

Sure Partners Limited

ARKLOW BANK WIND PARK  
PHASE 2

**ONSHORE GRID  
INFRASTRUCTURE**

**VOLUME III**

**Chapter 9 APPENDICES**

**Appendix 9.1a** GI Reports - Landfall  
Factual Report

ARUP

 **sse**  
Renewables

**Appendix 9.1a**  
Landfall Factual  
Report

# IRISH DRILLING LIMITED

LOUGHREA, CO. GALWAY, IRELAND



CONTRACT DRILLING  
SITE INVESTIGATION

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## ARKLOW BANK WIND PARK ONSHORE GROUND INVESTIGATIONS

### LANDFALL SITE INVESTIGATIONS FACTUAL REPORT

Sure Partners Ltd,  
South County Business Park,  
Leopardstown,  
Dublin 18.

ARUP,  
Consulting Engineers,  
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	Prepared by	Approved by	Rev. Issue Date:	Revision No.
	Ronan Killeen	Declan Joyce	4 <sup>th</sup> January 2021	20 WW_101/02b
<u>Signature</u>	RK	DJ		

Report No.: LF100034-ENG-GT-ONX-RPT-0001

## FOREWORD

The borehole and trial pit records have been compiled from an examination of the samples by a Geotechnical Engineer and from the Drillers' descriptions.

The report presents an opinion on the configuration of the strata within the site based on the borehole and trial pit results. The assumptions, though reasonable, are given for guidance only and no liability can be accepted for changes in conditions not revealed by the boreholes and trial pits.

The fieldwork was carried out in accordance with IS EN 1997-2 and BS5930, 2015 Code of Practice for Site Investigations with precedence given to IS EN 1997-2 where applicable.

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## 1.0 Introduction.

Irish Drilling Ltd. (IDL) was instructed by Sure Partners Limited (SPL), to carry out a site investigation at the site of the proposed landfall site for the Arklow Bank Wind Park (ABWP) Onshore Grid Infrastructure Project.

This site investigation was carried out to provide detailed factual geotechnical information of the underlying ground conditions at the proposed landfall site.

The fieldwork commenced on October 13<sup>th</sup> 2020 and was completed on November 4<sup>th</sup> 2020.

## 2.0 Site & Geology

The site is located north of Arklow Town and comprises of an area circa 200m by 200m in dimension and this is proposed to be used to accommodate the proposed subsea cable.

The site can be generally described as arable farmland with sloping and undulating topography.

A Site Plan, prepared by the client's representatives and amended by IDL to show 'as-built' locations, is included with this report as Appendix 9.

The following were the main published information sources used:

### Subsoil Geology

General Classification:

Cable Percussive borehole, Trial Pit data, the Teagasc Subsoil Mapping (2004) and the Quaternary Geology of Ireland – Sediments Map: 1 to 50,000 were reviewed to obtain information on subsoil classifications within the proposed locations.

### Solid Geology

General Classification:

The 1:100,000 scale map series Geological Survey of Ireland: A geological Description: Sheet 16 and the Geological Survey of Ireland Map Viewer were used to establish the probable geological rock formations underlying the proposed location.

Site investigation data is available as point source data along the proposed route, and the majority of the ground in between the points can only be assumed to follow the characteristics of the nearest available data.

A summary of the ground conditions recorded in published data for the region (including GSI database) is outlined as follows:

#### Glacial Till:

Generally, glacial till is what was often referred to as Boulder Clay. Here we have the calcareous Irish Sea till, a diverse material that has been largely deposited sub-glacially and has a wide range of characteristics due to the variety of parent materials and processes of deposition. Till is generally tightly packed, unsorted, heterogeneous, unbedded, and can have a wide range of particle sizes and types, which are often but not exclusively angular or sub-angular.

#### Bedrock:

The general bedrock lithology mapped beneath the location is the Ordovician Ballylane Shale Formation. This rock formation is generally composed of a series of layered sandstones, siltstones and shales. From core samples thus identified as Ordovician Shales: and seen greenish grey, grey and dark grey fine-grained shale with subordinate greenish brown and brown fine and medium grained sandstone.



### **3.0 Fieldwork.**

#### **3.1 Fieldwork Plant:**

The following plant was mobilised to site to carry out fieldwork operations:

Hyundai 140x Excavator.  
DeltaBase 520 Rotary Core Drill Rig.

Fieldwork carried out to date has included the following:

#### **3.2 Rotary Core Boreholes:**

Five rotary core boreholes were carried out to establish overburden conditions and rockhead and to establish the nature and integrity of the underlying rock.

The rotary core boreholes were carried out as 'stand-alone' boreholes and used a water based flush system as the drilling medium while a biodegradable polymer gel was also used where necessary to aid the drilling and soil / rock recovery process.

The boreholes were predominantly completed using wireline drilling techniques, with PQ and GeoboreS size (84mm core/123mm hole diameter and 100mm core / 155mm hole diameter) drill strings to recover soil and rock core samples.

The samples were stored in wooden boxes and returned to the laboratory where there were logged and photographed by a Geotechnical Engineer and presented for testing.

A downhole acoustic survey was carried out in all the boreholes and on completion of the acoustic televiewer surveys a 50mm diameter standpipe was installed in the following rotary core boreholes to allow for the monitoring of groundwater levels over a prolonged period of time: BH 01, BH 03 and BH 04.

The rotary core boreholes were carried out to depths ranging from 10.10m to 20.20m below ground level.

#### **3.3 Trial Pits:**

Twelve trial pits were excavated on site using a 13T wide-padded tracked excavator. The pits were logged and photographed by an Engineer with observations made on ground conditions, pit stability, water ingress and services encountered.

Small and bulk disturbed soil samples were recovered at each change in strata and returned to the laboratory and presented for testing.

Shear Vane Tests were carried out in-situ where applicable or on irregular lump samples recovered from trial pit arisings.

In-Situ tests consisting of thermal conductivity/thermal resistivity were also carried out at the following trial pit locations: TP 03-TP 12.

The tests were carried out using a TLS-100 Portable Thermal Conductivity/Thermal Resistivity Meter and the results are included as Appendix 2a of this factual report.

#### **3.4 Acoustic Televiewer Survey:**

An Acoustic Televiewer Survey was carried out by European Geophysical Surveys Limited.

The surveys were carried out at the following five rotary core locations: BH 01, 02, 03, 04 and 05.



The survey was carried out in the boreholes at depths ranging from 0.20m to 20.20m below ground level and consisted of the following: Optical Imager, Acoustic Imager, Natural Gamma, Caliper, Focused Resistivity, Fluid Temperature and Conductivity, Impeller Flowmeter and Full Wave Sonic.

The records of the televiewer survey are included as a 'stand-alone' report in appendix 3 of this report.

### **3.5 Soil Resistivity Test:**

One soil resistivity test (SR 07) was carried out on site.

The test was carried out using a Megger Resistivity Unit with electrode spacings of 1m, 2m and 3m used to complete the test.

The records of the soil resistivity test are included as Appendix 4 of this factual report.

### **3.6 Surveying:**

The borehole and trial pit locations were set out on site using a Trimble CU Bluetooth GPS Surveying Unit and the co-ordinates are included on the logs presented in the appendices. All fieldwork co-ordinates are reported to Irish Transverse Mercator (ITM) with Reduced Levels recorded relative to Malin Head Datum and with an accuracy level of + or – 0.10m.

### **3.7 General Summary:**

Ground conditions encountered during the completion of the fieldwork were typical and as expected for this region and predominantly consisted of Irish Sea Tills overlying Bedrock. The Tills in general consisted of slightly sandy slightly gravelly silt/clay with cobbles and boulders.

Intact bedrock in general is described as grey, fine-grained, thinly laminated shale.






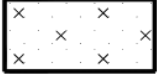

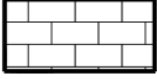

Bedrock was encountered in the rotary core boreholes at depths varying from 2.30m to 9.00m below ground level and for detailed descriptions of bedrock please refer to the engineering logs included in the appendices to this report.

Reference should be made to the engineering logs for a detailed description of the ground conditions encountered.

The fieldwork was carried out in accordance with IS EN 1997-2 and BS5930, 2015 Code of Practice for Site Investigations with precedence given to IS EN 1997-2 where applicable.



The following Key Legend Table details the symbology used on the engineering logs to describe ground conditions encountered:

Legend:			
	Made ground=mg		Clay=cl
	Boulders and cobbles=b/c		Peat=p
	Gravel=g		Silty sand=s/si
	Sand=s		Rock=r
	Silt=si		

#### 4.0 Laboratory Testing

Representative samples recovered from the boreholes and trial pits were scheduled for testing in the laboratory.

The test schedules were prepared by the Client's Engineer and included some or all of the following tests on disturbed and/or undisturbed soil samples recovered from the trial pits:

- \* 30nr Natural Moisture Content.
- \* 25nr Atterberg Limits.
- \* 27nr Particle Size Distribution.
- \* 23nr Sedimentation.
- \* 12nr Chemical (pH, Sulphate, Total Sulphur).
- \* 8nr Compaction.
- \* 8nr Moisture Content Relationship.
- \* 24nr Environmental Suite.
- \* 12nr Thermal Resistivity.

The test schedules also included some or all of the following tests on soil and/or rock core samples recovered from the boreholes:

- \* 10nr Natural Moisture Content.
- \* 9nr Atterberg Limits.
- \* 10nr Particle Size Distribution.
- \* 9nr Sedimentation.
- \* 7nr Triaxial.



- \* 46nr Point Load Tests.
- \* 5nr Unconfined Compressive Strength (UCS).
- \* 6n Natural Water Content (rock core).
- \* 6nr Flakiness Index.
- \* 2nr Frost Heave.
- \* 2nr Resistance to Freezing and Thawing.
- \* 14nr Rebound Hardness.
- \* 4nr Petrographic Analyses

A full summary of the soil and rock test results is included as Appendix 6 of this report.

A number of laboratory test results not available on issuance of this report will be presented as an Addendum to this report accordingly.

The test schedules were carried out predominantly at the IDL Laboratory located at Loughrea, County Galway.

A number of specialist tests not available at the IDL laboratory were carried out by designated laboratories on a subcontract basis as follows:

Laboratory chemical and environmental tests were carried out by Alcontrol Laboratories, UK.  
Triaxial soil tests were carried out by NMTL, Carlow.  
Specialist rock tests were carried out by Celtest Laboratories, UK.

The soil and rock descriptions as noted on the borehole and trial pit logs are in general visual descriptions as observed and logged by our Engineers and are described in accordance with IS EN 1997-2 and BS5930, 2015 Code of Practice for Site Investigations.

Soils descriptions (cohesive or otherwise) are also initially assessed based on the texture and 'feel' of the soil materials as witnessed by our Geotechnical Engineers.

Where laboratory classification tests have been carried out on soil or rock samples then these visual descriptions have been amended accordingly to take into account the results of these classification tests.

The records of all fieldwork, laboratory test results completed to date and photographs are included in the appendices of this Factual Report.

Ronan Killeen  
Chartered Engineer  
Irish Drilling Limited  
January 4<sup>th</sup> 2021



# Appendix 1      Borehole Records (Rotary Core)



## DRILLHOLE LOG

Project <b>Arklow Bank Wind Park-Landfall Site Investigations</b>				Location Arklow, County Wicklow		<b>DRILLHOLE No</b>  <b>BH01</b>
Job No <b>2020WW102</b>	Date 20-10-20 21-10-20	Ground Level (m OD) 13.97	Co-Ordinates () E 727,115.2 N 677,281.4			
Engineer <b>ARUP</b>					Sheet 1 of 1 Rev. DRAFT1	

RUN DETAILS						STRATA			Geology	Instrument/ Backfill	
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION					
						Discontinuities	Detail	Main			
0.00	75 (-)	NA			(2.50)	0.00 - 2.50 m: overburden		Stiff orangish brown slightly sandy CLAY. Sand is fine to medium.			
2.00		2.00 (15)	11.47		2.50	2.50 - 10.20 Discontinuities, apparently closely spaced, locally extremely and very closely spaced, dipping 18 to 20 and 84 to 86°, planar, smooth, with 0.5 to 6mm thick orangish brown clay smear and orange and orangish brown iron stain and powder. 2.51 - 10.20 Non-intact as closely spaced, locally extremely and very closely spaced discontinuities.		Medium strong locally strong thinly laminated greenish grey and grey fissile fine grained SHALE.			
3.50	100 (54) 0										
4.70	100 (45) 0										
5.20	100 (0) 0										
6.70	100 (64) 0	NI			(7.70)				6.30m to 7.00m: with fine to coarse gravel sized white quartz clasts.		
8.20	100 (63) 21								7.00m to 10.20m: dark grey.		
9.70	100 (61) 0										
10.20	100 (54) 0		3.77		10.20						
						BH terminated at 10.20m bgl on REs instruction.					

IDL AGS UK DH (SPTS) ARKLOW BANK RC LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IDL TP TEMPLATE.GDT 12/1/21

Drilling Progress and Water Observations								Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike	Water Standing	From (m)	To (m)	Type	Return (%)	
20-10-20	16.00	4.70	4.70	146	102			0	10.20	polymer	100	10 litres polydrill used. Acoustic televiewer works carried out. 50mm standpipe installed. Response zone 4.00m to 7.00m bgl.
21-10-20	08.30	4.70	4.70	146	102							
21-10-20	13.00	10.20	4.70	146	102							

All dimensions in metres Scale 1:68.75	Client: Sure Partners Limited	Method/ Plant Used	DeltaBase	Bit Design	GBS DK	Driller DK	Logged By EAT
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## DRILLHOLE LOG

Project <b>Arklow Bank Wind Park-Landfall Site Investigations</b>				Location Arklow, County Wicklow		<b>DRILLHOLE No</b>  <b>BH02</b>
Job No <b>2020WW102</b>	Date 21-10-20 21-10-20	Ground Level (m OD) 14.12	Co-Ordinates () E 727,198.8 N 677,284.6			
Engineer <b>ARUP</b>					Sheet 1 of 1 Rev. DRAFT1	

RUN DETAILS						STRATA			Geology	Instrument/ Backfill
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION				
						Discontinuities	Detail	Main		
0.00	75 (-)		13.92		0.20	0.00 - 6.30 m: overburden		Firm orangish brown slightly sandy CLAY. Stiff orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse of quartz chert and shale.		
2.00		2.00 (14)						2.00m to 6.30m: dark orangish brown.		
3.50	100 (-)	NA			(6.10)					
5.00	100 (-)	3.50 (27)								
6.30	38 (-)	5.00 (27)	7.82		6.30					
7.70	100 (30) 0					6.30 - 9.40 Discontinuities, apparently medium spaced, locally closely spaced, dipping 84 to 86°, planar, locally stepped, smooth, with 0.5 to 2mm thick brown silt smear and orange and dark orangish brown iron stain and powder.		Medium strong locally strong thinly laminated greenish brownish grey fissile fine grained SHALE.		
8.50	100 (0) 0	NI			(3.80)					
9.40	100 (31) 0									
10.10	100 (80) 64	4	4.02		10.10	9.40 - 10.10 Discontinuities, apparently medium spaced, locally closely spaced, dipping 38 to 40°, planar, smooth, with 0.5 to 1mm thick orangish brown clay smear, open.		9.40m to 10.10m: thinly laminated light grey and grey.		
								BH terminated at 10.10m bgl on REs instruction.		

IDL AGS UK DH (SPTS) ARKLOW BANK RC LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IDL TP TEMPLATE.GDT 12/1/21

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS	
Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike	Water Standing	From (m)	To (m)	Type		Return (%)
21-10-20	12.00	7.70	7.70	146	102			0	10.10	polymer	100	10 litres polydrill used. Acoustic televiwer works carried out. BH backfilled with grout.
21-10-20	17.00	10.10	7.70	123	84							

All dimensions in metres Scale 1:68.75	Client: Sure Partners Limited	Method/ Plant Used DeltaBase	Bit Design GBS/PQ	Driller DK	Logged By EAT
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## DRILLHOLE LOG

Project <b>Arklow Bank Wind Park-Landfall Site Investigations</b>				Location Arklow, County Wicklow		<b>DRILLHOLE No</b>  <b>BH03</b>
Job No <b>2020WW102</b>	Date 22-10-20 27-10-20	Ground Level (m OD) 9.18	Co-Ordinates () E 727,222.2 N 677,213.6			
Engineer <b>ARUP</b>					Sheet 1 of 2 Rev. DRAFT1	

RUN DETAILS				STRATA			Geology	Instrument/Backfill
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thickness)	DESCRIPTION		
						Discontinuities	Detail	Main
0.00	70 (-)	NA	8.98		0.20	0.00 - 2.30 m: overburden		Grass over firm orangish brown CLAY. Firm orangish brown sandy gravelly CLAY with cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartz chert and shale. Cobbles are of chert and shale.
1.70		2.00 (20)	7.48		1.70			
3.20	100 (41) 18	15	6.88		2.30	2.30 - 20.20 Discontinuities, apparently closely spaced, locally extremely and very closely spaced, dipping 58 to 60 and 18 to 20°, stepped, smooth, with 0.5 to 3mm thick grey silt smear.		Stiff brownish green slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of grey shale. Medium strong locally strong thinly laminated grey and dark grey fissile fine grained SHALE.
3.80	100 (30) 0	NI				3.00 - 4.70 Non-intact as closely spaced and very closely spaced discontinuities.		
5.30	100 (52) 18	4						
6.80	100 (37) 16	15						
8.20	85 (20) 0	NR/NI				6.80 - 11.20 No recovery as washout of fines during drilling. No record of cavity. Non-intact as closely spaced and very closely spaced discontinuities.		6.80m to 11.20m: Non-intact as medium strong thinly laminated dark grey fissile fine grained shale with much grey silt and orange and orangish brown iron stain and powder. 7.00m: dark grey.
9.70	86 (0) 0	NR/NI						
	80 (0) 0	NR/NI						

IDL AGS UK DH (SPTS) ARKLOW BANK RC LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IDL TP TEMPLATE.GDT 12/1/21

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike Standing	From (m)	To (m)	Type	Return (%)	
22-10-20	12.00	3.20	3.20	146	102		0	20.20	polymer	100	
22-10-20	17.00	6.80	3.20	123	84						
23-10-20	08.30	6.80	3.20	123	84						

All dimensions in metres Scale 1:68.75	Client: Sure Partners Limited	Method/ Plant Used DeltaBase	Bit Design GBS/PQ	Driller DK	Logged By EAT
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## DRILLHOLE LOG

Project <b>Arklow Bank Wind Park-Landfall Site Investigations</b>				Location Arklow, County Wicklow		<b>DRILLHOLE No</b>  <b>BH04</b>	
Job No <b>2020WW102</b>	Date 15-10-20 19-10-20	Ground Level (m OD) 19.64	Co-Ordinates () E 727,004.1 N 677,143.9				
Engineer <b>ARUP</b>						Sheet 1 of 2 Rev. DRAFT1	

RUN DETAILS					STRATA			Geology	Instrument/Backfill		
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thickness)	DESCRIPTION					
						Discontinuities	Detail	Main			
0.00	100 (-)					0.00 - 9.00 m: overburden		Firm dark orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of quartz chert and shale.			
2.00		2.00 (32)									
3.50	63 (-)	3.50 (18)									
5.00	100 (-)	NA			(9.00)	3.70m: stiff brown.					
6.50	60 (-)	6.50 (31)									
8.00	20 (-)	8.00 (13)									
8.50	60 (-)										
9.50	60 (10) 0		10.64		9.00	9.00 - 13.60 Discontinuities, apparently very closely and closely spaced, dipping 84 to 86 and 18 to 20°, planar, smooth, with 0.5 to 3mm thick orangish brown clay smear and orangish brown iron stain and powder.			Medium strong and strong thinly laminated greenish bluish grey fissile fine grained SHALE.		
10.50	80 (25) 0	9.50 (NA 50mm)				9.01 - 11.30 No recovery as washout of fines during drilling. No record of					
11.00	88 (19)	NR/NI									

IDL AGS UK DH (SPTS) ARKLOW BANK RC LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IDL TP TEMPLATE.GDT 12/1/21

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike Standing	From (m)	To (m)	Type	Return (%)	
15-10-20	17.00	10.50	10.50	146	102		0	13.60	polymer	100	5 gallons polydrill used. Acoustic televiwer works carried out. 50mm standpipe installed. Response zone 9.00m to 12.00m bgl.
16-10-20	08.30	10.50	10.50	146	102						

All dimensions in metres Scale 1:68.75	Client: Sure Partners Limited	Method/ Plant Used	DeltaBase	Bit Design	GBS	Driller PMcG	Logged By EAT
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**DRILLHOLE LOG**

Project <b>Arklow Bank Wind Park-Landfall Site Investigations</b>			Location Arklow, County Wicklow		DRILLHOLE No  <b>BH04</b>
Job No <b>2020WW102</b>	Date <b>15-10-20 19-10-20</b>	Ground Level (m OD) <b>19.64</b>	Co-Ordinates () <b>E 727,004.1 N 677,143.9</b>		
Engineer <b>ARUP</b>				Sheet <b>2 of 2</b> Rev. <b>DRAFT1</b>	

RUN DETAILS					STRATA			Geology	Instrument/ Backfill
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION			
						Discontinuities	Detail	Main	
11.30	0			x x x x	(4.60)	cavity. Non-intact as very closely spaced and closely spaced discontinuities.		Medium strong and strong thinly laminated greenish bluish grey fissile fine grained SHALE. (continued)	
	100 (31) 0	NI		x x x x					
12.80				x x x x					
	100 (0) 0			x x x x					
13.60			6.04	x x x x	13.60	BH terminated at 13.60m bgl on REs instruction.			

Drilling Progress and Water Observations								Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike	Water Standing	From (m)	To (m)	Type	Return (%)	
16-10-20	13.00	13.60	4.70	146	102							5 gallons polydrill used. Acoustic televiwer works carried out. 50mm standpipe installed. Response zone 9.00m to 12.00m bgl.

All dimensions in metres Scale 1:68.75	Client: Sure Partners Limited	Method/ Plant Used <b>DeltaBase</b>	Bit Design GBS	Driller PMcG	Logged By <b>EAT</b>
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IDL AGS UK DH (SPTS) ARKLOW BANK RC LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IDL TP TEMPLATE.GDT 12/1/21



## DRILLHOLE LOG

Project <b>Arklow Bank Wind Park-Landfall Site Investigations</b>				Location Arklow, County Wicklow		<b>DRILLHOLE No</b>  <b>BH05</b>
Job No <b>2020WW102</b>	Date 19-10-20 20-10-20	Ground Level (m OD) 14.28	Co-Ordinates () E 727,098.9 N 677,150.9			
Engineer <b>ARUP</b>					Sheet 1 of 1 Rev. DRAFT1	

RUN DETAILS						STRATA			Geology	Instrument/ Backfill
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION				
						Discontinuities	Detail	Main		
0.00	65 (-)	NA	14.08	—	0.20	0.00 - 3.00 m: overburden		Grass over firm orangish brown CLAY. Firm orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium of quartz chert and shale.		
2.00	67 (18) 0	2.00 (22)	11.58	x	2.70	3.00 - 10.40 Discontinuities, apparently closely and very closely spaced, dipping 86 to 90°, planar, smooth, with 0.5 to 1mm thick black silt smear and orange and dark orangish brown iron stain and powder.		Orangish brown silty fine and medium SAND.		
3.50	100 (13) 0		11.28	x	3.00			Medium strong thinly laminated greenish grey fissile fine grained SHALE.		
4.70	100 (35) 0		9.58	x	4.70			Strong locally very strong thinly laminated brown and greenish grey fine to coarse SANDSTONE. 5.20m to 5.30m: white quartz.		
5.30	100 (52) 27			x	(2.10)			Medium strong thinly laminated dark grey and brownish grey fissile fine grained SHALE.		
6.80	100 (38) 12	NA	7.48	x	6.80					
8.30	100 (17) 0			x	(3.60)					
9.70	100 (80) 35			x						
10.40		NI	3.88	x	10.40					
						BH terminated at 10.40m bgl on REs instruction.				

IDL AGS UK DH (SPTS) ARKLOW BANK RC LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IDL TP TEMPLATE.GDT 12/1/21

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike Standing	From (m)	To (m)	Type	Return (%)	
19-10-20	17.00	4.70	4.70	146	102		0	10.40	polymer	100	11 litres polydrill used. Acoustic televiewer works carried out. BH backfilled with grout.
20-10-20	08.30	4.70	4.70	146	102						
20-10-20	09.30	4.70	4.70	123	84						
20-10-20	13.00	10.40	4.70	123	84						

All dimensions in metres Scale 1:68.75	Client: Sure Partners Limited	Method/ Plant Used DeltaBase	Bit Design GBS/PQ	Driller DK	Logged By EAT
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## Appendix 2 Trial Pit Records

<b>PROJECT: Arklow Bank Wind Park-Landfall Site Investigations</b>		<b>TRIALPIT: TP01</b>
<b>LOCATION: Arklow, County Wicklow</b>		<b>Sheet 1 of 1</b>
<b>CLIENT: Sure Partners Limited</b>	<b>Co-ordinates:</b> E 727,185.2 N 677,363.4	<b>Rig: Hyundai 140LC9</b>
<b>ENGINEER: ARUP</b>		<b>Rev: DRAFT1</b>
<b>Ground level: 18.26m O.D.</b>		<b>DATE: 15.10.20</b>

<b>GROUNDWATER</b>	<b>PIT DIRECTION: 030-210</b>		Shoring/Support: N/A Stability: Pit stable.
Water strikes:      Rose to after:	<b>PIT DIMENSION: 0.90 * 4.00m</b>		
1st:    dry	<b>LOGGED BY: PC</b>		

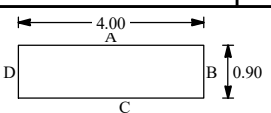
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									TOPSOIL: Grass over firm brown slightly gravelly silty CLAY with some rootlets. Gravel is subangular to subrounded fine to coarse of quartz shale and assorted volcanic clasts.
			S 1 B 2	0.40-0.50 0.40-0.50			17.96	0.30	Firm grey mottled orangish brown slightly gravelly silty CLAY with low cobble content. Gravel is subangular to rounded fine to coarse of chert quartz and shale. Cobbles are subangular to rounded of chert quartz and shale.
			VANE	0.60	19mm vane used 20 kN/m <sup>2</sup> in situ		17.46	0.80	Stiff brownish bluish grey slightly gravelly silty organic CLAY with low cobble content and some rootlets and some shell fragments. Gravel is subrounded to rounded fine to coarse of chert quartz and shale. Cobbles are subrounded to rounded of chert quartz and shale.
			S 3 B 4	1.40-1.50 1.40-1.50					
			B 5	2.40-2.50					
			B 6	3.60-3.70			14.56	3.70	
						END			TP terminated at 3.70m bgl on REs instruction - very stiff strata.

<b>Remarks:</b> TP dry on excavation. TP backfilled with arisings. Shear Vanes carried out in-situ on trial pit side walls at 0.60m bgl.	<b>Scale:</b> 1:27.5
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TRIAL PIT VANE & WL RISES - ARKLOW BANK TPS LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IRISHDRLL.GDT 12/1/21

**PROJECT:** Arklow Bank Wind Park-Landfall Site Investigations  
**LOCATION:** Arklow, County Wicklow  
**CLIENT:** Sure Partners Limited  
**ENGINEER:** ARUP  
**Co-ordinates:** E 727,181.2 N 677,335.1  
**TRIALPIT:** TP02  
**Sheet 1 of 1**  
**Rig:** Hyundai 140LC9  
**Rev:** DRAFT1

**Ground level:** 17.71m O.D.  
**GROUNDWATER**  
 Water strikes: 1st: dry 2nd: 3rd:  
 Rose to after:  
**PIT DIRECTION:** 030-210  
**PIT DIMENSION:** 0.90 \* 4.00m  
**LOGGED BY:** PC  
 Shoring/Support: N/A  
 Stability: Pit stable.



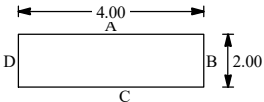
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0							17.41	0.30	TOPSOIL: Grass over firm damp brown slightly gravelly silty CLAY. Gravel is subangular to rounded fine to coarse of chert shale and quartz.
			S 1 B 2 VANE	0.50-0.60 0.50-0.60 0.60	19mm vane used 17 kN/m <sup>2</sup> in situ		16.81	0.90	Firm damp grey mottled orangish brown slightly gravelly silty CLAY with some rootlets. Gravel is subrounded to rounded fine to coarse of chert shale and quartz.
1			S 3 B 4	1.40-1.50 1.40-1.50					Stiff brown mottled bluish grey slightly gravelly silty CLAY with some shell fragments. Gravel is subrounded to rounded fine to coarse of chert shale and quartz.
2			B 5	2.50-2.60					
3			B 6	3.30-3.40			14.31	3.40	3.20m to 3.40m: with 0.5mm thick fine to medium sand laminae.
						END			TP terminated at 3.40m bgl on REs instruction - very stiff strata.

**Remarks:** TP dry on excavation. TP backfilled with arisings.  
 Shear Vanes carried out in-situ on trial pit side walls at 0.60m bgl.  
**Scale:** 1:27.5

TRIAL PIT VANE & WL RISES ARKLOW BANK TPS LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IRISHDRLL.GDT 12/1/21

<b>PROJECT: Arklow Bank Wind Park-Landfall Site Investigations</b>		<b>TRIALPIT: TP03</b>
<b>LOCATION: Arklow, County Wicklow</b>		<b>Sheet 1 of 1</b>
<b>CLIENT: Sure Partners Limited</b>	<b>Co-ordinates:</b> E 727,118.0 N 677,316.0	<b>Rig: Hyundai 140LC9</b>
<b>ENGINEER: ARUP</b>		<b>Rev: DRAFT1</b>

<b>Ground level: 17.25m O.D.</b>	<b>DATE: 15.10.20</b>
<b>GROUNDWATER</b> Water strikes:      Rose to after: 1st:      dry 2nd: 3rd:	<b>PIT DIRECTION: 200-020</b> <b>PIT DIMENSION: 2.00 * 4.00m</b> <b>LOGGED BY: PC</b>



Shoring/Support: N/A  
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0							17.05	0.20	TOPSOIL: Grass over firm brown silty CLAY with rootlets.
			VANE S 1 B 2	0.40 0.50-0.60 0.50-0.60	19mm vane used 16 kN/m <sup>2</sup> in situ		16.75	0.50	Firm grey mottled orangish brown slightly gravelly silty CLAY with low cobble content and some rootlets. Gravel is subrounded to rounded fine to coarse of shale chert and quartz. Cobbles are subrounded to rounded of shale chert and quartz.
			VANE D 3	0.80 1.10-1.20	19mm vane used 21 kN/m <sup>2</sup> in situ				Stiff brown mottled grey slightly gravelly silty CLAY. Gravel is subrounded to rounded fine to coarse of shale chert and quartz.
			S 4 B 5	1.50-1.60 1.50-1.60					
			B 6	2.80-2.90			14.45	2.80	Firm damp light orangish brown slightly gravelly clayey sandy SILT with low cobble content and low boulder content. Gravel is subrounded to rounded fine to coarse of shale chert and quartz. Cobbles are subrounded to rounded of shale chert and quartz. Boulders are subrounded of shale chert and quartz. Boulders are up to 250mm in length.
							13.15	4.10	TP terminated at 4.10m bgl on REs instruction.
						<b>END</b>			

**Remarks:** Shear Vanes carried out in-situ on trial pit side walls at 0.40m and 0.80m bgl. Thermal resistivity carried out at 1.20m bgl.  
TP dry on excavation. TP backfilled with arisings.

**Scale:** 1:27.5

TRIAL PIT VANE & WL RISES - ARKLOW BANK TPS LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IRISHDRLLGDT 12/1/21

<b>PROJECT: Arklow Bank Wind Park-Landfall Site Investigations</b>		<b>TRIALPIT: TP04</b>
<b>LOCATION: Arklow, County Wicklow</b>		<b>Sheet 1 of 1</b>
<b>CLIENT: Sure Partners Limited</b>	<b>Co-ordinates:</b> E 727,178.2 N 677,307.1	<b>Rig: Hyundai 140LC9</b>
<b>ENGINEER: ARUP</b>		<b>Rev: DRAFT1</b>
<b>Ground level: 16.43m O.D.</b>		<b>DATE: 15.10.20</b>

<b>GROUNDWATER</b>	<b>PIT DIRECTION: 020-200</b>		Shoring/Support: N/A Stability: Pit stable.
Water strikes: 1st: 3.10m      Rose to after: 20min      3.10m	<b>PIT DIMENSION: 2.00 * 4.00m</b>		
2nd: 3rd:	<b>LOGGED BY: PC</b>		

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									TOPSOIL: Grass over firm damp brown slightly gravelly silty CLAY. Gravel is subangular to rounded fine to coarse of shale and quartz.
			S 1 B 2 VANE	0.40-0.50 0.40-0.50 0.50	19mm vane used 16 kN/m <sup>2</sup> in situ		16.13	0.30	Firm damp grey mottled orangish brown slightly gravelly silty CLAY with low cobble content. Gravel is subrounded to rounded fine to coarse of shale and assorted volcanic clasts. Cobbles are subrounded to rounded of shale and assorted volcanic clasts.
1			VANE D 3	1.10 1.10-1.20	19mm vane used 18 kN/m <sup>2</sup> in situ		15.43	1.00	TP NORTH: Damp brownish orange silty fine to medium SAND. Apparent dip of stratum 40°. TP SOUTH: Firm greyish orangish brown clayey SILT.
			S 4 B 5 B 6	1.40-1.50 1.40-1.50 1.40-1.50					
2			B 7	2.40-2.50					
3							13.33	3.10	Very stiff mottled brownish bluish grey slightly gravelly silty organic CLAY with rootlets and some shell fragments. Gravel is rounded to well rounded fine to medium of shale and assorted volcanic clasts.
4			B 8	3.70-3.80			12.43	4.00	
						<b>END</b>			TP terminated at 4.00m bgl on REs instruction.

<b>Remarks:</b> Shear Vanes carried out in-situ on trial pit side walls at 0.50m and 1.10m bgl. Thermal resistivity carried out at 1.20m bgl. Ingress of water at 3.10m bgl. TP backfilled with arisings.	<b>Scale:</b> 1:27.5
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TRIAL PIT VANE & WL RISES - ARKLOW BANK TPS LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IRISHDRLL\_GDT\_12/1/21

<b>PROJECT: Arklow Bank Wind Park-Landfall Site Investigations</b>		<b>TRIALPIT: TP05</b>
<b>LOCATION: Arklow, County Wicklow</b>		<b>Sheet 1 of 1</b>
<b>CLIENT: Sure Partners Limited</b>	<b>Co-ordinates:</b> E 727,141.9 N 677,288.8	<b>Rig: Hyundai 140LC9</b>
<b>ENGINEER: ARUP</b>		<b>Rev: DRAFT1</b>
<b>Ground level: 15.00m O.D.</b>		<b>DATE: 15.10.20</b>

<b>GROUNDWATER</b>	<b>PIT DIRECTION: 010-190</b>		Shoring/Support: N/A Stability: Pit stable.
Water strikes:      Rose to after:	<b>PIT DIMENSION: 2.00 * 4.00m</b>		
1st:    dry	<b>LOGGED BY: PC</b>		

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									TOPSOIL: Grass over firm brown slightly gravelly silty CLAY. Gravel is subangular to rounded fine to coarse of shale chert and quartz.
			S 1 B 2	0.40-0.50 0.40-0.50			14.75	0.25	Firm grey mottled orangish brown slightly gravelly sandy silty CLAY. Sand is fine. Gravel is subangular to rounded fine to coarse of shale chert and quartz.
							14.40	0.60	Stiff brownish grey silty CLAY with some rootlets.
1			VANE D 3	1.10 1.10-1.20	19mm vane used 21 kN/m <sup>2</sup> in situ		13.70	1.30	Firm orangish brown slightly gravelly sandy SILT. Sand is fine to medium. Gravel is subrounded to rounded fine to coarse of shale and chert.
			S 4 B 5	1.50-1.60 1.50-1.60			12.80	2.20	Stiff brown mottled bluish grey slightly gravelly silty CLAY with low cobble content and 10mm thick fine to medium sand laminae. Gravel is subrounded to rounded fine to coarse of shale and chert. Cobbles are subrounded to rounded of shale and chert.
2									
			B 6	2.60-2.70					
3									
			B 7	3.80-3.90			11.00	4.00	
4						END			TP terminated at 4.00m bgl on REs instruction - very stiff strata.
5									

<b>Remarks:</b> Shear Vanes carried out in-situ on trial pit side walls at 1.10m bgl. Thermal resistivity carried out at 1.20m bgl. TP dry on excavation. TP backfilled with arisings.	<b>Scale:</b> 1:27.5
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TRIAL PIT VANE & WL RISES - ARKLOW BANK TPS LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IRISHDRLL.GDT 12/1/21



<b>PROJECT: Arklow Bank Wind Park-Landfall Site Investigations</b>		<b>TRIALPIT: TP06</b>
<b>LOCATION: Arklow, County Wicklow</b>		<b>Sheet 1 of 1</b>
<b>CLIENT: Sure Partners Limited</b>	<b>Co-ordinates:</b> E 727,170.4 N 677,251.5	<b>Rig: Hyundai 140LC9</b>
<b>ENGINEER: ARUP</b>		<b>Rev: DRAFT1</b>
<b>Ground level: 12.07m O.D.</b>		<b>DATE: 14.10.20</b>

<b>GROUNDWATER</b>	<b>PIT DIRECTION: 020-200</b>		Shoring/Support: N/A Stability: Pit stable.
Water strikes:      Rose to after:	<b>PIT DIMENSION: 2.00 * 4.00m</b>		
1st: dry	<b>LOGGED BY: PC</b>		

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									TOPSOIL: Grass over firm damp brown slightly gravelly silty CLAY with some rootlets. Gravel is subangular to subrounded fine to coarse of shale and quartz.
			S 1 B 2 VANE	0.40-0.50 0.40-0.50 0.50	19mm vane use 19 kN/m <sup>2</sup> in situ		11.77	0.30	Firm grey mottled orangish brown slightly gravelly silty CLAY with low cobble content and some rootlets. Gravel is subrounded to rounded fine to coarse of shale and assorted volcanic clasts. Cobbles are subrounded to rounded of shale and assorted volcanic clasts.
			D 3 VANE	1.10-1.20 1.20	19mm vane use 22 kN/m <sup>2</sup> in situ		11.27	0.80	Stiff orangish brownish grey slightly gravelly slightly sandy silty CLAY with low cobble content and low boulder content. Sand is medium to fine. Gravel is subrounded to rounded fine to coarse of shale and assorted volcanic clasts. Cobbles are subrounded to rounded of shale and assorted volcanic clasts. Boulders are rounded of shale and assorted volcanic clasts. Boulders are up to 230mm in length.
			S 4 B 5	1.40-1.50 1.40-1.50					
			B 6	2.10-2.20			10.07	2.00	Damp orangish brown slightly gravelly silty medium to fine SAND. Gravel is angular to subangular fine to coarse of shale.
			B 7	2.35-2.40			9.72 9.67	2.35 2.40	Probable weathered SHALE rock. Recovered as angular to subangular fine to coarse gravel and cobble sized clasts of grey shale with slightly clayey silty sand. TP terminated at 2.40m bgl as probable rock.
						END			

<b>Remarks:</b> Shear Vanes carried out in-situ on trial pit side walls at 0.50m and 1.20m bgl. Thermal resistivity carried out at 1.20m bgl. TP dry on excavation. TP backfilled with arisings.	<b>Scale:</b> 1:27.5
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<b>PROJECT: Arklow Bank Wind Park-Landfall Site Investigations</b>		<b>TRIALPIT: TP07</b>
<b>LOCATION: Arklow, County Wicklow</b>		<b>Sheet 1 of 1</b>
<b>CLIENT: Sure Partners Limited</b>	<b>Co-ordinates:</b> E 727,077.3 N 677,212.0	<b>Rig: Hyundai 140LC9</b>
<b>ENGINEER: ARUP</b>		<b>Rev: DRAFT1</b>
<b>Ground level: 17.43m O.D.</b>		<b>DATE: 13.10.20</b>

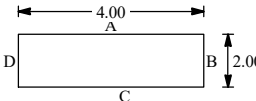
<b>GROUNDWATER</b>	<b>PIT DIRECTION: 280-100</b>		Shoring/Support: N/A Stability: Pit stable.
Water strikes:      Rose to after:	<b>PIT DIMENSION: 2.00 * 4.50m</b>		
1st: dry	<b>LOGGED BY: PC</b>		

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0							17.13	0.30	TOPSOIL: Grass over firm damp brown silty CLAY.
			S 1 B 2	0.40-0.50 0.40-0.50					Damp greyish brown slightly gravelly silty CLAY with low cobble content. Gravel is subrounded to rounded fine to coarse of shale and assorted volcanic clasts. Cobbles are subrounded to rounded of shale and assorted volcanic clasts.
			VANE D 3	1.10 1.10-1.20	19mm vane use 21 kN/m <sup>2</sup> in situ				
			S 4 B 5	1.50-1.60 1.50-1.60					
			B 6	2.40-2.50					
			B 7	3.40-3.50			13.83	3.60	Stiff damp brownish grey slightly gravelly silty CLAY. Gravel is subrounded to rounded fine to medium of shale and assorted volcanic clasts.
			B 8	4.40-4.50			12.93	4.50	TP terminated at 4.50m bgl on REs instruction.
							<b>END</b>		

<b>Remarks:</b> Shear Vanes carried out in-situ on trial pit side walls at 1.10m bgl. Thermal resistivity carried out at 1.20m bgl. TP dry on excavation. TP backfilled with arisings.	<b>Scale:</b> 1:27.5
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TRIAL PIT VANE & WL RISES ARKLOW BANK TPS LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IRISHDRLL.GDT 12/1/21

<b>PROJECT: Arklow Bank Wind Park-Landfall Site Investigations</b>		<b>TRIALPIT: TP08</b>
<b>LOCATION: Arklow, County Wicklow</b>		<b>Sheet 1 of 1</b>
<b>CLIENT: Sure Partners Limited</b>	<b>Co-ordinates:</b> E 727,021.5 N 677,187.2	<b>Rig: Hyundai 140LC9</b>
<b>ENGINEER: ARUP</b>		<b>Rev: DRAFT1</b>
<b>Ground level: 20.19m O.D.</b>		<b>DATE: 13.10.20</b>

<b>GROUNDWATER</b>		<b>PIT DIRECTION: 240-060</b> <b>PIT DIMENSION: 2.00 * 4.00m</b> <b>LOGGED BY: PC</b> 	Shoring/Support: N/A Stability: Pit stable.
Water strikes:	Rose to after:		
1st: 0.70m	20min 0.37m		
2nd: 1.70m	20min 0.90m		
3rd: 2.55m	20min 1.45m		

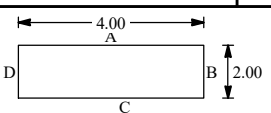
Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									TOPSOIL: Grass over firm damp brown clayey SILT.
			S 1 B 2	0.40-0.50 0.40-0.50			19.89	0.30	Stiff damp orange mottled greyish brown slightly gravelly silty CLAY with rootlets. Gravel is subrounded to rounded medium to coarse.
1			D 3	1.10-1.20					Pocket penetrometer @ 1.10m: 3.50 kg/cm <sup>2</sup> ; 2.50 kg/cm <sup>2</sup> .
			S 4 B 5	1.50-1.60 1.50-1.60					
2			B 6	2.50-2.60					
3									
			B 7	3.60-3.70					
4							16.29	3.90	Firm damp light greyish brown clayey SILT.
			B 8	4.40-4.50			15.69	4.50	
						<b>END</b>			TP terminated at 4.50m bgl on REs instruction.

<b>Remarks:</b> Shear Vanes carried out in-situ on trial pit side walls at 0.60m bgl. Thermal resistivity carried out at 1.20m bgl. TP dry on excavation. TP backfilled with arisings.	<b>Scale:</b> 1:27.5
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TRIAL PIT VANE & WL RISES ARKLOW BANK TPS LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IRISHDRLL.GDT 12/1/21

**PROJECT:** Arklow Bank Wind Park-Landfall Site Investigations  
**LOCATION:** Arklow, County Wicklow  
**CLIENT:** Sure Partners Limited  
**ENGINEER:** ARUP  
**Co-ordinates:** E 726,966.6 N 677,135.3  
**TRIALPIT:** TP09  
**Sheet 1 of 1**  
**Rig:** Hyundai 140LC9  
**Rev:** DRAFT1

**Ground level:** 20.89m O.D.  
**GROUNDWATER**  
 Water strikes: 1st: dry 2nd: 3rd:  
 Rose to after:  
**PIT DIRECTION:** 220-040  
**PIT DIMENSION:** 2.00 \* 4.00m  
**LOGGED BY:** PC  
 Shoring/Support: N/A  
 Stability: Pit stable.



Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									TOPSOIL: Grass over firm damp slightly gravelly silty CLAY with low cobble content. Gravel is subrounded to rounded medium to coarse of quartz chert and assorted volcanic clasts. Cobbles are subrounded to rounded of quartz chert and assorted volcanic clasts.
			VANE S 1 B 2	0.50 0.50-0.60 0.50-0.60	19mm vane use 15 kN/m <sup>2</sup> in situ		20.59	0.30	Firm damp grey mottled orangish brown slightly gravelly slightly sandy clayey SILT. Sand is coarse. Gravel is subrounded to rounded medium to coarse of shale quartz chert and assorted volcanic clasts.
			VANE D 3	0.90 1.10-1.20	19mm vane use 23 kN/m <sup>2</sup> in situ		20.19	0.70	Stiff damp mottled greyish brown slightly gravelly silty CLAY with low cobble content. Gravel is subrounded to rounded fine to coarse of assorted volcanic clasts chert and shale. Cobbles are subrounded to rounded of assorted volcanic clasts chert and shale.
			S 4 B 5	1.50-1.60 1.50-1.60					
			B 6	2.40-2.50					
							16.89	4.00	
						END			TP terminated at 4.00m bgl on REs instruction - very stiff strata.

**Remarks:** Thermal resistivity carried out at 1.20m bgl. TP dry on excavation. TP backfilled with arisings.  
**Scale:** 1:27.5

TRIAL PIT VANE & WL RISES ARKLOW BANK TPS LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IRISHDRLLGDT 12/1/21

<b>PROJECT: Arklow Bank Wind Park-Landfall Site Investigations</b>		<b>TRIALPIT: TP10</b>
<b>LOCATION: Arklow, County Wicklow</b>		<b>Sheet 1 of 1</b>
<b>CLIENT: Sure Partners Limited</b>	<b>Co-ordinates:</b> E 727,103.7 N 677,161.5	<b>Rig: Hyundai 140LC9</b>
<b>ENGINEER: ARUP</b>		<b>Rev: DRAFT1</b>
<b>Ground level: 14.64m O.D.</b>		<b>DATE: 14.10.20</b>

<b>GROUNDWATER</b>		<b>PIT DIRECTION: 170-350</b> <b>PIT DIMENSION: 2.00 * 4.00m</b> <b>LOGGED BY: PC</b>		Shoring/Support: N/A Stability: Pit unstable. Sidewall collapse from 1.80m bgl.
Water strikes:	Rose to after:			

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0							14.44	0.20	TOPSOIL: Grass over firm damp brown slightly gravelly silty CLAY. Gravel is subrounded to rounded fine to coarse of shale and quartz.
			S 1 B 2	0.40-0.50 0.40-0.50					Firm damp grey mottled orangish greyish brown slightly gravelly silty CLAY with low cobble content and some rootlets and some shell fragments. Gravel is subangular to subrounded fine to coarse of shale and assorted volcanic clasts. Cobbles are subrounded to rounded of shale and assorted volcanic clasts.
			D 3 VANE	1.10-1.20 1.20	19mm vane used 23 kN/m <sup>2</sup> in situ				
			S 4 B 5	1.40-1.50 1.40-1.50					
							12.84	1.80	Light orangish brown slightly gravelly silty medium to fine SAND with low cobble content and low boulder content. Gravel is subrounded to rounded fine to coarse of shale and assorted volcanic clasts. Cobbles are subrounded to rounded of shale and assorted volcanic clasts. Boulders are subrounded to rounded of shale and assorted volcanic clasts. Boulders are up to 400mm in length.
			B 6	2.00-2.10					
							11.94	2.70	
			B 7	2.80-2.90			11.74	2.90	Probable weathered SHALE rock. Recovered as angular to subangular fine to coarse gravel cobble and boulder sized clasts of grey shale with grey sandy gravel. Boulders are up to 250mm in length. TP terminated at 2.90m bgl as probable rock.
3						END			
4									
5									

<b>Remarks:</b> Thermal resistivity carried out at 1.20m bgl. TP dry on excavation. TP backfilled with arisings.	<b>Scale:</b> 1:27.5
--	-------------------------

TRIAL PIT VANE & WL RISES - ARKLOW BANK TPS LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IRISHDRLL.GDT 12/1/21

<b>PROJECT: Arklow Bank Wind Park-Landfall Site Investigations</b>		<b>TRIALPIT: TP11</b>
<b>LOCATION: Arklow, County Wicklow</b>		<b>Sheet 1 of 1</b>
<b>CLIENT: Sure Partners Limited</b>	<b>Co-ordinates:</b> E 726,983.1 N 677,096.6	<b>Rig: Hyundai 140LC9</b>
<b>ENGINEER: ARUP</b>		<b>Rev: DRAFT1</b>
<b>Ground level: 18.86m O.D.</b>		<b>DATE: 14.10.20</b>

<b>GROUNDWATER</b>	<b>PIT DIRECTION: 140-320</b>		Shoring/Support: N/A Stability: Pit stable.
Water strikes:      Rose to after:	<b>PIT DIMENSION: 2.00 * 4.00m</b>		
1st:    dry	<b>LOGGED BY: PC</b>		

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									TOPSOIL: Grass over firm damp slightly gravelly clayey SILT with low cobble content. Gravel is subrounded to rounded fine to coarse of shale chert and assorted volcanic clasts. Cobbles are subrounded to rounded of shale chert and assorted volcanic clasts.
			S 1 B 2 VANE	0.40-0.50 0.40-0.50 0.50	19mm vane use 20 kN/m <sup>2</sup> in situ		18.56	0.30	Firm damp mottled light grey orange brown slightly gravelly silty CLAY with some rootlets. Gravel is subrounded to rounded fine to coarse of shale chert and assorted volcanic clasts.
			VANE D 3	1.10 1.10-1.20	19mm vane use 27 kN/m <sup>2</sup> in situ		18.16	0.70	Stiff damp mottled greyish brown slightly gravelly slightly sandy silty CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded to rounded fine to coarse of assorted volcanic clasts granite and shale. Cobbles are subrounded to rounded of assorted volcanic clasts granite and shale.
			S 4 B 5	1.40-1.50 1.40-1.50			16.86	2.00	Very stiff brownish bluish grey slightly gravelly organic CLAY with 10mm thick sandy silty laminae. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of shale.
			B 6	2.50-2.60					
			B 7	3.80-3.90			14.96	3.90	
						<b>END</b>			TP terminated at 3.90m bgl on REs instruction.

