	
Fluoranthene		Selenium	
Benzo[k]fluoranthene		Antimony	
Benzo[ghi]perylene	Molybdenum		
Indeno[1,2,3-c,d]pyrene	Tin		
Benzo[b]fluoranthene	Barium		
Benzo[a]pyrene	Boron		
Di(2-ethylhexyl)phthalate (DEHP)	Plasticiser	Cobalt	
Isodrin	Pesticides	Vanadium	
Dieldrin		Nickel	
Diuron		Fluoride	
Isoproturon		Chloride	
Atrazine		TOC	
Simazine		Cyanide	
Glycophosate		Conductivity	
Mecoprop		Hardness	
2,4-D		pH	
MCPA			

The laboratory report is in Appendix 2 and results are presented in Table 2.2.

## 2.5 Discussion

The general leachate quality parameters indicate the leachate is in the Young Classification and therefore should be suitable for co-treatment at a municipal wastewater treatment plant, as per the recommendations of the EPA Research Report No. 214.

An assessment of the significance of the presence and concentration of priority substances in the leachate is dependent of the total loading of these substances on the wastewater treatment plant where the leachate will be treated and the assimilative capacity of the water course into which the treated effluent is discharged.

<sup>2</sup> EPA 'Guidance on the Screening for Priority Substances for Waste Water Discharge Licences'

**Table 2.2 Priority Substances**

Parameter	Group	Units	Result	Parameter	Group	Units	EQS
Benzene	VOCs	µg/l	3.9	Linuron	Pesticides	µg/l	NE
Carbon tetrachloride		µg/l	<2	Dichlobenil		µg/l	NE
1,2-Dichloroethane		µg/l	<2	2,6-Dichlorobenzamide		µg/l	NE
Dichloromethane		µg/l	<5	PCBs	PCBs	µg/l	NE
Tetrachloroethylene		µg/l	<3	Phenols (as Total C)	Phenols	µg/l	8
<b>Trichloroethylene</b>		µg/l	<3	Lead	Metals	µg/l	1.2
Trichlorobenzenes		µg/l	<3	Arsenic		µg/l	20
<b>Trichloromethane</b>		µg/l	<2	Copper		µg/l	5
Xylenes (all isomers):		µg/l	27	Zinc		µg/l	8
Ethyl Benzene		µg/l	11	Cadmium		µg/l	0.2
Toluene		µg/l	47	Mercury		µg/l	NE
Naphthlene		PAHs	µg/l	<10		Chromium	µg/l
Fluoranthene	µg/l		<5	Selenium		µg/l	NE
Benzo[k]fluoranthene	µg/l		<10	Antimony		µg/l	NE
Benzo[ghi]perylene	µg/l		<5	Molybdenum		µg/l	NE
Indeno[1,2,3-c,d]pyrene	µg/l		<10	Tin		µg/l	NE
Benzo[b]fluoranthene	µg/l		<10	Barium		µg/l	NE
Benzo[a]pyrene	µg/l		<10	Boron	µg/l	NE	
Di(2-ethylhexyl)phthalate (DEHP)	Plasticiser	µg/l	<50	Cobalt	µg/l	NE	
Isodrin	Pesticides	µg/l	<0.02	Vanadium	µg/l	NE	
Dieldrin		µg/l	<0.02	Nickel	µg/l	4	
Diuron		µg/l	0.11	Fluoride	mg/l	0.5	
<b>Isoproturon</b>		µg/l		Chloride	mg/l	NE	
Atrazine		µg/l	<0.02	TOC	mg/l	NE	
Simazine		µg/l	<0.04	Cyanide	mg/l	0.01	
Glyphosate		µg/l	120	Conductivity	µS/cm		
Mecoprop		µg/l	<0.1	Hardness	mg/l		
2,4-D		µg/l	<0.1	pH	units		
MCPA		µg/l	<0.1				

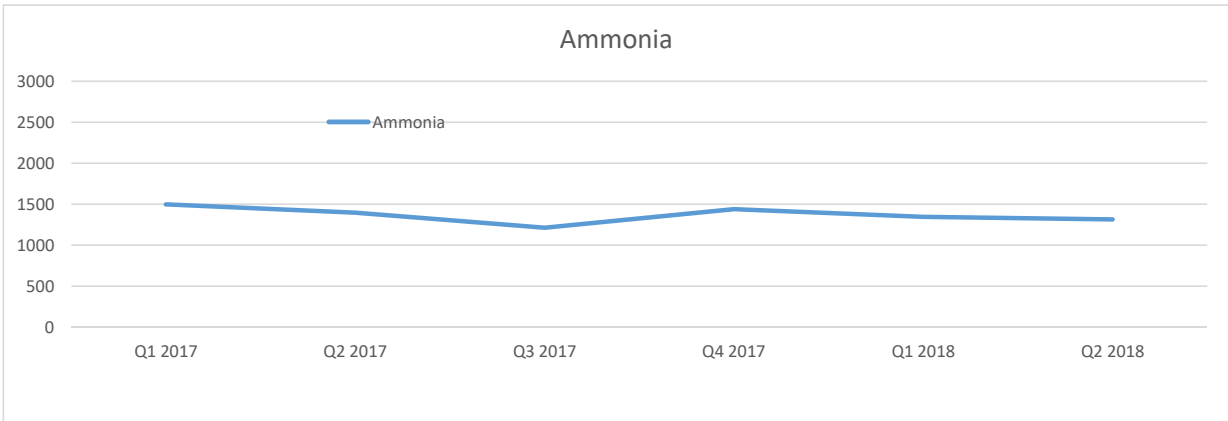
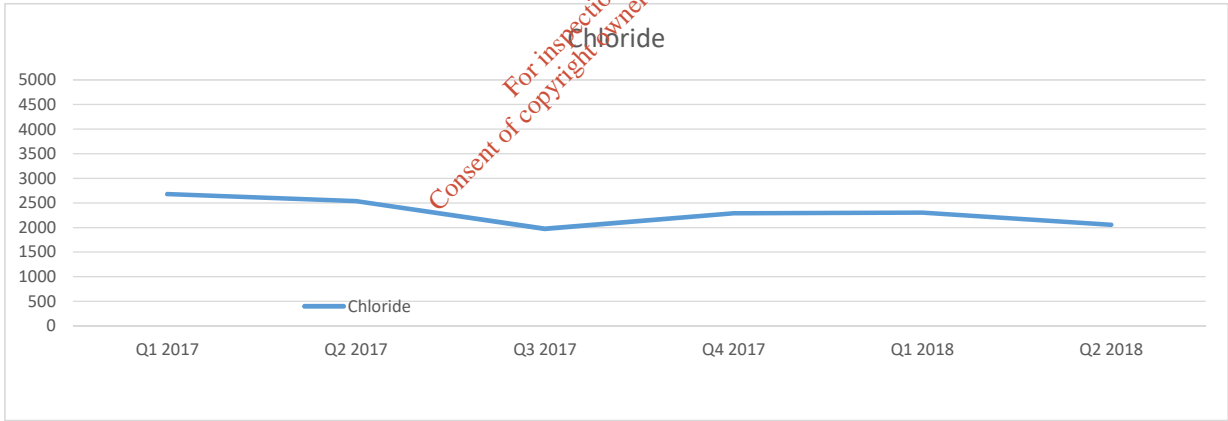
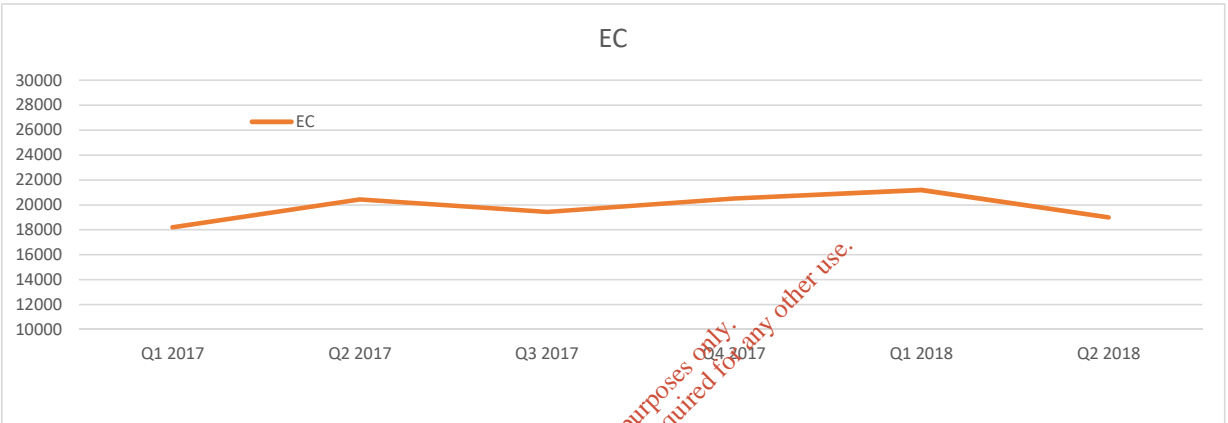
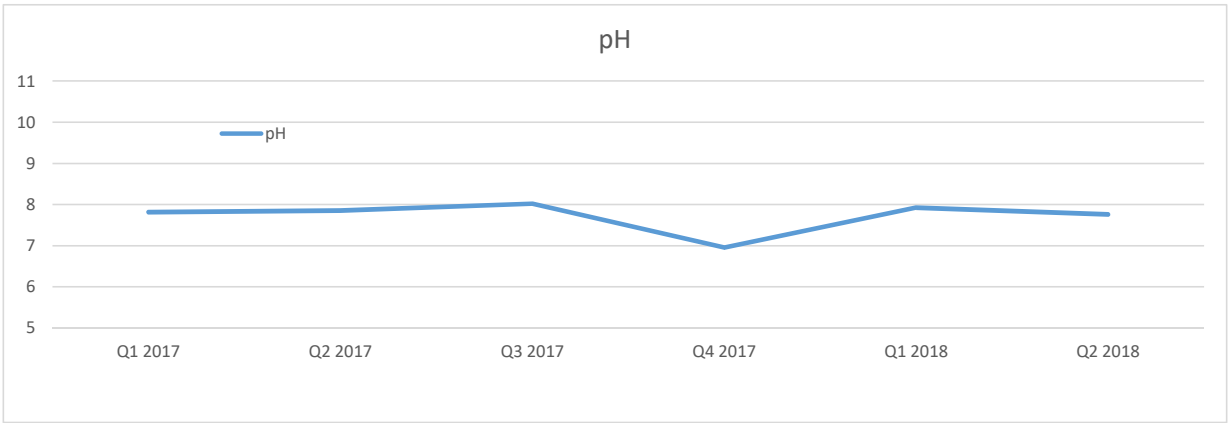
# **APPENDIX 1**