<b>Remarks:</b> Thermal resistivity carried out at 1.20m bgl. TP dry on excavation. TP backfilled with arisings.	<b>Scale:</b> 1:27.5
--	-------------------------

TRIAL PIT VANE & WL RISES - ARKLOW BANK TPS LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ - IRISHDRLL.GDT - 12/1/21

<b>PROJECT: Arklow Bank Wind Park-Landfall Site Investigations</b>		<b>TRIALPIT: TP12</b>
<b>LOCATION: Arklow, County Wicklow</b>		<b>Sheet 1 of 1</b>
<b>CLIENT: Sure Partners Limited</b>	<b>Co-ordinates:</b> E 727,054.6 N 677,115.1	<b>Rig: Hyundai 140LC9</b>
<b>ENGINEER: ARUP</b>		<b>Rev: DRAFT1</b>
<b>Ground level: 15.31m O.D.</b>		<b>DATE: 14.10.20</b>

<b>GROUNDWATER</b>	<b>PIT DIRECTION: 130-310</b>		Shoring/Support: N/A Stability: Pit stable.
Water strikes:      Rose to after:	<b>PIT DIMENSION: 2.00 * 4.50m</b>		
1st: dry	<b>LOGGED BY: PC</b>		

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									TOPSOIL: Grass over firm damp brown slightly gravelly silty CLAY with low cobble content. Gravel is subangular to rounded fine to coarse of shale assorted volcanic clasts and quartz. Cobbles are subrounded to rounded of shale assorted volcanic clasts and quartz.
			S 1 B 2 VANE	0.50-0.60 0.50-0.60 0.60	19mm vane use 17 kN/m <sup>2</sup> in situ		15.06	0.25	Firm grey mottled orange gravelly clayey sandy SILT with low cobble content. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of shale and assorted volcanic clasts. Cobbles are subrounded to rounded of shale and assorted volcanic clasts.
			D 3 VANE	1.10-1.20 1.20	19mm vane use 20 kN/m <sup>2</sup> in situ		14.51	0.80	Stiff damp brown mottled grey slightly gravelly silty CLAY with low cobble content. Gravel is subrounded to rounded fine to coarse of shale and assorted volcanic clasts. Cobbles are subrounded to rounded of shale and assorted volcanic clasts.
			S 4 B 5	1.40-1.50 1.40-1.50					
							13.21	2.10	Stiff damp greyish brown slightly gravelly sandy silty CLAY with low cobble content and some shell fragments and 150mm thick layers of fine to medium sand. Gravel is subrounded to rounded fine to coarse of shale and assorted volcanic clasts. Cobbles are subrounded to rounded of shale and assorted volcanic clasts.
			B 6	2.40-2.50					
							11.81	3.50	
			B 7	3.50-3.60			11.71	3.60	Probable weathered SHALE rock. Recovered as angular to subangular fine to coarse gravel cobble and boulder sized clasts of grey shale with grey slightly sandy clayey gravel. Boulders are up to 400mm in length. TP terminated at 3.60m bgl as probable rock.
						<b>END</b>			

<b>Remarks:</b> Thermal resistivity carried out at 1.20m bgl. TP dry on excavation. TP backfilled with arisings.	<b>Scale:</b> 1:27.5
--	-------------------------

TRIAL PIT VANE & WL RISES ARKLOW BANK TPS LANDFALL ALL FILE DRAFT 1 DEC 11 2020.GPJ IRISHDRLLGDT 12/1/21



## Appendix 2A Thermal Resistivity/ Conductivity Records



IRISH DRILLING LTD.  
Loughrea Co. Galway

Project: Arklow Bank Wind Park - Onshore Grid Infrastructure  
Client: Sure Partners Ltd (SSE)  
Location: Landfall Site, County Wicklow  
Date: 02/12/2020

Tel: (091) 841274 Fax: (091) 880861

Sheet No. 1  
Checked: RK

### Thermal Conductivity / Thermal Resistivity Records

Date	Location	Depth m(bgl)	Thermal Conductivity (W/m.K) K	Thermal Resistivity (K.m/W) R	Temperature Celcius
15/10/2020	TP 03	1.20	1.296 1.462 1.284	0.772 0.684 0.779	13.035 12.871 12.846
15/10/2020	TP 04	1.20	1.751 2.27 2.456	0.571 0.44 0.407	12.915 12.847 12.807
15/10/2020	TP 05	1.20	1.504 1.42 1.467	0.665 0.704 0.682	13.005 12.934 12.96
14/10/2020	TP 06	1.20	1.609 1.39 1.339	0.622 0.719 0.747	12.83 12.842 12.892
13/10/2020	TP 07	1.20	1.225 1.656 1.524	0.816 0.604 0.656	12.891 12.801 12.592
13/10/2020	TP 08	1.20	1.466 1.498 1.316	0.682 0.667 0.76	13.03 13.163 12.95
13/10/2020	TP 09	1.20	1.447 1.571 1.49	0.691 0.636 0.671	13.035 13.007 12.876
14/10/2020	TP 10	1.20	1.395 1.379 1.201	0.717 0.725 0.833	12.922 12.863 12.85
14/10/2020	TP 11	1.20	1.56 1.64 1.838	0.641 0.61 0.544	13.055 13.022 12.775
14/10/2020	TP 12	1.20	1.265 1.278 1.286	0.79 0.783 0.778	13.015 13.01 12.99



## Appendix 3 Acoustic Televiewer Survey

**REPORT ON THE  
GEOPHYSICAL LOGGING  
OF  
FIVE BOREHOLES  
AT  
ARKLOW BANK,  
Co. WICKLOW**

**Prepared For:**



**NOV2020/IDR2001\_ rpt/IRE**

	Name	Date
Logged by:	Adam White	Various
Report by:	Rhys Powell	27.11.20
Checked by:	Myles Kynaston	27.11.20

## CONTENTS

1. INTRODUCTION .....	1
2. THE GEOPHYSICAL LOGGING METHODS .....	2
3. PROCESSING AND PRESENTATION OF IMAGER RESULTS .....	5
4. BOREHOLE LOGGING CONSTRAINTS .....	6

## LIST OF FIGURES

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Appendix 1	Defect Classification
Appendix 2	Geophysical Logs

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## 1.0 INTRODUCTION

At the request of Irish Drilling Ltd., geophysical logging was carried out in five boreholes at Arklow Bank, Co. Wicklow.

The work was carried out by European Geophysical Services between the 30<sup>th</sup> of October and the 3<sup>rd</sup> of November 2020.

BH	Logs	From (m)	To (m)
1	Optical Imager, Acoustic Imager, Natural Gamma, Caliper, Focused Resistivity, Fluid Temperature & Conductivity, Impeller Flowmeter, Full-Wave Sonic	1.3	10.3
2	Optical Imager, Acoustic Imager, Natural Gamma, Caliper, Focused Resistivity, Fluid Temperature & Conductivity, Impeller Flowmeter, Full-Wave Sonic	0.2	10.3
3	Optical Imager, Acoustic Imager, Natural Gamma, Caliper, Focused Resistivity, Fluid Temperature & Conductivity, Impeller Flowmeter, Full-Wave Sonic	0.2	20.2
4	Optical Imager, Acoustic Imager, Natural Gamma, Caliper, Focused Resistivity, Fluid Temperature & Conductivity, Impeller Flowmeter, Full-Wave Sonic	0.4	13.5
5	Optical Imager, Acoustic Imager, Natural Gamma, Caliper, Focused Resistivity, Fluid Temperature & Conductivity, Impeller Flowmeter, Full-Wave Sonic	0.5	10.3

## **2.0 THE GEOPHYSICAL LOGGING METHODS**

### **The Equipment and Field Procedure**

A fully digital logging system with a 600m capacity motorised winch mounted in a 4x4 van was used.

All logging data was recorded digitally for reprocessing and archiving purposes.

The optical imager survey was carried out first to avoid the disturbance of the fluid by the geophysical logs which may affect water clarity.

### **Acoustic Borehole Imager (Amplitude and Travel Time)**

This tool scans the borehole wall through 360 degrees and records the acoustic reflection of the resulting signal in terms of amplitude and transit time (the travel time from the tool to the borehole wall). This technique requires a fluid filled borehole with a minimum of suspended solids, polymers or muds within the fluid column.

This sensitive technique responds to small diameter changes, rugosity and the acoustic nature of the borehole wall. It is primarily used for detecting fractures and other discontinuities. The resultant images are orientated (to magnetic North) 0° through 90°, 180° and 270° back to 0°.

The logging tool is centralised during data acquisition by two sets of bow springs. The bow springs are adjusted to a variety of borehole diameters prior to acquisition. The image is viewed on the way down the borehole to allow fine tuning of the acquisition parameters. The settings are then adjusted and the image recorded on the way up the borehole which ensures a constant line speed during acquisition.

Images and associated data are viewed in real time during the data acquisition.

The orientation system employs a flux gate magnetometer and therefore the recorded data within approximately one metre of magnetic steel casing is un-orientated. This is corrected manually during the post-processing stage

---

## **2.0 THE GEOPHYSICAL LOGGING METHODS**

### **Optical Borehole Imager (Optical)**

A precision-machined prism and CCD camera assembly permits a high definition video image of the borehole wall to be captured in a variety of horizontal and vertical resolutions. The resulting image is digitised in the sonde for transmission to the surface acquisition system.

The image is then orientated to Magnetic North and displayed as an unwrapped image log. This enables a detailed structural interpretation to be made if required.

For the best results the optical imager should be run above the water level or in clean, clear fluid. The logging tool is centralised during data acquisition by two sets of bow springs. The bow springs are adjusted to a variety of borehole diameters prior to acquisition. The image is recorded on the way down the borehole to limit disturbance to the clarity of the water in the borehole by the logging tool.

Images and associated data are viewed in real time during the data acquisition.

The orientation system employs a flux gate magnetometer and therefore the recorded data within approximately one metre of magnetic steel casing is un-orientated. This is corrected manually during the post-processing stage

### **Fluid Temperature (T)**

There is a natural geothermal gradient of increasing temperature with depth. This gradient varies with the thermal conductivity of the geological formation and is modified by water flowing in, out or vertically through the borehole.

This log is used to determine any flow pattern within the borehole and to identify flow zones.

Differential logs are produced over a one metre spacing, these are an interpretative aid to detect gradient changes.

### **Fluid Conductivity (EC or EC25)**

The electrical conductivity (EC) of the water is related to its salinity and dissolved solids and is therefore a measure of the quality of the borehole water. The shape of the log trace can indicate zones of inflow.

Using data from the temperature log the electrical conductivity is corrected to 25°C (EC25).

This log is used to identify different zones of water quality.

Differential logs are produced over a one metre spacing, these are an interpretative aid to detect gradient changes.

---

## 2.0 THE GEOPHYSICAL LOGGING METHODS

### Impeller Flowmeter (FV)

This log is used to determine any flow pattern within the borehole and identify flow zones. The tool uses an impeller and is normally run at a constant logging speed against the anticipated flow for the best response. The data is corrected for logging speed and a fluid velocity (FV) log is produced.

### Caliper (Cal)

This tool measures the mean diameter of the borehole. It is used to check the integrity of the borehole lining, and where the borehole is unlined to identify zones of washout, breakout or fissures.

### Natural Gamma (Gam)

The tool measures the naturally occurring gamma radiation found in rocks and sediments. It is mainly used to detect the clays that contain potassium  $K^{40}$ , though the  $U^{238}$  series of elements and the  $Th^{232}$  series of elements also emit gamma radiation.

The higher the concentration of these clay minerals the greater the responses on the natural gamma log.

### Focused Resistivity Log (Res Deep and Res Shallow)

The Focused Resistivity tool uses Guard Electrodes to focus the current into the formation. This gives excellent vertical resolution and good penetration, especially in highly conductive borehole fluids where a Normal Resistivity Sonde would not be as effective.

The tool has two electrode spacing's to allow a deep and shallow depth of investigation.

The response of this log is a function of porosity, type of formation / mineralogy and its pore water quality. These logs aid in the identification of strata and quality of the pore water.

### Full Wave Sonic (FWS) - unlined

This tool has been specially designed to provide a full wave form recording of sonic signals and uses fixed spaced transmitter – receivers.

The received signals are digitised at a fast sampling rate with high resolution. Data may be sampled at typically 5cm or 10cm intervals dependant upon resolution required.

The data is processed for P wave velocity (or transit time) and amplitude. This tool can only be used in fluid filled unlined boreholes.

---



### 3.0 PROCESSING AND PRESENTATION OF IMAGER RESULTS

Detailed logs of the imager data have been produced at a vertical scale of 1:10.

Constructional details and information on each borehole are given in the headers of each log.

All images have been referenced to Magnetic North.

The borehole's azimuth and tilt are plotted alongside the images.

The image of the borehole wall is presented in an unwrapped form with a horizontal scale marked 0° - North, through 90° - East, 180° - South, 270° - West, back to North.

Structural features and discontinuities have been picked from the images in the form of colour coded sinusoidal projections - see Appendix 1 for details. This 'Discontinuities' log is also presented with a horizontal scale marked 0° - North, through 90° - East, 180° - South, 270° - West, back to North.

Structure picking is not a definitive analysis of all the features within a borehole. Only the discontinuities that have a linear dip and direction are 'picked' and used in the analysis of the discontinuities. Features that do not have a regular sinusoidal shape do not have a linear dip and direction, 'best fit' picking of these features is done if approximately 80% coverage of the sinusoid can be achieved. Below this percentage the inaccuracy of the picking is too great and if included in any structural analysis may adversely skew the results. Vughs, solution holes, and angular break outs are examples of features not picked.

The apparent azimuth and apparent dip (i.e. relative to the borehole's azimuth and tilt) of the discontinuities are calculated using the diameter of the borehole and the geometric parameters of the sinusoids overlaid on the discontinuities. The final processing stage is to correct these apparent values to true azimuth (in relation to Magnetic North) and true dip (from horizontal) by correcting for the borehole's azimuth and tilt.

The final results are presented as a 'tadpole' plot (Discontinuities - True°). The horizontal position of the tadpole's head gives the defect's true dip angle and its tail points in the direction of the defect's azimuth. These logs are presented with a horizontal scale in degrees. By convention the top of the page is North (Magnetic) and the right hand edge of the paper is East.

The true structural data has been presented in digital format as an excel file (xls).

*Taking into account the accuracies of the manufacturer's transducers and dependent upon tool centralisation, borehole rugosity, borehole eccentricity and picking techniques etc the overall accuracy of the technique is estimated at +/- 5 degrees for azimuth and +/- 2 degrees for dip.*

## 5.0 BOREHOLE LOGGING CONSTRAINTS

- **Vehicle access restrictions**  
None
  - **Tool access restrictions**  
None
  - **Borehole conditions / risk to equipment**  
Good stable boreholes, casing to rock head.
  - **Lack of fluid filled column / cloudy fluid**  
Acoustic televiewer ran in boreholes with cloudy borehole fluid.
  - **Time constraint**  
None
  - **Borehole construction / casing**  
Steel casing to rockhead.
-

## Appendix 1

### Discontinuity Classification.

Discontinuity	Colour	Classification Parameters
Major Fracture or Fissure	Blue	An open break in the formation, that is <b><u>continuous</u></b> across the entire image.
Minor Fracture or Fissure	Turquoise	A thin or closed break in the formation, that is <b><u>continuous or discontinuous</u></b> across the image.
Vein	Green	That may be <b><u>continuous or discontinuous</u></b> across the entire image.
Fabric	Red	Defines a feature generally metamorphic, igneous or sedimentary in origin that may be <b><u>continuous or discontinuous</u></b> across the image, such as bedding and cross-bedding, schistosity or gneissosity.
Intrusions	Purple	Intrusive features such as dykes and sills, generally <b><u>continuous</u></b> across the image
Unknown	Black	Faint features which <b>can not</b> be classified.

## **Appendix 2**

### **Geophysical Logs**



# EUROPEAN GEOPHYSICAL SERVICES LTD

Client: **Irish Drilling**

Log Type:

Borehole: **BH1**

**Composite**

Location: **Arklow Bank**

Area: **Co. Wicklow**

Grid Ref:

Elevation:

Drilled Depth: (m)

Date:

**02.11.20**

Logged Depth: (m)

**10.1**

Recorded By:

**A. White**

Logging Datum:

**Ground Level**

Remarks:

Logged Interval: (m)

**1.3 - 10.1**

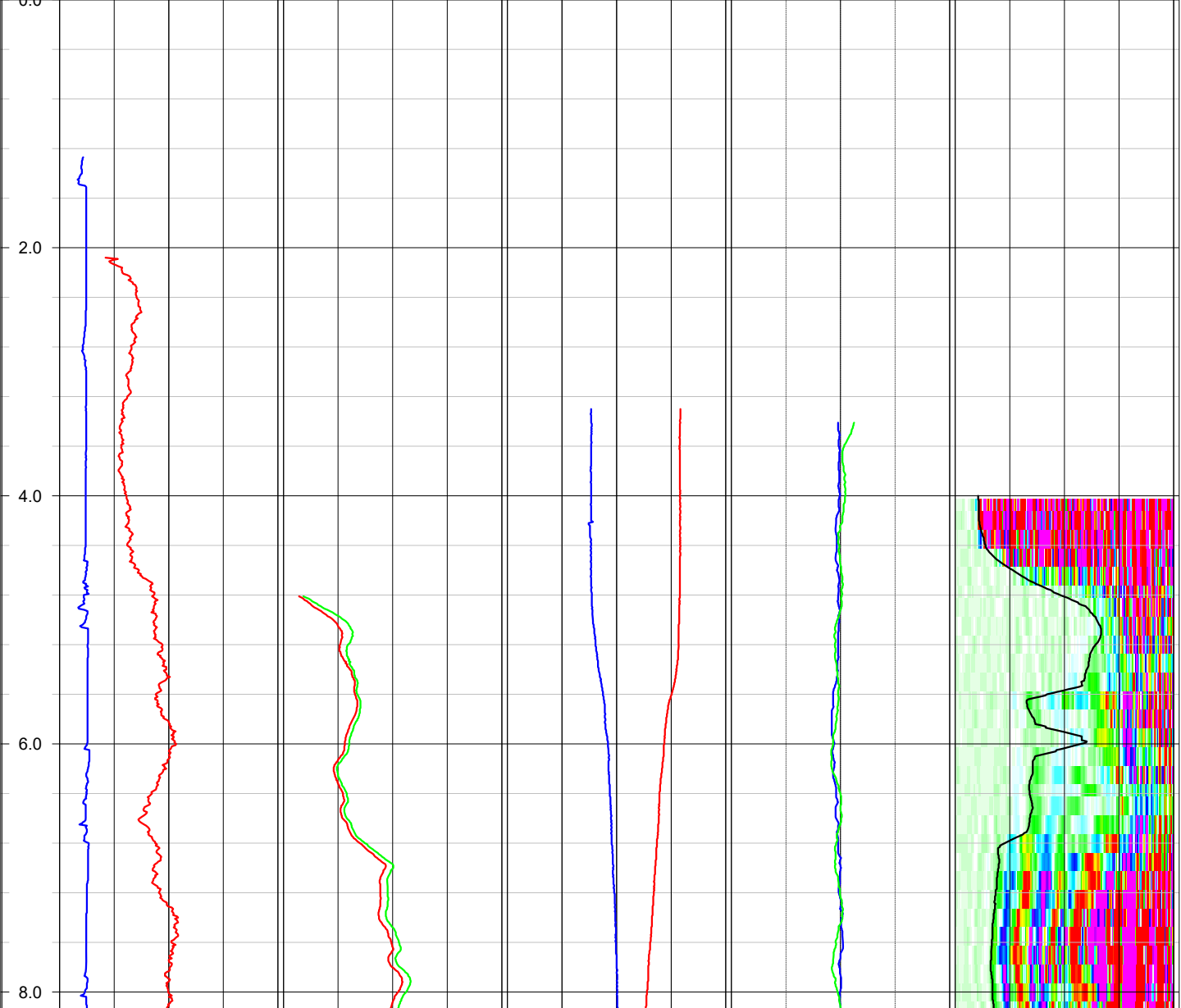
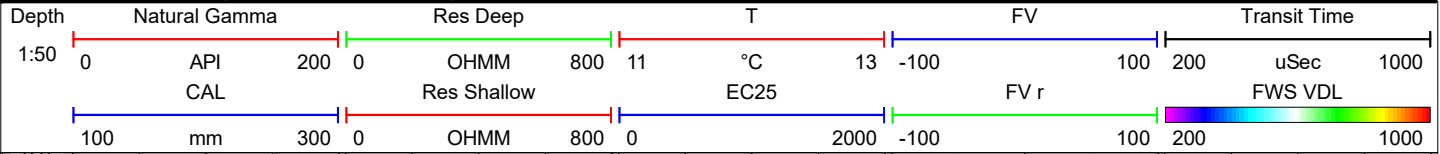
Fluid Level: (m)

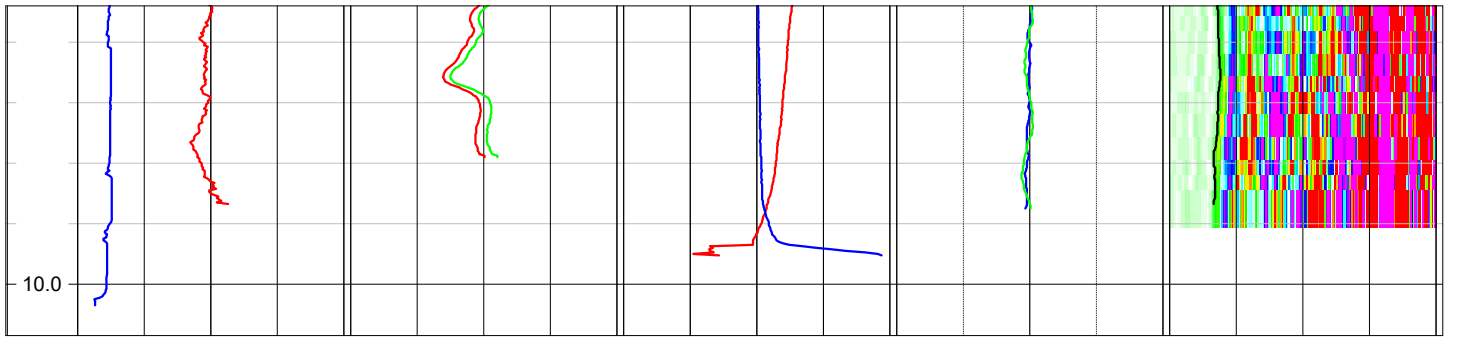
**3.2**

## BOREHOLE RECORD

## CASING RECORD

Bit: (mm)	From: (m)	To: (m)	Type	Size: (mm)	From: (m)	To: (m)
<b>120</b>	<b>4.8</b>	<b>10.1</b>	<b>Steel</b>	<b>122</b>	<b>0.0</b>	<b>4.8</b>







# EUROPEAN GEOPHYSICAL SERVICES LTD

Client: **Irish Drilling**

Log Type:

Borehole: **BH1**

**Image**

Location: **Arklow Bank**

Area: **Co. Wicklow**

Grid Ref:

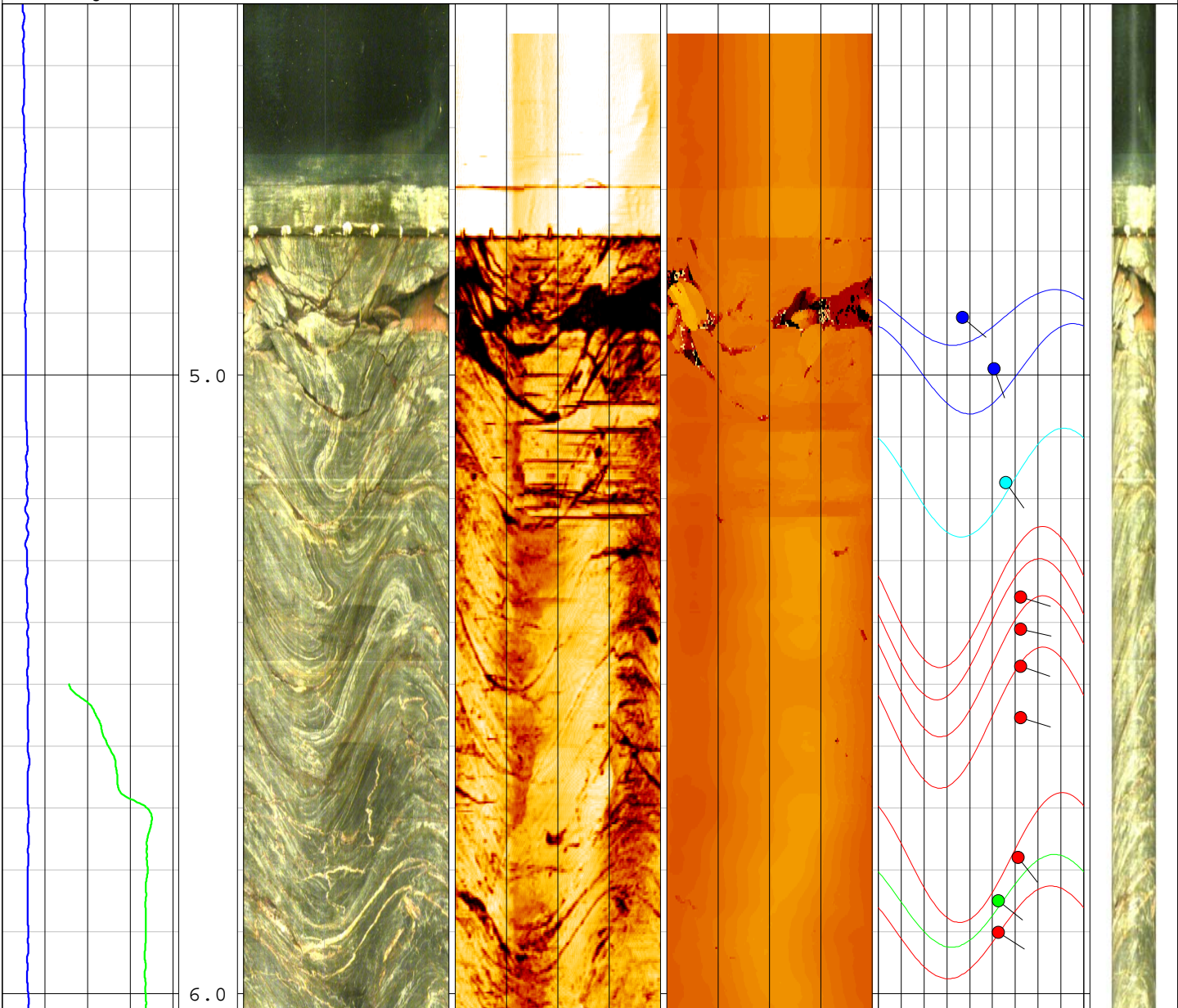
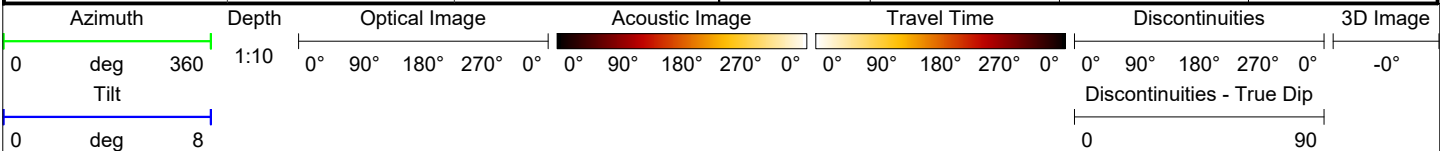
Elevation:

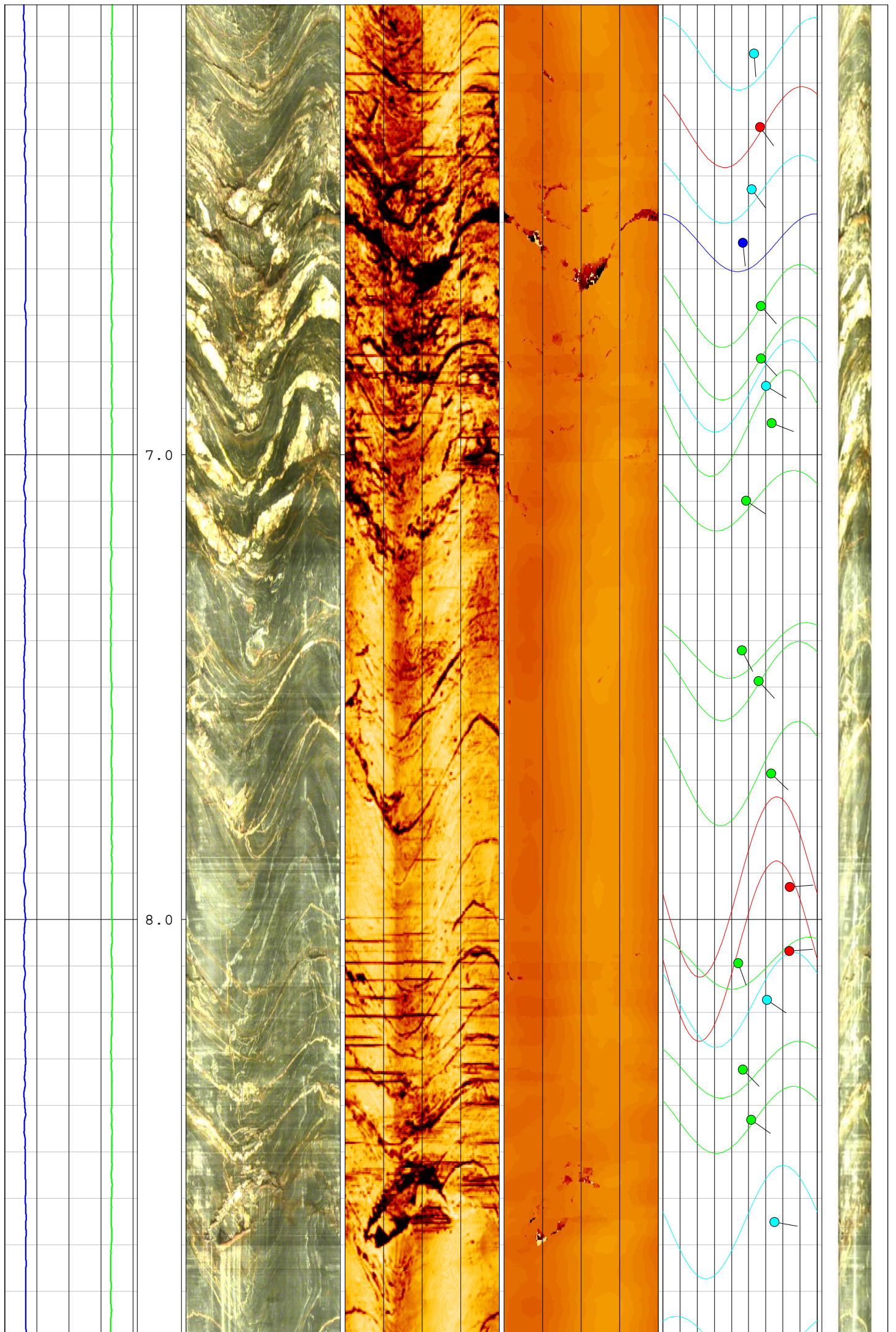
Drilled Depth: (m)		Date:	<b>02.11.20</b>
Logged Depth: (m)	<b>10.3</b>	Recorded By:	<b>A. White</b>
Logging Datum:	<b>Ground Level</b>	Remarks:	
Logged Interval: (m)	<b>4.8 - 10.3</b>		
Fluid Level: (m)	<b>3.3</b>		

## BOREHOLE RECORD

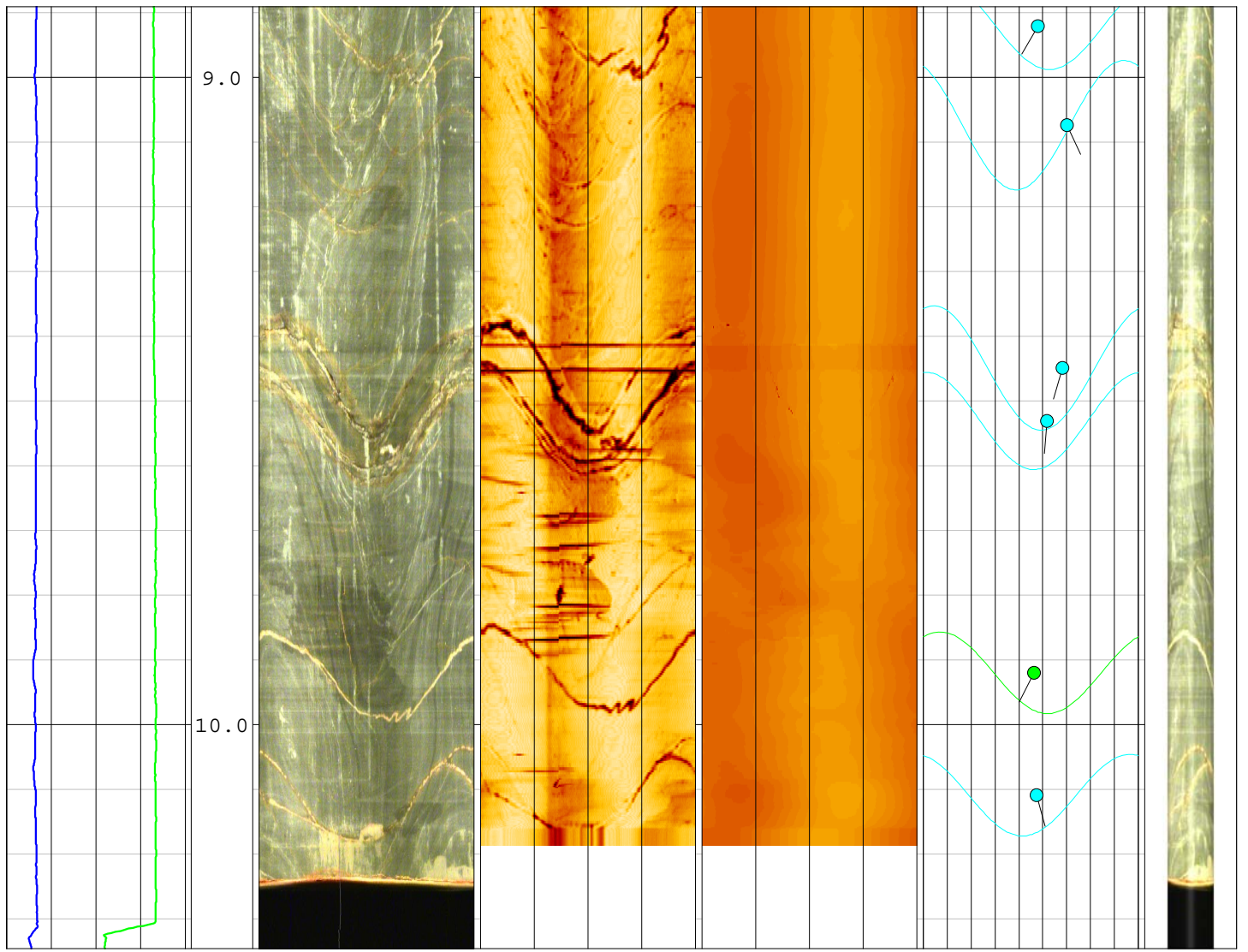
## CASING RECORD

Bit: (mm)	From: (m)	To: (m)	Type	Size: (mm)	From: (m)	To: (m)
<b>120</b>	<b>4.8</b>	<b>10.3</b>	<b>Steel</b>	<b>120</b>	<b>0.0</b>	<b>4.8</b>











# EUROPEAN GEOPHYSICAL SERVICES LTD

Client: **Irish Drilling**

Log Type:

Borehole: **BH2**

**Composite**

Location: **Arklow Bank**

Area: **Co. Wicklow**

Grid Ref:

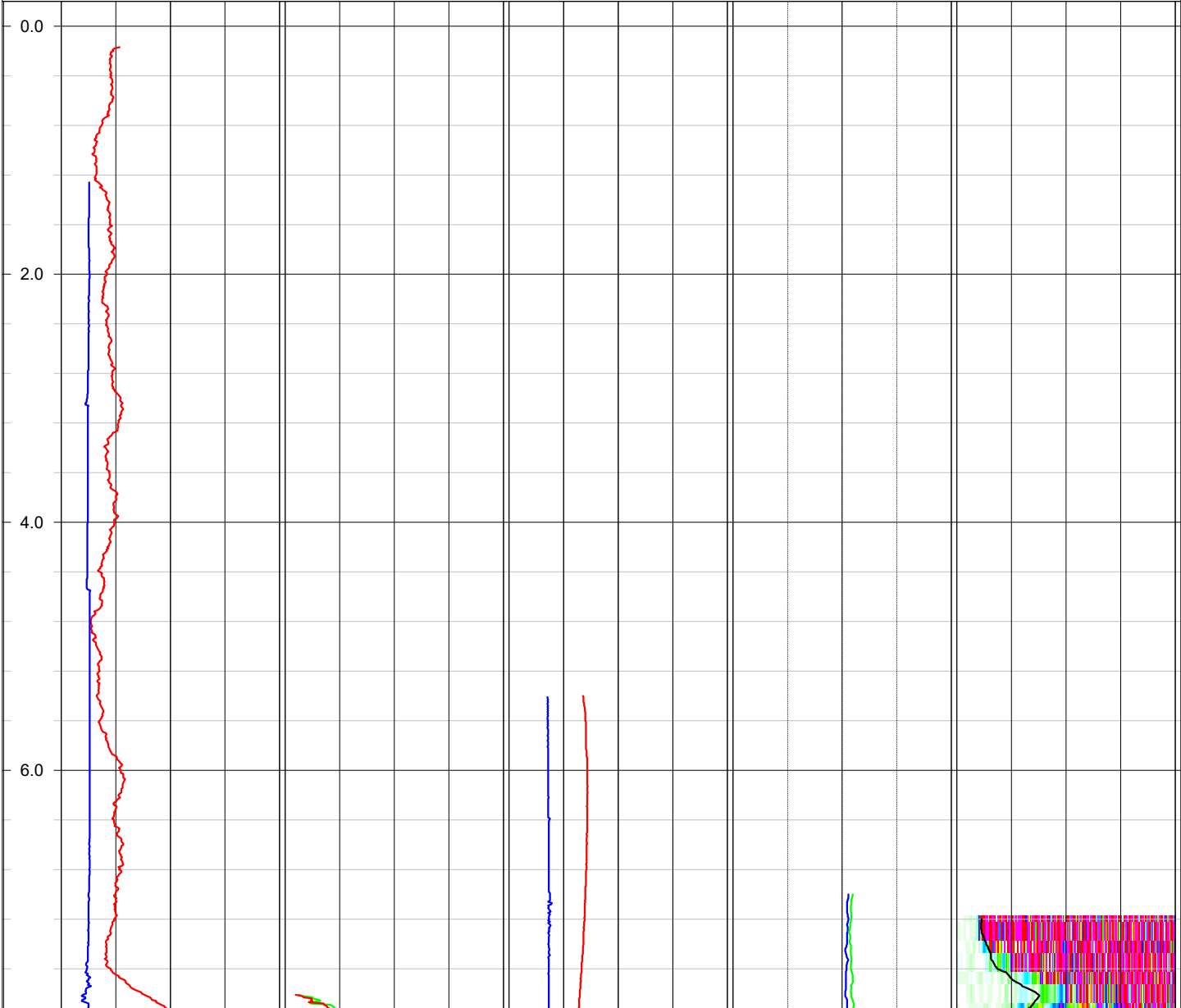
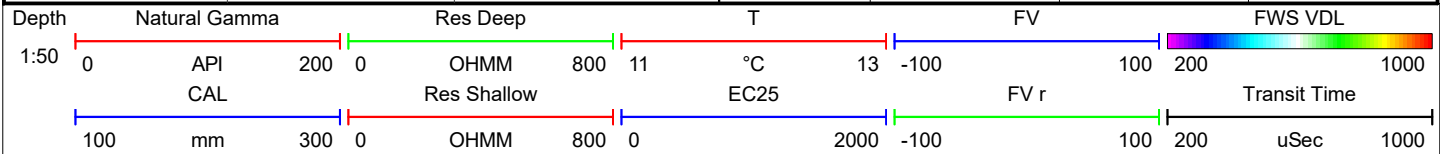
Elevation:

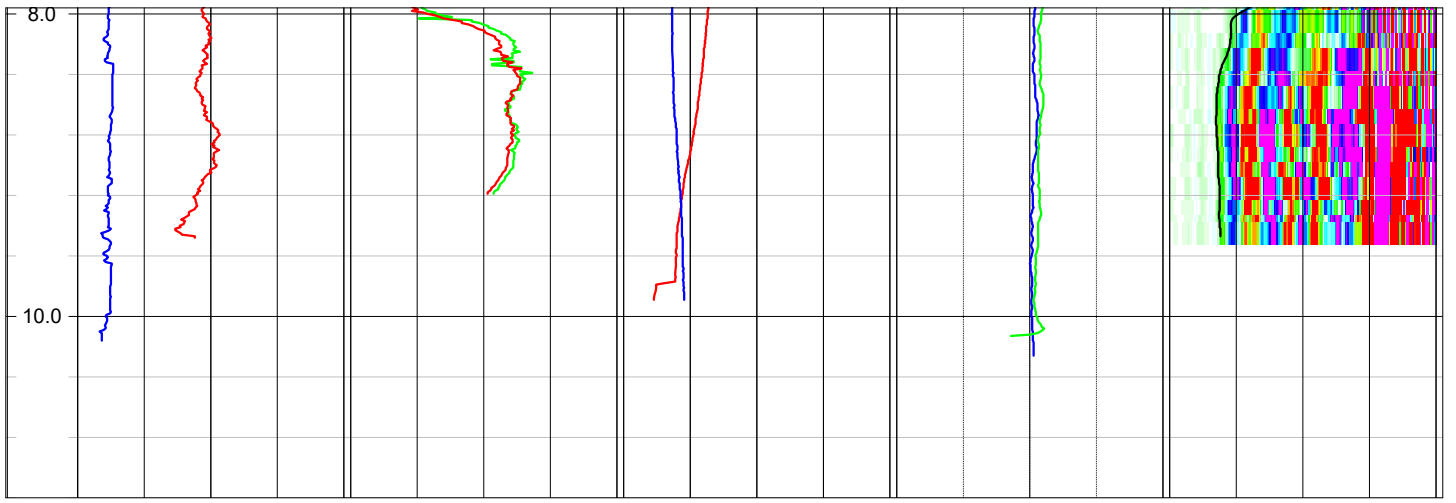
Drilled Depth: (m)	-	Date:	<b>03.11.20</b>
Logged Depth: (m)	<b>10.3</b>	Recorded By:	<b>A. White</b>
Logging Datum:	<b>Ground Level</b>	Remarks:	
Logged Interval: (m)	<b>0.2 - 10.3</b>		
Fluid Level: (m)	<b>5.4</b>		

## BOREHOLE RECORD

## CASING RECORD

Bit: (mm)	From: (m)	To: (m)	Type	Size: (mm)	From: (m)	To: (m)
<b>120</b>	<b>7.8</b>	<b>10.3</b>	<b>Steel</b>	<b>125</b>	<b>0.0</b>	<b>7.8</b>







# EUROPEAN GEOPHYSICAL SERVICES LTD

Client: **Irish Drilling**

Log Type:

Borehole: **BH2**

**Image**

Location: **Arklow Bank**

Area: **Co. Wicklow**

Grid Ref:

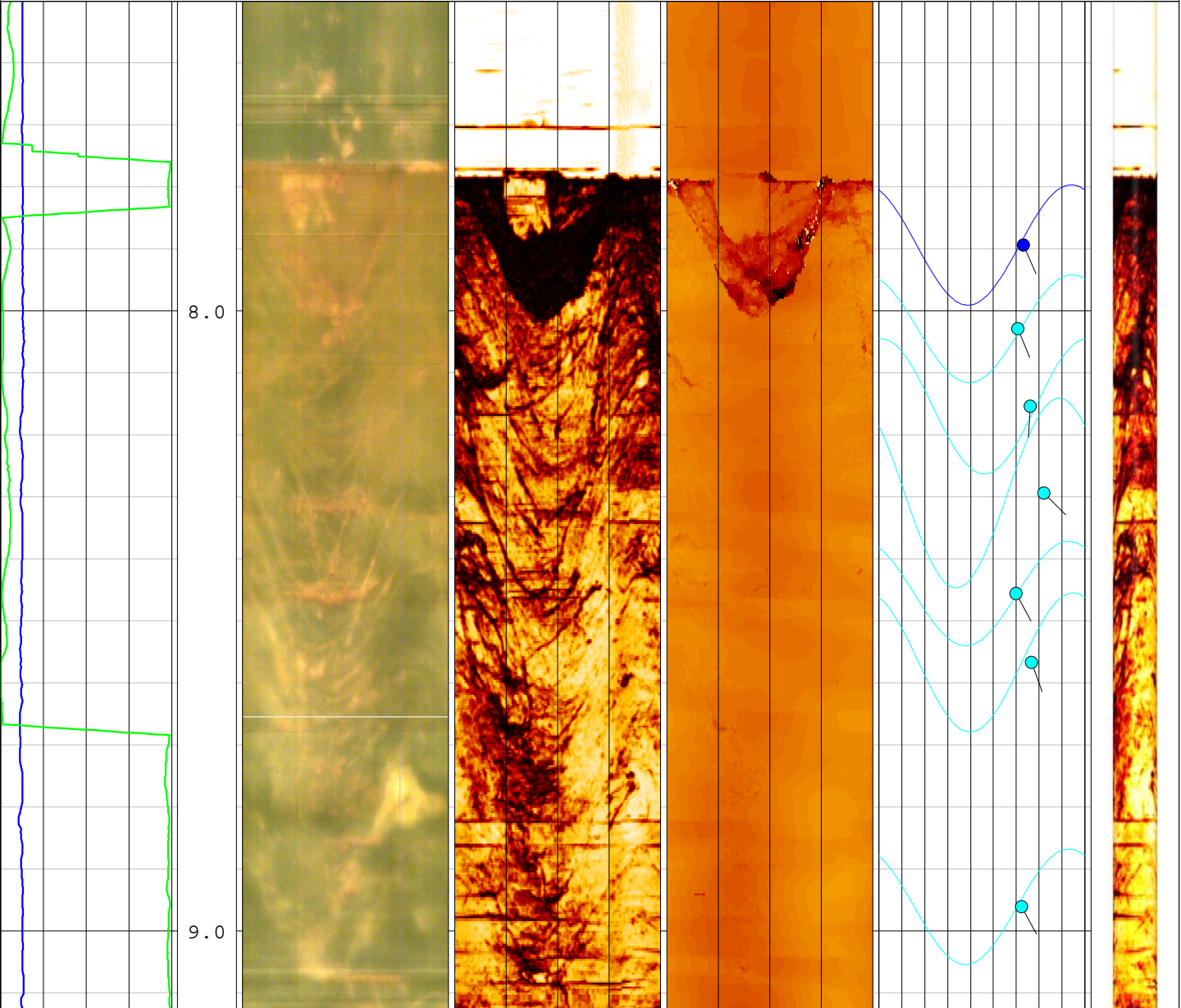
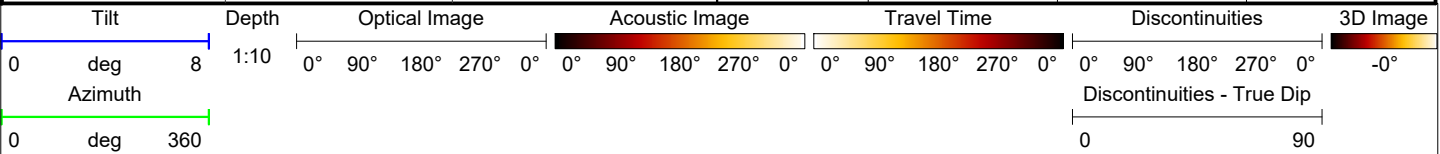
Elevation:

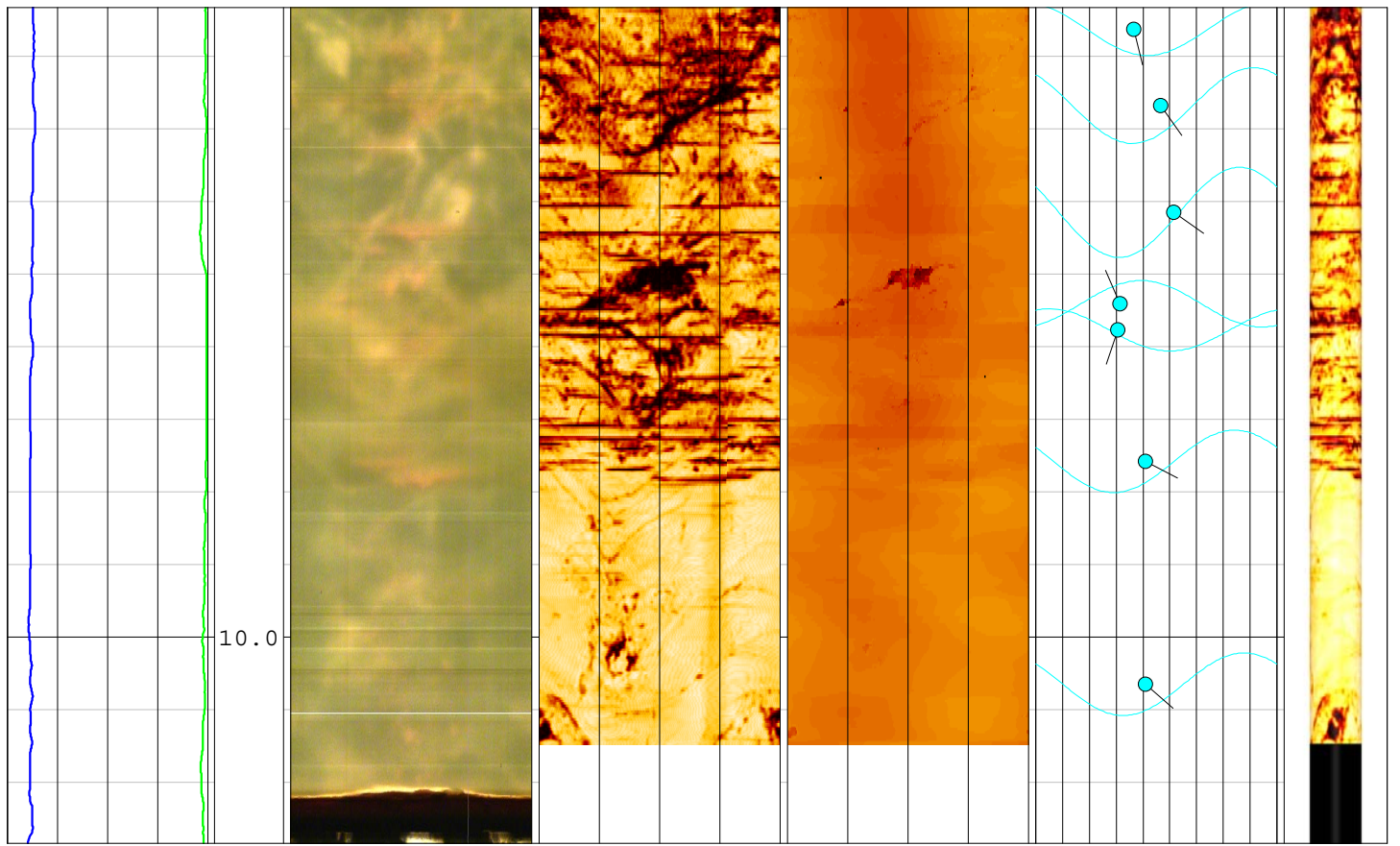
Drilled Depth: (m)	-	Date:	<b>03.11.20</b>
Logged Depth: (m)	<b>10.3</b>	Recorded By:	<b>A. White</b>
Logging Datum:	<b>Ground Level</b>	Remarks:	
Logged Interval: (m)	<b>7.8 - 10.3</b>		
Fluid Level: (m)	<b>5.4</b>		

## BOREHOLE RECORD

## CASING RECORD

Bit: (mm)	From: (m)	To: (m)	Type	Size: (mm)	From: (m)	To: (m)
<b>120</b>	<b>7.8</b>	<b>10.3</b>	<b>Steel</b>	<b>125</b>	<b>0.0</b>	<b>7.8</b>