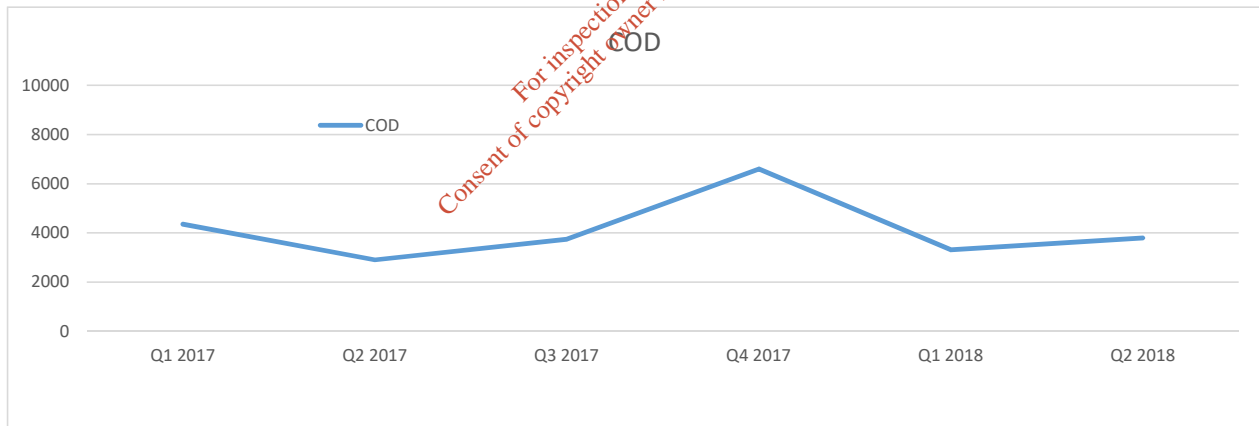
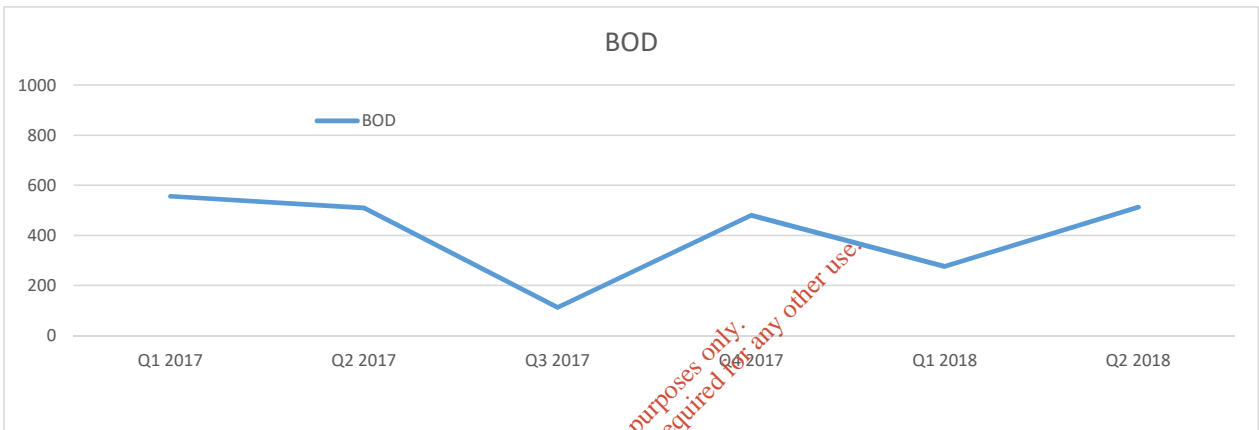
Leachate Results Q1 2017 to Q2 2018

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	Units	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Averages
<b>pH</b>	units	7.81	7.85	8.02	6.95	7.92	7.76	7.72
<b>EC</b>	µS/cm	18191	20424	19421	20501	21188	18980	19784
<b>Chloride</b>	mg/l	2681	2535	1973	2292	2300	2058	2306
<b>Ammonia</b>	mg/l	1498	1398	1213	1441	1348	1316	1369
<b>BOD</b>	mg/l	556	510	112	480	276	512	408
<b>COD</b>	mg/l	4360	2904	3750	6600	3320	3800	4122
<b>COD/BOD</b>	ratio	0.13	0.18	0.03	0.07	0.08	0.13	0.10
<b>TON</b>	mg/l	<0.2	<0.2	<4	<1	<0.2	<0.5	







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## **APPENDIX 2**

### Laboratory Report

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# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

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Cork  
Ireland

Tel: +44 (0) 1244 833780  
Fax: +44 (0) 1244 833781

**Attention :** Neil Sandes  
**Date :** 20th April, 2018  
**Your reference :** 18-211-04  
**Our reference :** Test Report 18/4994 Batch 1  
**Location :** Knockharley Landfill Leachate  
**Date samples received :** 5th April, 2018  
**Status :** Final report  
**Issue :** 1

One sample was received for analysis on 5th April, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.  
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

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## Compiled By:

**Bruce Leslie**  
Project Co-ordinator

Exova Jones Environmental

Client Name: O'Callaghan Moran & Associates  
 Reference: 18-211-04  
 Location: Knockharley Landfill Leachate  
 Contact: Neil Sandes  
 JE Job No.: 18/4994

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle  
 H=H<sub>2</sub>SO<sub>4</sub>, Z=ZnAc, N=NaOH, HN=HNO<sub>3</sub>