# EUROPEAN GEOPHYSICAL SERVICES LTD

Client: **Irish Drilling**

Log Type:

Borehole: **BH3**

**Composite**

Location: **Arklow Bank**

Area: **Co. Wicklow**

Grid Ref:

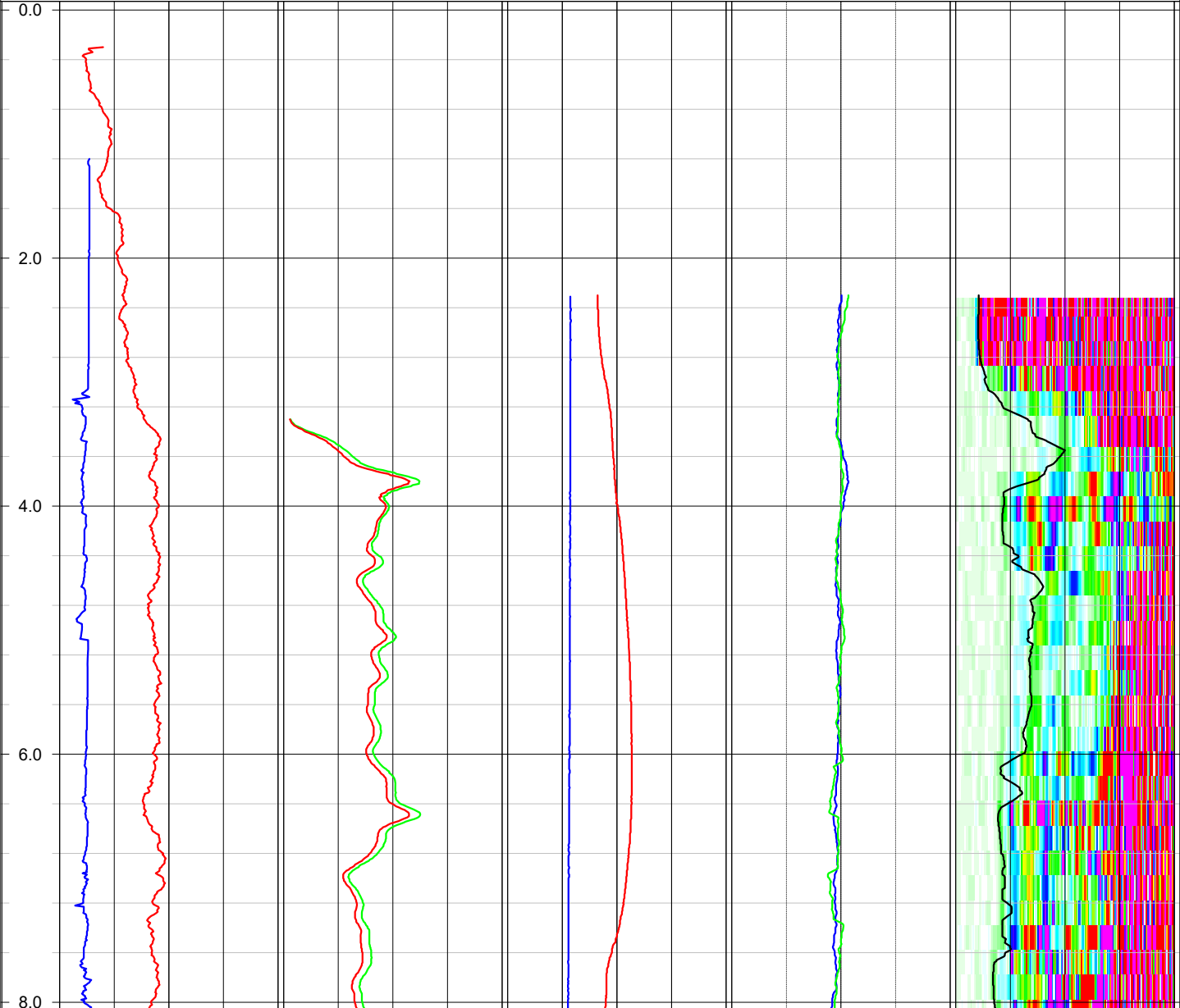
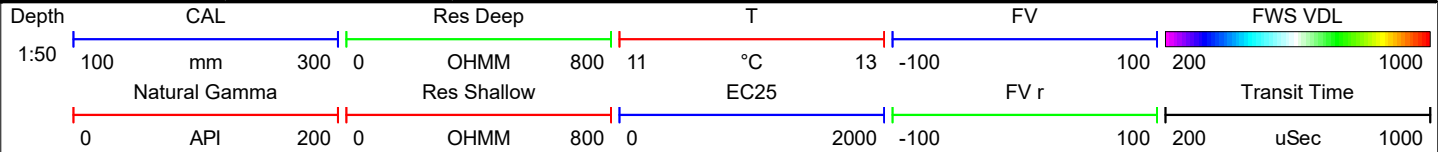
Elevation:

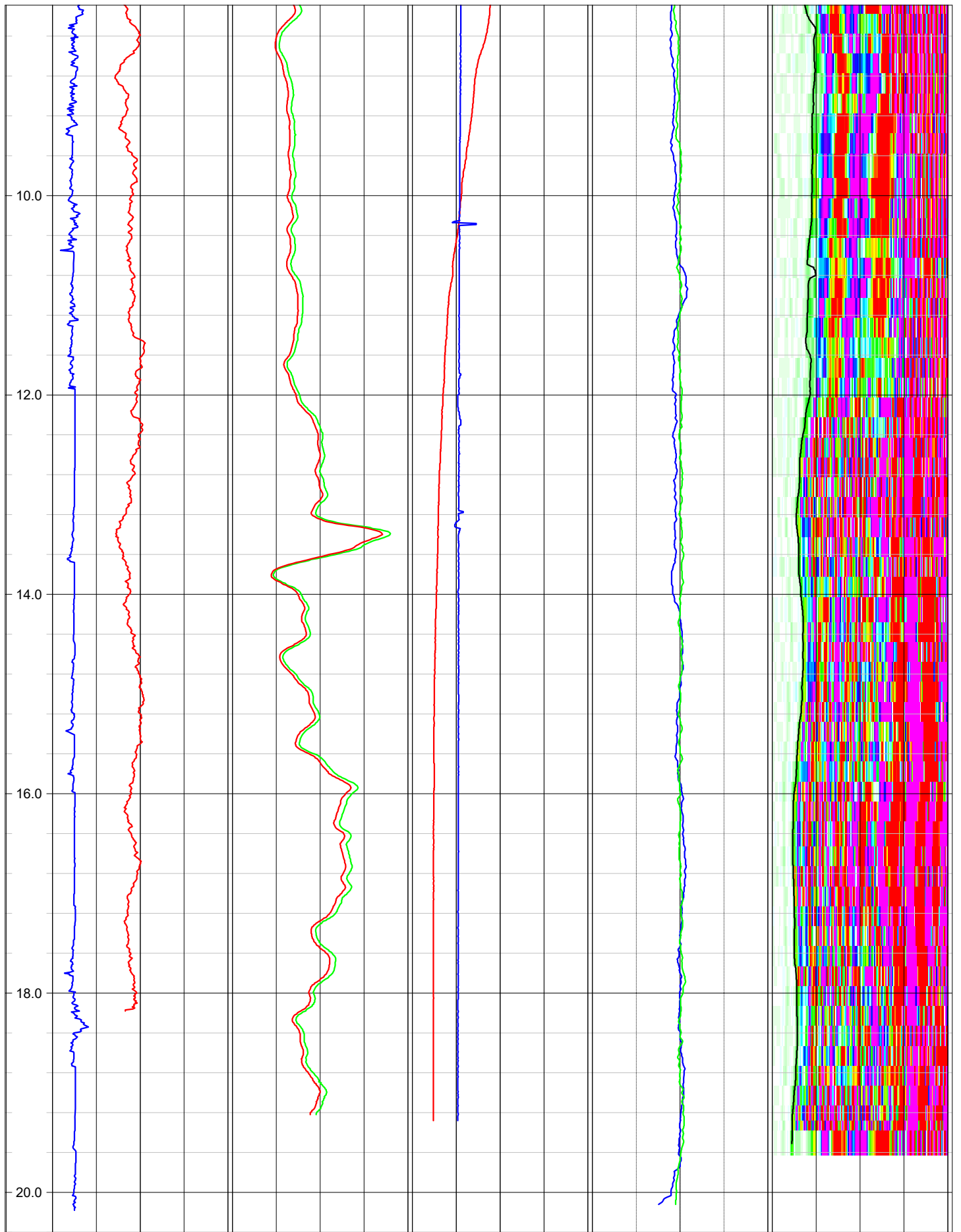
Drilled Depth: (m)		Date:	<b>03.11.20</b>
Logged Depth: (m)	<b>20.2</b>	Recorded By:	<b>A. White</b>
Logging Datum:	<b>Ground Level</b>	Remarks:	
Logged Interval: (m)	<b>0.4 - 20.2</b>		
Fluid Level: (m)	<b>1.7</b>		

## BOREHOLE RECORD

## CASING RECORD

Bit: (mm)	From: (m)	To: (m)	Type	Size: (mm)	From: (m)	To: (m)
<b>120</b>	<b>3.3</b>	<b>20.2</b>	<b>Steel</b>	<b>125</b>	<b>0.0</b>	<b>3.3</b>







# EUROPEAN GEOPHYSICAL SERVICES LTD

Client: **Irish Drilling**

Log Type:

Borehole: **BH3**

**Image**

Location: **Arklow Bank**

Area: **Co. Wicklow**

Grid Ref:

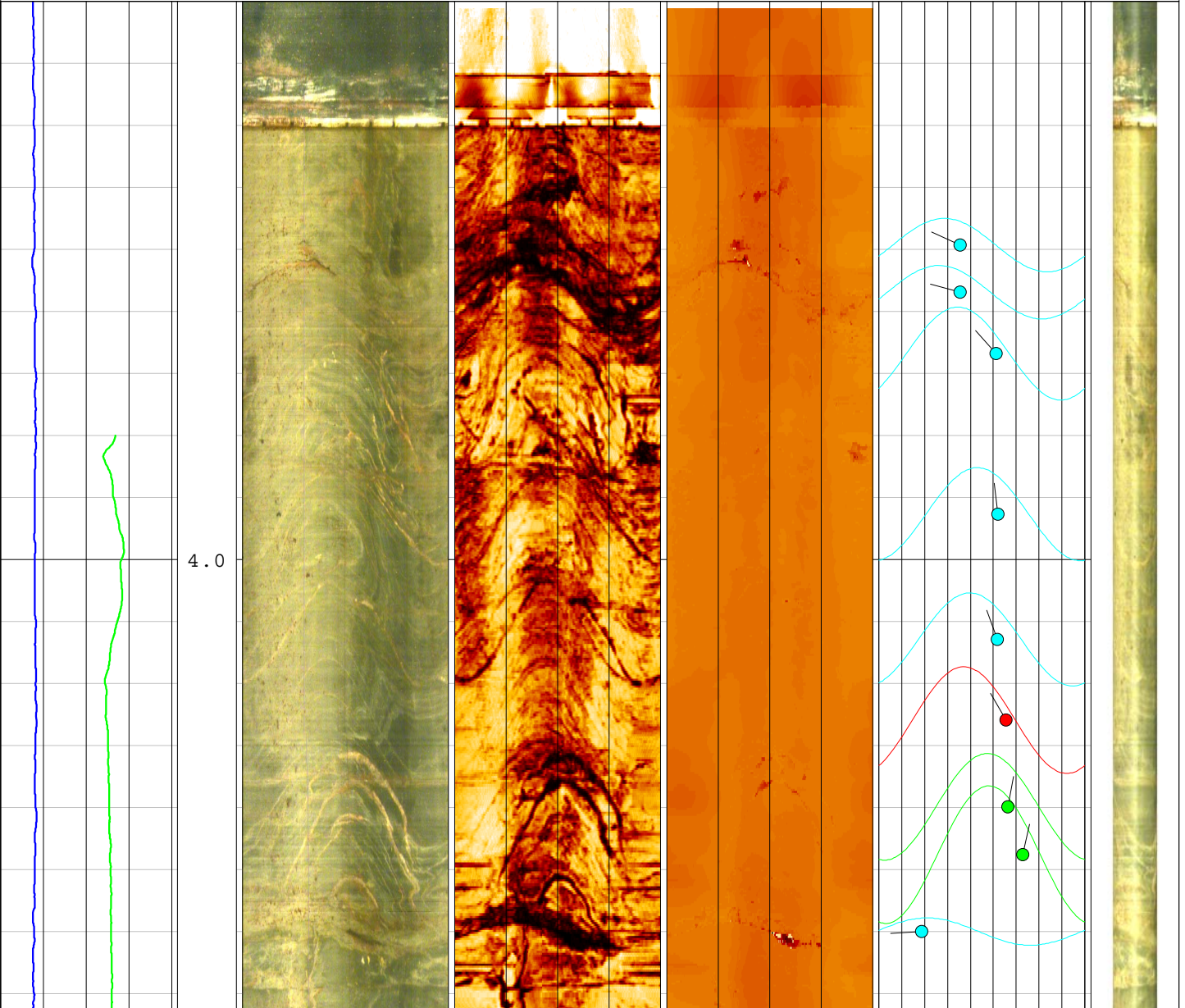
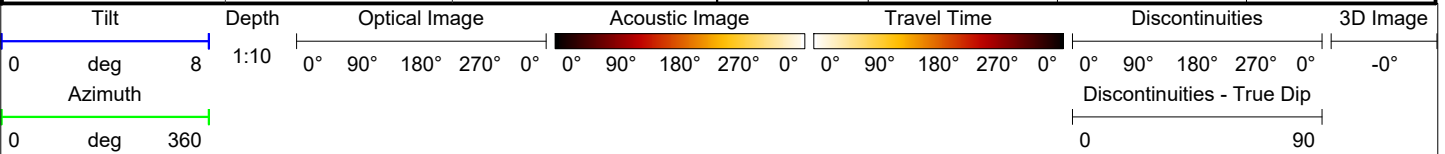
Elevation:

Drilled Depth: (m)		Date:	<b>03.11.20</b>
Logged Depth: (m)	<b>20.2</b>	Recorded By:	<b>A. White</b>
Logging Datum:	<b>Ground Level</b>	Remarks:	
Logged Interval: (m)	<b>3.3 - 20.2</b>		
Fluid Level: (m)	<b>1.7</b>		

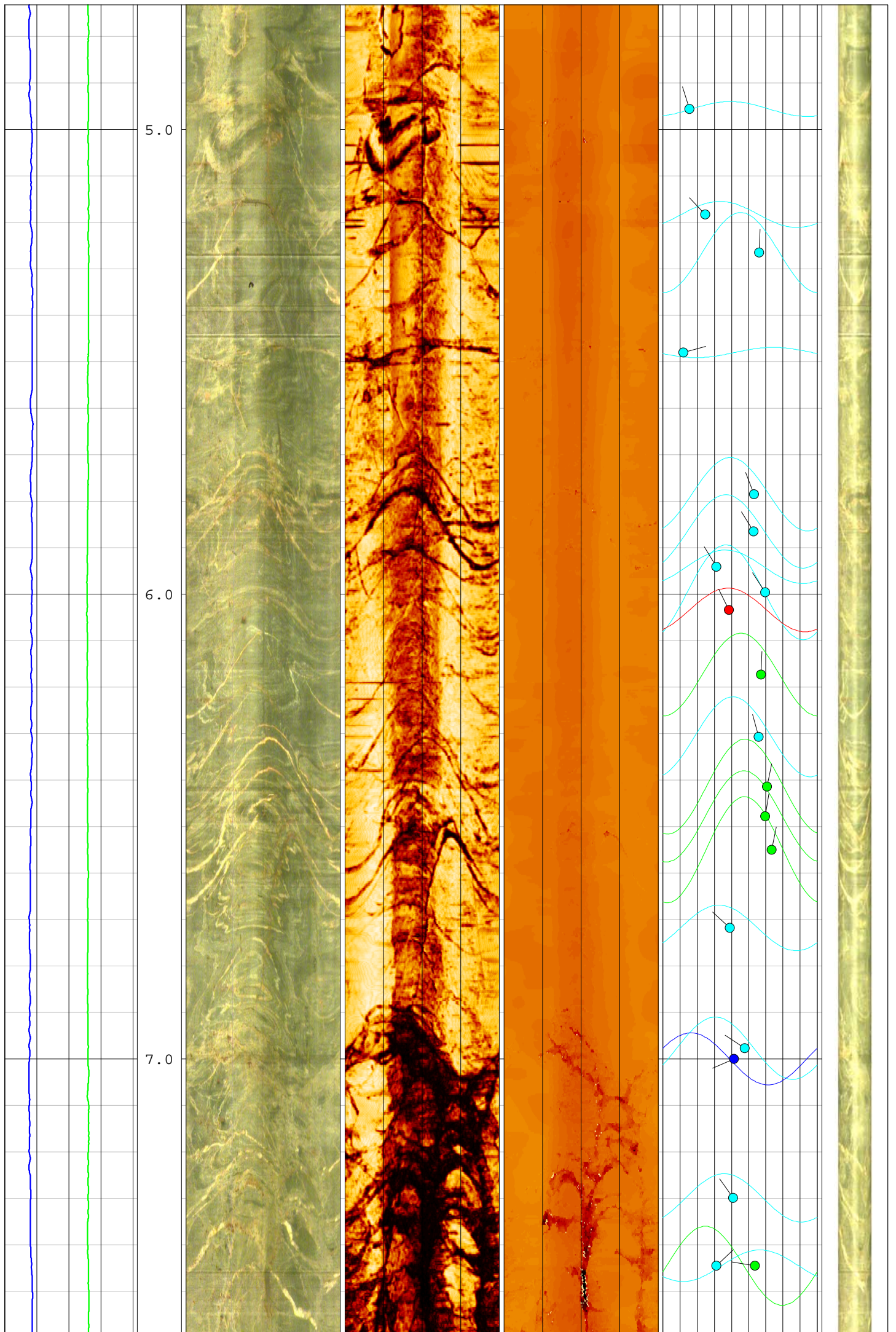
## BOREHOLE RECORD

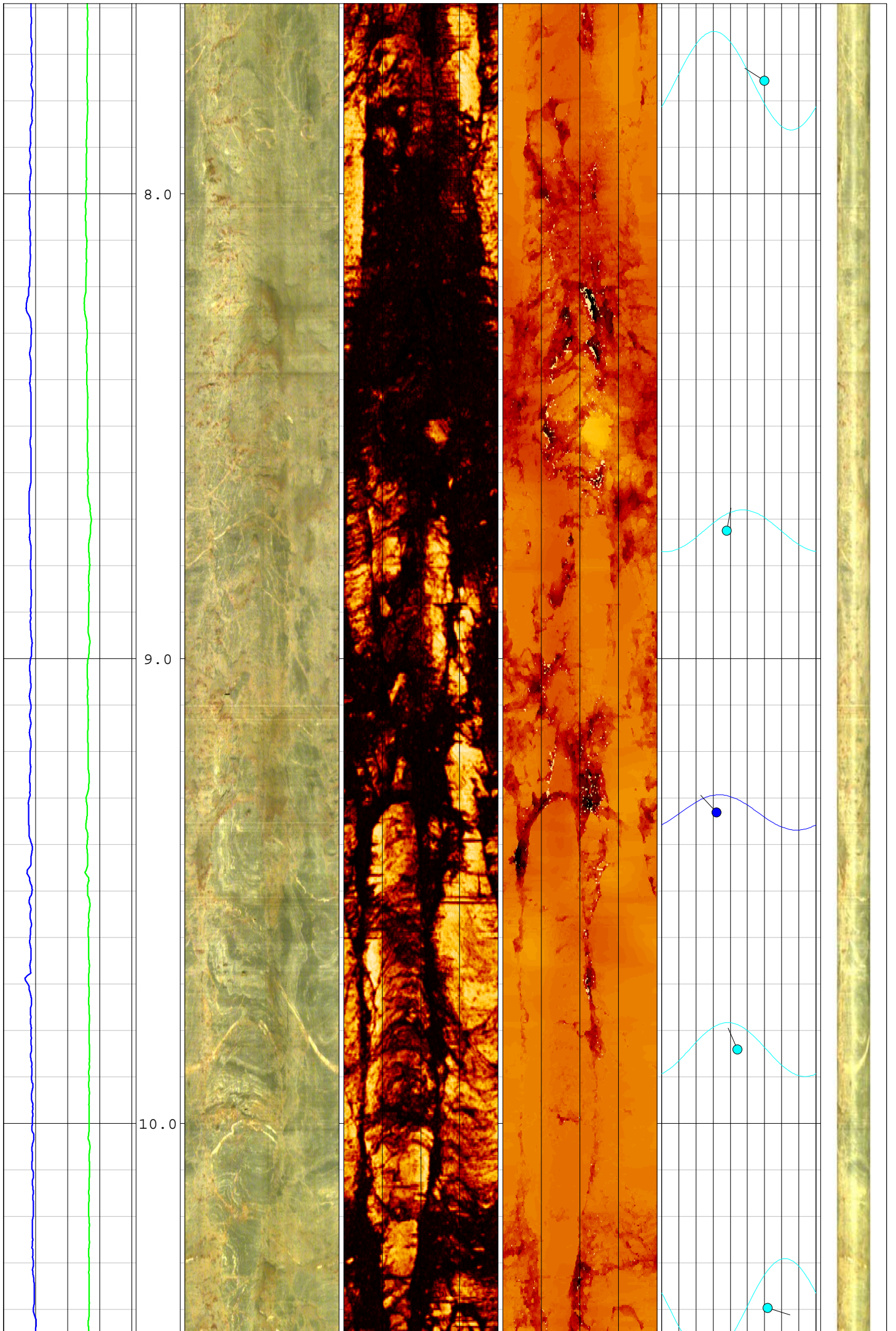
## CASING RECORD

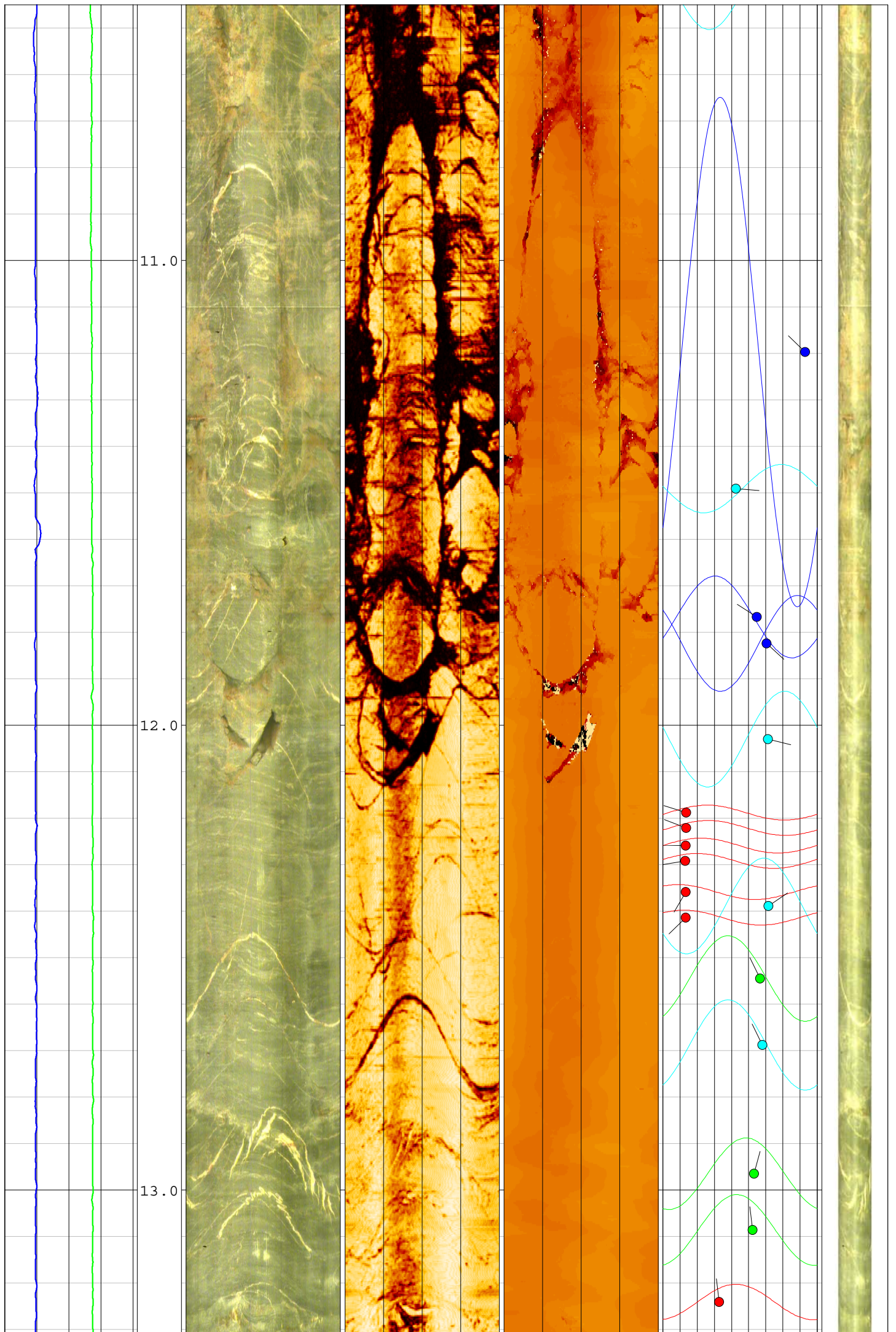
Bit: (mm)	From: (m)	To: (m)	Type	Size: (mm)	From: (m)	To: (m)
<b>120</b>	<b>3.3</b>	<b>20.2</b>	<b>Steel</b>	<b>125</b>	<b>0.0</b>	<b>3.3</b>

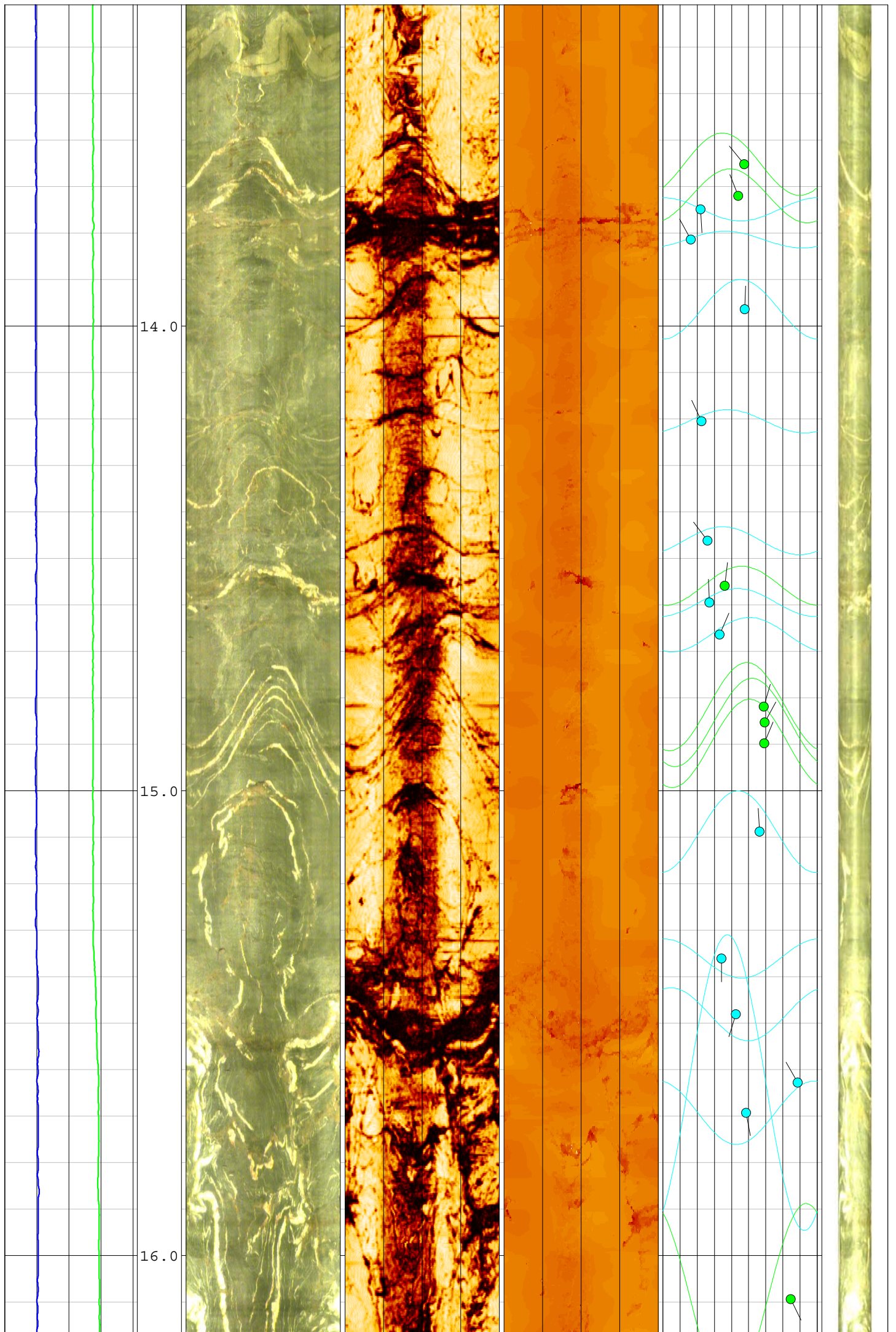


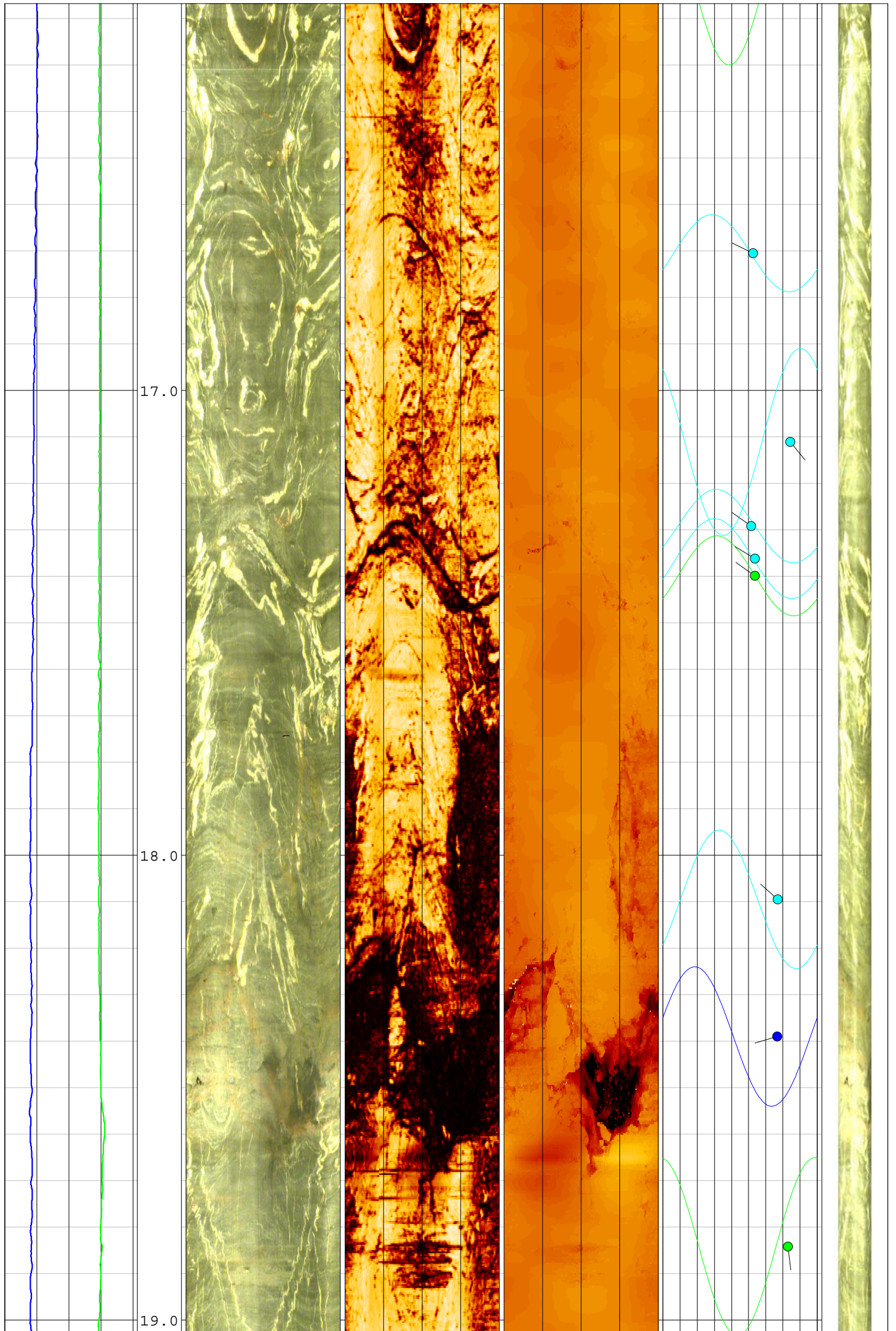


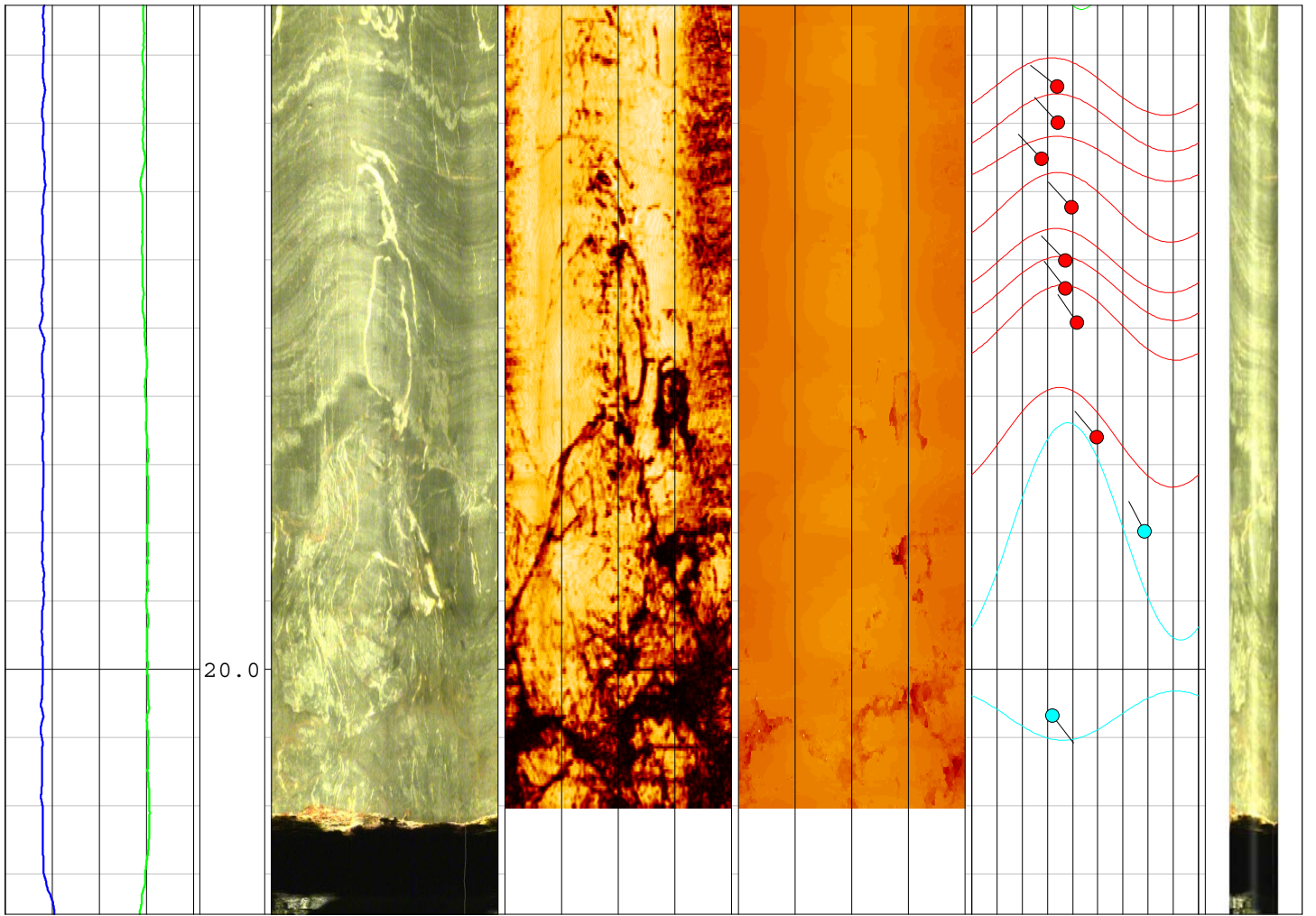














# EUROPEAN GEOPHYSICAL SERVICES LTD

Client: **Irish Drilling**

Log Type:

Borehole: **BH4**

**Composite**

Location: **Arklow Bank**

Area: **Co. Wicklow**

Grid Ref:

Elevation:

Drilled Depth: (m)

Date:

**02.11.20**

Logged Depth: (m)

**13.5**

Recorded By:

**A. White**

Logging Datum:

**Ground Level**

Remarks:

Logged Interval: (m)

**0.4 - 13.5**

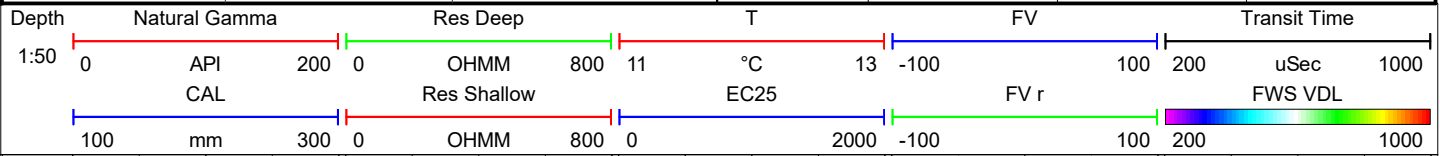
Fluid Level: (m)

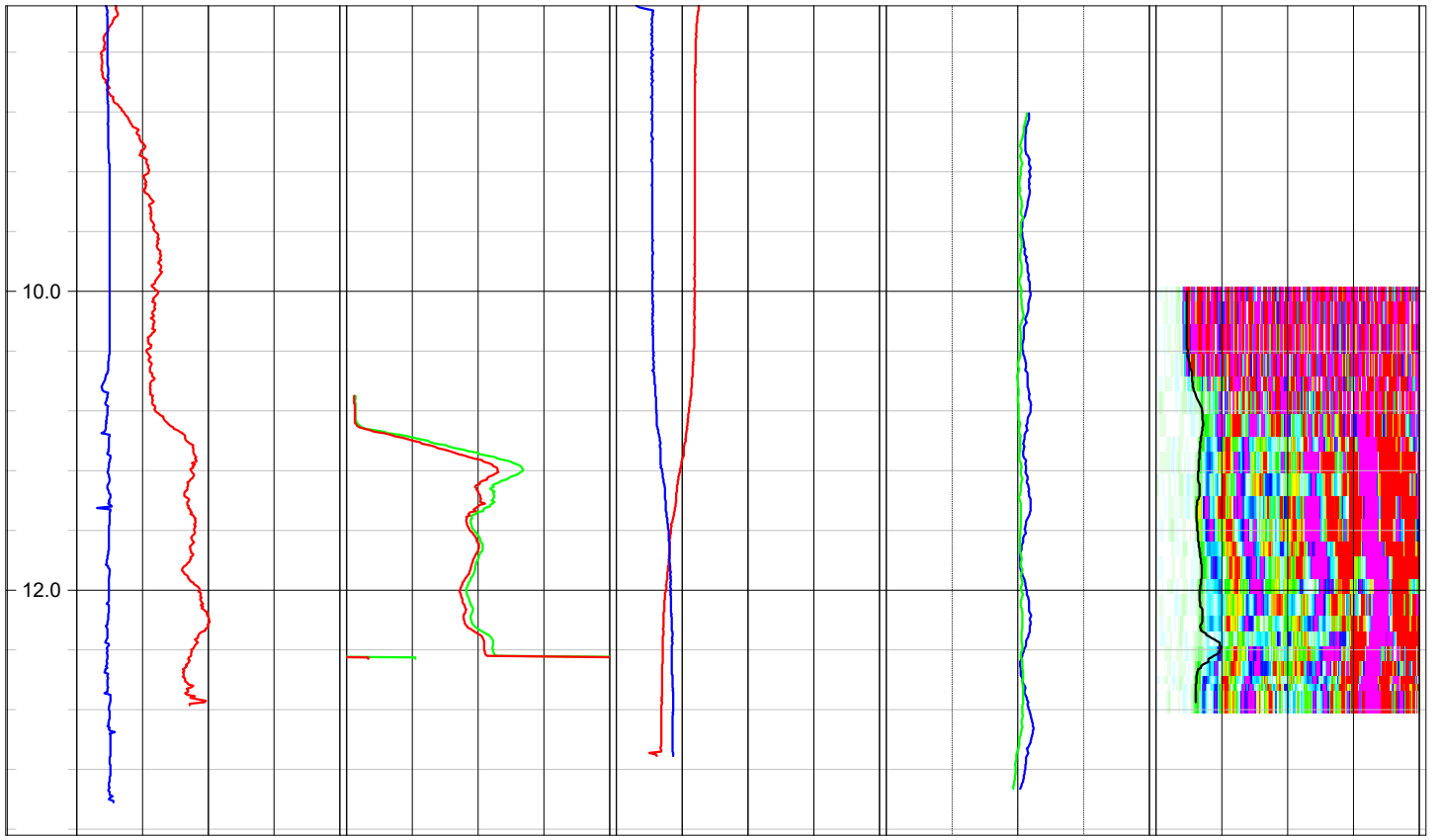
**8.1**

## BOREHOLE RECORD

## CASING RECORD

Bit: (mm)	From: (m)	To: (m)	Type	Size: (mm)	From: (m)	To: (m)
<b>120</b>	<b>10.7</b>	<b>13.5</b>	<b>Steel</b>	<b>125</b>	<b>0.0</b>	<b>10.7</b>









# EUROPEAN GEOPHYSICAL SERVICES LTD

Client: **Irish Drilling**

Log Type:

Borehole: **BH4**

**Image**

Location: **Arklow Bank**

Area: **Co. Wicklow**

Grid Ref:

Elevation:

Drilled Depth: (m)

Date:

**02.11.20**

Logged Depth: (m)

**13.5**

Recorded By:

**A. White**

Logging Datum:

**Ground Level**

Remarks:

Logged Interval: (m)

**10.9 - 13.5**

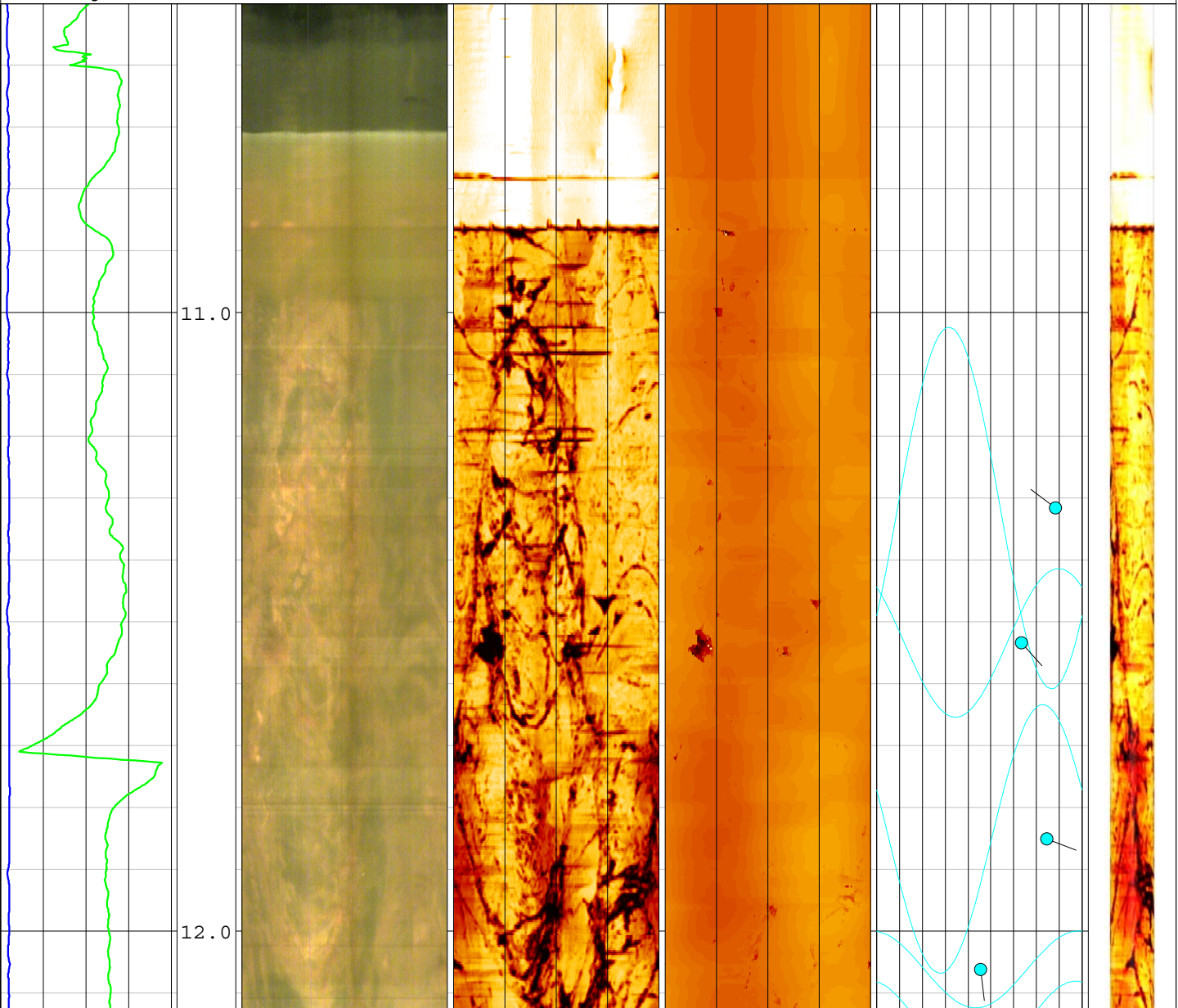
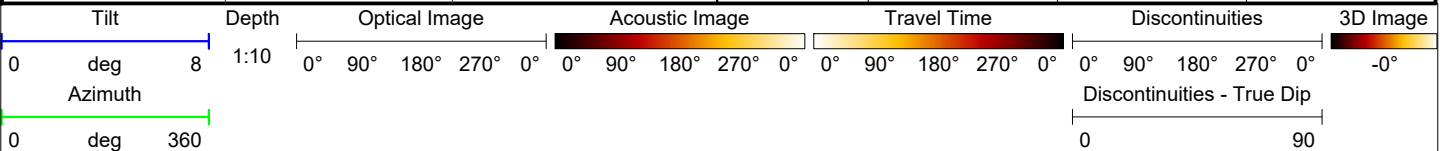
Fluid Level: (m)

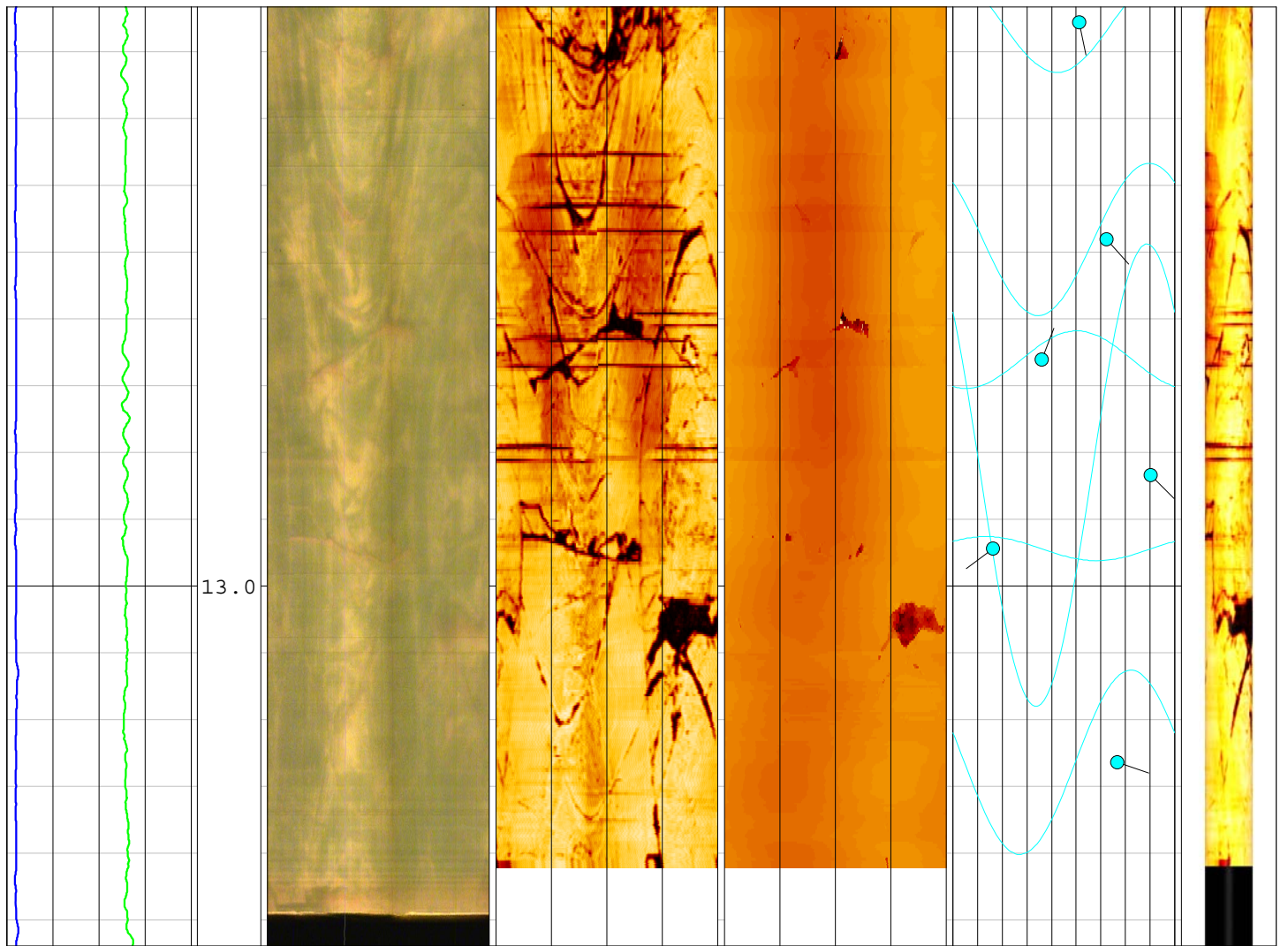
**8.1**

## BOREHOLE RECORD

## CASING RECORD

Bit: (mm)	From: (m)	To: (m)	Type	Size: (mm)	From: (m)	To: (m)
<b>120</b>	<b>10.9</b>	<b>13.5</b>	<b>Steel</b>	<b>125</b>	<b>0.0</b>	<b>10.9</b>







# EUROPEAN GEOPHYSICAL SERVICES LTD

Client: **Irish Drilling**

Log Type:

Borehole: **BH5**

**Composite**

Location: **Arklow Bank**

Area: **Co. Wicklow**

Grid Ref:

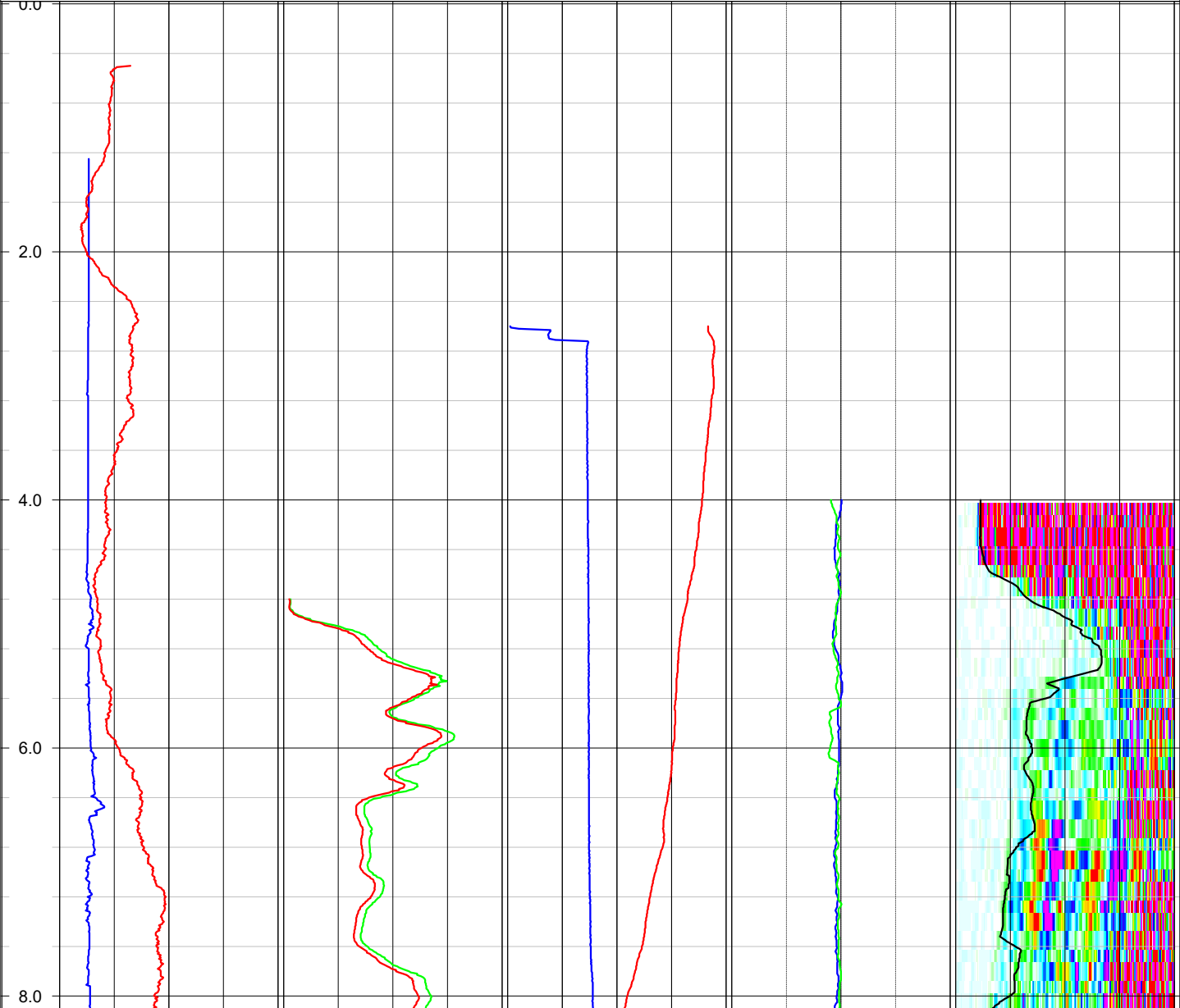
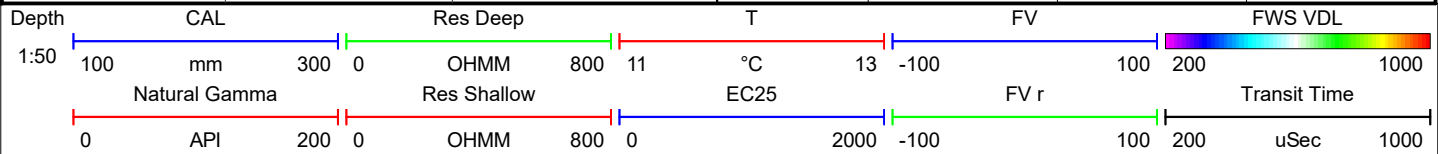
Elevation:

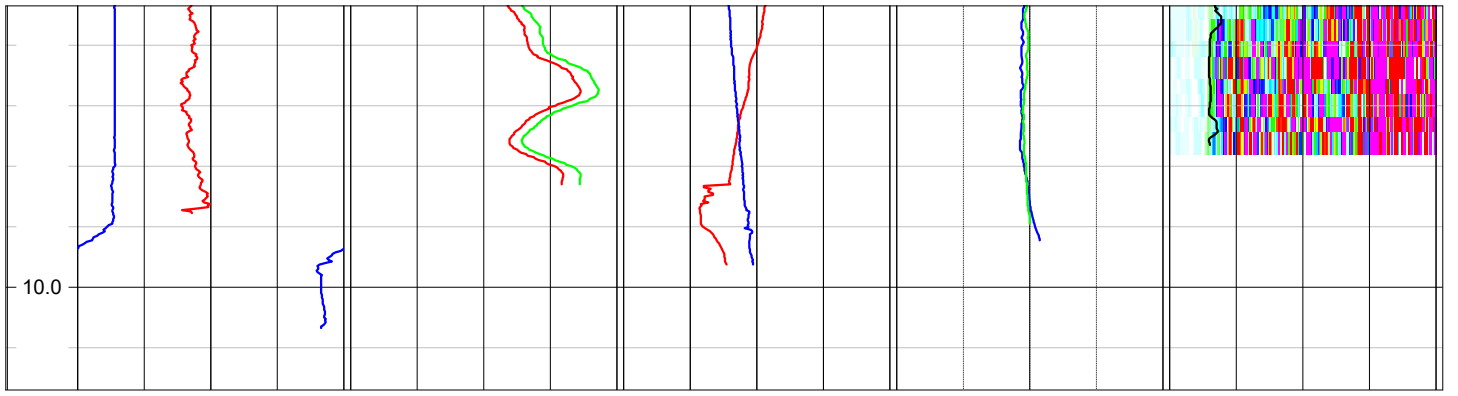
Drilled Depth: (m)	<b>10.5</b>	Date:	<b>30.10.20</b>
Logged Depth: (m)	<b>10.3</b>	Recorded By:	<b>A. White</b>
Logging Datum:	<b>Ground Level</b>	Remarks:	
Logged Interval: (m)	<b>0.5 - 10.3</b>		
Fluid Level: (m)	<b>2.6</b>		

## BOREHOLE RECORD

## CASING RECORD

Bit: (mm)	From: (m)	To: (m)	Type	Size: (mm)	From: (m)	To: (m)
<b>123</b>	<b>4.9</b>	<b>10.5</b>	<b>Steel</b>	<b>125</b>	<b>0.0</b>	<b>4.9</b>







# EUROPEAN GEOPHYSICAL SERVICES LTD

Client: **Irish Drilling**

Log Type:

Borehole: **BH 5**

**Image**

Location: **Arklow Bank**

Area: **Co. Wicklow**

Grid Ref:

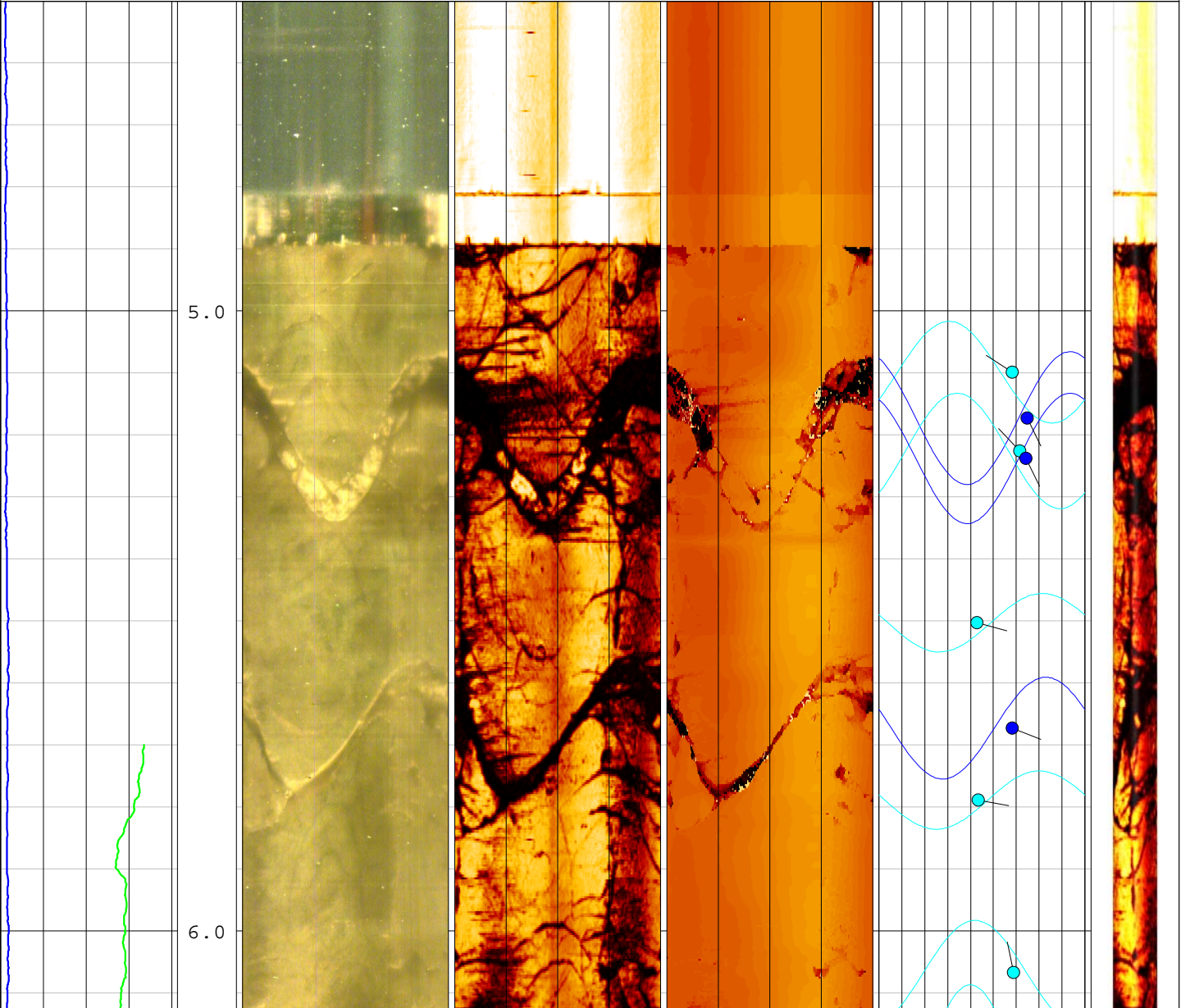
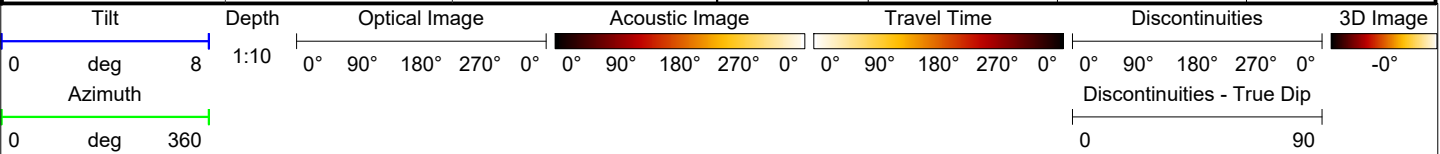
Elevation:

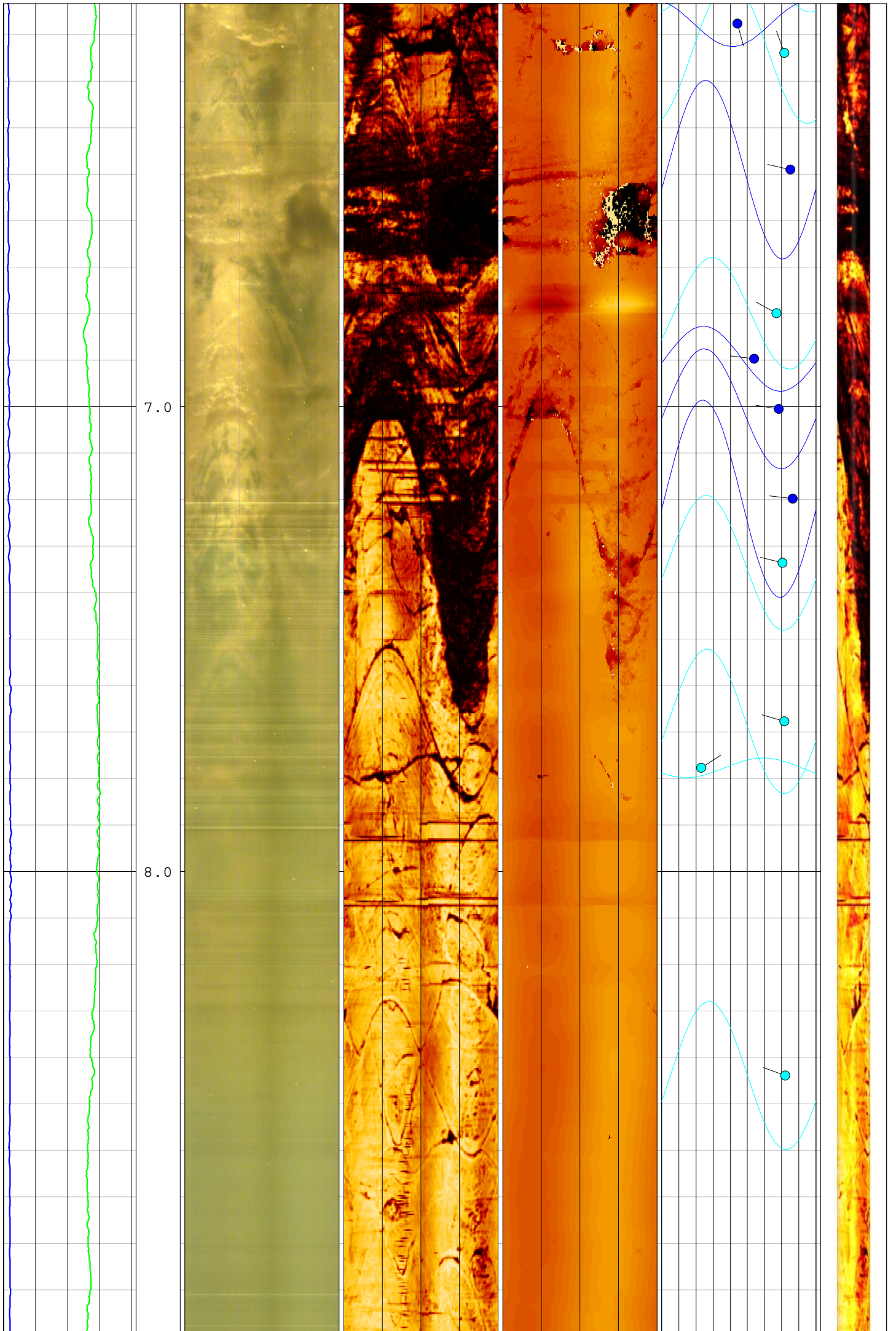
Drilled Depth: (m)	<b>10.5</b>	Date:	<b>30.10.20</b>
Logged Depth: (m)	<b>9.9</b>	Recorded By:	<b>A. White</b>
Logging Datum:	<b>Ground Level</b>	Remarks:	
Logged Interval: (m)	<b>4.9 - 9.9</b>		
Fluid Level: (m)	<b>2.7</b>		

## BOREHOLE RECORD

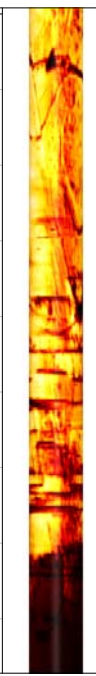
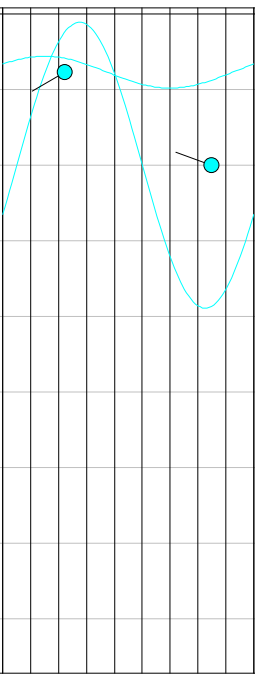
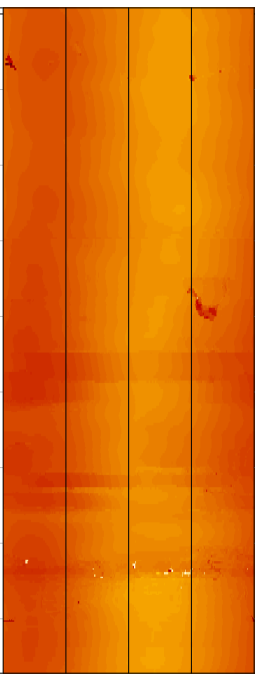
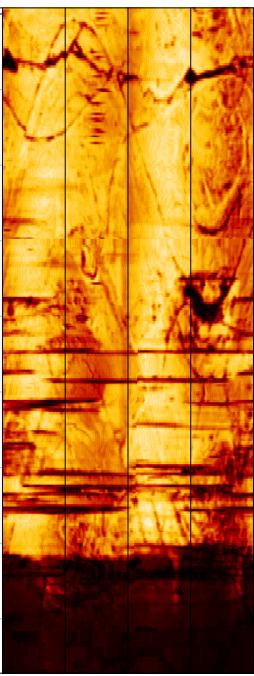
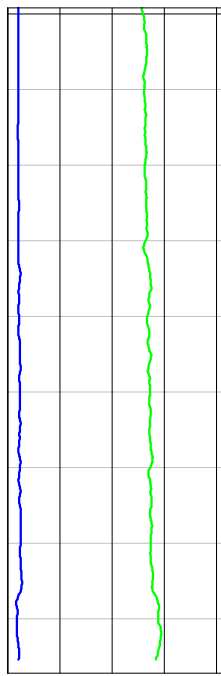
## CASING RECORD

Bit: (mm)	From: (m)	To: (m)	Type	Size: (mm)	From: (m)	To: (m)
<b>123</b>	<b>4.9</b>	<b>10.5</b>	<b>Steel</b>	<b>125</b>	<b>0.0</b>	<b>4.9</b>





9.0





## Appendix 4    Soil Resistivity Tests







## Appendix 5 Groundwater Readings

**IRISH DRILLING LTD.**

Loughrea Co. Galway

Tel: (091) 841274 Fax: (091) 880861

**Project:** Arklow Bank Wind Park - Onshore Grid Infrastructure**Client:** SSE**Location:** County Wicklow**Date:** 02/12/2020

Sheet No. 1

Checked: RK

**Water Levels in Standpipes**

Date	Location	Depth	Comments	Remarks
17.11.2020	BH01	3.10m	before purge	50mm standpipe, Rotary Core Borehole
		2.43m	after purge	
	BH03	0.94m	before purge	50mm standpipe, Rotary Core Borehole
		5.86m	after purge	
	BH04	7.92m	before purge	50mm standpipe, Rotary Core Borehole
		7.01m	after purge	
25.11.2020	BH01	3.10m	Data Logger installed at 5.00m bgl (Logger No. 31228).	
	BH03	1.00m	Data Logger installed at 15.00m bgl (Logger No. 31226).	
	BH04	7.94m	Data Logger installed at 10.50m bgl (Logger No. 31227).	

**Remarks:**

All readings record depth from ground level to top of water level.



## Appendix 6    Laboratory Tests Results



## Summary of Classification Test Results

Project No.		Project Name												
2020WW102		Arklow Bank Windpark												
Hole No.	Sample				Soil Description	Density bulk   dry Mg/m3	w %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Remarks	
	Ref	Top	Base	Type										
BH01		2.00	3.50	C	Dark brown slightly gravelly slightly sandy SILT.		21.0	90	41	20	21		CI	
BH02		2.00	3.50	C	Dark brown slightly sandy SILT.		26.0	98	50	29	21		MH	
BH04		2.00	3.50	C	Dark brown slightly gravelly slightly sandy SILT.		17.0	93	32	17	15		CL	
BH05		0.00	2.00	C	Brown sandy SILT. Sand is fine and medium.		19.0	92	52	26	26		CH	
TP01	2	0.40	0.50	B	Brown slightly sandy SILT.		34.0	99	77	29	48		CV	
TP01	6	3.60	3.70	B	Dark brown slightly sandy SILT.		26.0	99	55	30	25		MH	
TP02	2	0.50	0.60	B	Light brown slightly sandy SILT.		37.0	99	66	45	21		MH	
TP02	4	1.40	1.50	B	Dark brown slightly sandy SILT.		28.0	97	61	36	25		MH	
TP02	6	3.30	3.40	B	Dark brown slightly sandy SILT.		29.0	100	56	26	30		CH	
TP03	2	0.50	0.60	B	Light brown slightly sandy SILT.		34.0	99	66	37	29		MH	
TP03	5	1.50	1.60	B	Dark brown slightly gravelly slightly sandy SILT.		24.0	93	47	30	17		MI	
TP03	6	2.80	2.90	B	Brown slightly gravelly slightly sandy SILT.		21.0	96	32	19	13		CL	
TP04	2	0.40	0.50	B	Brown slightly sandy silty CLAY.		31.0	99	66	31	35		CH	
TP04	5	1.40	1.50	B	Brown gravelly very silty fine SAND.		13.0	92					NP	
TP04	6	1.40	1.50	B	Brown slightly gravelly slightly sandy SILT.		22.0	95	37	17	20		CI	
TP04	8	3.70	3.80	B	Mottled brown-grey slightly gravelly slightly sandy SILT.		18.0	90	60	31	29		MH	
TP05	2	0.40	0.50	B	Orange-brown slightly sandy SILT.		28.0	98	58	28	30		CH	
TP05	3	1.10	1.20	D	Brown slightly sandy SILT.		21.0							
TP05	5	1.50	1.60	B	Brown slightly sandy SILT.		30.0	97	35	25	10		CI	
TP05	6	2.60	2.70	B	Brown slightly sandy SILT.		28.0	99	56	29	27		MH	
TP06	2	0.40	0.50	B	Orange-brown slightly gravelly slightly sandy SILT.		22.0	96	50	27	23		MH	
TP06	6	2.10	2.20	B	Orange-brown sandy SILT. Sand is medium and fine.		24.0	95						
TP07	2	0.40	0.50	B	Brown slightly gravelly slightly sandy SILT.		27.0							
TP07	5	1.50	1.60	B	Brown slightly sandy SILT.		24.0	95	55	32	23		MH	
TP07	8	4.40	4.50	B	Dark brown slightly sandy SILT.		27.0	99	49	24	25		CI	
TP08	2	0.40	0.50	B	Brown slightly sandy SILT.		27.0	96	86	31	55		CV	

All tests performed in accordance with BS1377:1990 unless specified otherwise

<b>Key</b>	w = water content, LL = Liquid Limit, PL = Plastic Limit, PI = Plasticity Index	Date Printed	Approved By	Table
Density test	Liquid Limit	Particle density		
Linear measurement unless :	4pt cone unless :	sp - small pyknometer		1
wd - water displacement	1pt - single point test	gj - gas jar		sheet
wi - immersion in water	NP - Non Plastic	QC From No: R1	DCD	1



## Summary of Classification Test Results

Project No. 2020WW102	Project Name Arklow Bank Windpark
--------------------------	--------------------------------------

Hole No.	Sample				Soil Description	Density		w %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Remarks
	Ref	Top	Base	Type		bulk Mg/m3	dry Mg/m3							
TP08	8	4.40	4.50	B	Dark brown slightly sandy SILT.			27.0	99	39	20	19		CI
TP09	5	1.50	1.60	B	Brown slightly sandy SILT.			24.0	95	43	21	22		CI
TP10	2	0.40	0.50	B	Brown slightly sandy SILT.			33.0						
TP10	6	2.00	2.10	B	Brown silty medium and fine SAND.			14.0	88					
TP11	2	0.40	0.50	B	Brown slightly sandy SILT.			31.0	96	57	33	24		MH
TP11	6	2.50	2.60	B	Dark brown slightly sandy SILT.			28.0	99	85	38	47		MV
TP11	7	3.80	3.90	B	Dark brown slightly sandy SILT.			19.0	99	42	21	21		CI
TP12	6	2.40	2.50	B	Brown slightly gravelly sandy SILT. Sand is fine.			17.0	94	32	16	16		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

<b>Key</b> w = water content, LL = Liquid Limit, PL = Plastic Limit, PI = Plasticity Index Density test Liquid Limit Particle density Linear measurement unless : 4pt cone unless : sp - small pyknometer wd - water displacement 1pt - single point test gj - gas jar wi - immersion in water NP - Non Plastic	Date Printed 13/01/2021	Approved By DCD	Table 1 sheet 2
QC From No: R1			



### Plasticity (A-Line) Chart

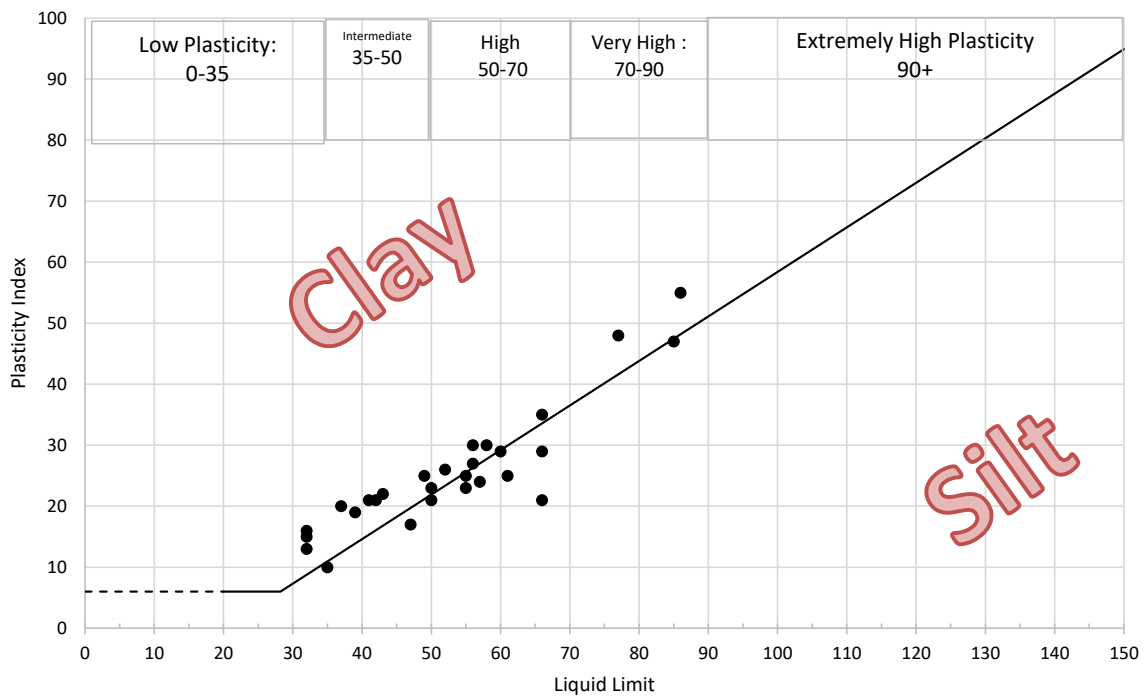
Project Number

Project Name:

Arklow Bank Windpark

Location:

2020WW102



Abbreviations in the remarks column of the Classification Summary Sheet: C = Clay, M = Silt

Plasticity abbreviations: L = Low, I = Intermediate, H = High, V = Very High, E = Extremely High.

The letter O is added to the symbol of any material containing a significant proportion of organic material.

Chart taken from BS5930: 2010

Approved By: DCD

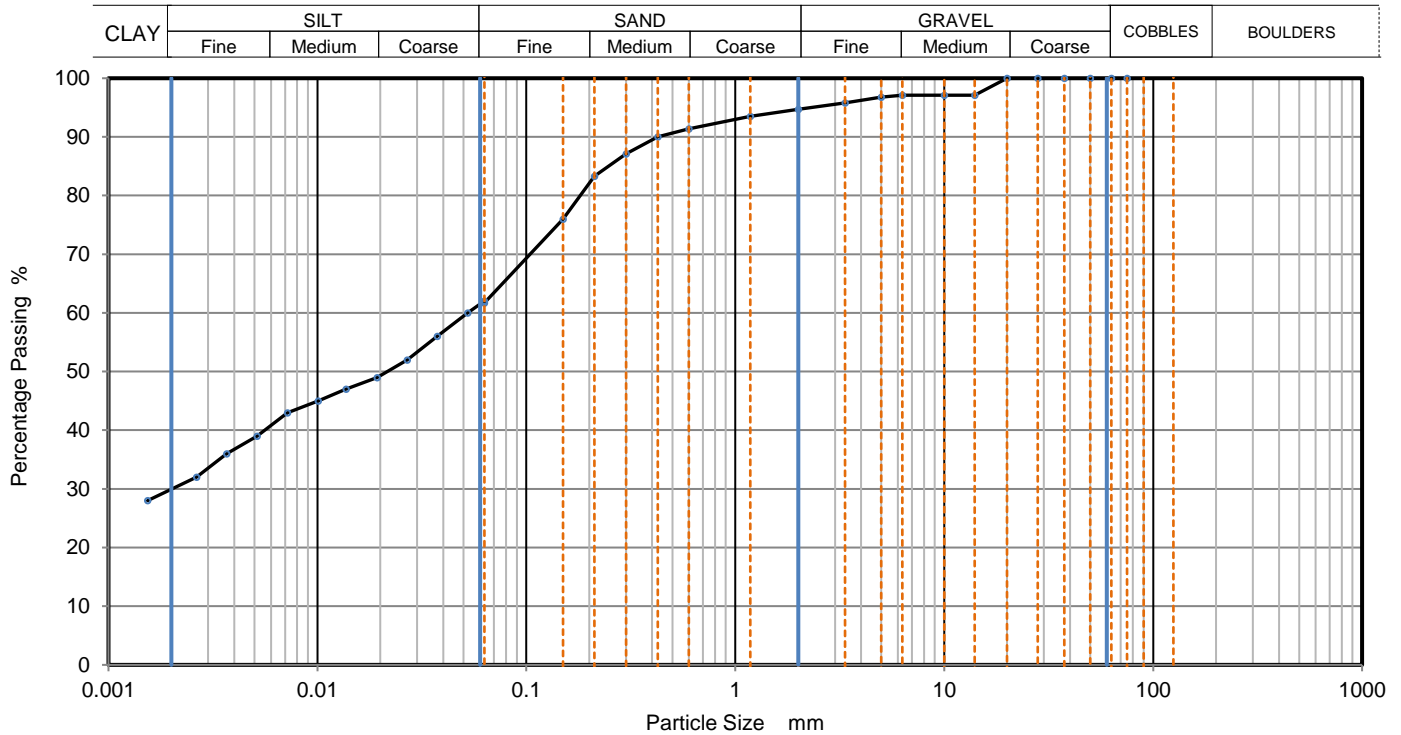
QC Form: R1



# PARTICLE SIZE DISTRIBUTION

Job Ref	2020WW102
Borehole/Pit No.	BH01
Sample No.	
Depth, m	2.00
Sample Type	C
KeyLAB ID	IDL1202011069

Site Name	Arklow Bank Windpark	
Soil Description	Dark brown slightly gravelly slightly sandy SILT.	
Specimen Reference	Specimen Depth	m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	62
		0.0523	60
75	100	0.0375	56
63	100	0.0269	52
50	100	0.0193	49
37.5	100	0.0137	47
28	100	0.0101	45
20	100	0.0072	43
14	97	0.0051	39
10	97	0.0037	36
6.3	97	0.0026	32
5	97	0.0015	28
3.35	96		
2	95		
1.18	94		
0.6	91	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.425	90		
0.3	87		
0.212	83		
0.15	76		
0.063	62		

Dry Mass of sample, g 835


Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	33
Silt	32
Clay	30

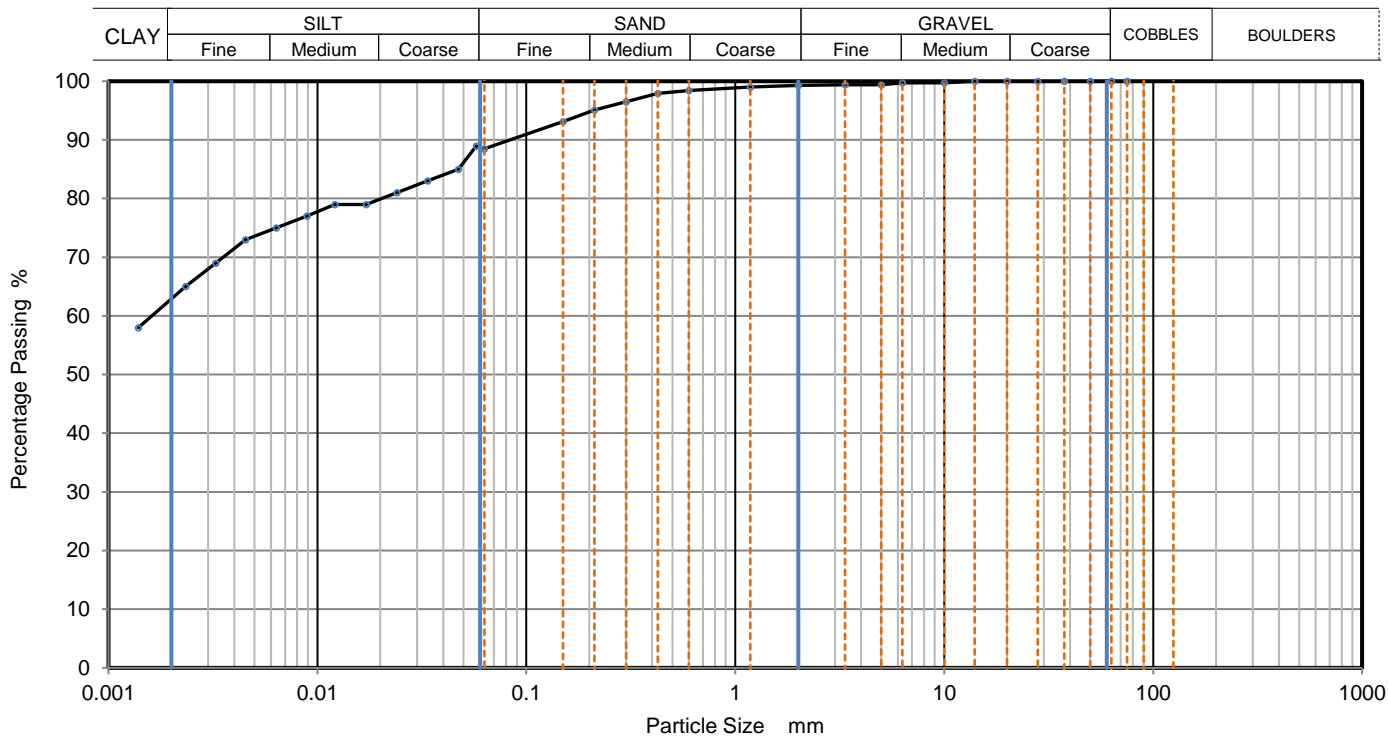
Grading Analysis	
D <sub>100</sub>	mm
D <sub>60</sub>	mm 0.0532
D <sub>30</sub>	mm 0.00204
D <sub>10</sub>	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks  
Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	1
ED	DCD	Dympna Darcy B.Sc.	07/01/2021 16:47	
				QC From No:R2



	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	BH02	
Site Name	Arklow Bank Windpark		Sample No.		
Soil Description	Dark brown slightly sandy SILT.		Depth, m	2.00	
Specimen Reference		Specimen Depth	m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020110618	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0575	89
		0.0472	85
75	100	0.0337	83
63	100	0.0240	81
50	100	0.0171	79
37.5	100	0.0121	79
28	100	0.0089	77
20	100	0.0064	75
14	100	0.0045	73
10	100	0.0033	69
6.3	100	0.0023	65
5	99	0.0014	58
3.35	99		
2	99		
1.18	99		
0.6	98	Particle density (assumed)	
0.425	98	2.65	Mg/m <sup>3</sup>
0.3	97		
0.212	95		
0.15	93		
0.063	89		

Dry Mass of sample, g

424


Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	11
Silt	25
Clay	63

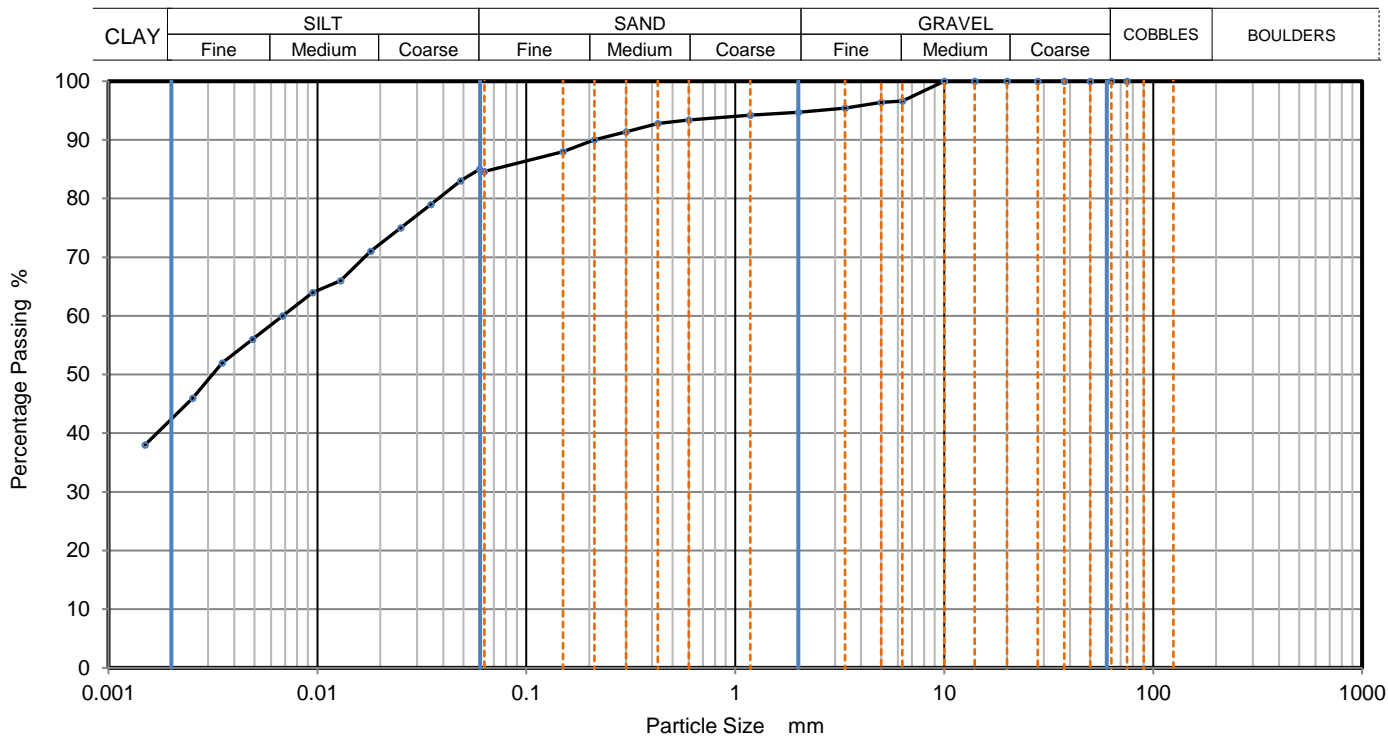
Grading Analysis		
D100	mm	
D60	mm	0.00162
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	<b>1</b>
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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	BH04	
Site Name	Arklow Bank Windpark		Sample No.		
Soil Description	Dark brown slightly gravelly slightly sandy SILT.		Depth, m	2.00	
Specimen Reference		Specimen Depth	m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020110644	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0596	85
		0.0485	83
75	100	0.0348	79
63	100	0.0250	75
50	100	0.0180	71
37.5	100	0.0129	66
28	100	0.0095	64
20	100	0.0068	60
14	100	0.0049	56
10	100	0.0035	52
6.3	97	0.0025	46
5	96	0.0015	38
3.35	95		
2	95		
1.18	94		
0.6	93	Particle density (assumed)	
0.425	93	2.65	Mg/m <sup>3</sup>
0.3	91		
0.212	90		
0.15	88		
0.063	85		

Dry Mass of sample, g

527


Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	10
Silt	42
Clay	43

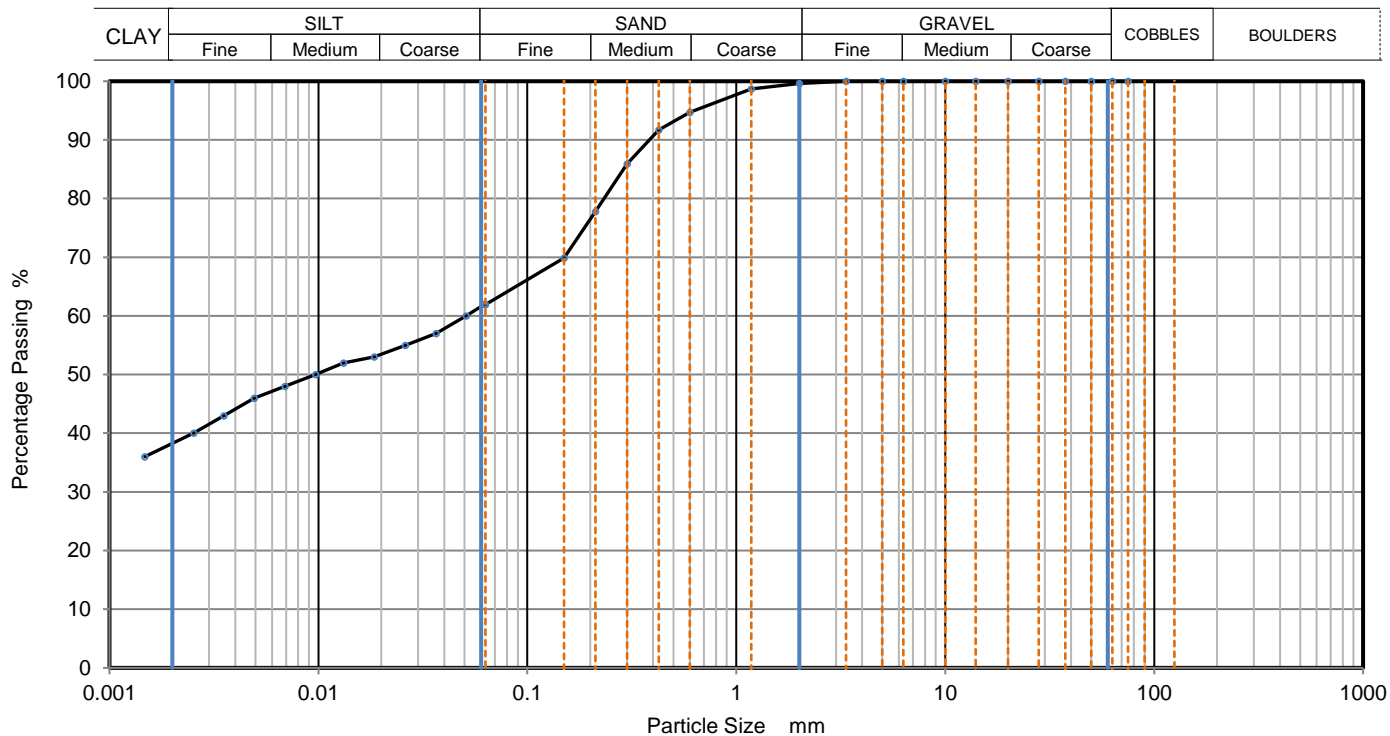
Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	BH05	
Site Name	Arklow Bank Windpark		Sample No.		
Soil Description	Brown sandy SILT. Sand is fine and medium.		Depth, m	0.00	
Specimen Reference		Specimen Depth	m	Sample Type	C
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020110660	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0626	62
		0.0509	60
75	100	0.0365	57
63	100	0.0260	55
50	100	0.0185	53
37.5	100	0.0132	52
28	100	0.0097	50
20	100	0.0069	48
14	100	0.0049	46
10	100	0.0035	43
6.3	100	0.0025	40
5	100	0.0015	36
3.35	100		
2	100		
1.18	99		
0.6	95	Particle density (assumed)	
0.425	92	2.65	Mg/m <sup>3</sup>
0.3	86		
0.212	78		
0.15	70		
0.063	62		

Dry Mass of sample, g

370

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	38
Silt	24
Clay	38

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

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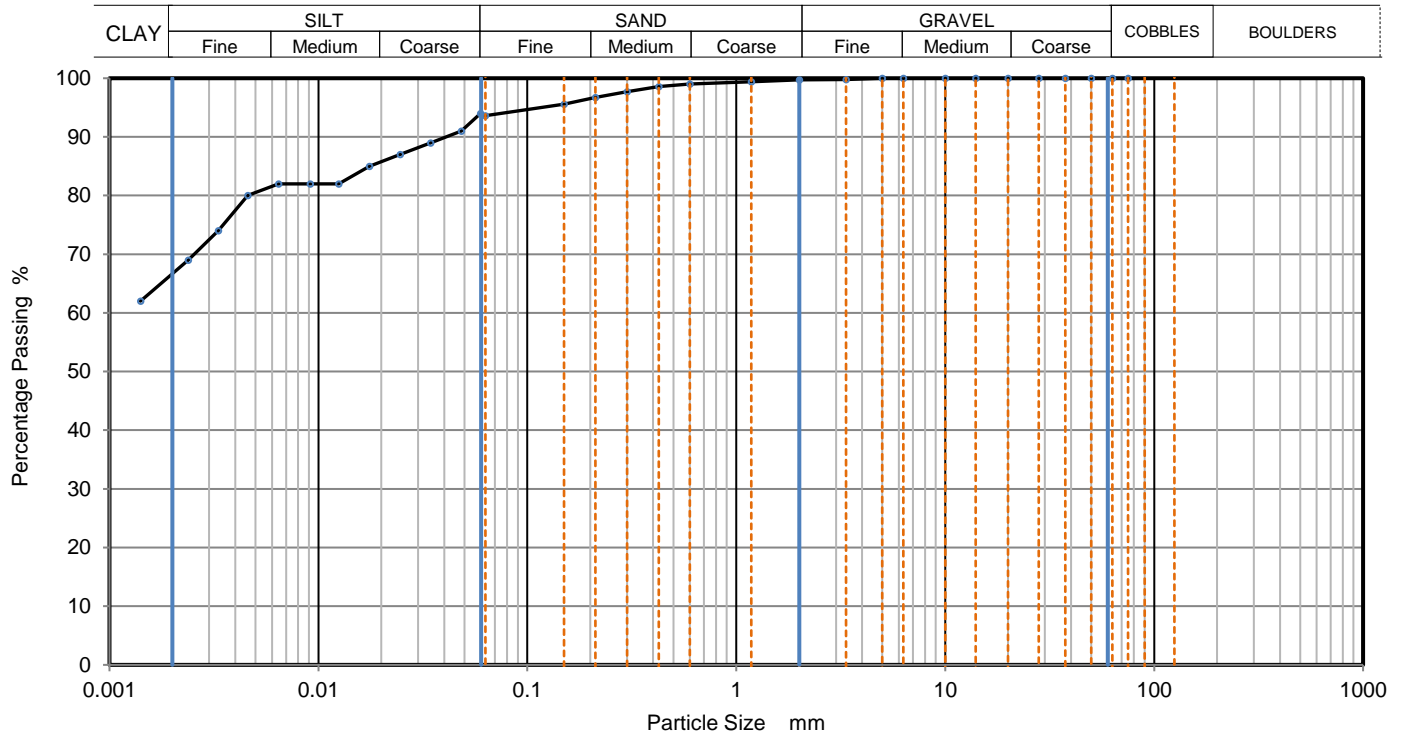
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## PARTICLE SIZE DISTRIBUTION

Job Ref	2020WW102
Borehole/Pit No.	TP01
Sample No.	2
Depth, m	0.40
Sample Type	B
KeyLAB ID	IDL1202010291

Site Name	Arklow Bank Windpark	
Soil Description	Brown slightly sandy SILT.	
Specimen Reference	Specimen Depth	m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0596	94
		0.0483	91
75	100	0.0345	89
63	100	0.0246	87
50	100	0.0175	85
37.5	100	0.0125	82
28	100	0.0091	82
20	100	0.0064	82
14	100	0.0046	80
10	100	0.0033	74
6.3	100	0.0024	69
5	100	0.0014	62
3.35	100		
2	100		
1.18	99		
0.6	99	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.425	99		
0.3	98		
0.212	97		
0.15	96		
0.063	94		


Dry Mass of sample, g 226

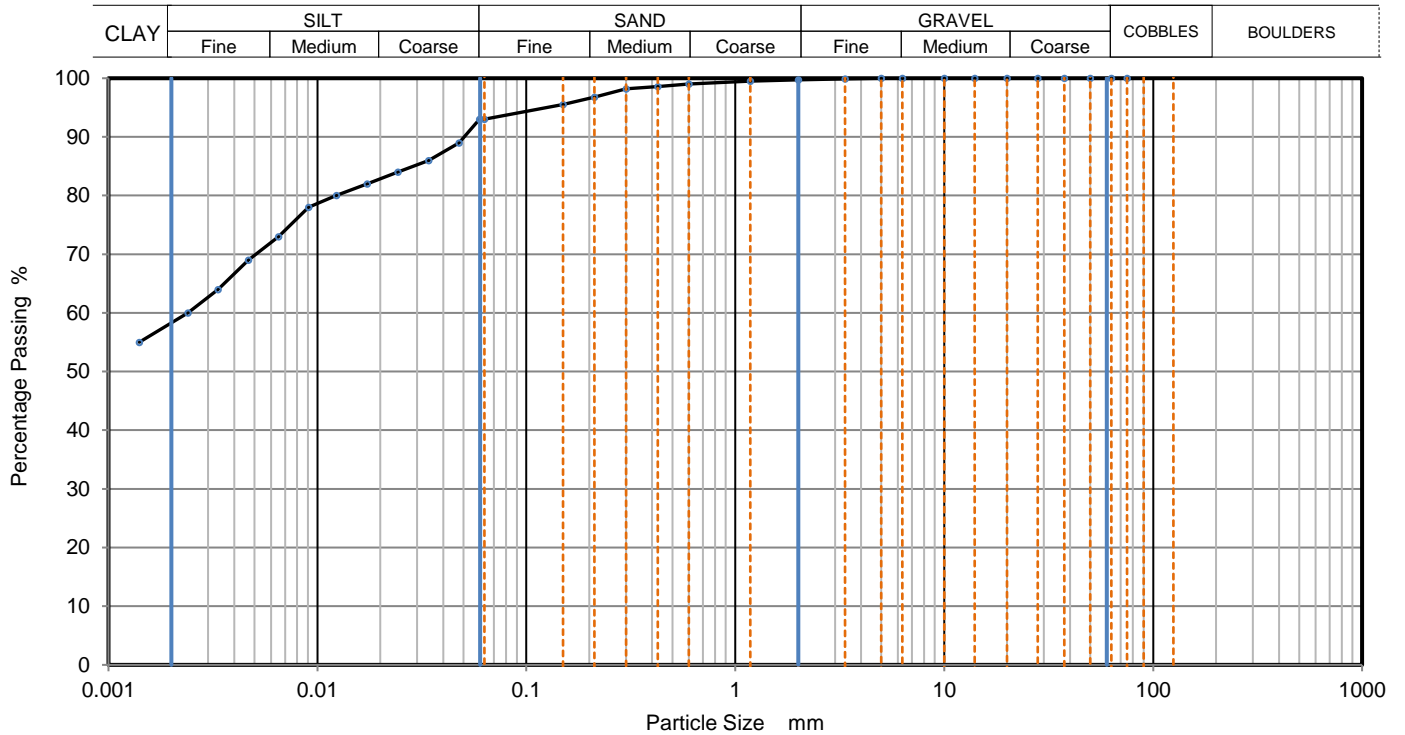
Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	6
Silt	27
Clay	67