J E Sample No.	1-10													
Sample ID	Lagoon													
Depth														
COC No / misc														
Containers	V N P G													
Sample Date	04/04/2018													
Sample Type	Leachate													
Batch Number	1													
Date of Receipt	05/04/2018													
											LOD/LOR	Units	Method No.	
Dissolved Antimony	53 <sup>AA</sup>											<2	ug/l	TM30/PM14
Dissolved Arsenic	188.0 <sup>AA</sup>											<2.5	ug/l	TM30/PM14
Dissolved Barium	600 <sup>AA</sup>											<3	ug/l	TM30/PM14
Dissolved Boron	9398 <sup>AA</sup>											<12	ug/l	TM30/PM14
Dissolved Cadmium	<1.0 <sup>AA</sup>											<0.5	ug/l	TM30/PM14
Total Dissolved Chromium	440.9 <sup>AA</sup>											<1.5	ug/l	TM30/PM14
Dissolved Cobalt	32 <sup>AA</sup>											<2	ug/l	TM30/PM14
Dissolved Copper	<14 <sup>AA</sup>											<7	ug/l	TM30/PM14
Dissolved Lead	<10 <sup>AA</sup>											<5	ug/l	TM30/PM14
Dissolved Mercury	<2 <sup>AA</sup>											<1	ug/l	TM30/PM14
Dissolved Molybdenum	7 <sup>AA</sup>											<2	ug/l	TM30/PM14
Dissolved Nickel	201 <sup>AA</sup>											<2	ug/l	TM30/PM14
Dissolved Selenium	<6 <sup>AA</sup>											<3	ug/l	TM30/PM14
Dissolved Tin	58 <sup>AA</sup>											<5	ug/l	TM30/PM14
Dissolved Vanadium	227.9 <sup>AA</sup>											<1.5	ug/l	TM30/PM14
Dissolved Zinc	25 <sup>AA</sup>											<3	ug/l	TM30/PM14
Total Hardness Dissolved (as CaCO <sub>3</sub> )	943 <sup>AA</sup>											<1	mg/l	TM30/PM14
VOC TICs	ND												None	TM15/PM10
SVOC TICs	See Attached <sup>AC</sup>												None	TM16/PM30

Please see attached notes for all abbreviations and acronyms

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**Client Name:** O'Callaghan Moran & Associates  
**Reference:** 18-211-04  
**Location:** Knockharley Landfill Leachate  
**Contact:** Neil Sandes  
**JE Job No.:** 18/4994

**Report :** Liquid

**Liquids/products:** V=40ml vial, G=glass bottle, P=plastic bottle  
 H=H<sub>2</sub>SO<sub>4</sub>, Z=ZnAc, N=NaOH, HN=HNO<sub>3</sub>

J E Sample No.	1-10														LOD/LOR	Units	Method No.
Sample ID	Lagoon																
Depth																	
COC No / misc																	
Containers	V N P G																
Sample Date	04/04/2018																
Sample Type	Leachate																
Batch Number	1																
Date of Receipt	05/04/2018																
Pesticides																	
Organochlorine Pesticides																	
Aldrin	<0.10 <sub>AC</sub>														<0.01	ug/l	TM149/PM30
Alpha-HCH (BHC)	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Beta-HCH (BHC)	<0.20 <sub>AD</sub>														<0.01	ug/l	TM149/PM30
Chlorothalonil	<5.00 <sub>AF</sub>														<0.01	ug/l	TM149/PM30
cis-Chlordane	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Delta-HCH (BHC)	<0.10 <sub>AC</sub>														<0.01	ug/l	TM149/PM30
Dieldrin	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Endosulphan I	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Endosulphan II	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Endosulphan sulphate	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Endrin	<0.04 <sub>AB</sub>														<0.01	ug/l	TM149/PM30
Gamma-HCH (BHC)	<0.20 <sub>AD</sub>														<0.01	ug/l	TM149/PM30
Heptachlor	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Heptachlor Epoxide	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Hexachlorobenzene	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Isodrin	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
o,p'-DDE	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
o,p'-DDT	<0.10 <sub>AC</sub>														<0.01	ug/l	TM149/PM30
o,p'-Methoxychlor	<0.10 <sub>AC</sub>														<0.01	ug/l	TM149/PM30
o,p'-TDE	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
p,p'-DDE	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
p,p'-DDT	<0.20 <sub>AD</sub>														<0.01	ug/l	TM149/PM30
p,p'-Methoxychlor	<0.40 <sub>AE</sub>														<0.01	ug/l	TM149/PM30
p,p'-TDE	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Pendimethalin	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Permethrin I	<0.10 <sub>AC</sub>														<0.01	ug/l	TM149/PM30
Permethrin II	<0.40 <sub>AE</sub>														<0.01	ug/l	TM149/PM30
Quintozene (PCNB)	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Tecnazene	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Telodrin	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
trans-Chlordane	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Triadimefon	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Triallate	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Trifluralin	<0.02 <sub>AA</sub>														<0.01	ug/l	TM149/PM30
Benazolin	<0.1														<0.1	ug/l	TM42/PM30
Bentazone	<0.1														<0.1	ug/l	TM42/PM30
Bromoxynil	<0.1														<0.1	ug/l	TM42/PM30
Clopyralid	<0.1														<0.1	ug/l	TM42/PM30
4 - CPA	<0.1														<0.1	ug/l	TM42/PM30
2,4-D	<0.1														<0.1	ug/l	TM42/PM30
2,4 - DB	<0.1														<0.1	ug/l	TM42/PM30