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks  
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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP01	
Site Name	Arklow Bank Windpark		Sample No.	6	
Soil Description	Dark brown slightly sandy SILT.		Depth, m	3.60	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL1202010296	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0596	93
		0.0477	89
75	100	0.0340	86
63	100	0.0242	84
50	100	0.0173	82
37.5	100	0.0123	80
28	100	0.0091	78
20	100	0.0065	73
14	100	0.0047	69
10	100	0.0033	64
6.3	100	0.0024	60
5	100	0.0014	55
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	99	2.65	Mg/m3
0.3	98		
0.212	97		
0.15	96		
0.063	93		

Dry Mass of sample, g 427

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	7
Silt	35
Clay	58

Grading Analysis		
D100	mm	
D60	mm	0.00244
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks  
Preparation and testing in accordance with BS1377 unless noted below

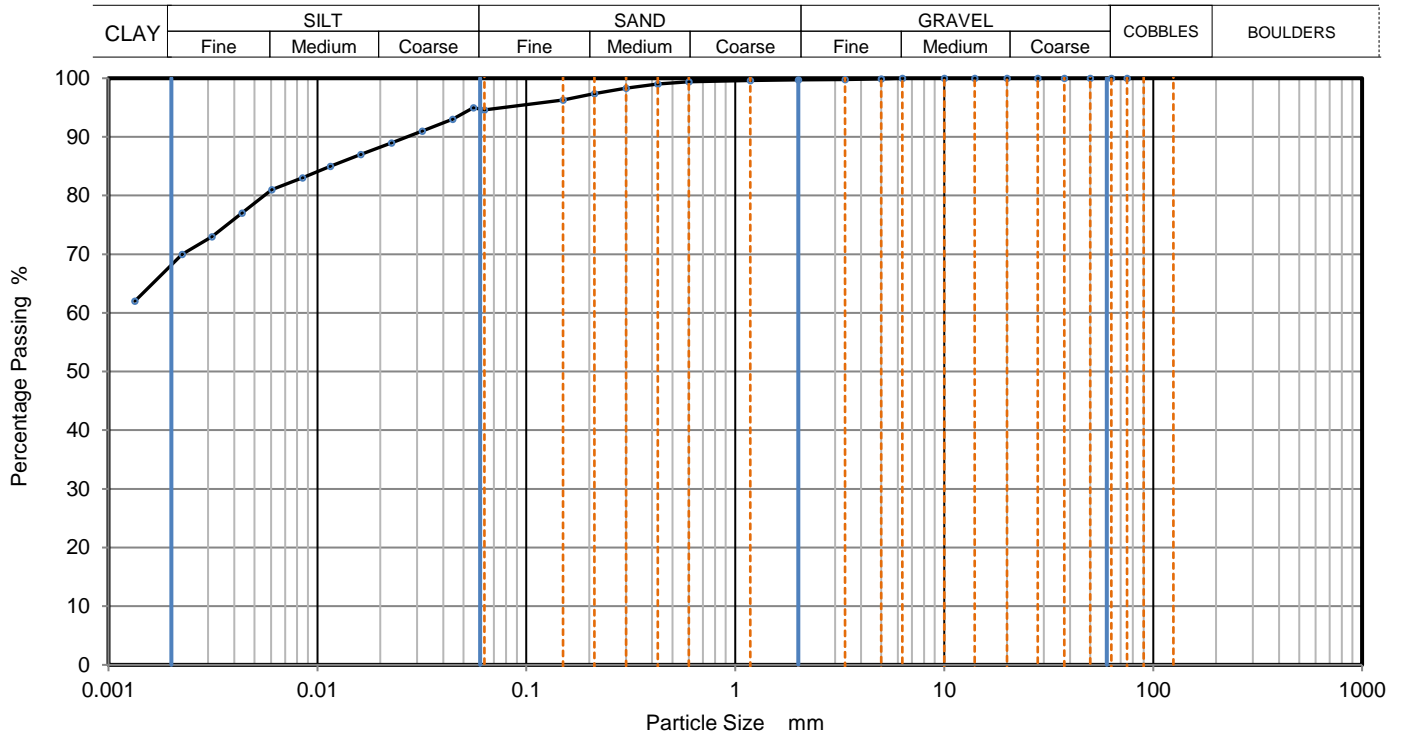
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# PARTICLE SIZE DISTRIBUTION

Job Ref	2020WW102
Borehole/Pit No.	TP02
Sample No.	2
Depth, m	0.50
Sample Type	B
KeyLAB ID	IDL1202010298

Site Name	Arklow Bank Windpark	
Soil Description	Light brown slightly sandy SILT.	
Specimen Reference	Specimen Depth	m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0559	95
		0.0444	93
75	100	0.0317	91
63	100	0.0226	89
50	100	0.0161	87
37.5	100	0.0115	85
28	100	0.0085	83
20	100	0.0061	81
14	100	0.0044	77
10	100	0.0031	73
6.3	100	0.0022	70
5	100	0.0013	62
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.425	99		
0.3	98		
0.212	97		
0.15	96		
0.063	95		


Dry Mass of sample, g 474

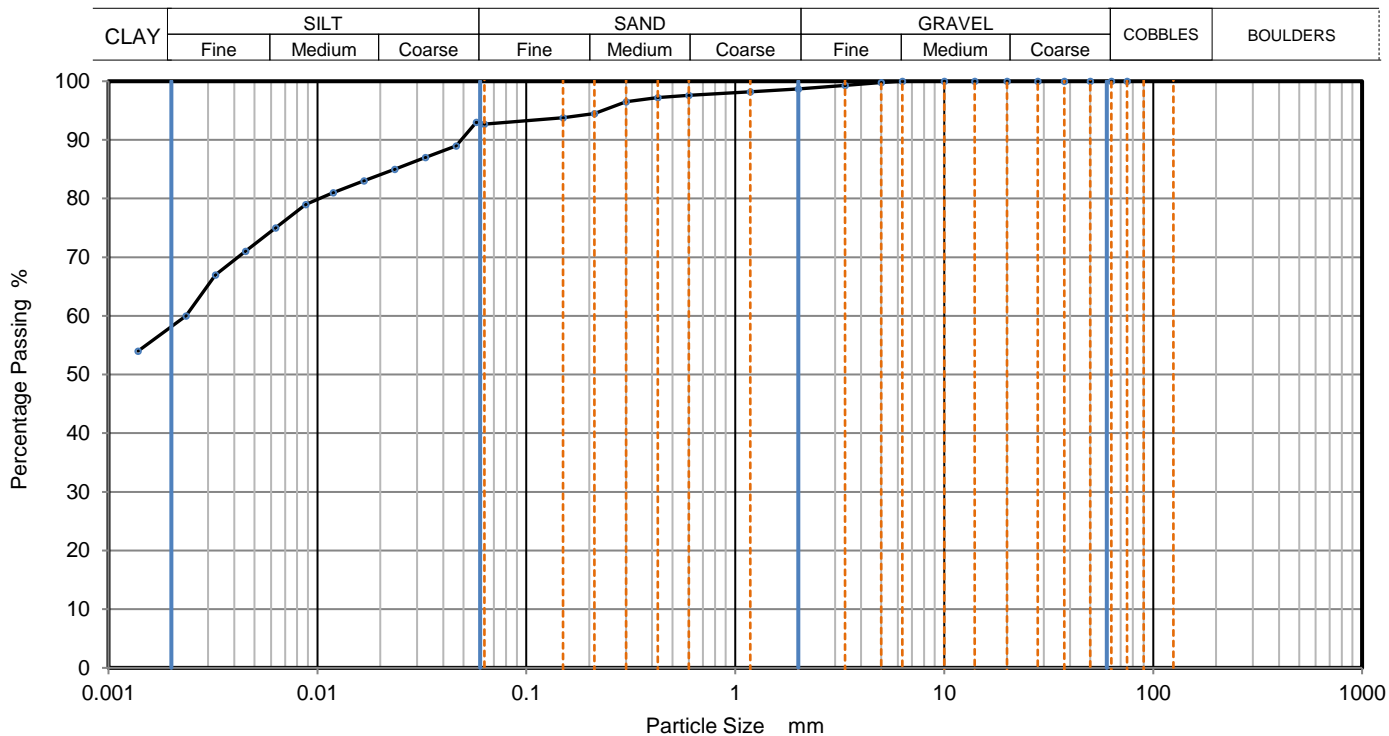
Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	5
Silt	27
Clay	68

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks  
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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP02	
Site Name	Arklow Bank Windpark		Sample No.	4	
Soil Description	Dark brown slightly sandy SILT.		Depth, m	1.40	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020102911	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0575	93
		0.0461	89
75	100	0.0329	87
63	100	0.0234	85
50	100	0.0167	83
37.5	100	0.0119	81
28	100	0.0088	79
20	100	0.0063	75
14	100	0.0045	71
10	100	0.0033	67
6.3	100	0.0023	60
5	100	0.0014	54
3.35	99		
2	99		
1.18	98		
0.6	98	Particle density (assumed)	
0.425	97	2.65	Mg/m <sup>3</sup>
0.3	97		
0.212	95		
0.15	94		
0.063	93		

Dry Mass of sample, g

373

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	6
Silt	34
Clay	59

Grading Analysis		
D100	mm	
D60	mm	0.00226
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

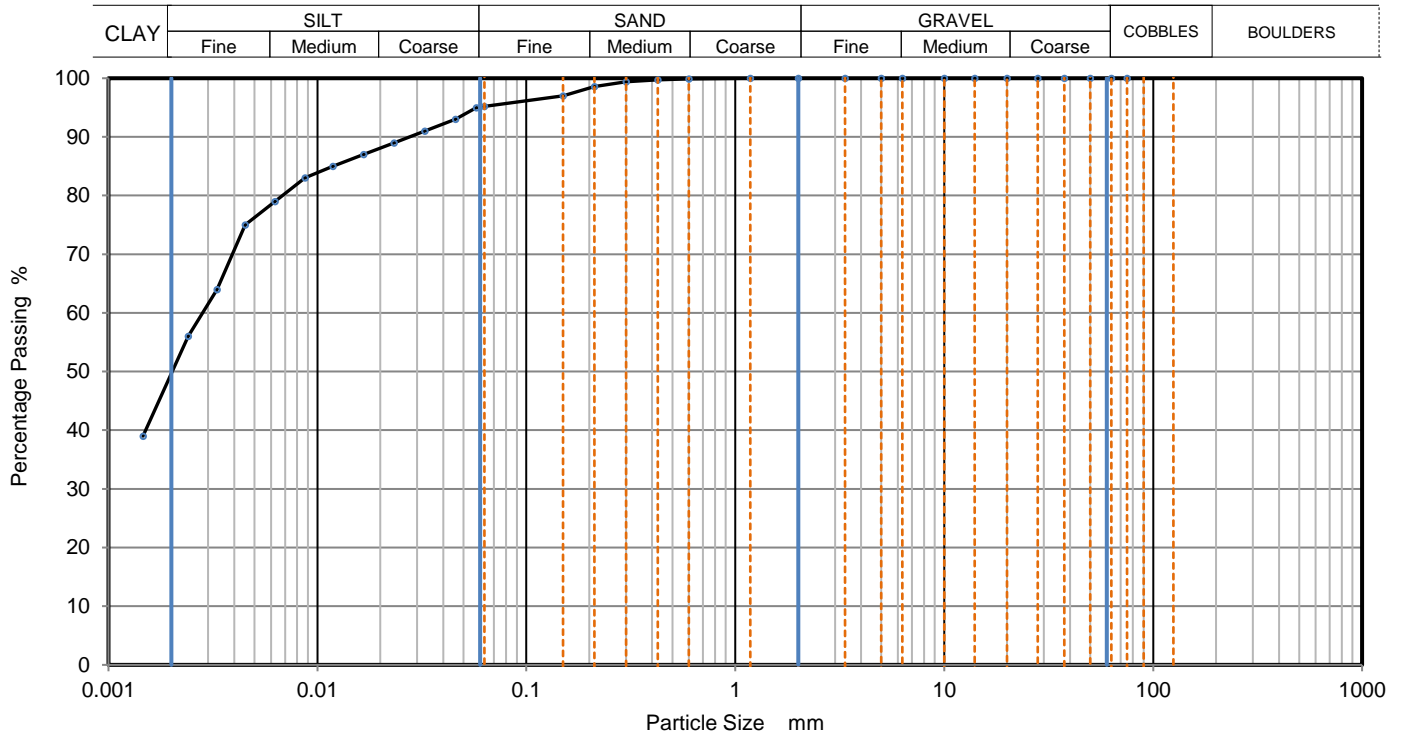
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# PARTICLE SIZE DISTRIBUTION

Job Ref	2020WW102
Borehole/Pit No.	TP02
Sample No.	6
Depth, m	3.30
Sample Type	B
KeyLAB ID	IDL12020102913

Site Name	Arklow Bank Windpark	
Soil Description	Dark brown slightly sandy SILT.	
Specimen Reference	Specimen Depth	m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0575	95
		0.0458	93
75	100	0.0327	91
63	100	0.0233	89
50	100	0.0166	87
37.5	100	0.0119	85
28	100	0.0087	83
20	100	0.0063	79
14	100	0.0045	75
10	100	0.0033	64
6.3	100	0.0024	56
5	100	0.0015	39
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed)	
0.425	100	2.65	Mg/m3
0.3	99		
0.212	99		
0.15	97		
0.063	95		

Dry Mass of sample, g 471


Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	5
Silt	46
Clay	50

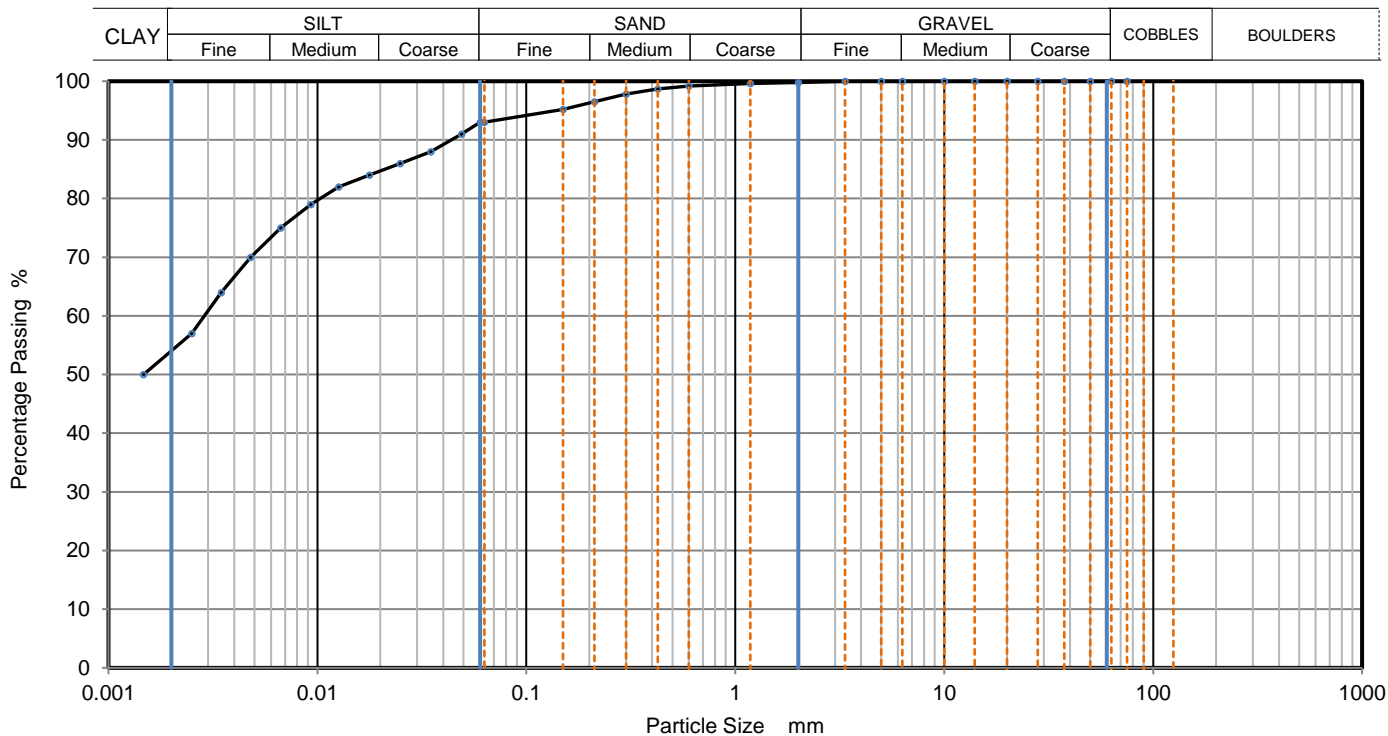
Grading Analysis		
D100	mm	
D60	mm	0.00282
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks  
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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP03	
Site Name	Arklow Bank Windpark		Sample No.	2	
Soil Description	Light brown slightly sandy SILT.		Depth, m	0.50	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020102916	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0601	93
		0.0490	91
75	100	0.0349	88
63	100	0.0249	86
50	100	0.0177	84
37.5	100	0.0126	82
28	100	0.0093	79
20	100	0.0067	75
14	100	0.0048	70
10	100	0.0035	64
6.3	100	0.0025	57
5	100	0.0015	50
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	99	2.65	Mg/m3
0.3	98		
0.212	97		
0.15	95		
0.063	93		

Dry Mass of sample, g

380


Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	7
Silt	39
Clay	54

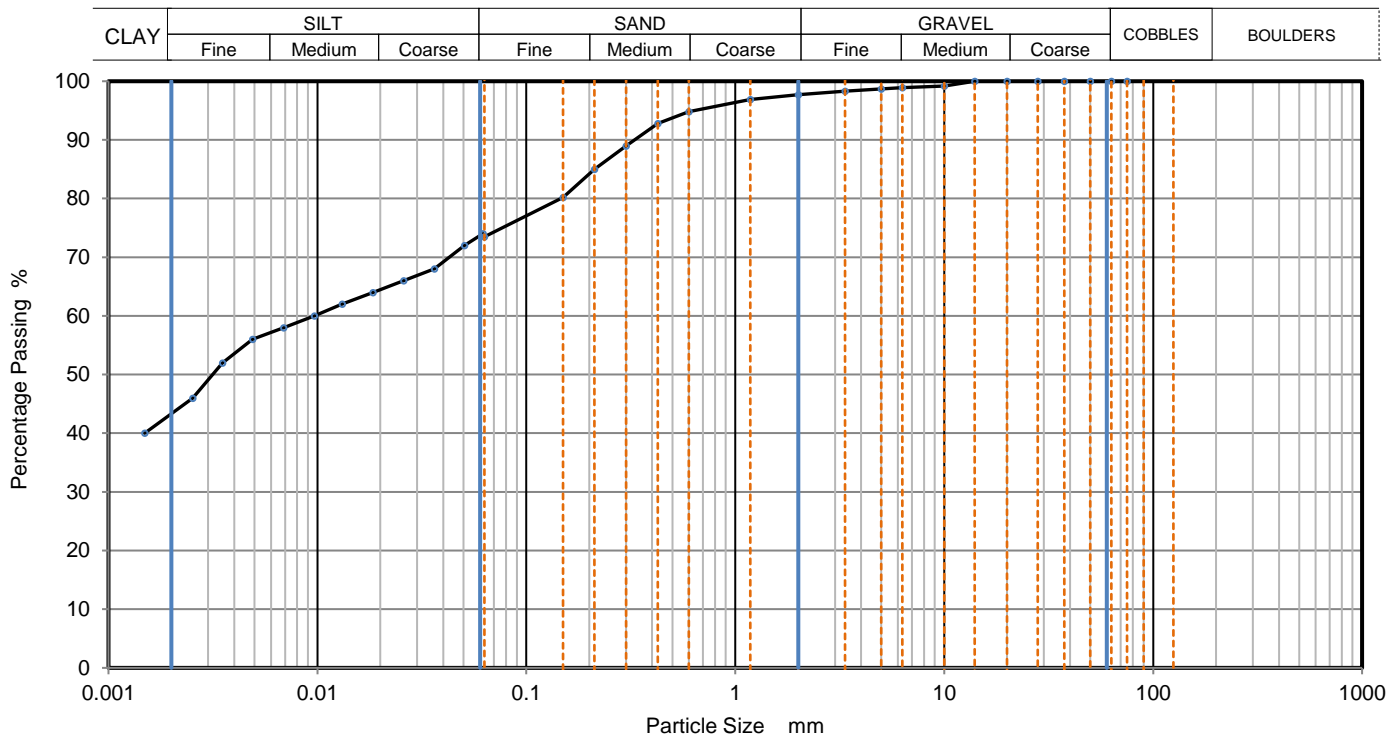
Grading Analysis		
D100	mm	
D60	mm	0.00292
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP03	
Site Name	Arklow Bank Windpark		Sample No.	5	
Soil Description	Dark brown slightly gravelly slightly sandy SILT.		Depth, m	1.50	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020102920	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0621	74
		0.0506	72
75	100	0.0363	68
63	100	0.0259	66
50	100	0.0184	64
37.5	100	0.0131	62
28	100	0.0097	60
20	100	0.0069	58
14	100	0.0049	56
10	99	0.0035	52
6.3	99	0.0025	46
5	99	0.0015	40
3.35	98		
2	98		
1.18	97		
0.6	95	Particle density (assumed)	
0.425	93	2.65	Mg/m <sup>3</sup>
0.3	89		
0.212	85		
0.15	80		
0.063	74		

Dry Mass of sample, g

538


Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	24
Silt	31
Clay	43

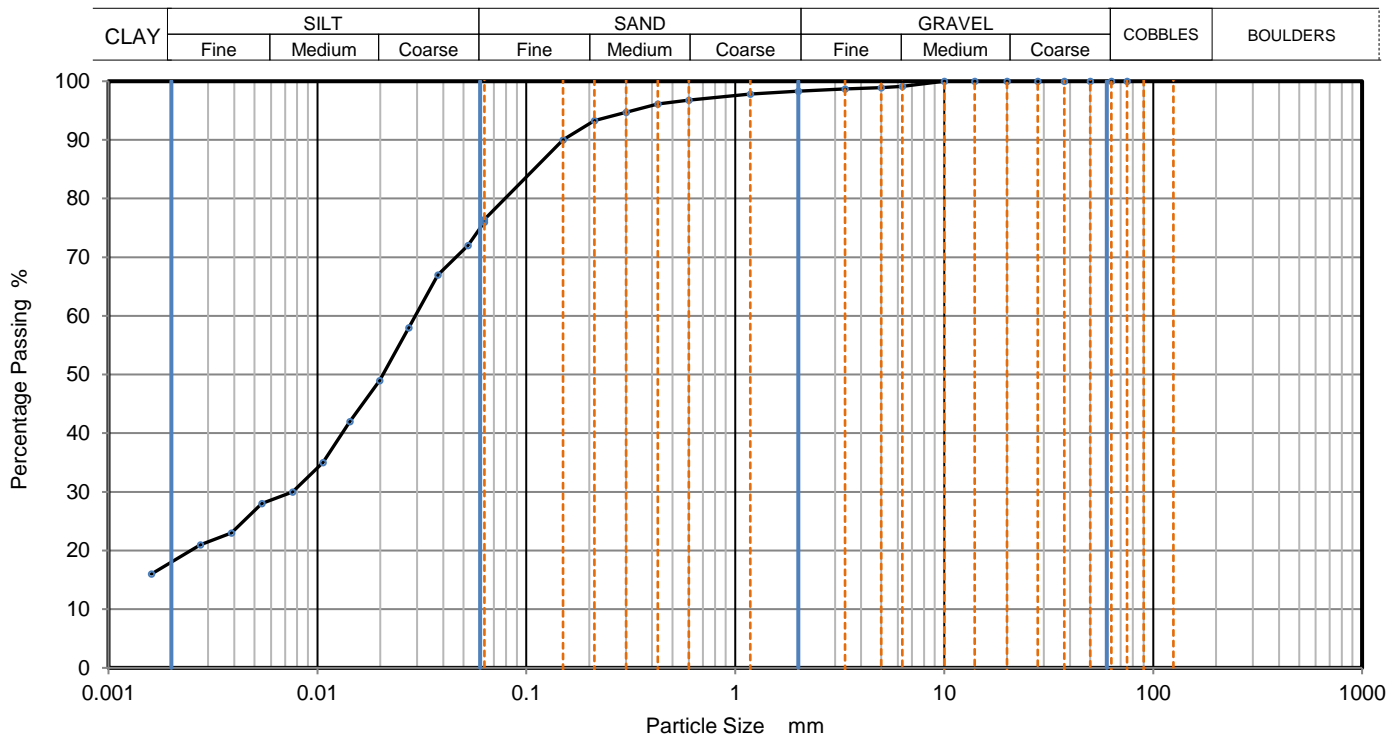
Grading Analysis		
D100	mm	
D60	mm	0.0103
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP03	
Site Name	Arklow Bank Windpark		Sample No.	6	
Soil Description	Brown slightly gravelly slightly sandy SILT.		Depth, m	2.80	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020102921	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	76
		0.0525	72
75	100	0.0377	67
63	100	0.0274	58
50	100	0.0199	49
37.5	100	0.0143	42
28	100	0.0106	35
20	100	0.0076	30
14	100	0.0054	28
10	100	0.0039	23
6.3	99	0.0028	21
5	99	0.0016	16
3.35	99		
2	98		
1.18	98		
0.6	97	Particle density (assumed)	
0.425	96	2.65	Mg/m3
0.3	95		
0.212	93		
0.15	90		
0.063	76		

Dry Mass of sample, g

662

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	22
Silt	58
Clay	18

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

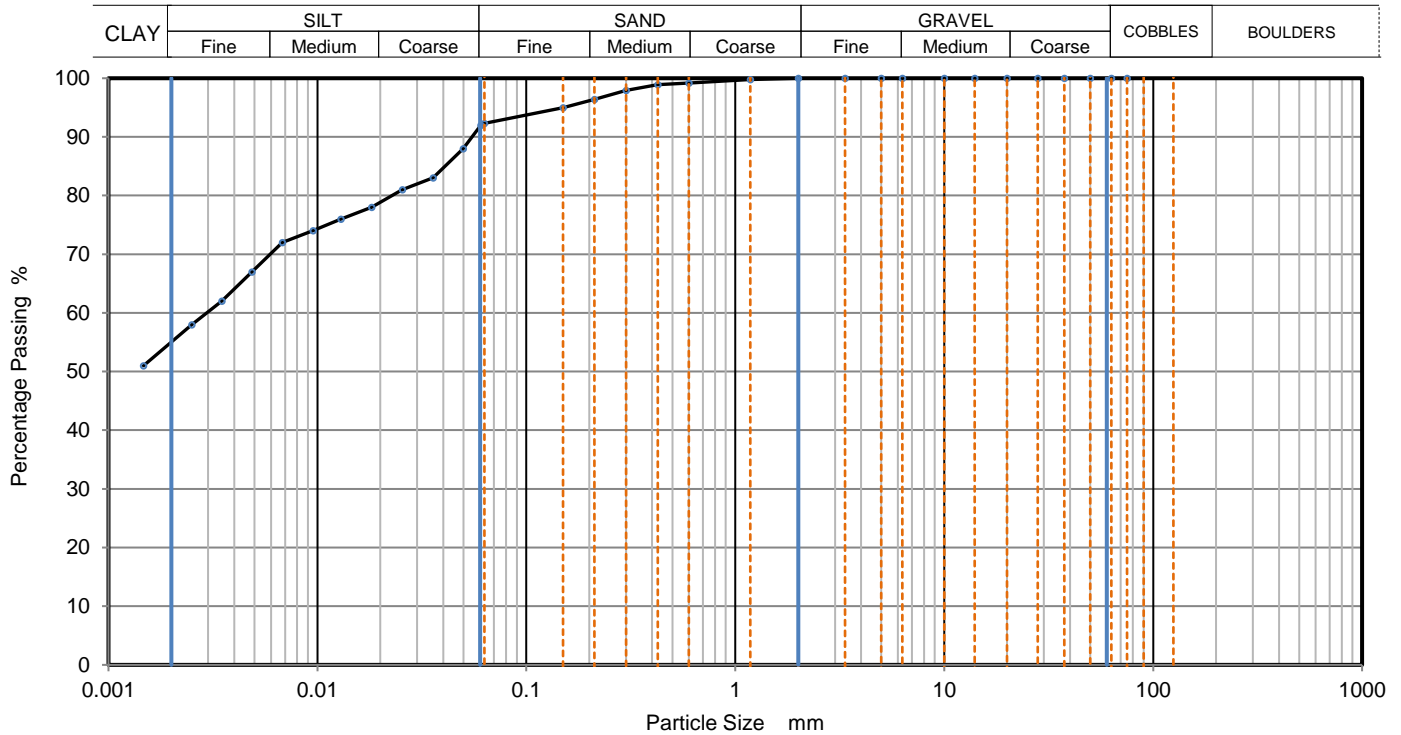
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## PARTICLE SIZE DISTRIBUTION

Job Ref	2020WW102
Borehole/Pit No.	TP04
Sample No.	2
Depth, m	0.40
Sample Type	B
KeyLAB ID	IDL12020102923

Site Name	Arklow Bank Windpark	
Soil Description	Brown slightly sandy silty CLAY.	
Specimen Reference	Specimen Depth	m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0606	92
		0.0498	88
75	100	0.0358	83
63	100	0.0255	81
50	100	0.0182	78
37.5	100	0.0129	76
28	100	0.0095	74
20	100	0.0068	72
14	100	0.0049	67
10	100	0.0035	62
6.3	100	0.0025	58
5	100	0.0015	51
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.425	99		
0.3	98		
0.212	96		
0.15	95		
0.063	92		

Dry Mass of sample, g 484

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	8
Silt	38
Clay	55

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks  
Preparation and testing in accordance with BS1377 unless noted below

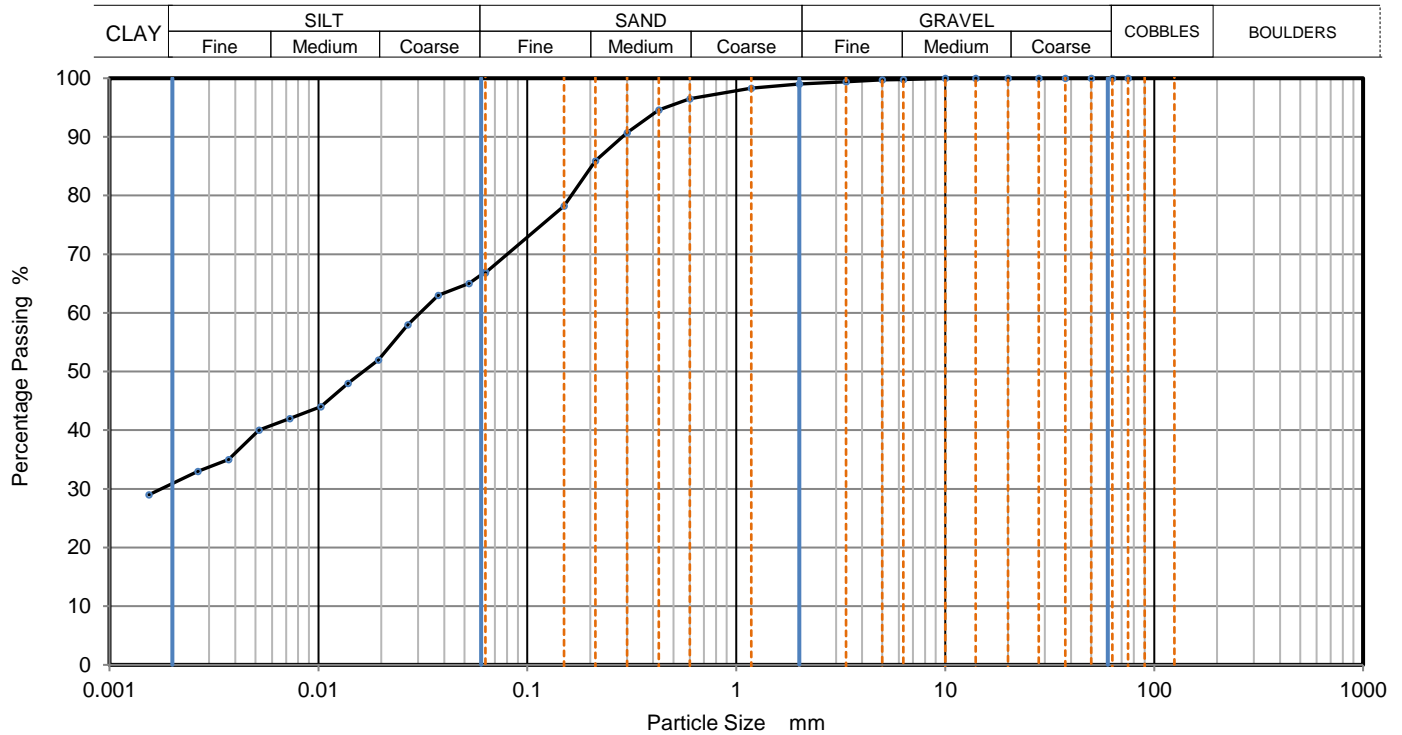
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# PARTICLE SIZE DISTRIBUTION

Job Ref	2020WW102
Borehole/Pit No.	TP04
Sample No.	6
Depth, m	1.40
Sample Type	B
KeyLAB ID	IDL12020102929

Site Name	Arklow Bank Windpark	Specimen Reference	
Soil Description	Brown slightly gravelly slightly sandy SILT.	Specimen Depth	m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	67
		0.0525	65
75	100	0.0374	63
63	100	0.0268	58
50	100	0.0194	52
37.5	100	0.0139	48
28	100	0.0103	44
20	100	0.0073	42
14	100	0.0052	40
10	100	0.0037	35
6.3	100	0.0026	33
5	100	0.0015	29
3.35	99		
2	99		
1.18	98		
0.6	97	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.425	95		
0.3	91		
0.212	86		
0.15	78		
0.063	67		

Dry Mass of sample, g 608

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	32
Silt	36
Clay	31

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks  
Preparation and testing in accordance with BS1377 unless noted below

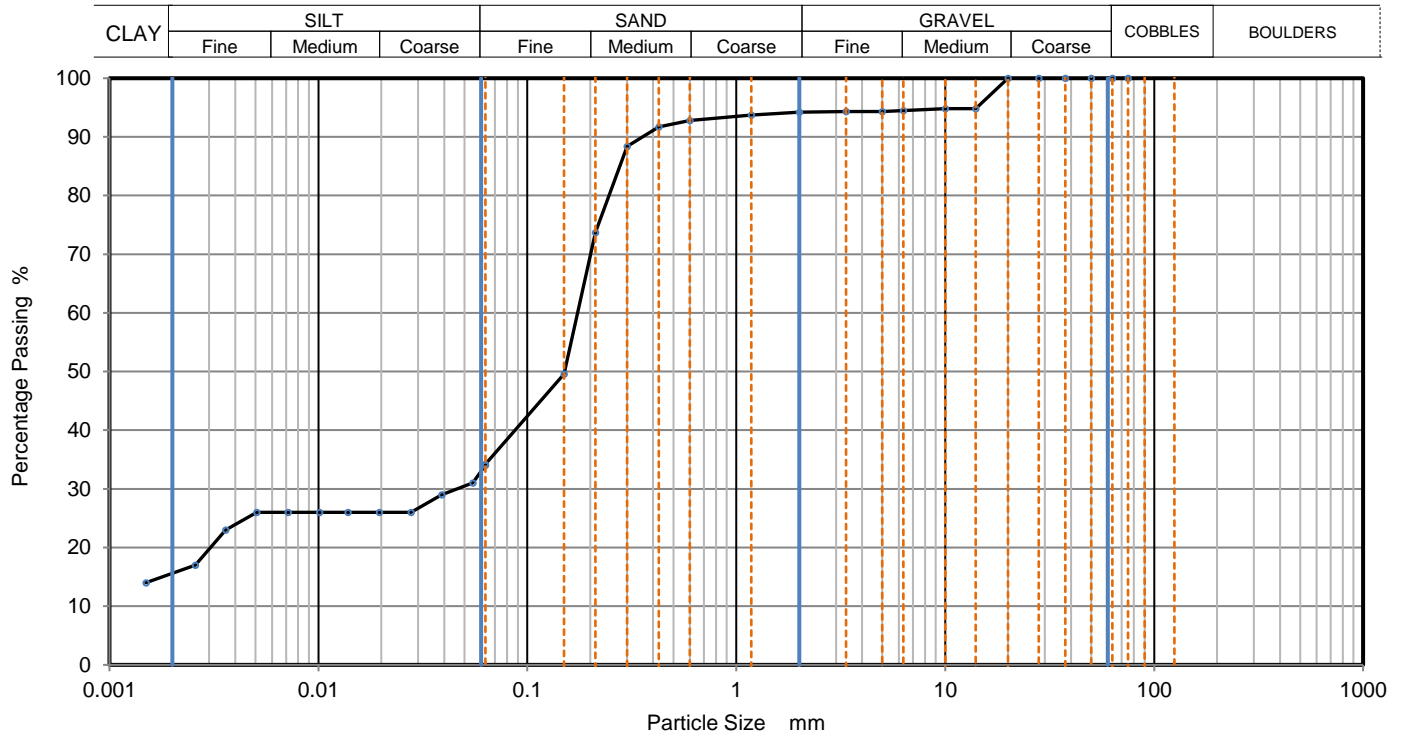
Operator	Checked	Approved	Sheet printed	1
ED	DCD	Dympna Darcy B.Sc.	07/01/2021 14:16	
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## PARTICLE SIZE DISTRIBUTION

Job Ref	<b>2020WW102</b>
Borehole/Pit No.	TP04
Sample No.	5
Depth, m	1.40
Sample Type	B
KeyLAB ID	IDL12020102928

Site Name	Arklow Bank Windpark	
Soil Description	Brown gravelly very silty fine SAND.	
Specimen Reference	Specimen Depth	m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	34
		0.0548	31
75	100	0.0390	29
63	100	0.0277	26
50	100	0.0196	26
37.5	100	0.0139	26
28	100	0.0101	26
20	100	0.0072	26
14	95	0.0051	26
10	95	0.0036	23
6.3	95	0.0026	17
5	94	0.0015	14
3.35	94		
2	94		
1.18	94		
0.6	93	Particle density (assumed)	
0.425	92	2.65	Mg/m3
0.3	88		
0.212	74		
0.15	50		
0.063	34		

Dry Mass of sample, g

462

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	60
Silt	18
Clay	16

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

**Remarks**

Preparation and testing in accordance with BS1377 unless noted below

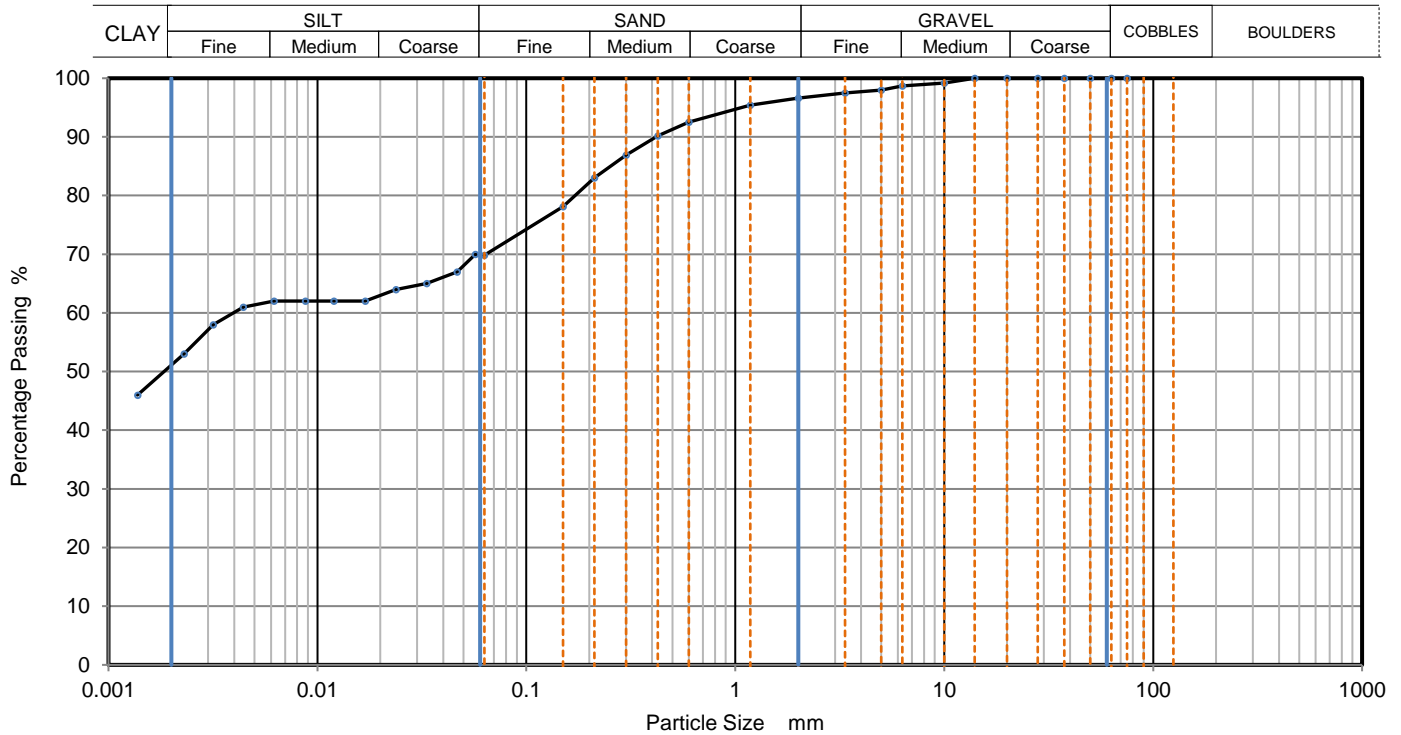
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## PARTICLE SIZE DISTRIBUTION

Job Ref	<b>2020WW102</b>
Borehole/Pit No.	TP04
Sample No.	8
Depth, m	3.70
Sample Type	B
KeyLAB ID	IDL12020102931

Site Name	Arklow Bank Windpark	
Soil Description	Mottled brown-grey slightly gravelly slightly sandy SILT.	
Specimen Reference	Specimen Depth	m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0570	70
		0.0467	67
75	100	0.0333	65
63	100	0.0238	64
50	100	0.0169	62
37.5	100	0.0120	62
28	100	0.0088	62
20	100	0.0062	62
14	100	0.0044	61
10	99	0.0032	58
6.3	99	0.0023	53
5	98	0.0014	46
3.35	98		
2	97		
1.18	95		
0.6	93	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.425	90		
0.3	87		
0.212	83		
0.15	78		
0.063	70		

Dry Mass of sample, g 741

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	27
Silt	18
Clay	52

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks  
Preparation and testing in accordance with BS1377 unless noted below

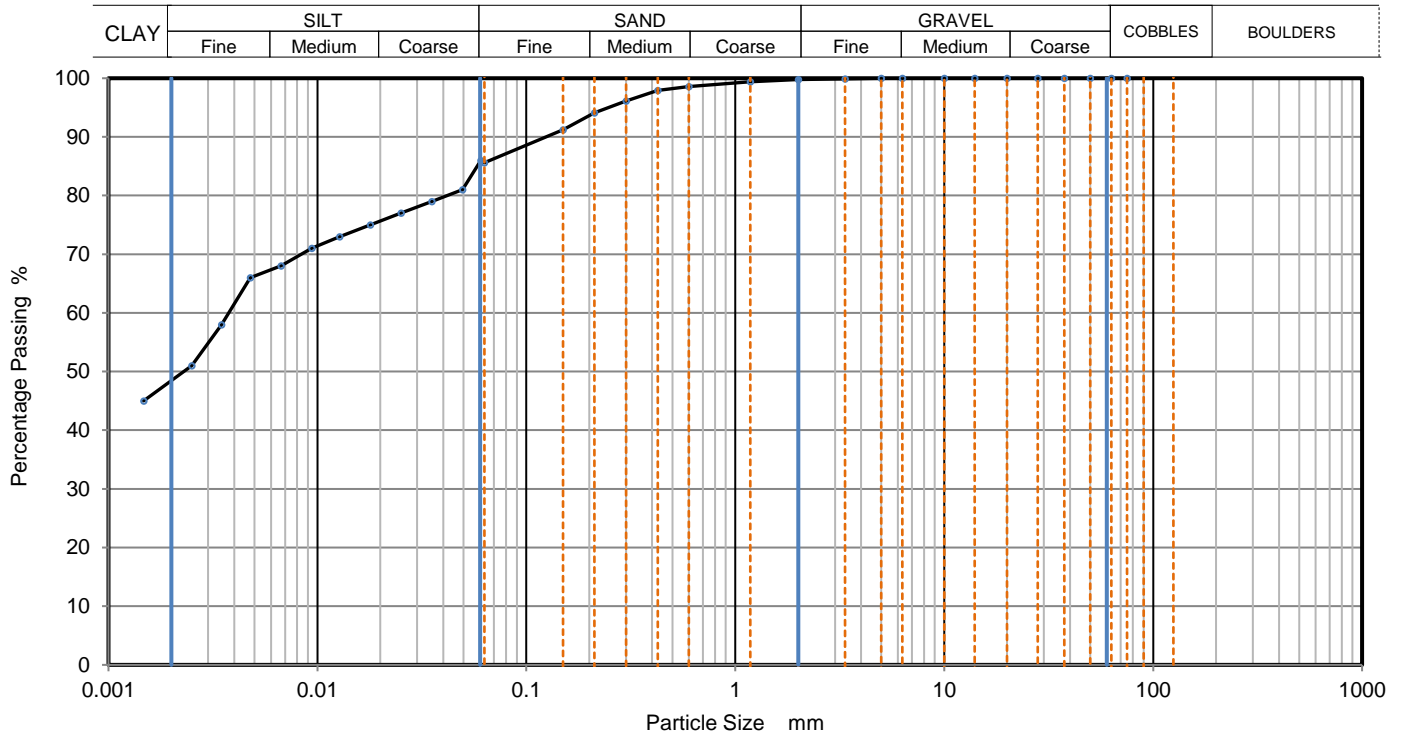
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## PARTICLE SIZE DISTRIBUTION

Job Ref	<b>2020WW102</b>
Borehole/Pit No.	TP05
Sample No.	2
Depth, m	0.40
Sample Type	B
KeyLAB ID	IDL12020102933

Site Name	Arklow Bank Windpark	
Soil Description	Orange-brown slightly sandy SILT.	
Specimen Reference	Specimen Depth	m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0606	86
		0.0496	81
75	100	0.0353	79
63	100	0.0252	77
50	100	0.0179	75
37.5	100	0.0128	73
28	100	0.0094	71
20	100	0.0067	68
14	100	0.0048	66
10	100	0.0035	58
6.3	100	0.0025	51
5	100	0.0015	45
3.35	100		
2	100		
1.18	99		
0.6	99	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.425	98		
0.3	96		
0.212	94		
0.15	91		
0.063	86		

Dry Mass of sample, g 433

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	14
Silt	37
Clay	49

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks  
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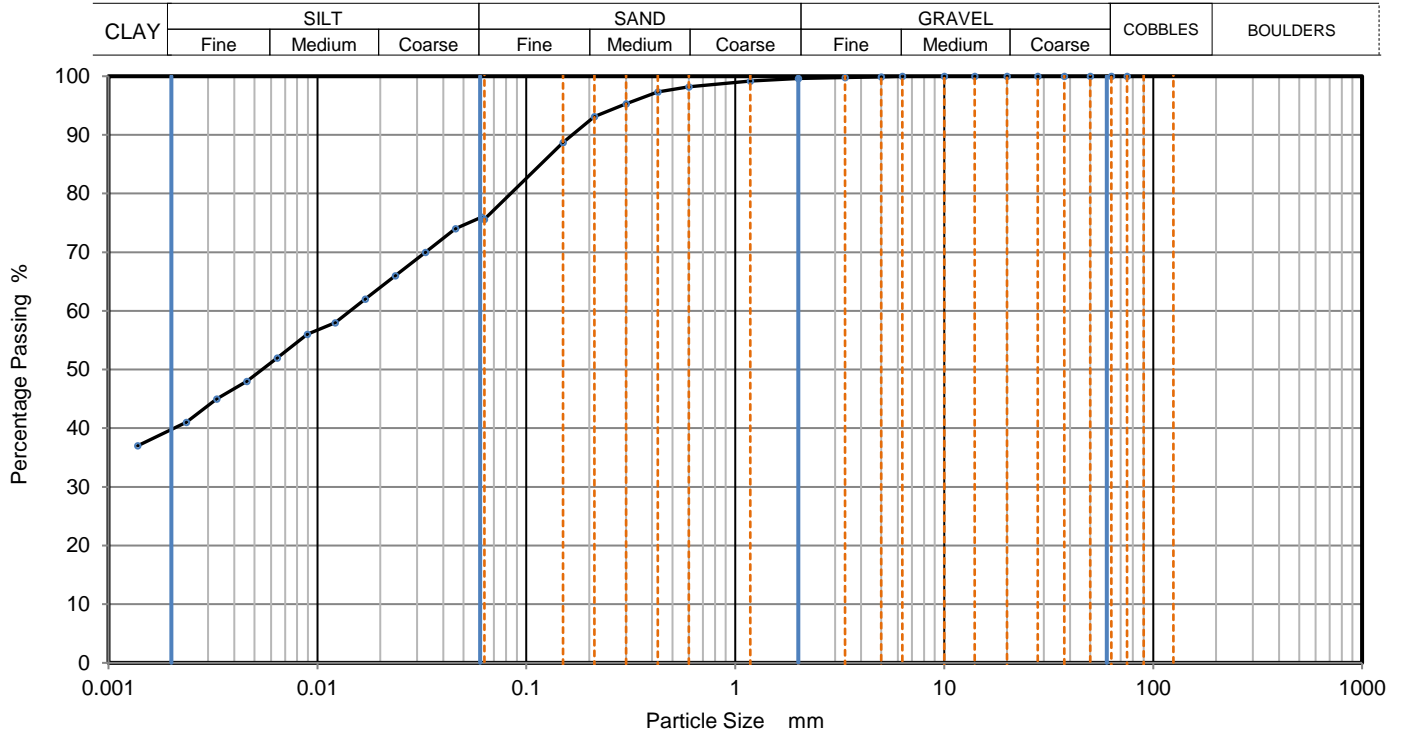




## PARTICLE SIZE DISTRIBUTION

Job Ref	2020WW102
Borehole/Pit No.	TP05
Sample No.	5
Depth, m	1.50
Sample Type	B
KeyLAB ID	IDL12020102937