Please see attached notes for all abbreviations and acronyms

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**Exova Jones Environmental**

**Client Name:** O'Callaghan Moran & Associates  
**Reference:** 18-211-04  
**Location:** Knockharley Landfill Leachate  
**Contact:** Neil Sandes  
**JE Job No.:** 18/4994

**Report : Liquid**

**Liquids/products:** V=40ml vial, G=glass bottle, P=plastic bottle  
 H=H<sub>2</sub>SO<sub>4</sub>, Z=ZnAc, N=NaOH, HN=HNO<sub>3</sub>

J E Sample No.										Please see attached notes for all abbreviations and acronyms								
Sample ID	Lagoon	Depth		COC No / misc		Containers	V N P G	Sample Date	04/04/2018	Sample Type	Leachate	Batch Number	1	Date of Receipt	05/04/2018	LOD/LOR	Units	Method No.
Dicamba	<0.1														<0.1	ug/l	TM42/PM30	
Dichloroprop	<0.1														<0.1	ug/l	TM42/PM30	
Diclofop	<0.1														<0.1	ug/l	TM42/PM30	
Fenoprop	<0.1														<0.1	ug/l	TM42/PM30	
Flamprop	<0.1														<0.1	ug/l	TM42/PM30	
Flamprop – isopropyl	<0.1														<0.1	ug/l	TM42/PM30	
Ioxynil	<0.1														<0.1	ug/l	TM42/PM30	
MCPA	<0.1														<0.1	ug/l	TM42/PM30	
MCPB	<0.1														<0.1	ug/l	TM42/PM30	
Mecoprop	<0.1														<0.1	ug/l	TM42/PM30	
Picloram	<0.1														<0.1	ug/l	TM42/PM30	
Pentachlorophenol	<0.1														<0.1	ug/l	TM42/PM30	
2,4,5 - T	<0.1														<0.1	ug/l	TM42/PM30	
2,3,6 - TBA	<0.1														<0.1	ug/l	TM42/PM30	
Triclopyr	<0.1														<0.1	ug/l	TM42/PM30	
Atrazine	<0.02 <sup>AA</sup>														<0.01	ug/l	TM149/PM30	
Simazine	<0.04 <sup>AB</sup>														<0.01	ug/l	TM149/PM30	
PCB 28	<0.1														<0.1	ug/l	TM17/PM30	
PCB 52	<0.1														<0.1	ug/l	TM17/PM30	
PCB 101	<0.1														<0.1	ug/l	TM17/PM30	
PCB 118	<0.1														<0.1	ug/l	TM17/PM30	
PCB 138	<0.1														<0.1	ug/l	TM17/PM30	
PCB 153	<0.1														<0.1	ug/l	TM17/PM30	
PCB 180	<0.1														<0.1	ug/l	TM17/PM30	
Total 7 PCBs	<0.7														<0.7	ug/l	TM17/PM30	
Fluoride	0.7														<0.3	mg/l	TM173/PM0	
Chloride	2137.0														<0.3	mg/l	TM38/PM0	
Total Cyanide	0.16														<0.01	mg/l	TM89/PM0	
Dissolved Methane	9985 <sup>++</sup>														<1	ug/l	TM25/PM0	
Monuron	<0.10 <sup>SV AC</sup>														<0.01	ug/l	TM97/PM55	
Diuron	0.11 <sup>SV AC</sup>														<0.01	ug/l	TM97/PM55	
Linuron	<0.10 <sup>SV AC</sup>														<0.01	ug/l	TM97/PM55	
Electrical Conductivity @25C	20227														<2	uS/cm	TM76/PM0	
Glyphosate*	120.0														<0.2	ug/l	Subcontracted	
pH	7.81														<0.01	pH units	TM73/PM0	
Total Organic Carbon	1399														<2	mg/l	TM60/PM0	