Site Name	Arklow Bank Windpark	
Soil Description	Brown slightly sandy SILT.	
Specimen Reference	Specimen Depth	m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0611	76
		0.0458	74
75	100	0.0329	70
63	100	0.0236	66
50	100	0.0170	62
37.5	100	0.0122	58
28	100	0.0089	56
20	100	0.0064	52
14	100	0.0046	48
10	100	0.0033	45
6.3	100	0.0024	41
5	100	0.0014	37
3.35	100		
2	100		
1.18	99		
0.6	98		
0.425	97	Particle density (assumed)	
0.3	95	2.65	Mg/m3
0.212	93		
0.15	89		
0.063	76		


Dry Mass of sample, g 528

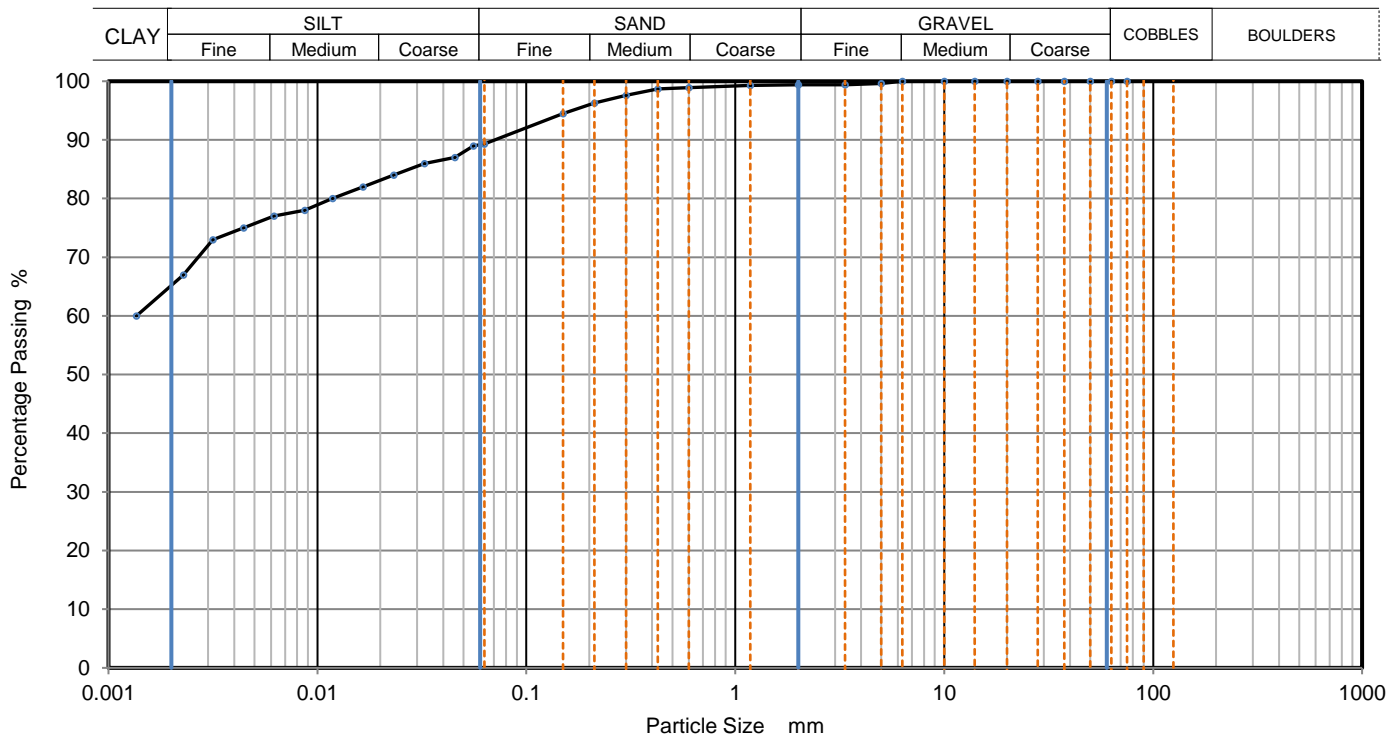
Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	24
Silt	36
Clay	40

Grading Analysis		
D100	mm	
D60	mm	0.0142
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks  
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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP05	
Site Name	Arklow Bank Windpark		Sample No.	6	
Soil Description	Brown slightly sandy SILT.		Depth, m	2.60	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020102938	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0559	89
		0.0455	87
75	100	0.0325	86
63	100	0.0232	84
50	100	0.0165	82
37.5	100	0.0118	80
28	100	0.0087	78
20	100	0.0062	77
14	100	0.0044	75
10	100	0.0032	73
6.3	100	0.0023	67
5	100	0.0014	60
3.35	99		
2	99		
1.18	99		
0.6	99	Particle density (assumed)	
0.425	99	2.65	Mg/m <sup>3</sup>
0.3	98		
0.212	96		
0.15	95		
0.063	89		

Dry Mass of sample, g

369


Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	10
Silt	24
Clay	66

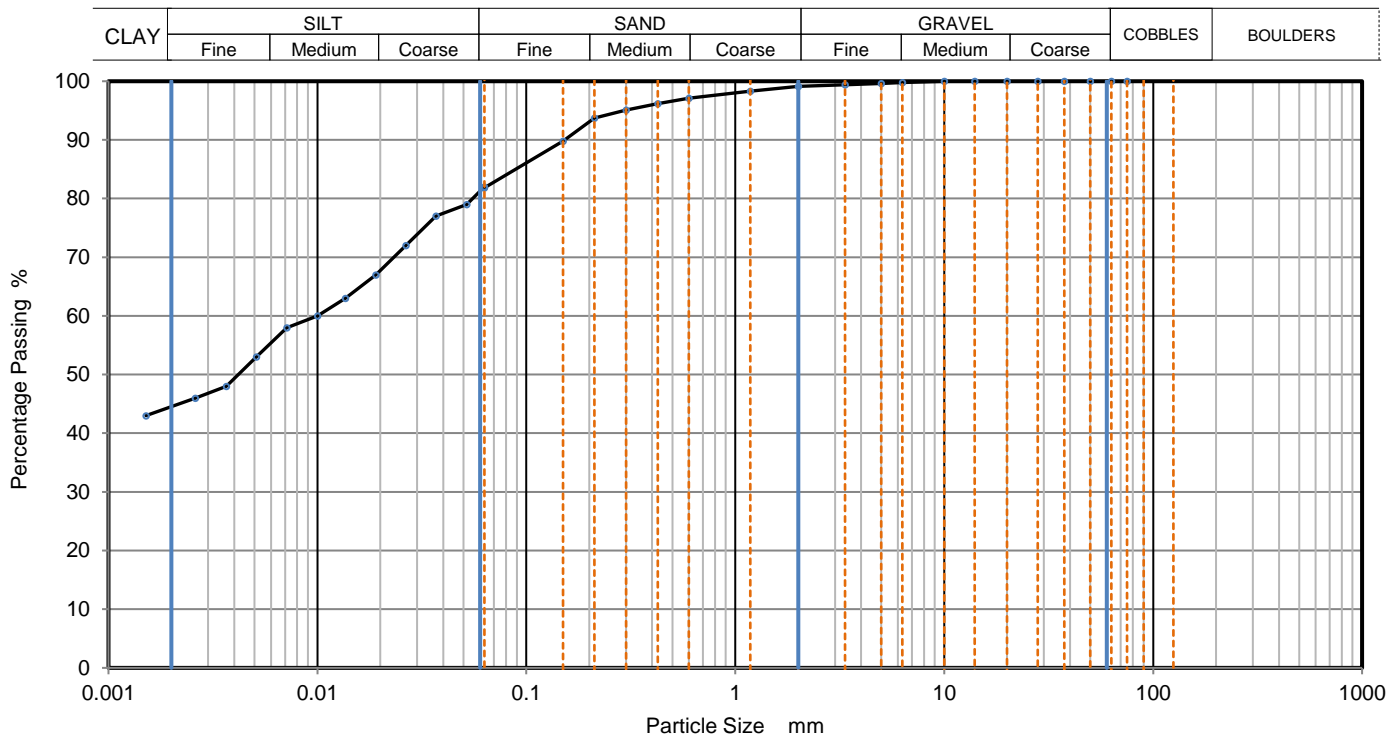
Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	<b>2020WW102</b>	
			Borehole/Pit No.	TP06	
Site Name	Arklow Bank Windpark		Sample No.	2	
Soil Description	Orange-brown slightly gravelly slightly sandy SILT.		Depth, m	0.40	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL1202010301	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	82
		0.0519	79
75	100	0.0370	77
63	100	0.0265	72
50	100	0.0190	67
37.5	100	0.0136	63
28	100	0.0100	60
20	100	0.0071	58
14	100	0.0051	53
10	100	0.0037	48
6.3	100	0.0026	46
5	100	0.0015	43
3.35	99		
2	99		
1.18	98		
0.6	97	Particle density (assumed)	
0.425	96	2.65	Mg/m <sup>3</sup>
0.3	95		
0.212	94		
0.15	90		
0.063	82		

Dry Mass of sample, g

395


Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	17
Silt	37
Clay	45

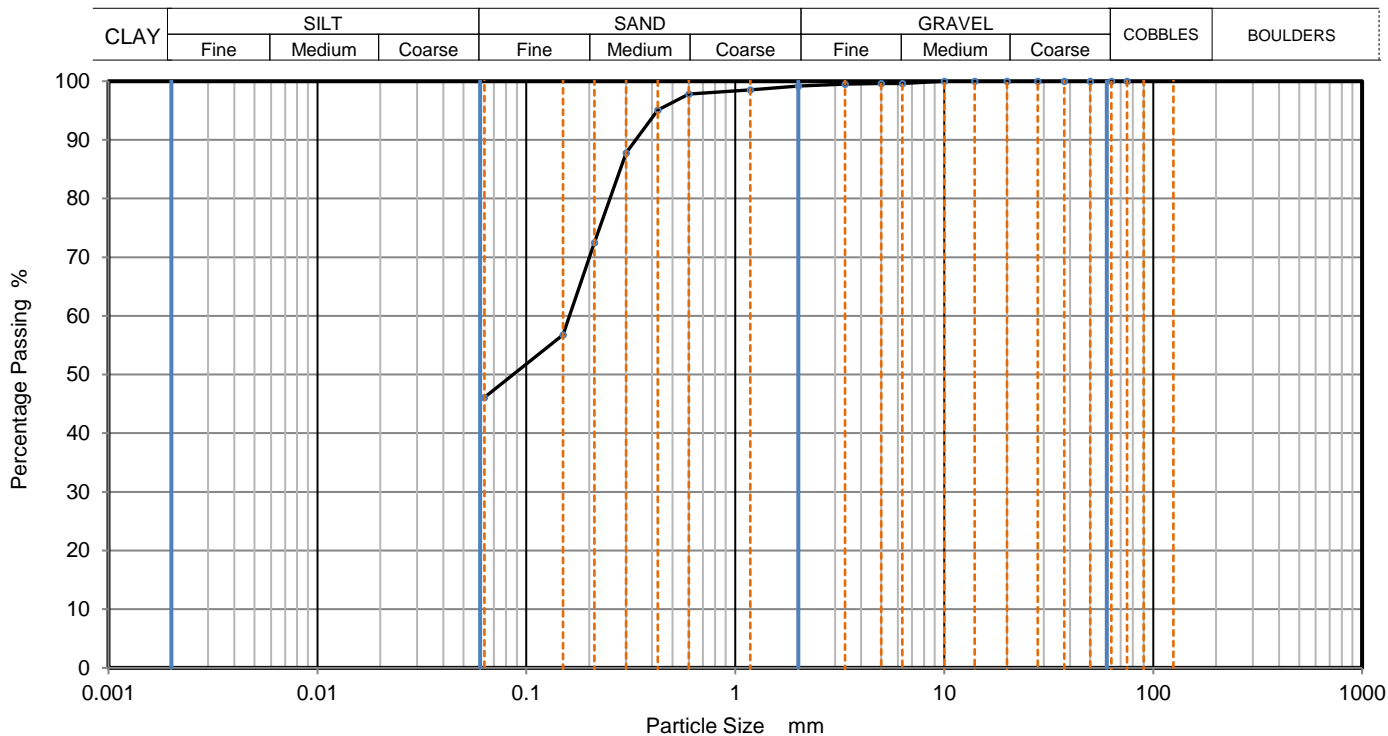
Grading Analysis		
D100	mm	
D60	mm	0.00981
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP06	
Site Name	Arklow Bank Windpark		Sample No.	6	
Soil Description	Orange-brown sandy SILT. Sand is medium and fine.		Depth, m	2.10	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2		KeyLAB ID	IDL1202010307	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	98		
0.425	95		
0.3	88		
0.212	73		
0.15	57		
0.063	46		

Dry Mass of sample, g

603


Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	53
Fines <0.063mm	46

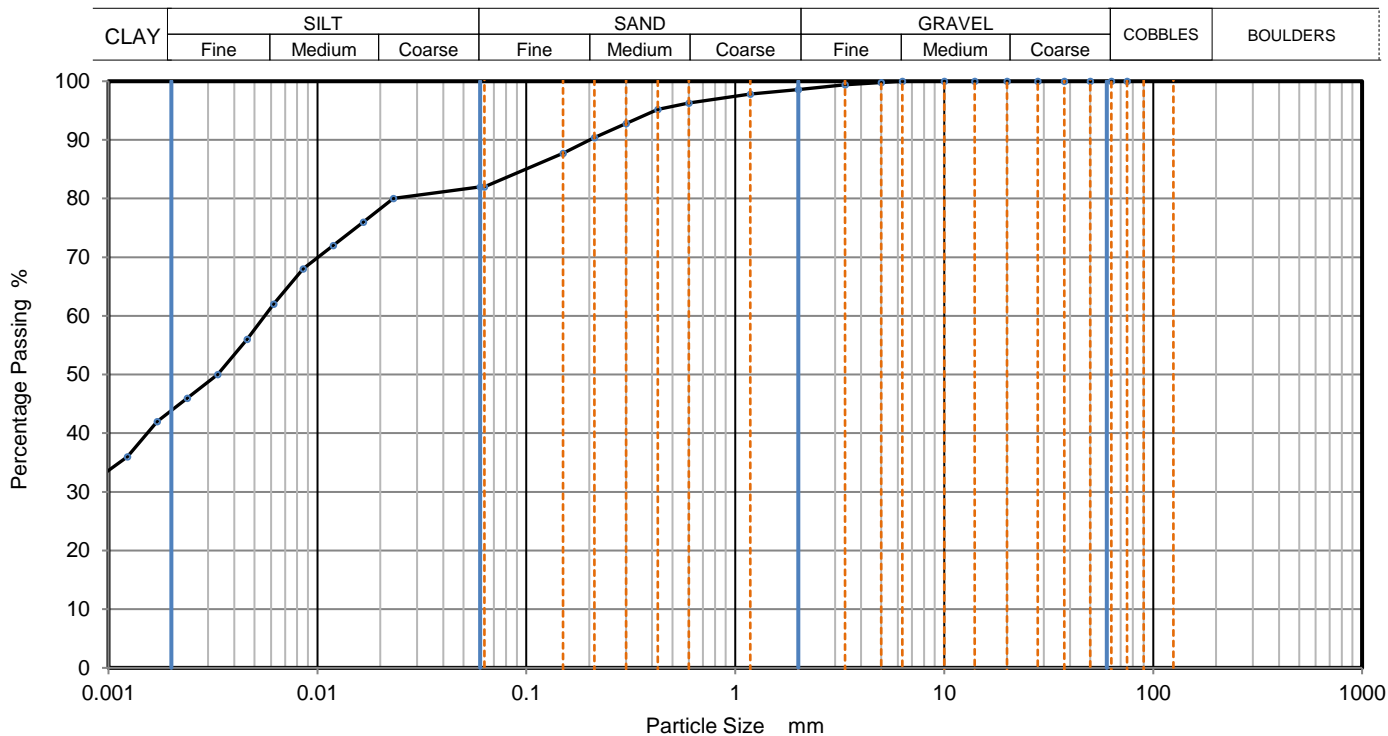
Grading Analysis		
D100	mm	
D60	mm	0.161
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP07	
Site Name	Arklow Bank Windpark		Sample No.	5	
Soil Description	Brown slightly sandy SILT.		Depth, m	1.50	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020103014	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0601	82
		0.0231	80
75	100	0.0166	76
63	100	0.0119	72
50	100	0.0085	68
37.5	100	0.0062	62
28	100	0.0046	56
20	100	0.0033	50
14	100	0.0024	46
10	100	0.0017	42
6.3	100	0.0012	36
5	100	0.0007	30
3.35	99		
2	99		
1.18	98		
0.6	96	Particle density (assumed)	
0.425	95	2.65	Mg/m3
0.3	93		
0.212	90		
0.15	88		
0.063	82		

Dry Mass of sample, g

397


Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	17
Silt	38
Clay	44

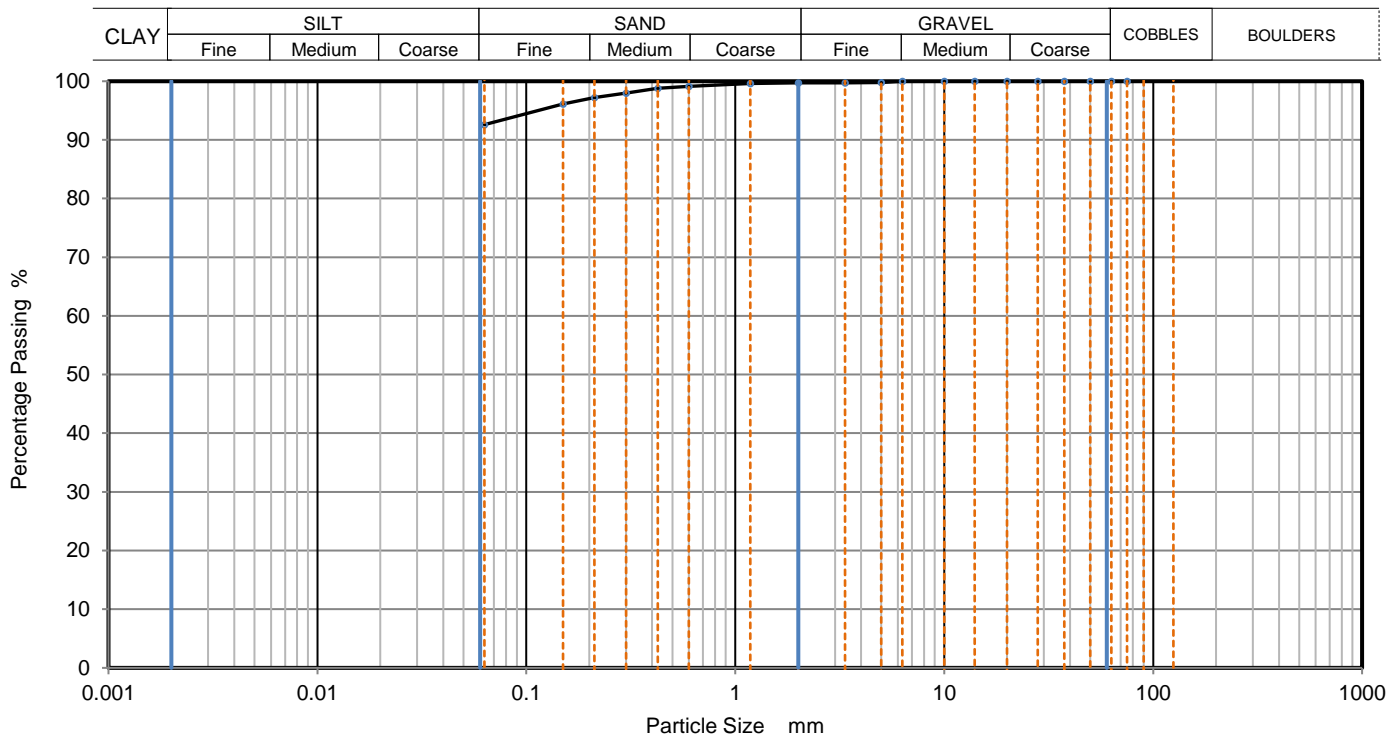
Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP07	
Site Name	Arklow Bank Windpark		Sample No.	8	
Soil Description	Dark brown slightly sandy SILT.		Depth, m	4.40	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2		KeyLAB ID	IDL12020103017	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	99		
0.3	98		
0.212	97		
0.15	96		
0.063	93		

Dry Mass of sample, g

494
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Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	7
Fines <0.063mm	93

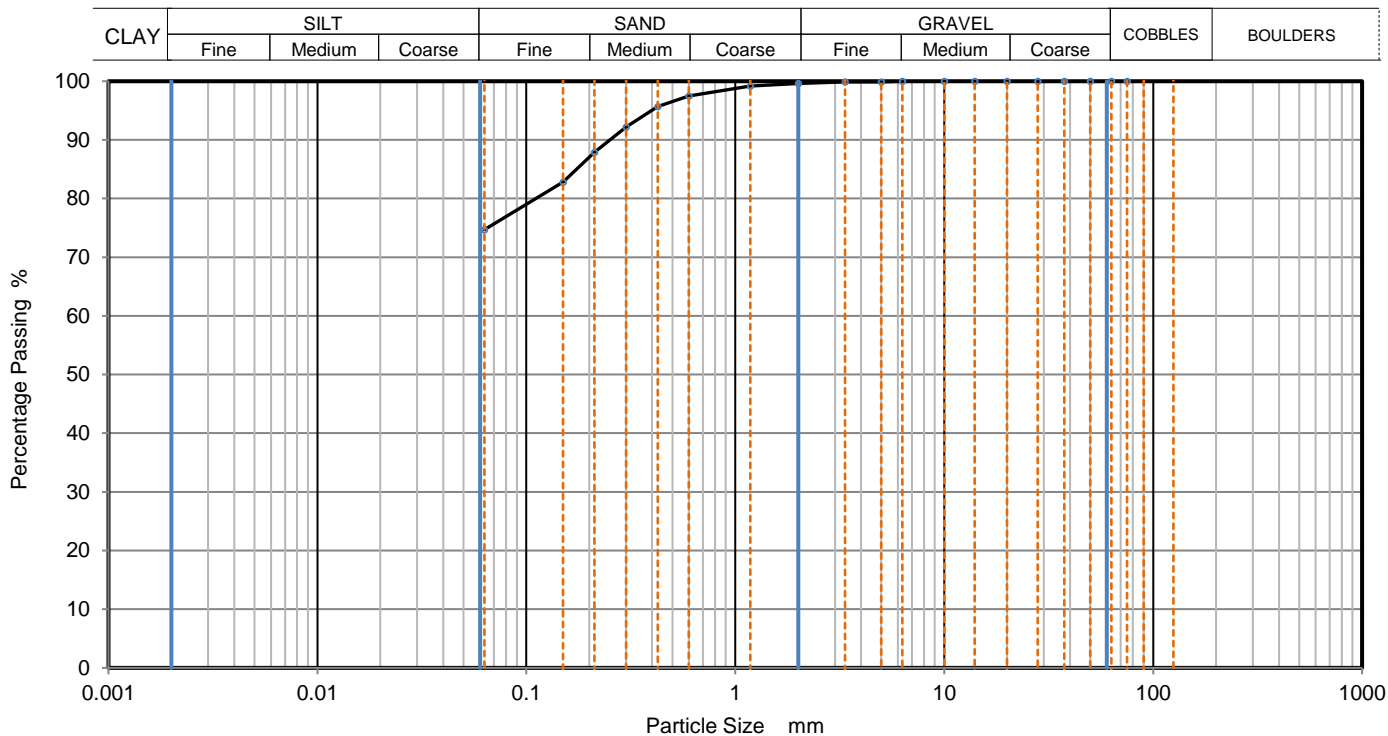
Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP08	
Site Name	Arklow Bank Windpark		Sample No.	2	
Soil Description	Brown slightly sandy SILT.		Depth, m	0.40	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2		KeyLAB ID	IDL12020103019	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	98		
0.425	96		
0.3	92		
0.212	88		
0.15	83		
0.063	75		

Dry Mass of sample, g

387


Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	25
Fines <0.063mm	75

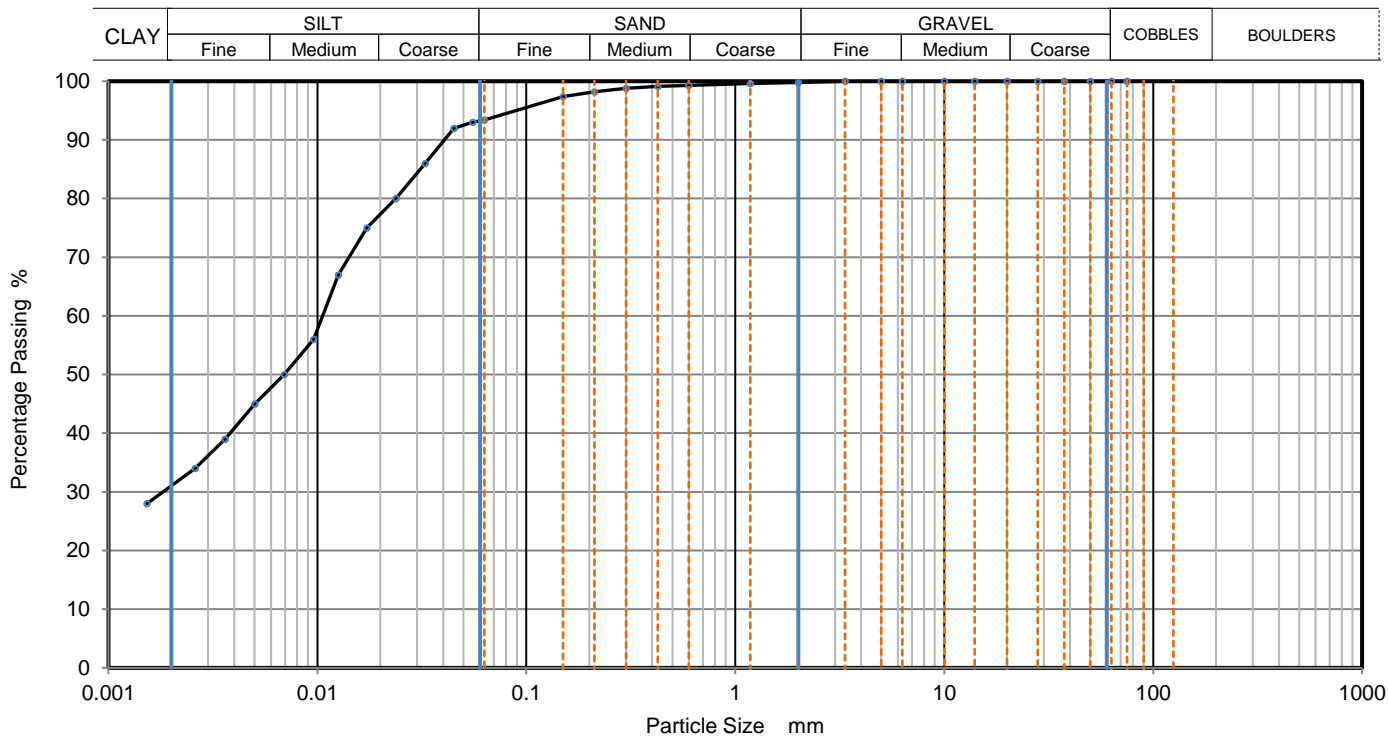
Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP08	
Site Name	Arklow Bank Windpark		Sample No.	8	
Soil Description	Dark brown slightly sandy SILT.		Depth, m	4.40	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020103025	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0553	93
		0.0450	92
75	100	0.0327	86
63	100	0.0238	80
50	100	0.0172	75
37.5	100	0.0126	67
28	100	0.0096	56
20	100	0.0069	50
14	100	0.0050	45
10	100	0.0036	39
6.3	100	0.0026	34
5	100	0.0015	28
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	99	2.65	Mg/m <sup>3</sup>
0.3	99		
0.212	98		
0.15	97		
0.063	93		

Dry Mass of sample, g

444

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	6
Silt	63
Clay	31


Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

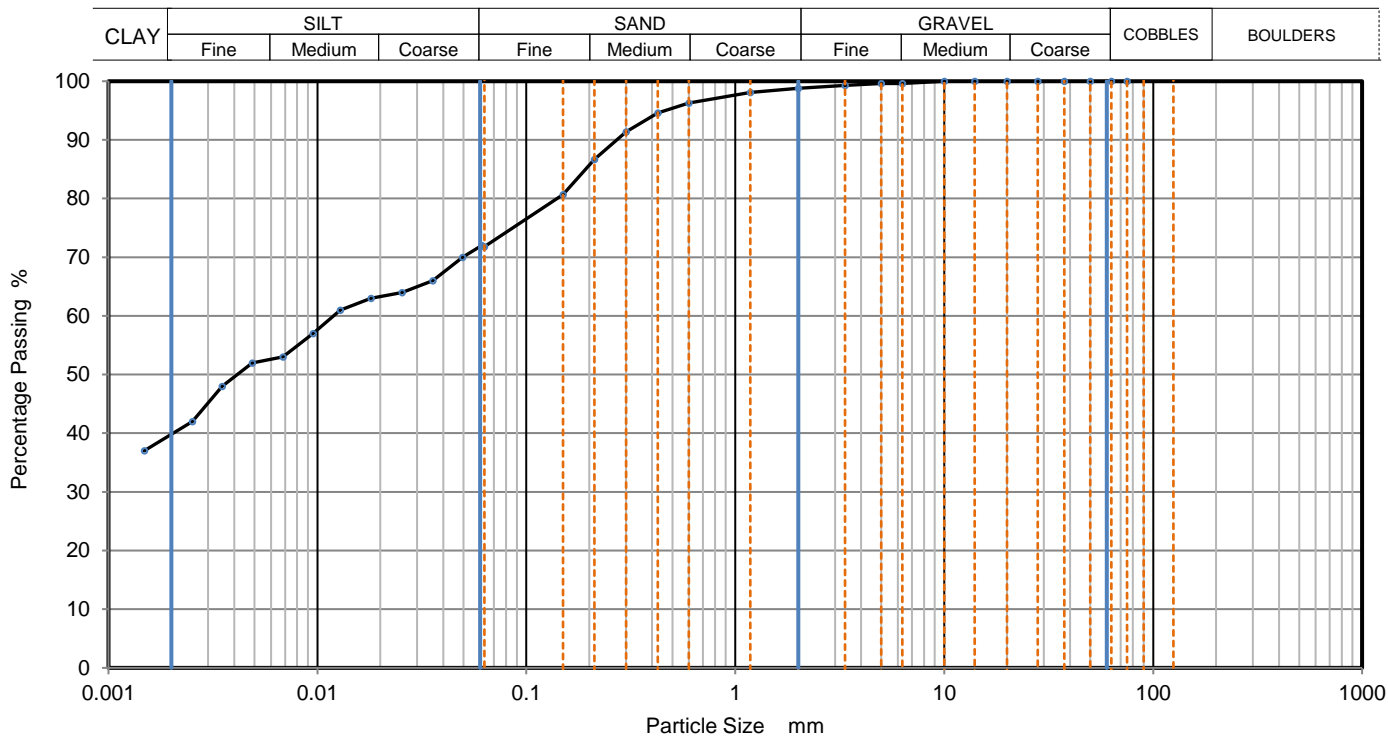
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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP09	
Site Name	Arklow Bank Windpark		Sample No.	5	
Soil Description	Brown slightly sandy SILT.		Depth, m	1.50	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020103032	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0611	72
		0.0496	70
75	100	0.0356	66
63	100	0.0254	64
50	100	0.0181	63
37.5	100	0.0129	61
28	100	0.0095	57
20	100	0.0068	53
14	100	0.0049	52
10	100	0.0035	48
6.3	100	0.0025	42
5	100	0.0015	37
3.35	99		
2	99		
1.18	98		
0.6	96	Particle density (assumed)	
0.425	95	2.65	Mg/m3
0.3	91		
0.212	87		
0.15	81		
0.063	72		

Dry Mass of sample, g

492


Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	27
Silt	32
Clay	40

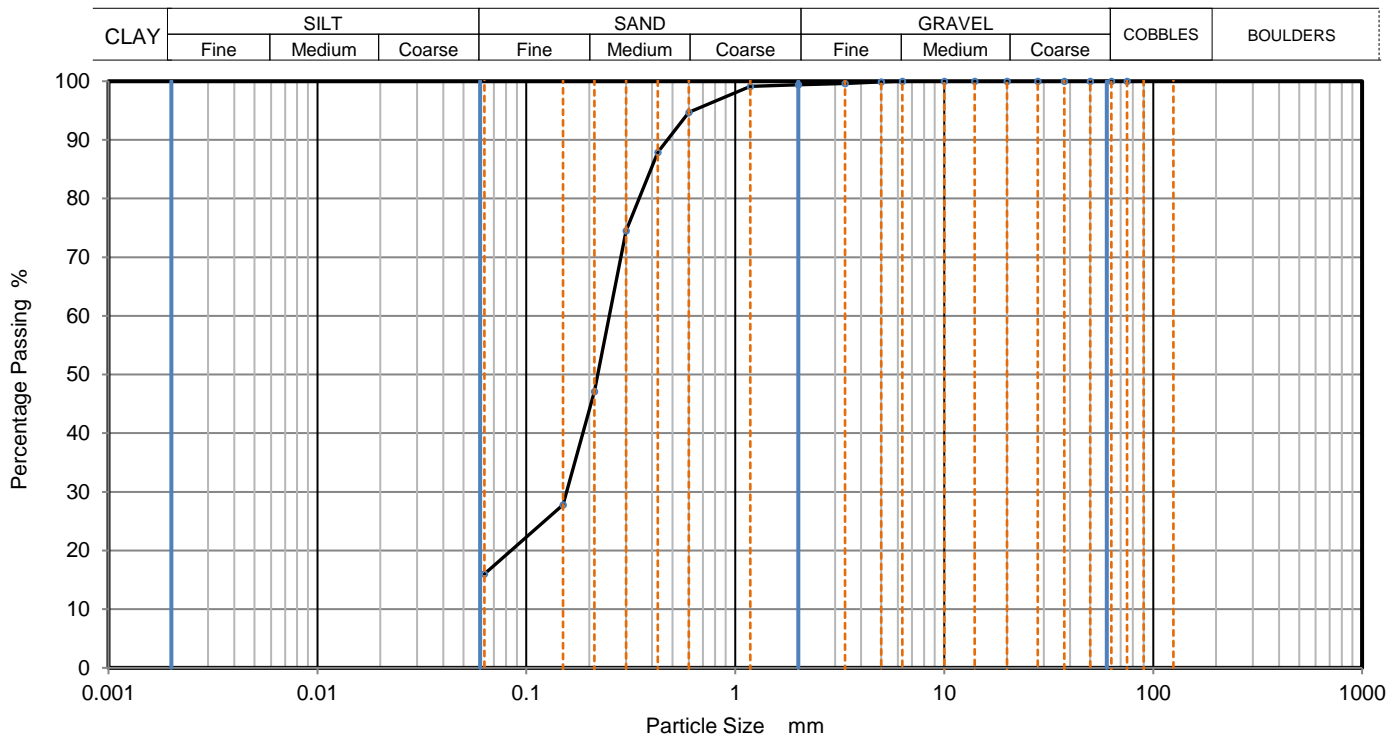
Grading Analysis		
D100	mm	
D60	mm	0.0121
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP10	
Site Name	Arklow Bank Windpark		Sample No.	6	
Soil Description	Brown silty medium and fine SAND.		Depth, m	2.00	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2		KeyLAB ID	IDL12020103040	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	95		
0.425	88		
0.3	75		
0.212	47		
0.15	28		
0.063	16		

Dry Mass of sample, g

741
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Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	84
Fines <0.063mm	16

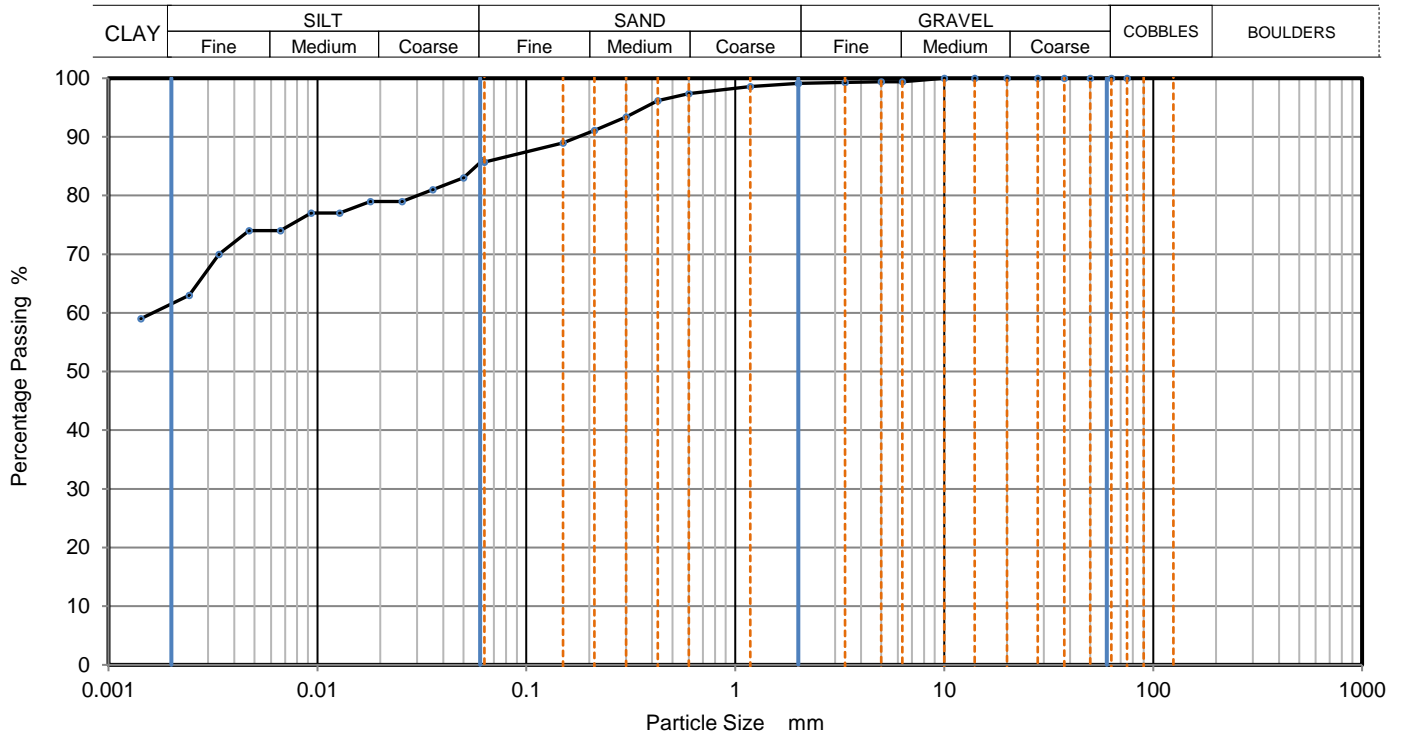
Grading Analysis		
D100	mm	
D60	mm	0.25
D30	mm	0.156
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP11	
Site Name	Arklow Bank Windpark		Sample No.	2	
Soil Description	Brown slightly sandy SILT.		Depth, m	0.40	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020103043	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0616	86
		0.0499	83
75	100	0.0356	81
63	100	0.0254	79
50	100	0.0179	79
37.5	100	0.0128	77
28	100	0.0093	77
20	100	0.0066	74
14	100	0.0047	74
10	100	0.0034	70
6.3	99	0.0024	63
5	99	0.0014	59
3.35	99		
2	99		
1.18	99		
0.6	97	Particle density (assumed)	
0.425	96	2.65	Mg/m <sup>3</sup>
0.3	93		
0.212	91		
0.15	89		
0.063	86		


Dry Mass of sample, g 463

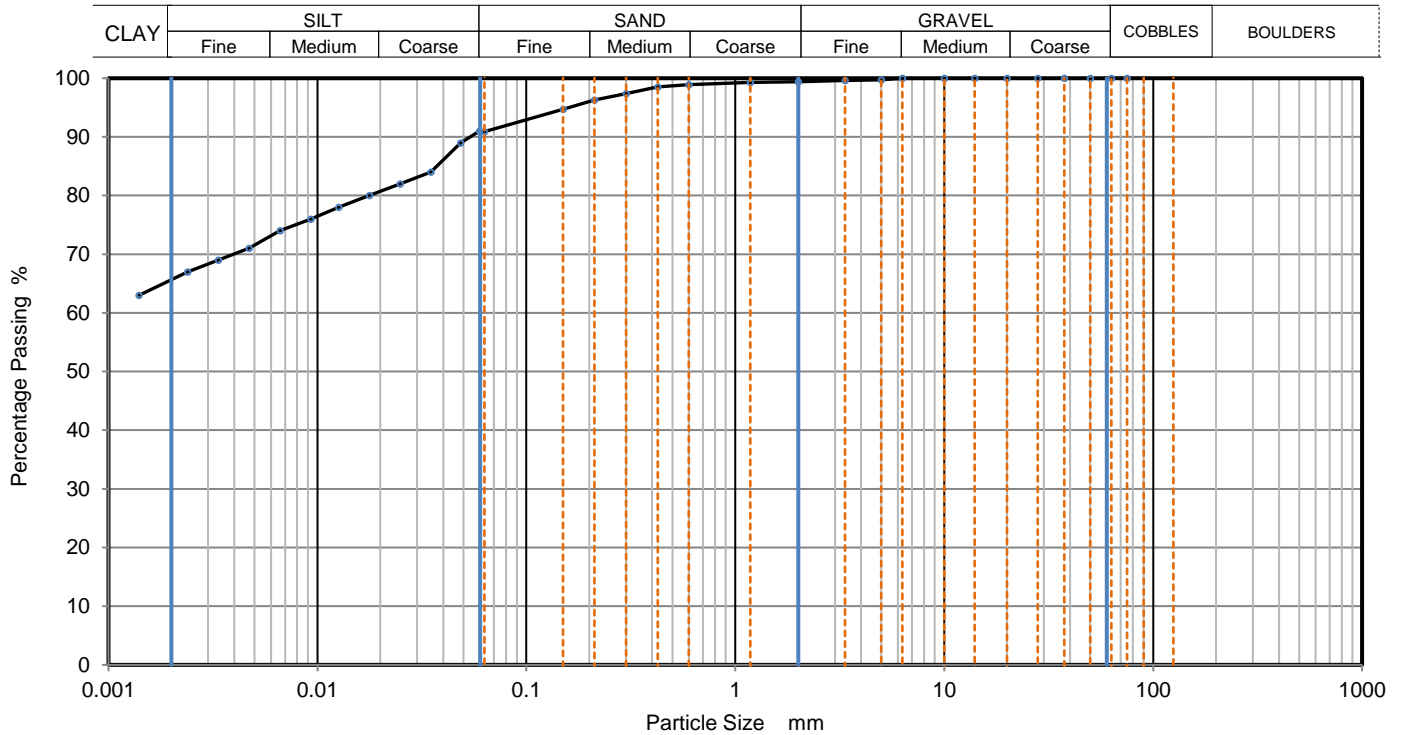
Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	13
Silt	24
Clay	62

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks  
Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	<b>1</b>
ED	DCD	Dympna Darcy B.Sc.	07/01/2021 14:17	
			QC From No:R2	

	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP11	
Site Name	Arklow Bank Windpark		Sample No.	6	
Soil Description	Dark brown slightly sandy SILT.		Depth, m	2.50	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020103049	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0596	91
		0.0485	89
75	100	0.0348	84
63	100	0.0248	82
50	100	0.0177	80
37.5	100	0.0126	78
28	100	0.0093	76
20	100	0.0066	74
14	100	0.0047	71
10	100	0.0034	69
6.3	100	0.0024	67
5	100	0.0014	63
3.35	100		
2	99		
1.18	99		
0.6	99	Particle density (assumed)	
0.425	99	2.65	Mg/m <sup>3</sup>
0.3	97		
0.212	96		
0.15	95		
0.063	91		


Dry Mass of sample, g 605

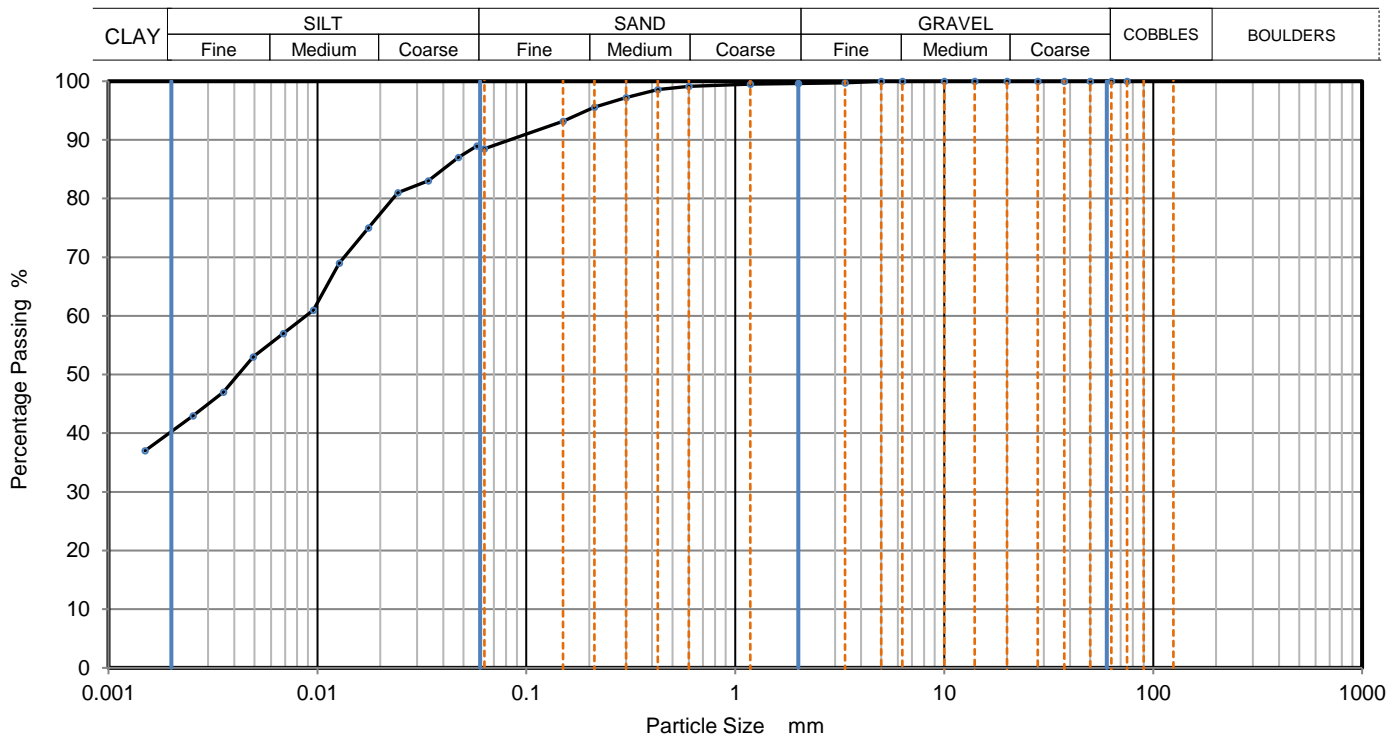
Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	9
Silt	25
Clay	66

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks  
Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	<b>1</b>
ED	DCD	Dympna Darcy B.Sc.	07/01/2021 14:17	
				QC From No:R2

	<b>PARTICLE SIZE DISTRIBUTION</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP11	
Site Name	Arklow Bank Windpark		Sample No.	7	
Soil Description	Dark brown slightly sandy SILT.		Depth, m	3.80	
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	IDL12020103050	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0580	89
		0.0472	87
75	100	0.0340	83
63	100	0.0242	81
50	100	0.0176	75
37.5	100	0.0127	69
28	100	0.0096	61
20	100	0.0069	57
14	100	0.0049	53
10	100	0.0035	47
6.3	100	0.0025	43
5	100	0.0015	37
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	99	2.65	Mg/m3
0.3	97		
0.212	96		
0.15	93		
0.063	89		

Dry Mass of sample, g

545

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	11
Silt	48
Clay	41

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

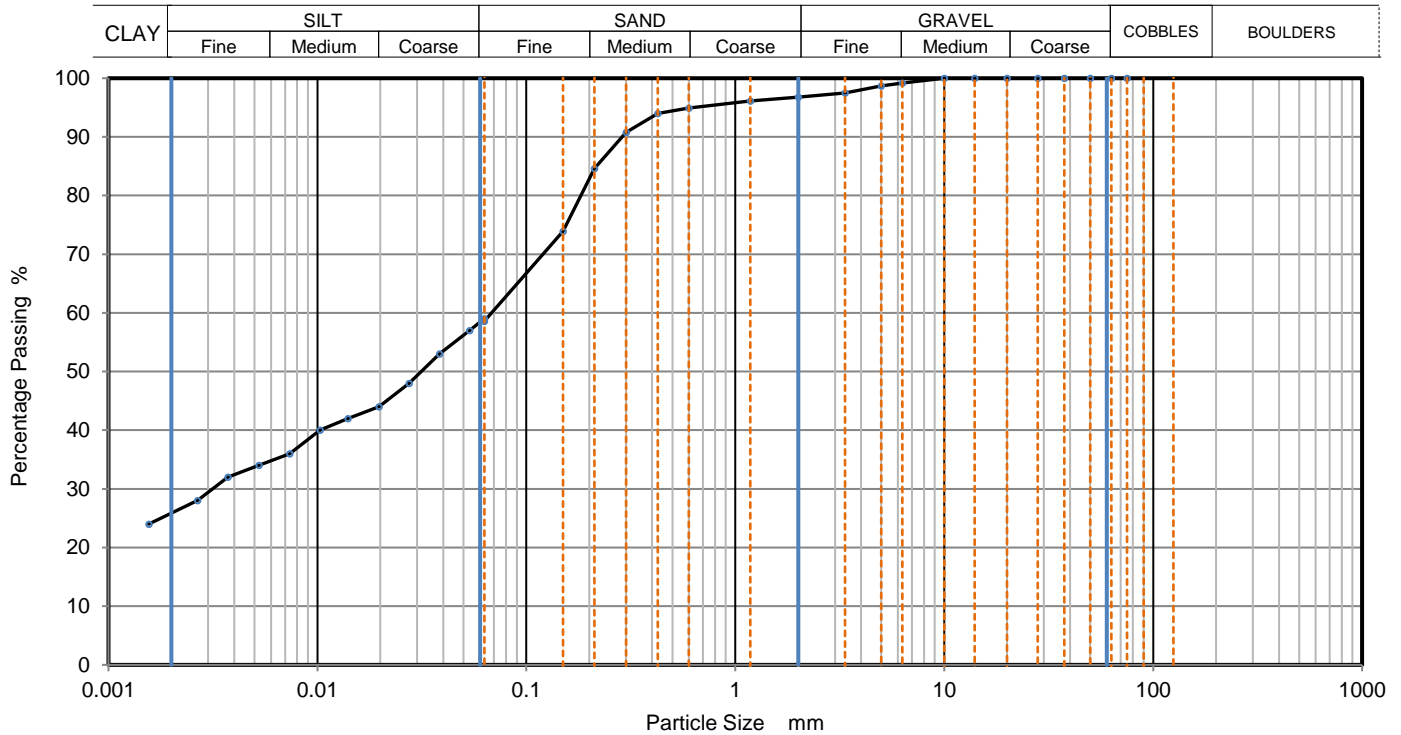
Operator	Checked	Approved	Sheet printed	<b>1</b>
ED	DCD	Dympna Darcy B.Sc.	07/01/2021 14:17	
				QC From No:R2



# PARTICLE SIZE DISTRIBUTION

Job Ref	2020WW102
Borehole/Pit No.	TP12
Sample No.	6
Depth, m	2.40
Sample Type	B
KeyLAB ID	IDL12020103058

Site Name	Arklow Bank Windpark	
Soil Description	Brown slightly gravelly sandy SILT. Sand is fine.	
Specimen Reference	Specimen Depth	m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	59
		0.0535	57
75	100	0.0384	53
63	100	0.0275	48
50	100	0.0197	44
37.5	100	0.0140	42
28	100	0.0103	40
20	100	0.0074	36
14	100	0.0052	34
10	100	0.0037	32
6.3	99	0.0027	28
5	99	0.0016	24
3.35	98		
2	97		
1.18	96		
0.6	95	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.425	94		
0.3	91		
0.212	85		
0.15	74		
0.063	59		

Dry Mass of sample, g 549

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	38
Silt	33
Clay	26

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks  
Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	1
ED	DCD	Dympna Darcy B.Sc.	07/01/2021 14:17	
				QC From No:R2



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

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

Irish Drilling Limited  
Old Galway Road  
Loughrea  
Co. Galway

**Attention:** Dympna Darcy

## CERTIFICATE OF ANALYSIS

**Date of report Generation:** 23 December 2020  
**Customer:** Irish Drilling Limited  
**Sample Delivery Group (SDG):** 201216-121  
**Your Reference:** 2020WW102  
**Location:** Arklow Bank  
**Report No:** 581370

We received 12 samples on Wednesday December 16, 2020 and 12 of these samples were scheduled for analysis which was completed on Wednesday December 23, 2020. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

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

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

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

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

Approved By:

**Sonia McWhan**

Operations Manager





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201216-121  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 581370  
Superseded Report:

## Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23446025	TP01	B4	1.40 - 1.50	15/10/2020
23446038	TP02	B2	0.50 - 0.60	15/10/2020
23446040	TP03	D3	1.10 - 1.20	15/10/2020
23446042	TP04	B7	2.40 - 2.50	15/10/2020
23446046	TP05	D3	1.10 - 1.20	15/10/2020
23446049	TP06	B5	1.40 - 1.50	14/10/2020
23446053	TP07	B6	2.40 - 2.50	13/10/2020
23446056	TP08	B2	0.40 - 0.50	13/10/2020
23446060	TP09	B5	1.50 - 1.60	13/10/2020
23446027	TP10	B2	0.40 - 0.50	14/10/2020
23446030	TP11	B2	0.40 - 0.50	14/10/2020
23446032	TP12	B7	3.50 - 3.60	14/10/2020

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





# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	201216-121	<b>Client Reference:</b>	2020WW102
<b>Location:</b>	Arklow Bank	<b>Order Number:</b>	9028
		<b>Report Number:</b>	581370
		<b>Superseded Report:</b>	

**Results Legend**

- X Test
- N No Determination Possible

**Sample Types -**

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

Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type
23446032	TP12	B7	3.50 - 3.60	250g Amber Jar (ALE210)	S
23446030	TP11	B2	0.40 - 0.50	250g Amber Jar (ALE210)	S
23446027	TP10	B2	0.40 - 0.50	250g Amber Jar (ALE210)	S
23446060	TP09	B5	1.50 - 1.60	250g Amber Jar (ALE210)	S
23446056	TP08	B2	0.40 - 0.50	250g Amber Jar (ALE210)	S
23446053	TP07	B6	2.40 - 2.50	250g Amber Jar (ALE210)	S
23446049	TP06	B5	1.40 - 1.50	250g Amber Jar (ALE210)	S
23446046	TP05	D3	1.10 - 1.20	250g Amber Jar (ALE210)	S
23446042	TP04	B7	2.40 - 2.50	250g Amber Jar (ALE210)	S
23446040	TP03	D3	1.10 - 1.20	250g Amber Jar (ALE210)	S
23446038	TP02	B2	0.50 - 0.60	250g Amber Jar (ALE210)	S
23446025	TP01	B4	1.40 - 1.50	250g Amber Jar (ALE210)	S

Parameter	All	NDPs: 0 Tests: 12														
Anions by Kone (soil)	All	NDPs: 0 Tests: 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X
pH	All	NDPs: 0 Tests: 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sample description	All	NDPs: 0 Tests: 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total Sulphate	All	NDPs: 0 Tests: 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total Sulphur	All	NDPs: 0 Tests: 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201216-121  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 581370  
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	Inclusions	Inclusions 2
23446025	TP01	1.40 - 1.50	Light Brown	Sandy Loam	None	Stones
23446038	TP02	0.50 - 0.60	Light Brown	Silty Clay	Vegetation	N/A
23446040	TP03	1.10 - 1.20	Dark Brown	Sandy Silt Loam	None	Stones
23446042	TP04	2.40 - 2.50	Light Brown	Silty Clay Loam	None	Stones
23446046	TP05	1.10 - 1.20	Light Brown	Clay	Stones	None
23446049	TP06	1.40 - 1.50	Light Brown	Sandy Silt Loam	None	None
23446053	TP07	2.40 - 2.50	Light Brown	Clay	Stones	None
23446056	TP08	0.40 - 0.50	Light Brown	Clay	Vegetation	None
23446060	TP09	1.50 - 1.60	Dark Brown	Sandy Clay Loam	None	Stones
23446027	TP10	0.40 - 0.50	Dark Brown	Loamy Sand	None	Stones
23446030	TP11	0.40 - 0.50	Light Brown	Clay	Vegetation	None
23446032	TP12	3.50 - 3.60	Light Brown	Clay	None	None

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.







# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201216-121      **Client Reference:** 2020WW102      **Report Number:** 581370  
**Location:** Arklow Bank      **Order Number:** 9028      **Superseded Report:**

## Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
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
TM221	Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd	Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer
TM243		Mixed Anions In Soils By Kone

NA = not applicable.

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



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b> 201216-121	<b>Client Reference:</b> 2020WW102	<b>Report Number:</b> 581370
<b>Location:</b> Arklow Bank	<b>Order Number:</b> 9028	<b>Superseded Report:</b>

## Test Completion Dates

	23446025	23446038	23446040	23446042	23446046	23446049	23446053	23446056	23446060	23446027
<b>Lab Sample No(s)</b>	TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08	TP09	TP10
<b>Customer Sample Ref.</b>										
<b>AGS Ref.</b>	B4	B2	D3	B7	D3	B5	B6	B2	B5	B2
<b>Depth</b>	1.40 - 1.50	0.50 - 0.60	1.10 - 1.20	2.40 - 2.50	1.10 - 1.20	1.40 - 1.50	2.40 - 2.50	0.40 - 0.50	1.50 - 1.60	0.40 - 0.50
<b>Type</b>	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)	23-Dec-2020	23-Dec-2020	22-Dec-2020	23-Dec-2020	23-Dec-2020	23-Dec-2020	22-Dec-2020	22-Dec-2020	23-Dec-2020	23-Dec-2020
pH	18-Dec-2020	18-Dec-2020	18-Dec-2020	18-Dec-2020	18-Dec-2020	18-Dec-2020	18-Dec-2020	18-Dec-2020	18-Dec-2020	18-Dec-2020
Sample description	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020
Total Sulphate	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020	22-Dec-2020	22-Dec-2020
Total Sulphur	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020

	23446030	23446032
<b>Lab Sample No(s)</b>	TP11	TP12
<b>Customer Sample Ref.</b>		
<b>AGS Ref.</b>	B2	B7
<b>Depth</b>	0.40 - 0.50	3.50 - 3.60
<b>Type</b>	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)	23-Dec-2020	23-Dec-2020
pH	18-Dec-2020	18-Dec-2020
Sample description	17-Dec-2020	17-Dec-2020
Total Sulphate	21-Dec-2020	21-Dec-2020
Total Sulphur	21-Dec-2020	21-Dec-2020



# CERTIFICATE OF ANALYSIS

<b>SDG:</b> 201216-121	<b>Client Reference:</b> 2020WW102	<b>Report Number:</b> 581370
<b>Location:</b> Arklow Bank	<b>Order Number:</b> 9028	<b>Superseded Report:</b>

## Appendix

## General

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

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

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

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

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

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

7. Results relate only to the items tested.

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

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

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

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

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

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

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

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

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

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

### 18. Sample Deviations

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

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

### 19. Asbestos

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

#### Identification of Asbestos in Bulk Materials & Soils

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

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

#### Respirable Fibres

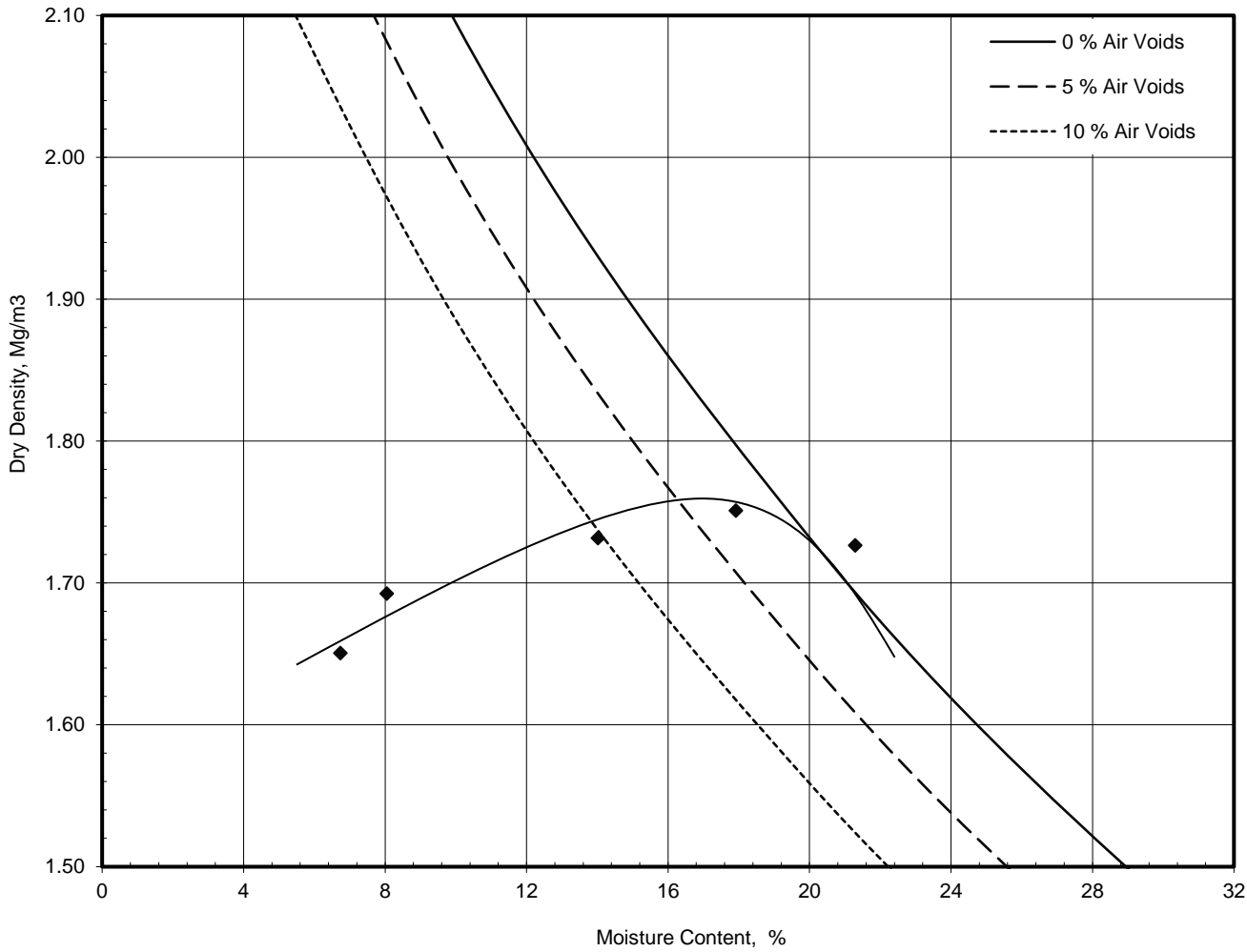
Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung. Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2017)*.

**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.**

<b>Dry Density / Moisture Content Relationship Light Compaction</b>		Job Ref	2020WW102		
		Borehole / Pit No	TP04		
Site Name	Arklow Bank Windpark		Sample No	5	
Soil Description	Brown gravelly very silty fine SAND.		Depth	1.40 m	
Specimen Ref.	1	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer		Keylab ID	IDL12020102928	

Compaction Test Reference/No.



Preparation	Material used was natural and air dried	
Mould Type	CBR	
Samples Used	Composite specimens tested	
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density -	Mg/m <sup>3</sup>	2.65

<b>Maximum Dry Density</b>	Mg/m <sup>3</sup>	<b>1.75</b>
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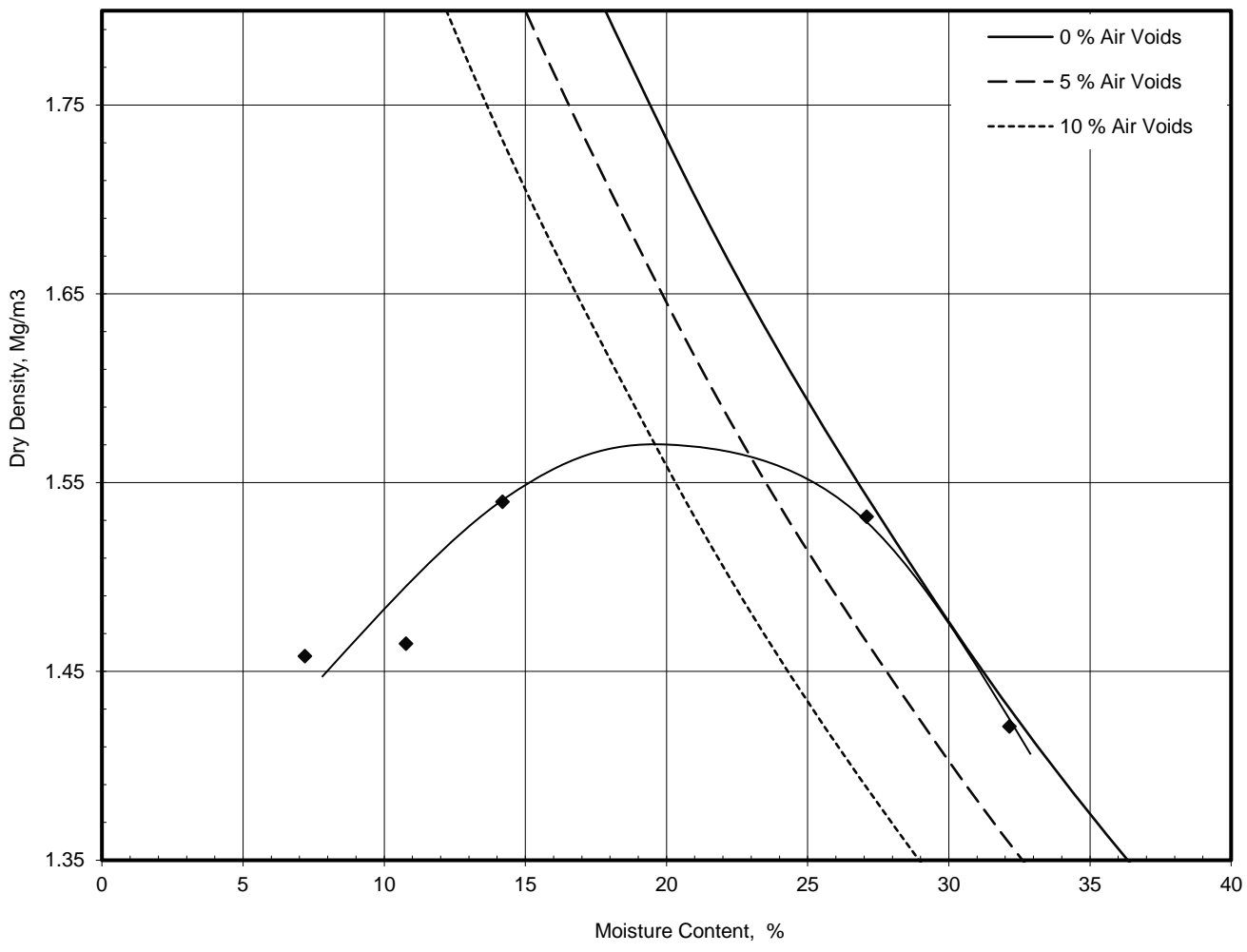
<b>Optimum Moisture Content</b>	%	<b>18</b>
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Operator	Checked	Approved	Remarks	QC Form R4 Sheet 1 of 1
RG	DCD	DCD		



<b>Dry Density / Moisture Content Relationship Light Compaction</b>		Job Ref	2020WW102		
		Borehole / Pit No	TP06		
Site Name	Arklow Bank Windpark		Sample No	5	
Soil Description	Orange-brown slightly gravelly slightly sandy SILT.		Depth	1.40 m	
Specimen Ref.	1	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer		Keylab ID	IDL1202010306	

Compaction Test Reference/No.



Preparation	Material used was natural and air dried	
Mould Type	CBR	
Samples Used	Composite specimens tested	
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m <sup>3</sup>	2.65

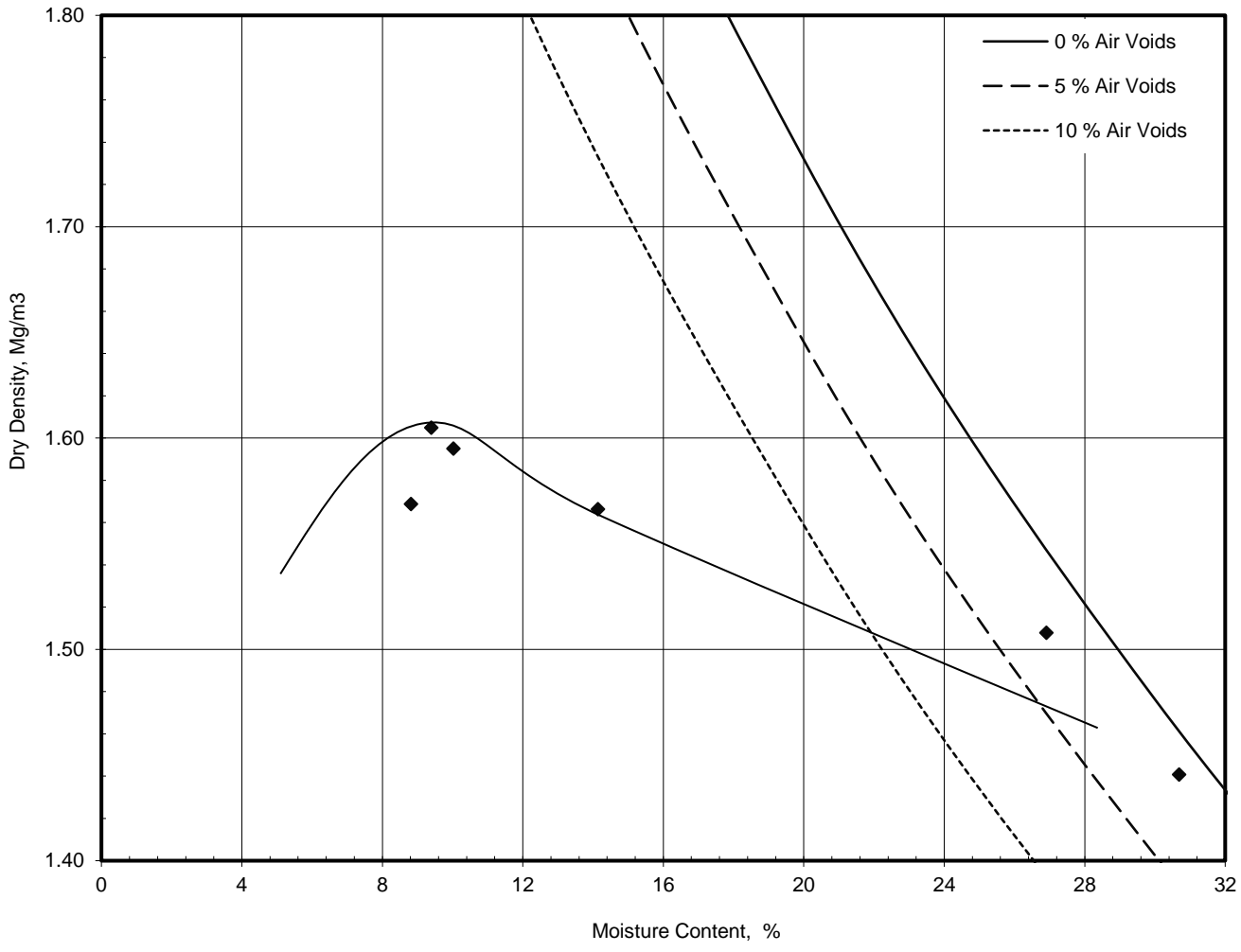
<b>Maximum Dry Density</b>	Mg/m <sup>3</sup>	<b>1.56</b>
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<b>Optimum Moisture Content</b>	%	<b>20</b>
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Operator	Checked	Approved	Remarks	QC Form R4 Sheet 1 of 1
RG	DCD	DCD		

<b>Dry Density / Moisture Content Relationship Light Compaction</b>		Job Ref	2020WW102		
		Borehole / Pit No	TP07		
Site Name	Arklow Bank Windpark		Sample No	2	
Soil Description	Brown slightly gravelly slightly sandy SILT.		Depth	0.40 m	
Specimen Ref.	1	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer		Keylab ID	IDL12020103010	

Compaction Test Reference/No.



Preparation	Material used was natural and air dried	
Mould Type	CBR	
Samples Used	Composite specimens tested	
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m <sup>3</sup>	2.65

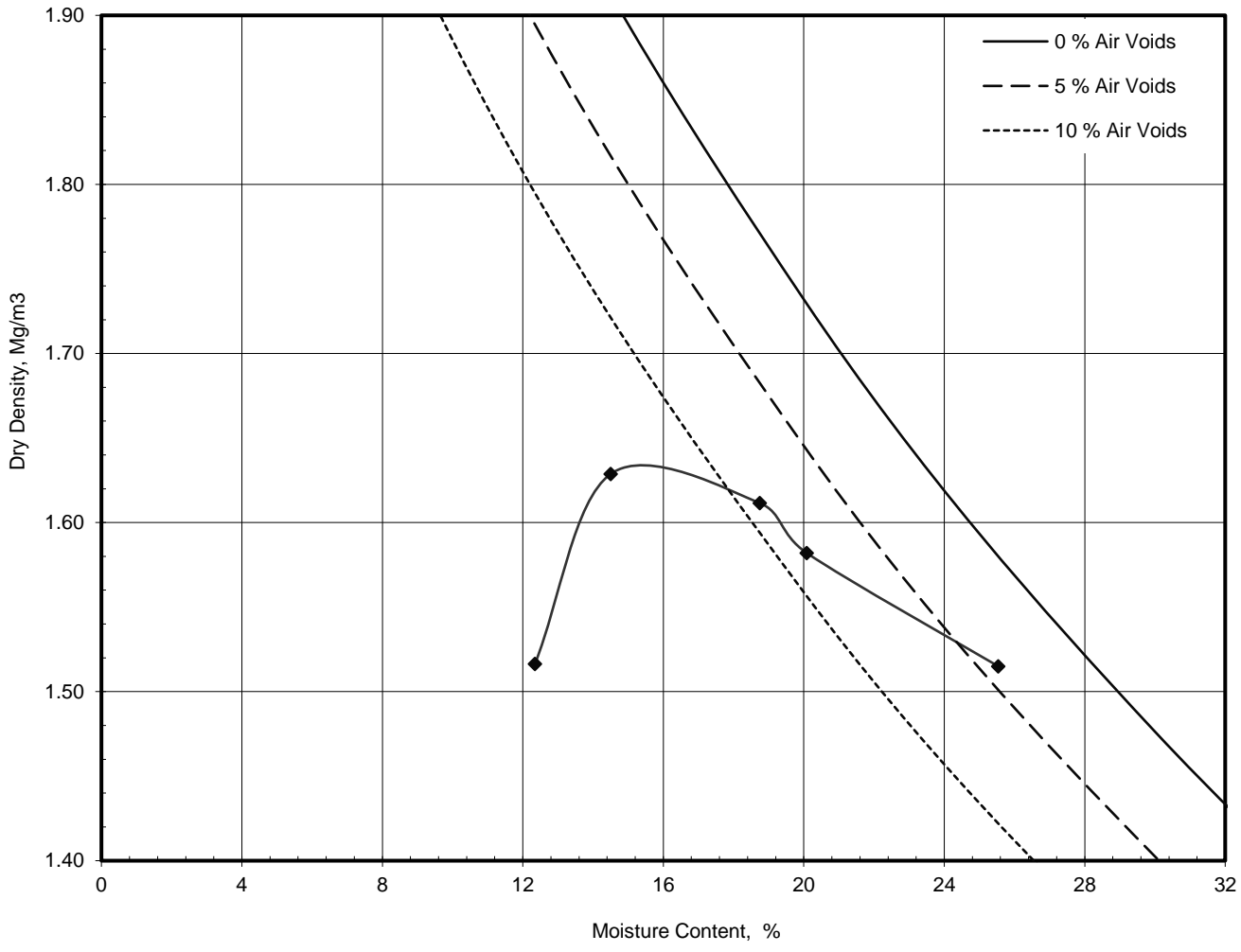
<b>Maximum Dry Density</b>	Mg/m <sup>3</sup>	<b>1.60</b>
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<b>Optimum Moisture Content</b>	%	<b>9.1</b>
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Operator	Checked	Approved	Remarks	QC Form R4 Sheet 1 of 1
RG	DCD	DCD		

<b>Dry Density / Moisture Content Relationship Light Compaction</b>		Job Ref	2020WW102		
		Borehole / Pit No	TP08		
Site Name	Arklow Bank Windpark		Sample No	5	
Soil Description	Greyish-brown slightly gravelly sandy SILT.		Depth	1.50 m	
Specimen Ref.	1	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer		Keylab ID	IDL12020103022	

Compaction Test Reference/No.



Preparation	Material used was natural and air dried	
Mould Type	CBR	
Samples Used	Composite specimens tested	
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m <sup>3</sup>	2.65

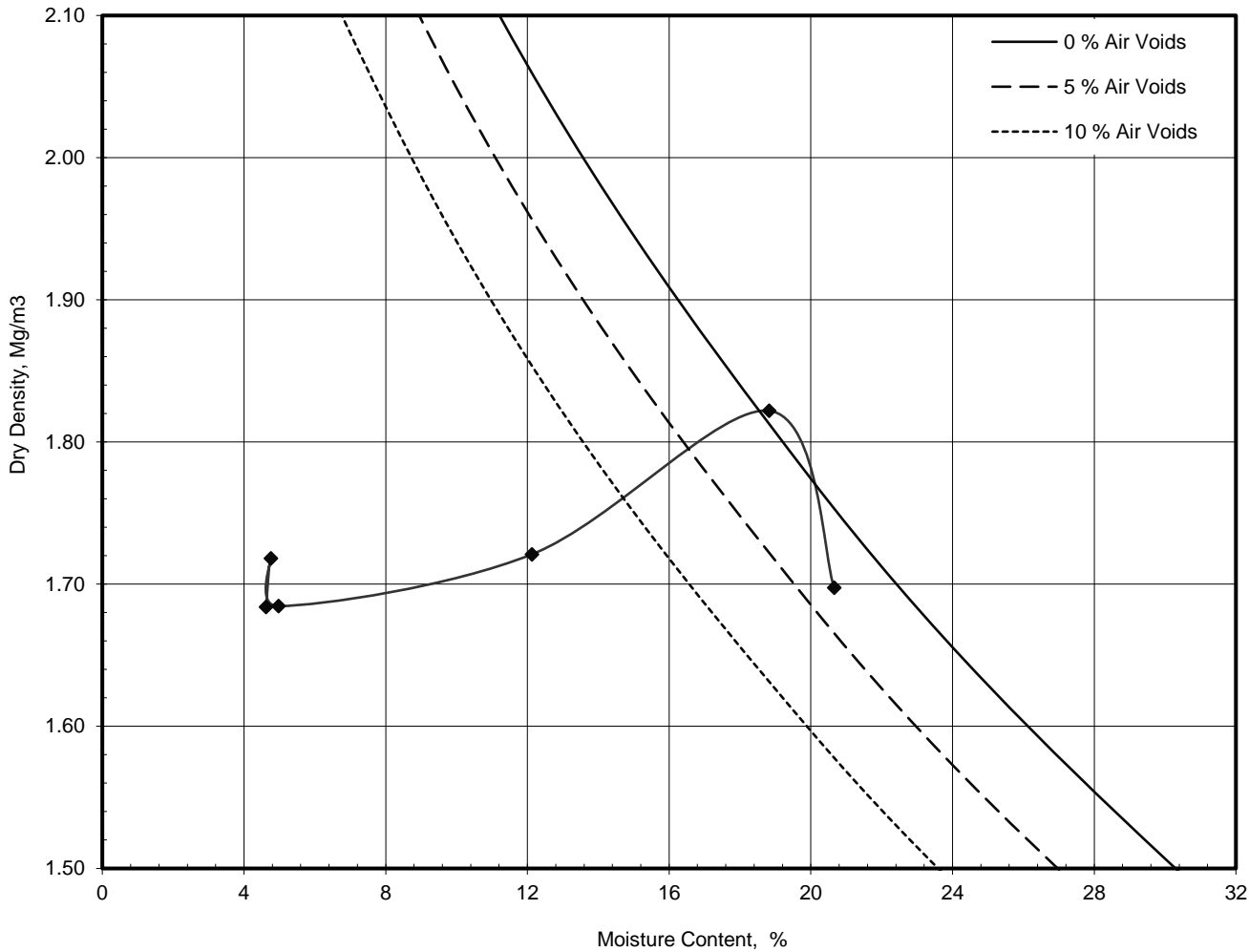
<b>Maximum Dry Density</b>	Mg/m <sup>3</sup>	<b>1.64</b>
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<b>Optimum Moisture Content</b>	%	<b>16</b>
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Operator	Checked	Approved	Remarks	QC Form R4 Sheet 1 of 1
RG	DCD	DCD		

<b>Dry Density / Moisture Content Relationship Light Compaction</b>		Job Ref	2020WW102		
		Borehole / Pit No	TP09		
Site Name	Arklow Bank Windpark		Sample No	2	
Soil Description	Grey-brown slightly sandy SILT.		Depth	0.50 m	
Specimen Ref.	1	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer		Keylab ID	IDL12020103028	

Compaction Test Reference/No.



Preparation	Material used was natural and air dried	
Mould Type	CBR	
Samples Used	Composite specimens tested	
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m <sup>3</sup>	2.75

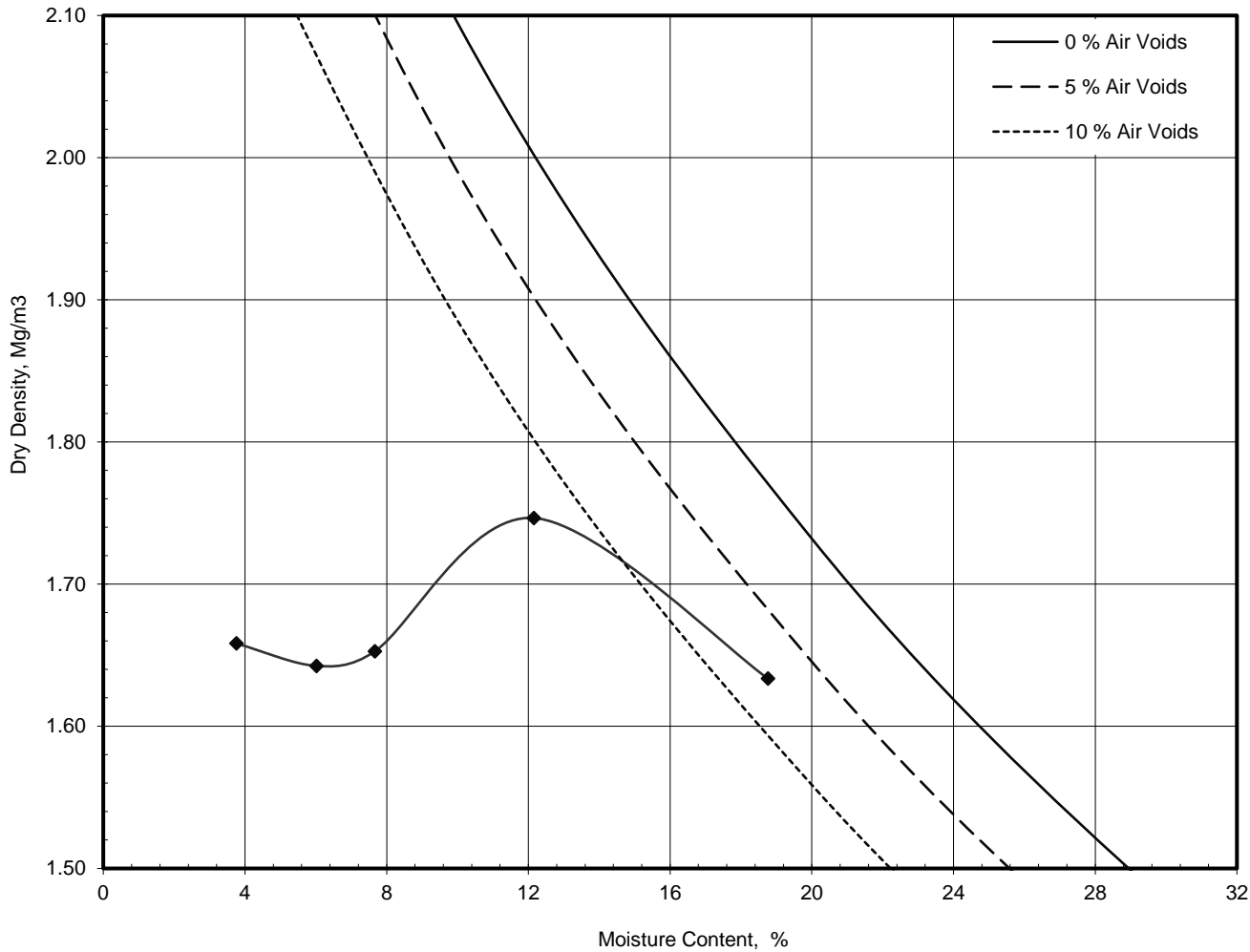
<b>Maximum Dry Density</b>	Mg/m <sup>3</sup>	<b>1.82</b>
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<b>Optimum Moisture Content</b>	%	<b>19</b>
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Operator	Checked	Approved	Remarks	QC Form R4 Sheet 1 of 1
RG	DCD	DCD		

<b>Dry Density / Moisture Content Relationship Light Compaction</b>		Job Ref	2020WW102		
		Borehole / Pit No	TP10		
Site Name	Arklow Bank Windpark		Sample No	5	
Soil Description	Brown slightly sandy SILT.		Depth	1.40 m	
Specimen Ref.	1	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer		Keylab ID	IDL12020103039	

Compaction Test Reference/No.



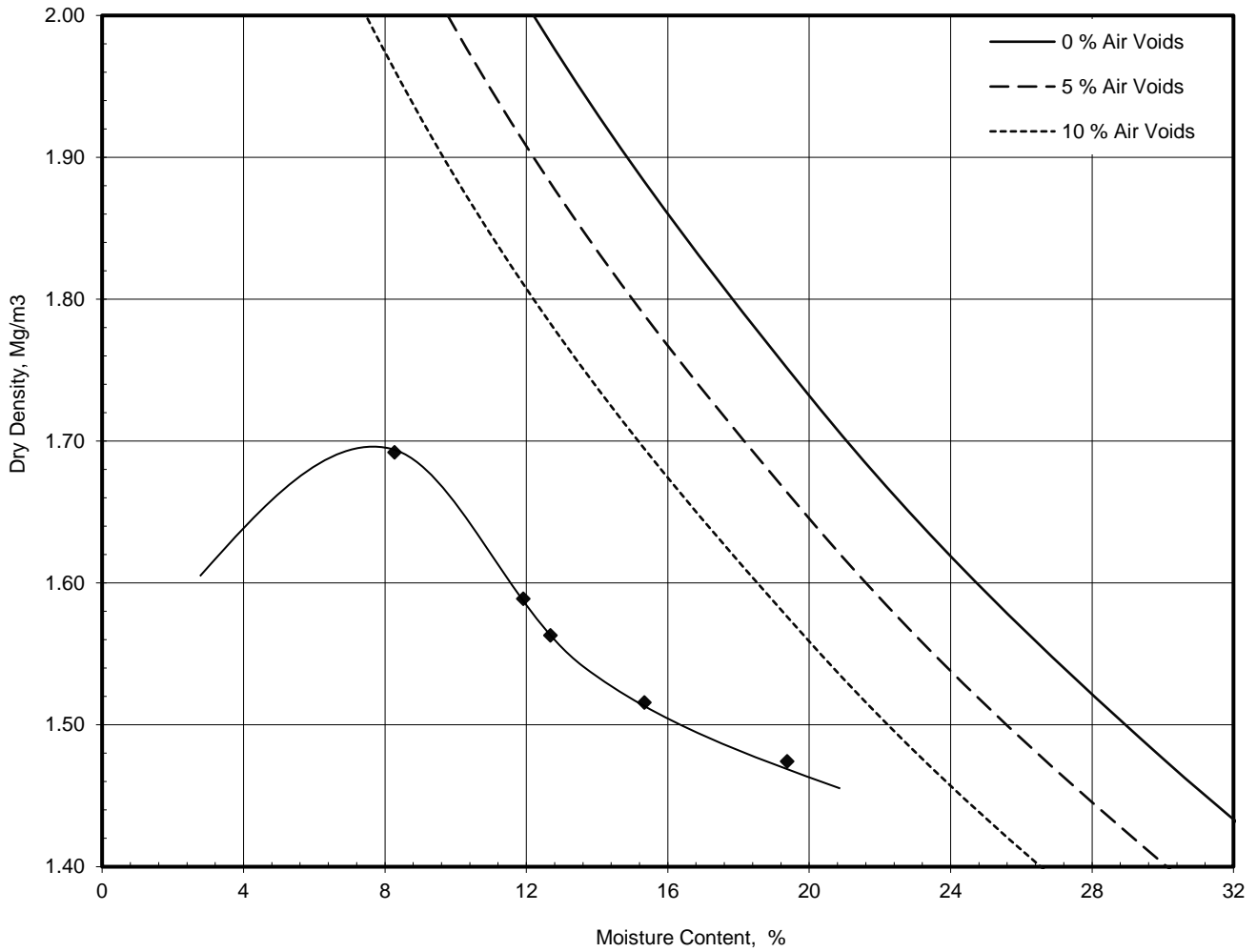
Preparation	Material used was natural and air dried	
Mould Type	CBR	
Samples Used	Composite specimens tested	
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m <sup>3</sup>	2.65

<b>Maximum Dry Density</b>	Mg/m <sup>3</sup>	<b>1.75</b>
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<b>Optimum Moisture Content</b>	%	<b>12</b>
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Operator	Checked	Approved	Remarks	QC Form R4 Sheet 1 of 1
RG	DCD	DCD		

<b>Dry Density / Moisture Content Relationship Light Compaction</b>		Job Ref	2020WW102		
		Borehole / Pit No	TP11		
Site Name	Arklow Bank Windpark		Sample No	5	
Soil Description	Brown slightly gravelly slightly sandy SILT.		Depth	1.40 m	
Specimen Ref.		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer		Keylab ID	IDL12020103048	
Compaction Test Reference/No.					



Preparation	Material used was natural and air dried	
Mould Type	CBR	
Samples Used	Composite specimens tested	
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m <sup>3</sup>	2.65

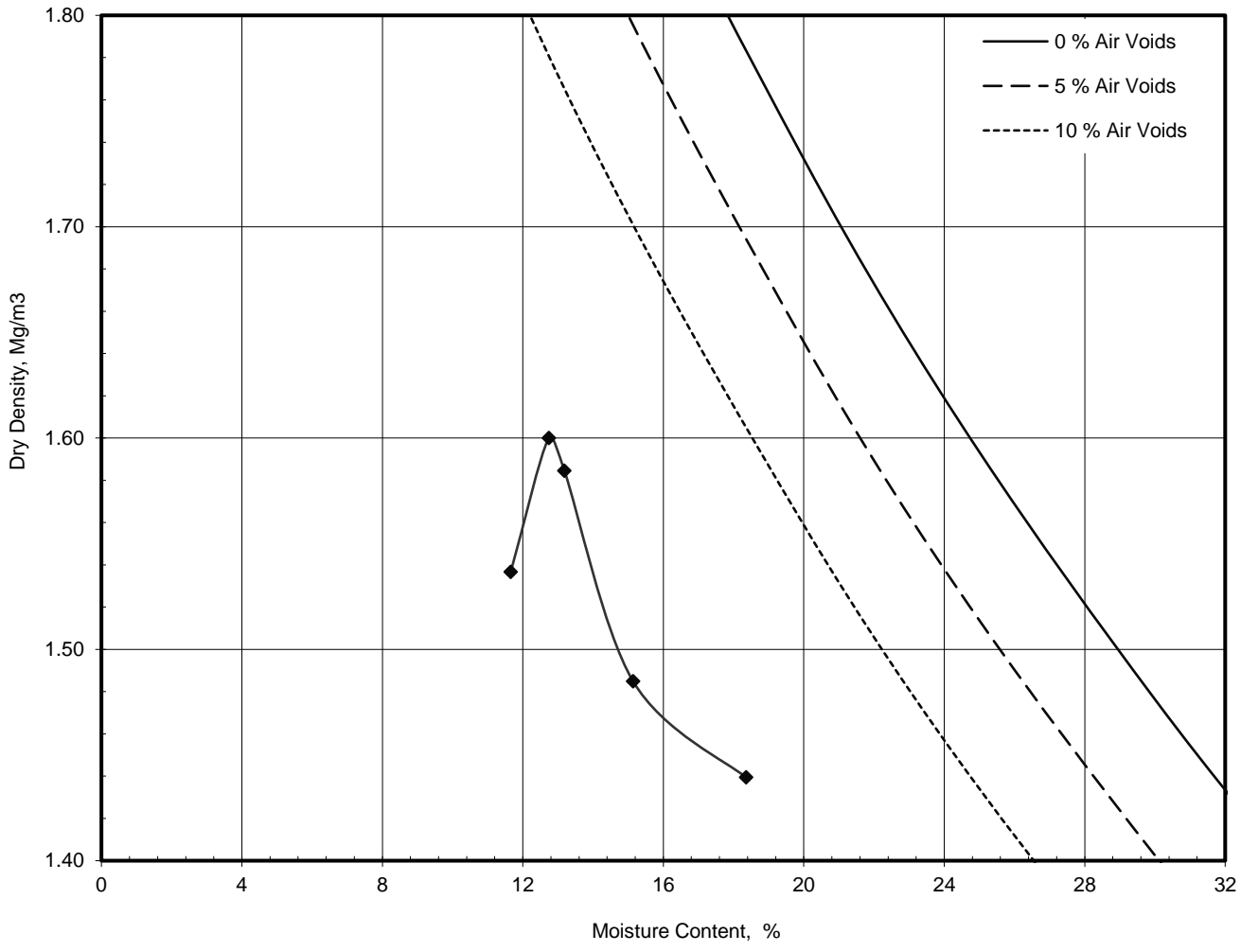
<b>Maximum Dry Density</b>	Mg/m <sup>3</sup>	<b>1.69</b>
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<b>Optimum Moisture Content</b>	%	<b>8.7</b>
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Operator	Checked	Approved	Remarks	QC Form R4 Sheet 1 of 1
RG	DCD	DCD		

<b>Dry Density / Moisture Content Relationship Light Compaction</b>		Job Ref	2020WW102		
		Borehole / Pit No	TP12		
Site Name	Arklow Bank Windpark		Sample No	5	
Soil Description	Brown slightly gravelly sandy SILT. Sand is fine.		Depth	1.40 m	
Specimen Ref.	1	Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer		Keylab ID	IDL12020103057	

Compaction Test Reference/No.



Preparation	Material used was natural and air dried	
Mould Type	CBR	
Samples Used	Composite specimens tested	
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m <sup>3</sup>	2.65

<b>Maximum Dry Density</b>	Mg/m <sup>3</sup>	<b>1.60</b>
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<b>Optimum Moisture Content</b>	%	<b>13</b>
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Operator	Checked	Approved	Remarks	QC Form R4 Sheet 1 of 1
RG	DCD	DCD		

	<b>Moisture Condition Value / Moisture Content Relationship</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP04	
Site Name	Arklow Bank Windpark		Sample No.	5	
Soil Description	Brown gravelly very silty fine SAND.		Depth	1.4	
Specimen Reference	1	Specimen Depth	m	Sample Type	B
Specimen Description			KeyLAB ID	IDL12020102928	
Test Method	BS1377:Part4:1990:clause 5.5		Date started	25/11/2020	

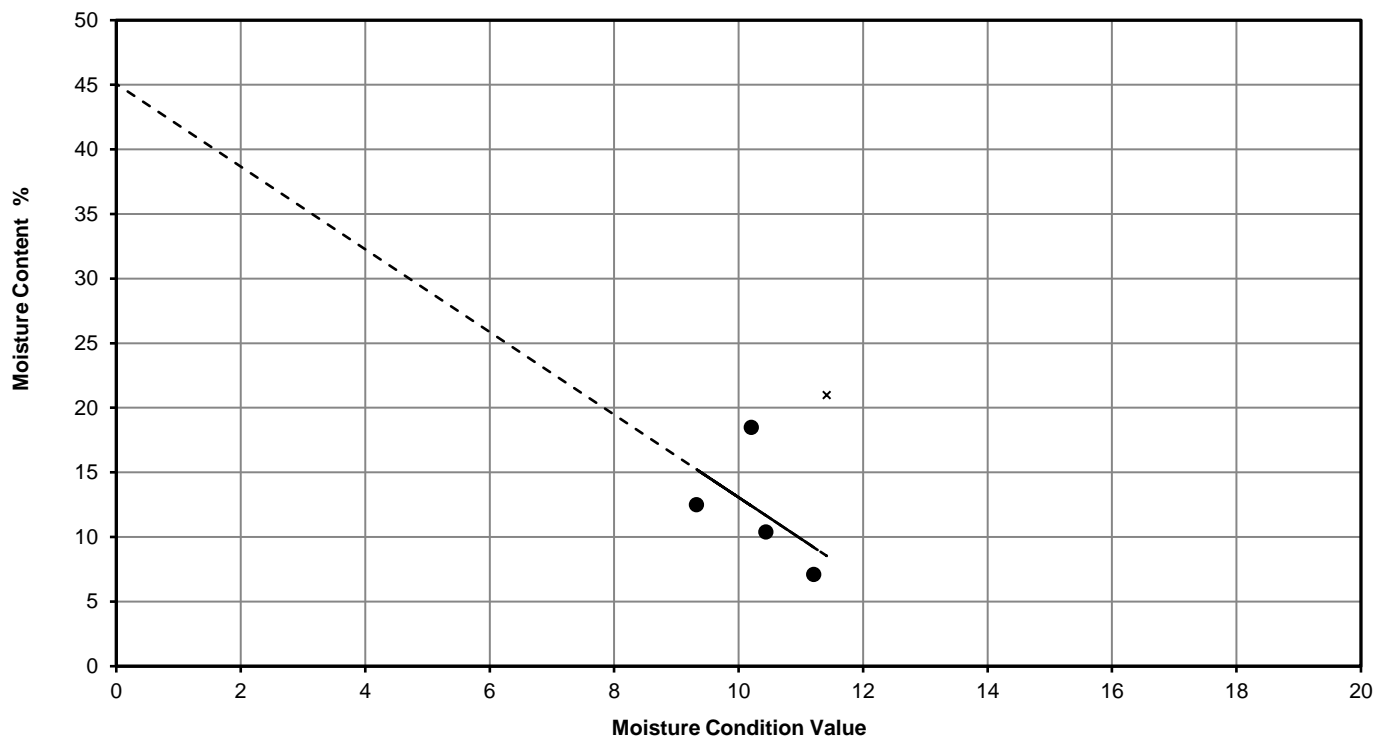
<b>Sample preparation</b>	Amount of material larger than 20mm sieve removed	0	%
	Natural Moisture Content of sample	13.1	%
	Initial Moisture Content of test sample below 20mm	18.5	%
	Composite of fresh and reused material tested		

**General remarks**

**Table of results**

MCV Test Number	1	2	3	4	5
Moisture Content, %	18.5	12.5	10.4	7.1	21.0
Moisture Condition Value	10.2	9.3	10.4	11.2	11.4
MCV report	10.2	9.3	10.4	11.2	11.4
Effective / Valid data point	YES	YES	YES	YES	NO
Specimen remarks					

● valid points    × invalid points    - - - - extended regression    — linear regression



Tested	Checked	Approved
RG	DCD	DCD

Lab Sheet Reference : QC Form R7



	<b>Moisture Condition Value / Moisture Content Relationship</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP06	
Site Name	Arklow Bank Windpark		Sample No.	5	
Soil Description	Orange-brown slightly gravelly slightly sandy SILT.		Depth	1.4	
Specimen Reference	1	Specimen Depth	m	Sample Type	B
Specimen Description			KeyLAB ID	IDL1202010306	
Test Method	BS1377:Part4:1990:clause 5.5		Date started	07/12/2020	

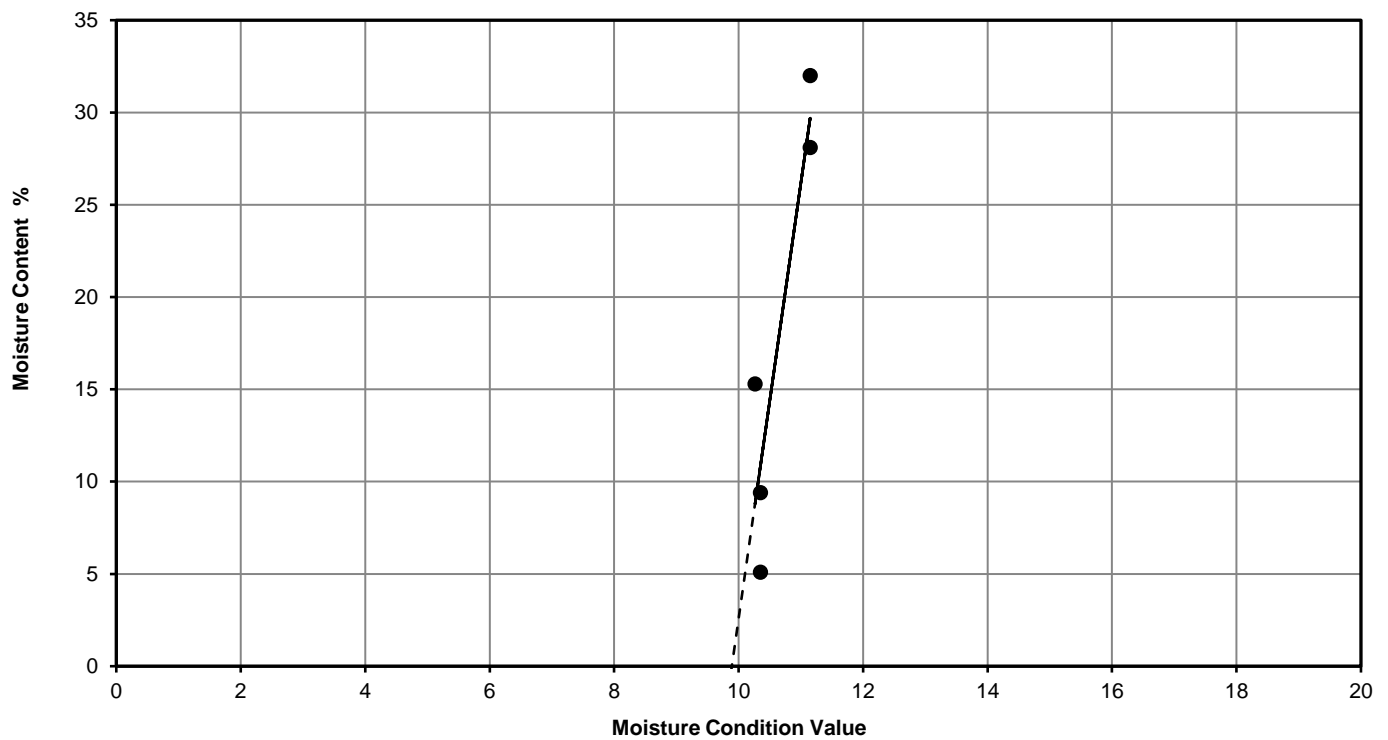
<b>Sample preparation</b>	Amount of material larger than 20mm sieve removed	0	%
	Natural Moisture Content of sample	23	%
	Initial Moisture Content of test sample below 20mm	32	%
	Composite of fresh and reused material tested		