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**Client Name:** O'Callaghan Moran & Associates  
**Reference:** 18-211-04  
**Location:** Knockharley Landfill Leachate  
**Contact:** Neil Sandes  
**JE Job No.:** 18/4994

**SVOC Report :** Liquid

J E Sample No.	1-10													
Sample ID	Lagoon													
Depth														
COC No / misc														
Containers	V N P G													
Sample Date	04/04/2018													
Sample Type	Leachate													
Batch Number	1													
Date of Receipt	05/04/2018													
										LOD/LOR	Units	Method No.		
SVOC MS														
<b>Phenols</b>														
2-Chlorophenol	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
2-Methylphenol	40.9 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
2-Nitrophenol	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
4-Methylphenol	216 <sup>AC</sup>											<1	ug/l	TM16/PM30
4-Nitrophenol	<100 <sup>AC</sup>											<10	ug/l	TM16/PM30
Pentachlorophenol	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
Phenol	56 <sup>AC</sup>											<1	ug/l	TM16/PM30
<b>PAHs</b>														
2-Chloronaphthalene	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
2-Methylnaphthalene	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
Naphthalene	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
Acenaphthylene	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
Acenaphthene	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
Fluorene	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
Phenanthrene	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
Anthracene	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
Fluoranthene	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
Pyrene	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
Benzo(a)anthracene	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
Chrysene	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
Benzo(bk)fluoranthene	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
Benzo(a)pyrene	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
Indeno(123cd)pyrene	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
Dibenzo(ah)anthracene	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
Benzo(ghi)perylene	<5.0 <sup>AC</sup>											<0.5	ug/l	TM16/PM30
<b>Phthalates</b>														
Bis(2-ethylhexyl) phthalate	<50 <sup>AC</sup>											<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
Di-n-butyl phthalate	<15.0 <sup>AC</sup>											<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
Diethyl phthalate	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30
Dimethyl phthalate	<10 <sup>AC</sup>											<1	ug/l	TM16/PM30

Please see attached notes for all abbreviations and acronyms

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# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/4994

## SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

## WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

## DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

## SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

## BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

## NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

**ABBREVIATIONS and ACRONYMS USED**

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x2 Dilution
AB	x4 Dilution
AC	x10 Dilution
AD	x20 Dilution
AE	x40 Dilution
AF	x500 Dilution

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JE Job No: 18/4994

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM25	Determinaion of Dissolved Methane, Ethane and Ethene by Headspace GC-FID	PM0	No preparation is required.				
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.				
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.				
TM42	Modified US EPA method 8270. Pesticides and herbicides by GC-MS	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM60	Modified USEPA 9060. Determination of TOC by calculation from Total Carbon and Inorganic Carbon using a TOC analyser, the carbon in the sample is converted to CO2 and then passed through a non-dispersive infrared gas analyser (NDIR).	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.				
TM76	Modified US EPA method 120.1. Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.				

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JE Job No: 18/4994

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.				
TM97	Determination of specific Uron Herbicides using Reversed Phase High Performance Liquid Chromatography and Mass Spectroscopy detection.	PM55	Liquid samples are passed through a Solid Phase Extraction (SPE) column under vacuum and a solvent of appropriate polarity (Methanol) is used to elute the analytes from the column. Solid samples are extracted with solvent by End over End.				
TM149	Determination of Pesticides by Large Volume Injection on GC Triple Quad MS, based upon USEPA method 8270	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.				
Subcontracted	Subcontracted analysis, sent to an ISO 17025 accredited laboratory where possible.						

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