**General remarks**

**Table of results**

MCV Test Number	1	2	3	4	5
Moisture Content, %	32.0	9.4	15.3	28.1	5.1
Moisture Condition Value	11.1	10.4	10.3	11.1	10.4
MCV report	11.1	10.4	10.3	11.1	10.4
Effective / Valid data point	YES	YES	YES	YES	YES
Specimen remarks					

● valid points    × invalid points    - - - - extended regression    — linear regression



Tested	Checked	Approved
RG	DCD	DCD

Lab Sheet Reference : QC Form R7

	<b>Moisture Condition Value / Moisture Content Relationship</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP07	
Site Name	Arklow Bank Windpark		Sample No.	2	
Soil Description	Brown slightly gravelly slightly sandy SILT.		Depth	0.4	
Specimen Reference	1	Specimen Depth	m	Sample Type	B
Specimen Description			KeyLAB ID	IDL12020103010	
Test Method	BS1377:Part4:1990:clause 5.5		Date started	02/12/2020	

**Sample preparation**

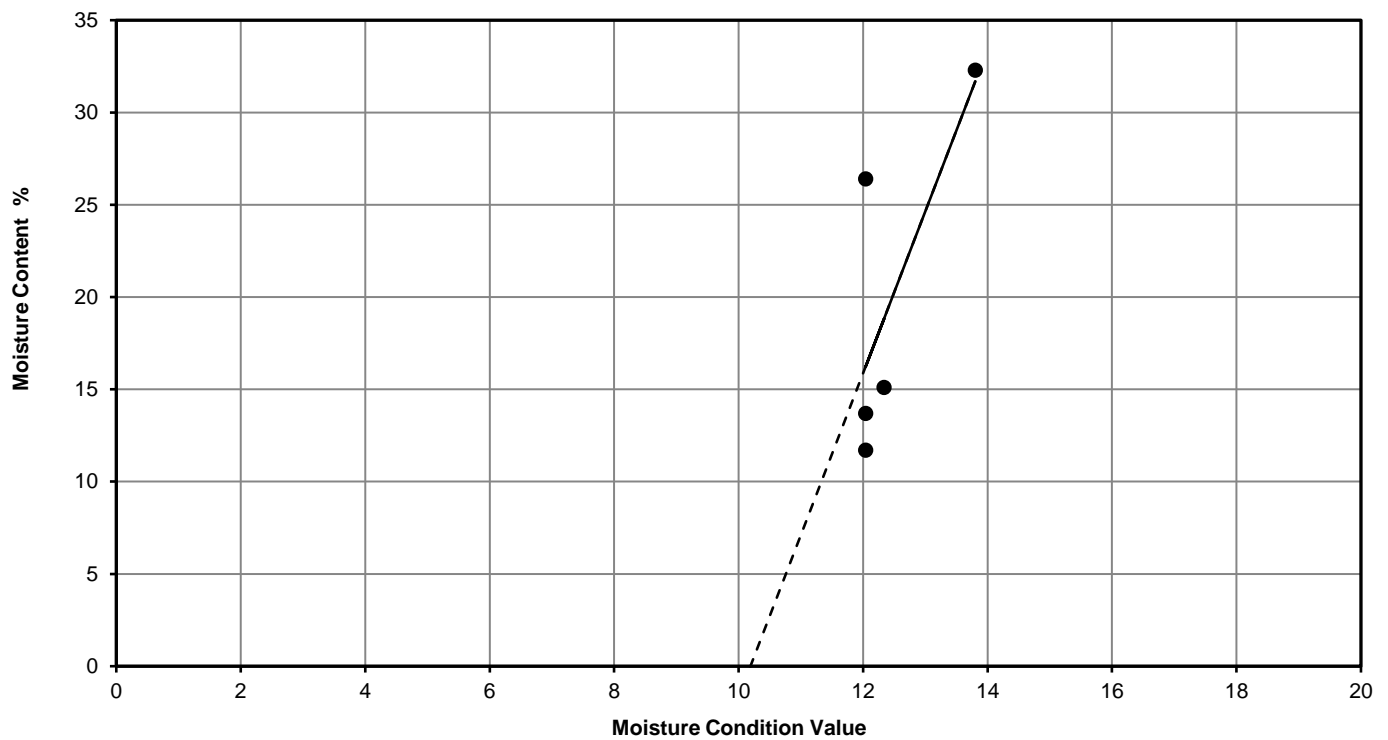
Amount of material larger than 20mm sieve removed	0	%
Natural Moisture Content of sample	27	%
Initial Moisture Content of test sample below 20mm	32.3	%
Composite of fresh and reused material tested		

**General remarks**

**Table of results**

MCV Test Number	1	2	3	4	5
Moisture Content, %	32.3	11.7	15.1	13.7	26.4
Moisture Condition Value	13.8	12.0	12.3	12.0	12.0
MCV report	13.8	12	12.3	12	12
Effective / Valid data point	YES	YES	YES	YES	YES
Specimen remarks					

● valid points    × invalid points    - - - - extended regression    — linear regression



Tested	Checked	Approved
RG	DCD	DCD

Lab Sheet Reference : QC Form R7

	<b>Moisture Condition Value / Moisture Content Relationship</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP08	
Site Name	Arklow Bank Windpark		Sample No.	5	
Soil Description	Greyish-brown slightly gravelly sandy SILT.		Depth	1.5	
Specimen Reference	1	Specimen Depth	m	Sample Type	B
Specimen Description			KeyLAB ID	IDL12020103022	
Test Method	BS1377:Part4:1990:clause 5.5		Date started	26/11/2020	

**Sample preparation**

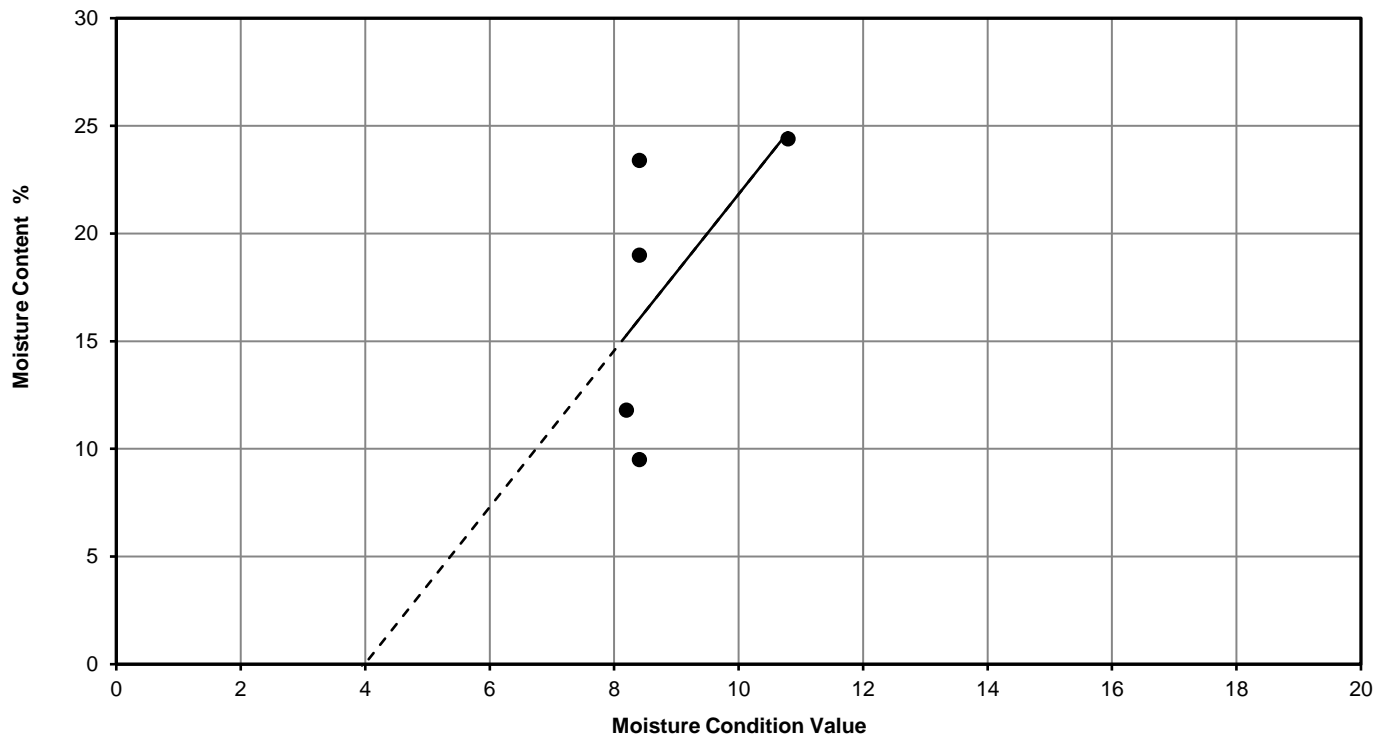
Amount of material larger than 20mm sieve removed	0	%
Natural Moisture Content of sample	27	%
Initial Moisture Content of test sample below 20mm	24.4	%
Composite of fresh and reused material tested		

**General remarks**

**Table of results**

MCV Test Number	1	2	3	4	5
Moisture Content, %	24.4	23.4	19.0	9.5	11.8
Moisture Condition Value	10.8	8.4	8.4	8.4	8.2
MCV report	10.8	8.4	8.4	8.4	8.2
Effective / Valid data point	YES	YES	YES	YES	YES
Specimen remarks					

● valid points    × invalid points    - - - - extended regression    — linear regression



Tested	Checked	Approved
RG	DCD	DCD

Lab Sheet Reference : QC Form R7

	<b>Moisture Condition Value / Moisture Content Relationship</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP09	
Site Name	Arklow Bank Windpark		Sample No.	2	
Soil Description	Grey-brown slightly sandy SILT.		Depth	0.5	
Specimen Reference	1	Specimen Depth	m	Sample Type	B
Specimen Description			KeyLAB ID	IDL12020103028	
Test Method	BS1377:Part4:1990:clause 5.5		Date started	27/11/2020	

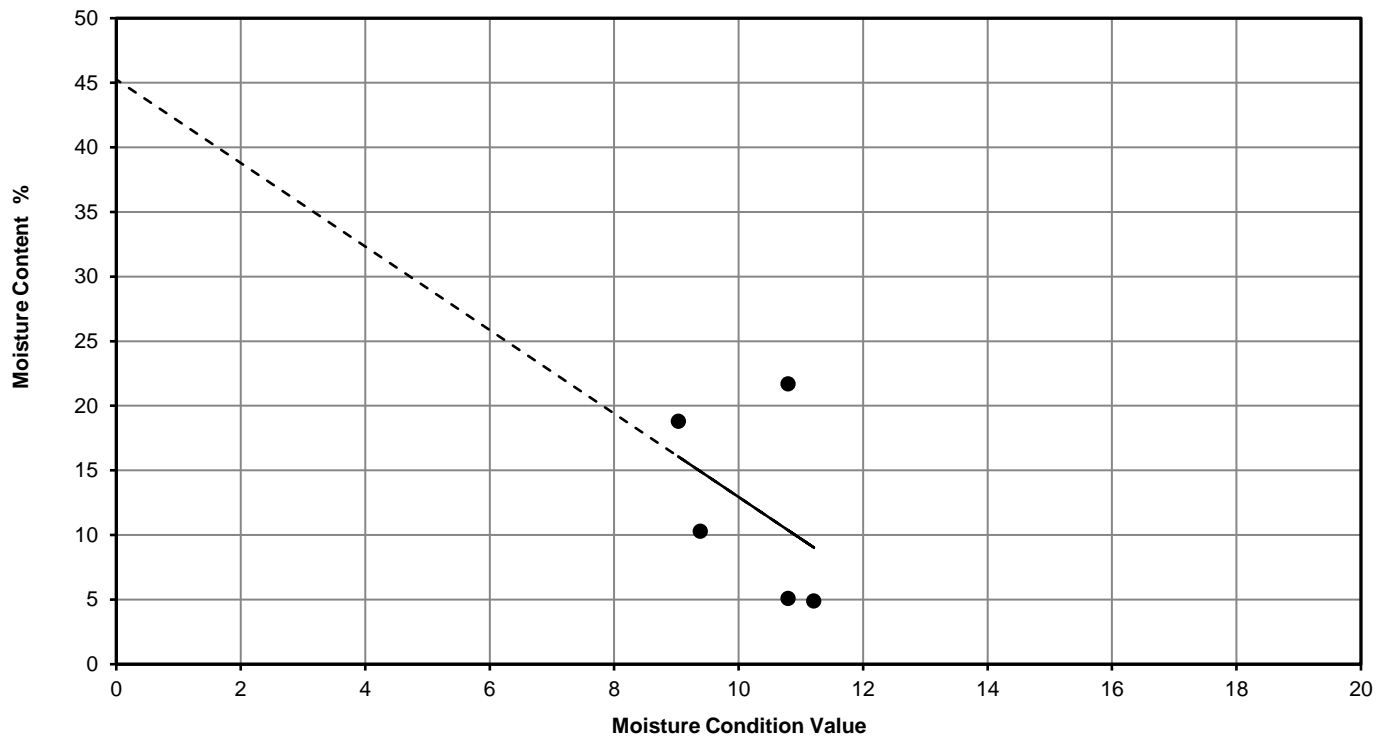
<b>Sample preparation</b>	Amount of material larger than 20mm sieve removed	0	%
	Natural Moisture Content of sample	18.8	%
	Initial Moisture Content of test sample below 20mm	18.8	%
	Composite of fresh and reused material tested		

**General remarks**

**Table of results**

MCV Test Number	1	2	3	4	5
Moisture Content, %	18.8	10.3	5.1	4.9	21.7
Moisture Condition Value	9.0	9.4	10.8	11.2	10.8
MCV report	9	9.4	10.8	11.2	10.8
Effective / Valid data point	YES	YES	YES	YES	YES
Specimen remarks					

● valid points    × invalid points    - - - - extended regression    — linear regression



Tested	Checked	Approved
RG	DCD	DCD

Lab Sheet Reference : QC Form R7

	<b>Moisture Condition Value / Moisture Content Relationship</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP10	
Site Name	Arklow Bank Windpark		Sample No.	5	
Soil Description	Brown slightly sandy SILT.		Depth	1.4	
Specimen Reference	1	Specimen Depth	m	Sample Type	B
Specimen Description			KeyLAB ID	IDL12020103039	
Test Method	BS1377:Part4:1990:clause 5.5		Date started	30/11/2020	

**Sample preparation**

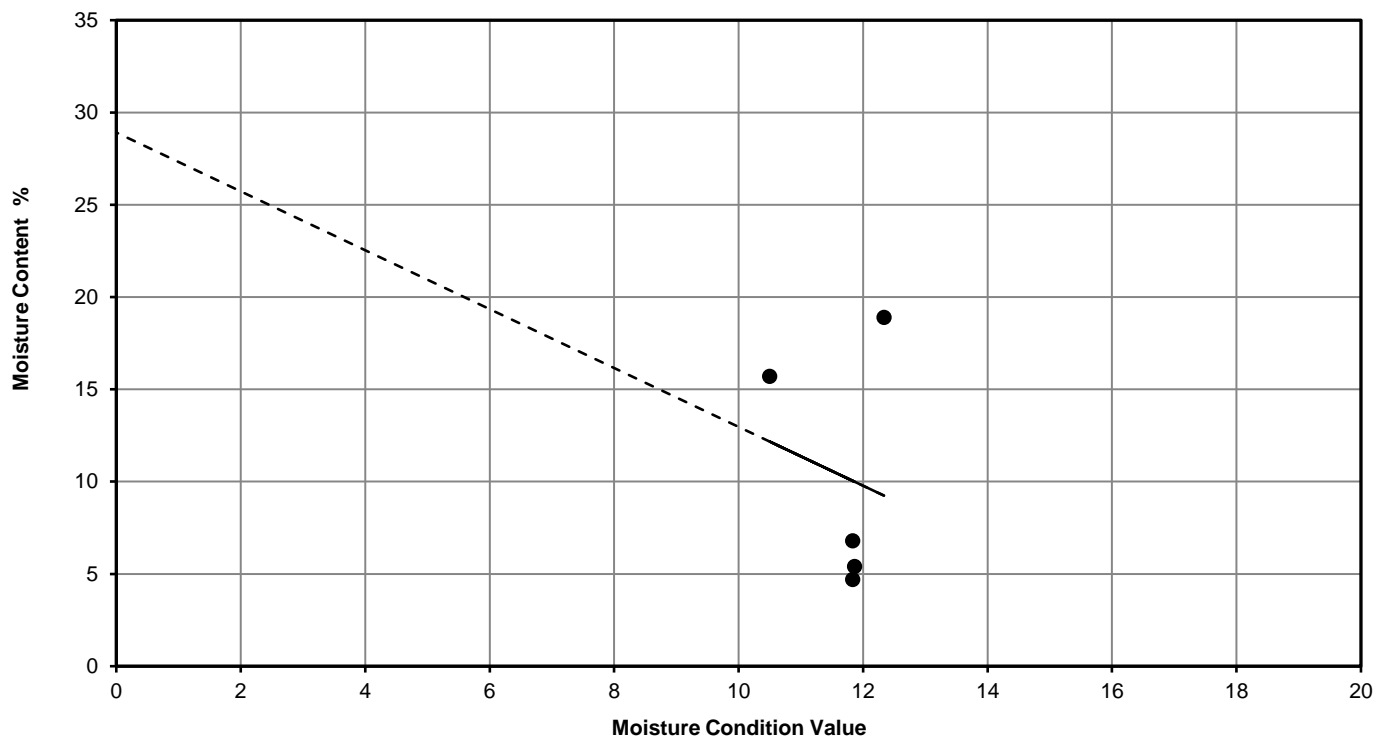
Amount of material larger than 20mm sieve removed	0	%
Natural Moisture Content of sample	20	%
Initial Moisture Content of test sample below 20mm	19	%
Composite of fresh and reused material tested		

**General remarks**

**Table of results**

MCV Test Number	1	2	3	4	5
Moisture Content, %	18.9	15.7	6.8	5.4	4.7
Moisture Condition Value	12.3	10.5	11.8	11.9	11.8
MCV report	12.3	10.5	11.8	11.9	11.8
Effective / Valid data point	YES	YES	YES	YES	YES
Specimen remarks					

● valid points    × invalid points    - - - - extended regression    — linear regression



Tested	Checked	Approved
RG	DCD	DCD

Lab Sheet Reference : QC Form R7

	<b>Moisture Condition Value / Moisture Content Relationship</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP11	
Site Name	Arklow Bank Windpark		Sample No.	5	
Soil Description	Brown slightly gravelly slightly sandy SILT.		Depth	1.4	
Specimen Reference	1	Specimen Depth	m	Sample Type	B
Specimen Description			KeyLAB ID	IDL12020103048	
Test Method	BS1377:Part4:1990:clause 5.5		Date started	27/11/2020	

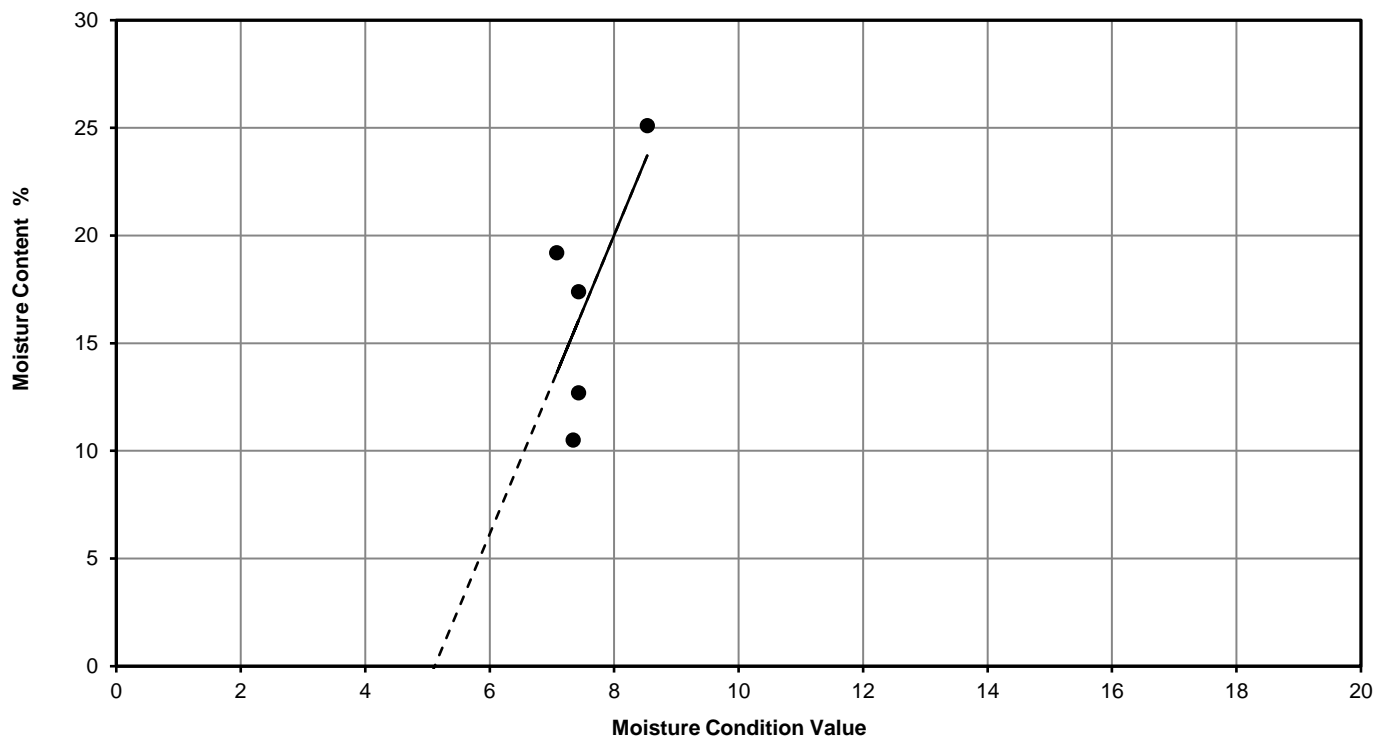
<b>Sample preparation</b>	Amount of material larger than 20mm sieve removed	0	%
	Natural Moisture Content of sample	26	%
	Initial Moisture Content of test sample below 20mm	25	%
	Composite of fresh and reused material tested		

**General remarks**

**Table of results**

MCV Test Number	1	2	3	4	5
Moisture Content, %	25.1	19.2	17.4	12.7	10.5
Moisture Condition Value	8.5	7.1	7.4	7.4	7.3
MCV report	8.5	7.1	7.4	7.4	7.3
Effective / Valid data point	YES	YES	YES	YES	YES
Specimen remarks					

● valid points    × invalid points    - - - - extended regression    — linear regression



Tested	Checked	Approved
RG	DCD	DCD

Lab Sheet Reference : QC Form R7

	<b>Moisture Condition Value / Moisture Content Relationship</b>		Job Ref	2020WW102	
			Borehole/Pit No.	TP12	
Site Name	Arklow Bank Windpark		Sample No.	5	
Soil Description	Brown slightly gravelly sandy SILT. Sand is fine.		Depth	1.4	
Specimen Reference	1	Specimen Depth	m	Sample Type	B
Specimen Description			KeyLAB ID	IDL12020103057	
Test Method	BS1377:Part4:1990:clause 5.5		Date started	08/12/2020	

**Sample preparation**

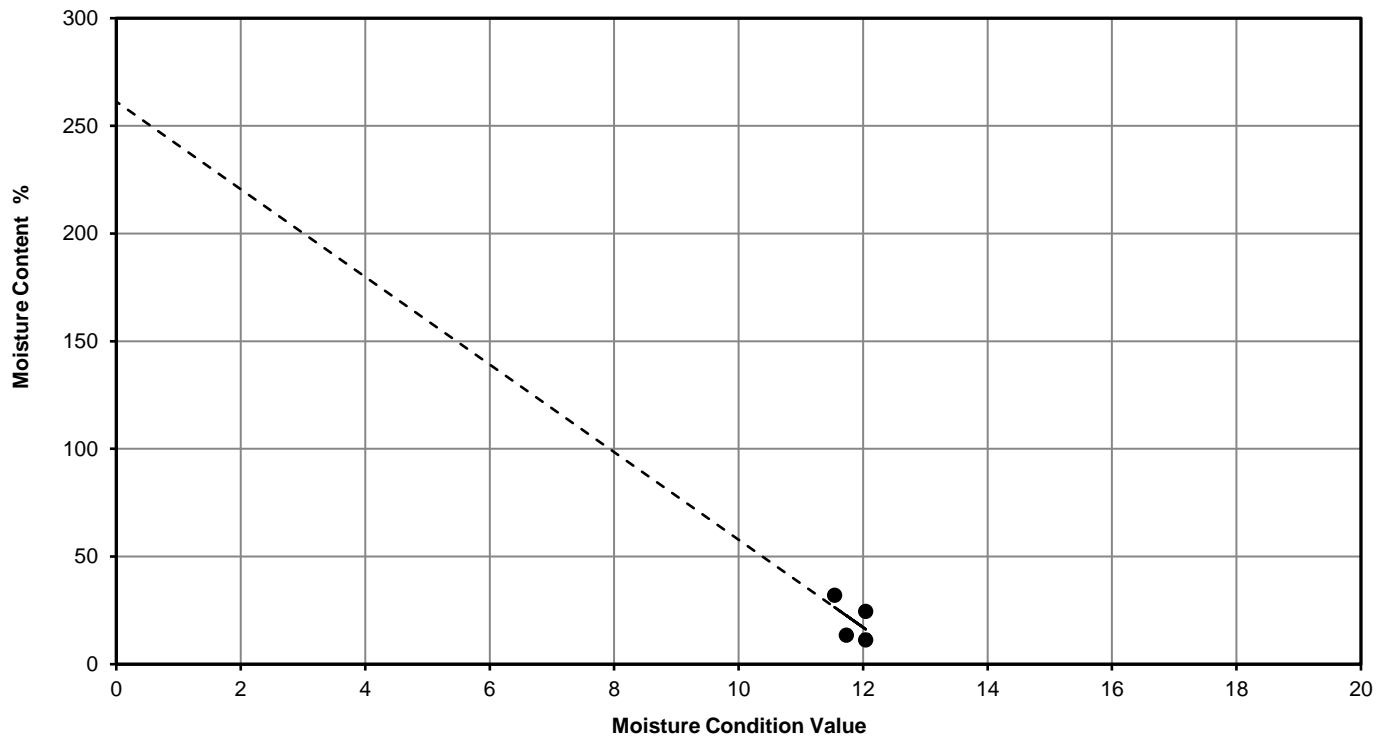
Amount of material larger than 20mm sieve removed	0	%
Natural Moisture Content of sample	32	%
Initial Moisture Content of test sample below 20mm	32	%
Composite of fresh and reused material tested		

**General remarks**

**Table of results**

MCV Test Number	1	2	3	4	5
Moisture Content, %	32.1	24.6	12.7	13.5	11.3
Moisture Condition Value	11.5	12.0	12.0	11.7	12.0
MCV report	11.5	12	12	11.7	12
Effective / Valid data point	YES	YES	YES	YES	YES
Specimen remarks					

● valid points    × invalid points    - - - - extended regression    — linear regression



Tested	Checked	Approved
RG	DCD	DCD

Lab Sheet Reference : QC Form R7

# Point Load Strength Index Tests Summary of Results

Project No. 2020WW102      Project Name Arklow Bank Windpark

Borehole No.	Sample			Specimen		Rock Type and Test condition	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P kN	Equivalent diameter, De mm	Point Load Strength Index		Remarks (including water content if measured)
	Top Depth m	Base Depth m	Type	Top m	Base m		Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm			Is MPa	Is(50) MPa	
BH01	3.50	4.7	C	4.2	4.34		A	U	YES		101.5		88.0	7.3	106.6	0.6	0.9	Weak
BH01	5.20	6.7	C	5.7	5.80		D	U	YES		101.5		101.5	3.2	101.5	0.3	0.4	Weak
BH01	6.70	8.2	C	7	7.20		A	U	YES		101.5		101.5	1.3	114.5	0.1	0.1	Very Weak
BH01	6.70	8.2	C	7.8	7.90		D	U	YES		101.5		101.5	2.1	101.5	0.2	0.3	Weak
BH01	8.20	9.7	C	8.52	8.66		D	U	YES		101.5		101.5	4.3	101.5	0.4	0.6	Weak
BH01	9.70	10.2	C	9.9	10.04		D	U	YES		101.5		101.5	3.2	101.5	0.3	0.4	Weak
BH02	9.40	10.1	C	9.68	9.75		D	U	YES		84.5		84.5	2.7	84.5	0.4	0.5	Weak
BH03	1.70	3.2	C	3	3.20		D	U	YES		101.5		101.5	1.2	101.5	0.1	0.2	Weak
BH03	3.20	3.8	C	3.5	3.65		A	U	YES		84.7		73.0	1.1	88.7	0.1	0.2	Weak
BH03	3.80	5.3	C	4.8	4.93		D	U	YES		84.7		84.7	2.2	84.7	0.3	0.4	Weak
BH03	5.30	6.8	C	6.46	6.60		A	U	YES		84.7		80.0	5.0	92.9	0.6	0.8	Weak
BH03	11.20	12.7	C	11.8	12.00		D	U	YES		84.7		84.7	5.6	84.7	0.8	1.0	Weak
BH03	12.70	14.2	C	12.8	13.00		D	U	YES		84.7		84.7	2.9	84.7	0.4	0.5	Weak
BH03	14.20	15.7	C	14.8	15.00		D	U	YES		84.7		84.7	0.8	84.7	0.1	0.1	Very Weak
BH03	15.70	17.2	C	15.8	15.94		D	U	YES		84.7		84.7	4.1	84.7	0.6	0.7	Weak
BH03	17.20	18.7	C	17.95	18.30		D	U	YES		84.7		84.7	8.3	84.7	1.2	1.5	Medium Strong
BH03	18.70	20.2	C	18.7	18.90		D	U	YES		84.7		84.7	3.3	84.7	0.5	0.6	Weak
BH05	4.70	5.3	C	4.5	4.66		D	U	YES		84.7		84.7	5.1	84.7	0.7	0.9	Weak
BH05	5.30	6.8	C	5.5	5.67		D	U	YES		84.7		84.7	3.5	84.7	0.5	0.6	Weak
BH05	6.80	8.3	C	7.5	7.74		D	U	YES		84.7		84.7	3.9	84.7	0.5	0.7	Weak

Test Type  
D - Diametral, A - Axial, I - Irregular Lump, B - Block  
Direction  
L - parallel to planes of weakness  
P - perpendicular to planes of weakness  
U - unknown or random  
Dimensions  
Dps - Distance between platens ( platen separation )  
Dps' - at failure ( see ISRM note 6 )  
Lne - Length from platens to nearest free end  
W - Width of shortest dimension perpendicular to load, P

Diametral

Axial

Block/irregular lump

Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise Detailed legend for test and dimensions, based on ISRM, is shown above. Size factor, F = (De/50)0.45 for all tests.	Date Printed 13/01/2021	Approved By <div style="border: 1px solid green; padding: 2px; display: inline-block;">APPROVED By DCD at</div> Administrator	Table sheet 1 sheet 1
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**Point Load Strength Index Tests  
Summary of Results**

Project No. 2020WW102	Project Name Arklow Bank Windpark
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Borehole No.	Sample			Specimen		Rock Type and Test condition	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P kN	Equivalent diameter, De mm	Point Load Strength Index		Remarks (including water content if measured)
	Top Depth m	Base Depth m	Type	Top m	Base m		Type (D, A, I, B)	Direction (L, P or U)		Ln mm	W mm	Dps mm	Dps' mm			Is MPa	Is(50) MPa	
BH05	9.70	10.4	C	9.8	10.06		D	U	YES		84.7		84.7	3.8	84.7	0.5	0.7	Weak

Test Type  
D - Diametral, A - Axial, I - Irregular Lump, B - Block

Direction  
L - parallel to planes of weakness  
P - perpendicular to planes of weakness  
U - unknown or random

Dimensions  
Dps - Distance between platens ( platen separation )  
Dps' - at failure ( see ISRM note 6 )  
Ln - Length from platens to nearest free end  
W - Width of shortest dimension perpendicular to load, P

Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise Detailed legend for test and dimensions, based on ISRM, is shown above. Size factor, F = (De/50)0.45 for all tests.	Date Printed 13/01/2021	Approved By APPROVED By DCD at Administrator	Table sheet 1 sheet 2
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**UNIAXIAL COMPRESSION TEST ON ROCK - SUMMARY OF RESULTS**


Project No. 2020WW102	Project Name Arklow Bank Windpark
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Hole No.	Sample				Specimen Depth (m)	Specimen Dimensions <sup>2</sup>			Bulk Density <sup>2</sup> Mg/m <sup>3</sup>	Water Content <sup>1</sup> %	Uniaxial Compression <sup>3</sup>				Remarks
	Ref	Top	Base	Type		Dia. mm	Length mm	H/D			Condition	Stress Rate MPa/s	Mode of failure	UCS MPa	
BH03		12.70	14.20	C	13.0-13.4	84.5	224.7	2.7	2.73		as received	0.0383	MS	6.5	Weak

**Notes**

1 ISRM p87 test 1, water content at 105 ± 3 °C, specimen as tested for UCS  
 2 ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density  
 3 ISRM p153 part 1, determination of Uniaxial Compressive Strength ( UCS ) of Rock Materials  
 above notes apply unless annotated otherwise in the remarks

Mode of failure :  
 S - Single shear MS - multiple shear  
 AC - Axial cleavage F - Fragmented

Test Specification International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007	Date Printed 13/01/2021	Approved By  Administrato	Table sheet 1 1
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IRISH DRILLING LTD. Loughrea Co. Galway <a href="mailto:Lab@IrishDrilling.ie">Lab@IrishDrilling.ie</a> Tel: (091) 841274	Contract:	<b>Arklow Bank</b>	2020WW102
	Client:	SSE	
	Engineer:	<b>Arup</b>	
	Date:	13.01.2021	
	Tested by:	<b>DCD / RG</b>	

## Thermal Conductivity / Resistivity Test

Using ThermTest TLS-100 Thermal Conductivity / Thermal Resistivity Meter

BS1377:Part 2:1990 and ASTM D5334-08

Location	Depth (m.bgl)	Date	Soil Temperature Before Test °C	Thermal Conductivity W/m.K	Thermal Resistivity K.m/W	Moisture Content Tested %	Bulk Density Mg.m3	Sample Description / preparation
TP03	1.1-1.2	24.11.20	17.28	0.177	5.635	33.6		mct from Tub
TP04	1.1-1.2	24.11.20	17.16	1.41	0.709	13.1		mct from Tub
TP04	1.4-1.5	25.11.20	13.118	2.02	0.495	17.9	2.065	mct from compaction point 1
TP04	1.4-1.5	26.11.20	18.225	1	1	14	1.974	mct from compaction point 2
TP04	1.4-1.5	27.11.20	11.619	1.298	0.77	8	1.829	mct from compaction point 3
TP04	1.4-1.5	30.11.20	12.303	0.945	1.058	6.7	1.762	mct from compaction point 4
TP04	1.4-1.5	01.12.20	12.662	1.783	0.561	21.3	2.094	mct from compaction point 5
TP05	1.1-1.2	24.11.20	10.39	1.145	0.873	21		mct from Tub
TP06	1.1-1.2	27.11.20	15.22	1.203	0.831	22		mct from Tub
TP06	1.4-1.5	7.12.20	13.201	1.322	0.756	32.1	1.878	mct from compaction point 1
TP06	1.4-1.5	8.12.20	18.897	1.115	0.897	11.2	1.846	mct from compaction point 2
TP06	1.4-1.5	9.12.20	16.785	0.783	1.278	14.2	1.758	mct from compaction point 3

Location	Depth (m.bgl)	Date	Soil Temperature Before Test °C	Thermal Conductivity W/m.K	Thermal Resistivity K.m/W	Moisture Content Tested %	Bulk Density Mg.m3	Sample Description / preparation
TP06	1.4-1.5	10.12.20	13.414	1.32	0.758	27.1	1.947	mct from compaction point 4
TP06	1.4-1.5	14.12.20	11.082	0.902	1.108	3.4	1.767	mct from compaction point 5
TP07	1.1-1.2	27.11.20	15.421	1.062	0.942	24		mct from Tub
TP07	0.4-0.5	02.12.20	13.062	1.566	0.638	30.7	1.883	mct from compaction point 1
TP07	0.4-0.5	03.12.20	10.17	1.116	0.896	9.4	1.756	mct from compaction point 2
TP07	0.4-0.5	07.12.20	14.282	1.153	0.867	14.1	1.788	mct from compaction point 3
TP07	0.4-0.5	08.12.20	12.961	1.206	0.829	10	1.755	mct from compaction point 4
TP07	0.4-0.5	09.12.20	13.291	1.527	0.655	26.9	1.914	mct from compaction point 5
TP08	1.1-1.2	27.11.20	15.318	0.702	1.424	26		mct from Tub
TP08	1.5-1.6	26.11.20	13.502	1.353	0.739	25.5	1.902	mct from compaction point 1
TP08	1.5-1.6	27.11.20	17.714	1.201	0.833	20.1	1.9	mct from compaction point 2
TP08	1.5-1.6	30.11.20	15.261	0.836	1.196	17.6	1.831	mct from compaction point 3
TP08	1.5-1.6	02.12.20	11.081	1.092	0.916	14.5	1.865	mct from compaction point 4
TP08	1.5-1.6	03.12.20	18.48	0.727	1.376	12.3	1.704	mct from compaction point 5
TP09	0.5-0.6	27.11.20	12.48	2.155	0.464	18.8	2.165	mct from compaction point 1
TP09	0.5-0.6	30.11.20	13.04	2.099	0.476	12.1	1.843	mct from compaction point 2
TP09	0.5-0.6	01.12.20	15.572	1.125	0.889	4.8	1.8	mct from compaction point 3
TP09	0.5-0.6	02.12.20	16.156	0.801	1.249	5	1.768	mct from compaction point 4
TP09	0.5-0.6	03.12.20	14.117	0.538	1.859	4.6	1.762	mct from compaction point 5
TP09	1.1-1.2	30.11.20	13.354	1.144	0.874	12.1		mct from tub
TP10	1.1-1.2	30.11.20	13.071	0.475	2.107	14		mct from Tub
TP10	1.4-1.5	30.11.20	13.488	1.35	0.741	20.4	2.047	mct from compaction point 1
TP10	1.4-1.5	01.12.20	22.601	0.664	1.507	7.7	1.78	mct from compaction point 2
TP10	1.4-1.5	02.12.20	16.615	0.757	1.321	6	1.741	mct from compaction point 3
TP10	1.4-1.5	03.12.20	19.022	0.347	2.883	3.8	1.721	mct from compaction point 4
TP10	1.4-1.5	04.12.20	21.917	0.501	1.995	4.7	1.762	mct from compaction point 5
TP11	1.1-1.2	30.11.20	13.684	1.37	0.73	25.1		mct from Tub

Location	Depth (m.bgl)	Date	Soil Temperature Before Test °C	Thermal Conductivity W/m.K	Thermal Resistivity K.m/W	Moisture Content Tested %	Bulk Density Mg.m3	Sample Description / preparation
TP11	1.4-1.5	27.11.20	12.022	1.655	0.604	25.6	2.009	mct from compaction point 1
TP11	1.4-1.5	30.11.20	14.687	1.572	0.636	19.4	1.76	mct from compaction point 2
TP11	1.4-1.5	01.12.20	17.155	1.178	0.849	15.3	1.748	mct from compaction point 3
TP11	1.4-1.5	02.12.20	16.934	1.111	0.9	12.7	1.761	mct from compaction point 4
TP11	1.4-1.5	03.12.20	17.57	0.584	1.712	11.9	1.778	mct from compaction point 5
TP12	1.1-1.2	30.11.20	13.413	0.877	1.141			mct from Tub
TP12	1.4-1.5	04.12.20	6.436	1.445	0.692	18.4	2.051	mct from compaction point 1
TP12	1.4-1.5	07.12.20	14.122	1.312	0.762	13.2	1.793	mct from compaction point 2
TP12	1.4-1.5	08.12.20	19.583	1.113	0.898	12.7	1.804	mct from compaction point 3
TP12	1.4-1.5	09.12.20	14.651	0.512	1.955	15.1	1.71	mct from compaction point 4
TP12	1.4-1.5	10.12.20	16.887	0.619	1.614	11.7	1.716	mct from compaction point 5



## Appendix 6A Laboratory Tests Results (Environment)



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

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

Irish Drilling Limited  
Old Galway Road  
Loughrea  
Co. Galway

**Attention:** Dympna Darcy

## CERTIFICATE OF ANALYSIS

**Date of report Generation:** 14 December 2020  
**Customer:** Irish Drilling Limited  
**Sample Delivery Group (SDG):** 201015-115  
**Your Reference:** 2020WW102  
**Location:** Arklow Bank  
**Report No:** 579794

We received 18 samples on Thursday October 15, 2020 and 18 of these samples were scheduled for analysis which was completed on Monday December 14, 2020. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

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

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

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

Approved By:

**Sonia McWhan**

Operations Manager





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23039439	TP007	ES1	0.40 - 0.50	13/10/2020
23039335	TP007	ES4	1.50 - 1.60	13/10/2020
23039368	TP008	ES1	0.40 - 0.50	13/10/2020
23039374	TP008	ES4	1.50 - 1.60	13/10/2020
23039379	TP009	ES1	0.50 - 0.60	13/10/2020
23039387	TP009	ES4	1.50 - 1.60	13/10/2020
23039330	TP202	ES1	0.50 - 0.60	12/10/2020
23039392	TP202	ES4	1.40 - 1.50	12/10/2020
23039401	TP203	ES1	0.50 - 0.60	12/10/2020
23039408	TP203	ES4	1.60 - 1.70	12/10/2020
23039414	TP311	ES1	0.40 - 0.50	12/10/2020
23039421	TP311	ES2	1.10 - 1.20	12/10/2020
23039427	TP311	ES4	2.10 - 2.20	12/10/2020
23039434	TP311	ES4	3.10 - 3.20	12/10/2020
23039342	TP319	ES1	0.40 - 0.50	12/10/2020
23039350	TP319	ES2	1.20 - 1.30	12/10/2020
23039356	TP319	ES3	2.30 - 2.40	12/10/2020
23039363	TP319	ES5	3.50 - 3.60	12/10/2020

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





# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	201015-115	<b>Client Reference:</b>	2020WW102	<b>Report Number:</b>	579794
<b>Location:</b>	Arklow Bank	<b>Order Number:</b>	9028	<b>Superseded Report:</b>	

<b>Results Legend</b>  <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; align-items: center;"><span style="background-color: yellow; border: 1px solid black; width: 15px; height: 15px; margin-right: 5px;"></span> <b>Test</b></div> <div style="display: flex; align-items: center;"><span style="background-color: red; color: white; border: 1px solid black; width: 15px; height: 15px; margin-right: 5px;"></span> <b>No Determination Possible</b></div> </div> Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	
		23039439	TP007	ES1	0.40 - 0.50	1kg TUB with Handle (ALE260)	S
		23039335	TP007	ES4	1.50 - 1.60	250g Amber Jar (ALE215)	S
		23039368	TP008	ES1	0.40 - 0.50	1kg TUB with Handle (ALE260)	S
		23039374	TP008	ES4	1.50 - 1.60	250g Amber Jar (ALE215)	S
		23039379	TP009	ES1	0.50 - 0.60	1kg TUB with Handle (ALE260)	S
		23039387	TP009	ES4	1.50 - 1.60	250g Amber Jar (ALE215)	S
	23039330	TP202	ES1	0.50 - 0.60	250g Amber Jar (ALE215)	S	
Anions by Kone (w)	All	NDPs: 0 Tests: 18					
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 18					
CEN Readings	All	NDPs: 0 Tests: 18					
Chromium III	All	NDPs: 0 Tests: 18					
Coronene	All	NDPs: 0 Tests: 18					
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 18					
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 18					
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 18					
Easily Liberated Sulphide	All	NDPs: 0 Tests: 18					
EPH by GCxGC-FID	All	NDPs: 0 Tests: 18					
EPH CWG GC (S)	All	NDPs: 0 Tests: 18					
Fluoride	All	NDPs: 0 Tests: 18					
GRO by GC-FID (S)	All	NDPs: 0 Tests: 18					
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 18					
Loss on Ignition in soils	All	NDPs: 0 Tests: 18					





# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b> 201015-115	<b>Client Reference:</b> 2020WW102	<b>Report Number:</b> 579794
<b>Location:</b> Arklow Bank	<b>Order Number:</b> 9028	<b>Superseded Report:</b>

<b>Results Legend</b> <div style="margin-top: 5px;"> <span style="background-color: yellow; border: 1px solid black; padding: 2px;">X</span> Test  <span style="background-color: red; color: white; border: 1px solid black; padding: 2px;">N</span> No Determination Possible         </div> Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	
		230393330	TP202	ES1	0.50 - 0.60	250g Amber Jar (ALE210)	S
		230393387	TP009	ES4	1.50 - 1.60	1kg TUB with Handle (ALE280)	S
		230393379	TP009	ES1	0.50 - 0.60	60g VOC (ALE215)	S
		23039374	TP008	ES4	1.50 - 1.60	250g Amber Jar (ALE210)	S
		23039368	TP008	ES1	0.40 - 0.50	1kg TUB with Handle (ALE280)	S
		23039439	TP007	ES1	0.40 - 0.50	250g Amber Jar (ALE210)	S
Mercury Dissolved	All	NDPs: 0 Tests: 18					
Metals in solid samples by OES	All	NDPs: 0 Tests: 18					
PAH 16 & 17 Calc	All	NDPs: 0 Tests: 18					
PAH by GCMS	All	NDPs: 0 Tests: 18					
PCBs by GCMS	All	NDPs: 0 Tests: 18					
pH	All	NDPs: 0 Tests: 18					
Phenols by HPLC (W)	All	NDPs: 0 Tests: 18					
Sample description	All	NDPs: 0 Tests: 18					
Semi Volatile Organic Compounds	All	NDPs: 0 Tests: 18					
Total Dissolved Solids	All	NDPs: 0 Tests: 18					
Total Organic Carbon	All	NDPs: 0 Tests: 18					
TPH CWG GC (S)	All	NDPs: 0 Tests: 18					
VOC MS (S)	All	NDPs: 0 Tests: 18					



# CERTIFICATE OF ANALYSIS



Validated

**SDG:** 201015-115 **Client Reference:** 2020WW102 **Report Number:** 579794  
**Location:** Arklow Bank **Order Number:** 9028 **Superseded Report:**

<b>Results Legend</b>  <input checked="" type="checkbox"/> <b>Test</b>  <input type="checkbox"/> <b>No Determination Possible</b>  Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	
		230393434	TP311	ES4	3.10 - 3.20	250g Amber Jar (ALE210)	S
		230393434	TP311	ES4	3.10 - 3.20	60g VOC (ALE215)	S
		230393442	TP319	ES1	0.40 - 0.50	250g Amber Jar (ALE210)	S
		230393442	TP319	ES1	0.40 - 0.50	60g VOC (ALE215)	S
		230393350	TP319	ES2	1.20 - 1.30	250g Amber Jar (ALE215)	S
		230393350	TP319	ES2	1.20 - 1.30	1kg TUB with Handle (ALE280)	S
	230393356	TP319	ES3	2.30 - 2.40	250g Amber Jar (ALE215)	S	
	230393356	TP319	ES3	2.30 - 2.40	60g VOC (ALE215)	S	
	230393356	TP319	ES3	2.30 - 2.40	1kg TUB with Handle (ALE280)	S	
	230393363	TP319	ES5	3.50 - 3.60	250g Amber Jar (ALE210)	S	
	230393363	TP319	ES5	3.50 - 3.60	60g VOC (ALE215)	S	
	230393363	TP319	ES5	3.50 - 3.60	1kg TUB with Handle (ALE280)	S	
Anions by Kone (w)	All		NDPs: 0 Tests: 18				
	X			X			
Asbestos ID in Solid Samples	All		NDPs: 0 Tests: 18				
	X			X			
CEN Readings	All		NDPs: 0 Tests: 18				
	X			X			
Chromium III	All		NDPs: 0 Tests: 18				
	X	X		X	X	X	
Coronene	All		NDPs: 0 Tests: 18				
	X	X		X	X	X	
Cyanide Comp/Free/Total/Thiocyanate	All		NDPs: 0 Tests: 18				
	X	X		X	X	X	
Dissolved Metals by ICP-MS	All		NDPs: 0 Tests: 18				
	X			X		X	
Dissolved Organic/Inorganic Carbon	All		NDPs: 0 Tests: 18				
	X			X		X	
Easily Liberated Sulphide	All		NDPs: 0 Tests: 18				
	X	X		X	X	X	
EPH by GCxGC-FID	All		NDPs: 0 Tests: 18				
	X	X		X	X	X	
EPH CWG GC (S)	All		NDPs: 0 Tests: 18				
	X	X		X	X	X	
Fluoride	All		NDPs: 0 Tests: 18				
	X			X		X	
GRO by GC-FID (S)	All		NDPs: 0 Tests: 18				
	X	X		X	X	X	
Hexavalent Chromium (s)	All		NDPs: 0 Tests: 18				
	X	X		X	X	X	
Loss on Ignition in soils	All		NDPs: 0 Tests: 18				
	X	X		X	X	X	



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b> 201015-115	<b>Client Reference:</b> 2020WW102	<b>Report Number:</b> 579794
<b>Location:</b> Arklow Bank	<b>Order Number:</b> 9028	<b>Superseded Report:</b>

Results Legend	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		Sample Type	
	X Test	No Determination Possible	N	Possible	N	Possible	N	Possible	N	Possible	N	Possible
<b>Sample Types -</b> S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other												
	Mercury Dissolved	All	NDPs: 0 Tests: 18									
	Metals in solid samples by OES	All	NDPs: 0 Tests: 18	X		X		X		X		X
	PAH 16 & 17 Calc	All	NDPs: 0 Tests: 18	X		X		X		X		X
	PAH by GCMS	All	NDPs: 0 Tests: 18	X		X		X		X		X
	PCBs by GCMS	All	NDPs: 0 Tests: 18	X		X		X		X		X
	pH	All	NDPs: 0 Tests: 18	X		X		X		X		X
	Phenols by HPLC (W)	All	NDPs: 0 Tests: 18		X		X		X		X	
	Sample description	All	NDPs: 0 Tests: 18	X		X		X		X		X
	Semi Volatile Organic Compounds	All	NDPs: 0 Tests: 18	X		X		X		X		X
	Total Dissolved Solids	All	NDPs: 0 Tests: 18		X		X		X		X	
	Total Organic Carbon	All	NDPs: 0 Tests: 18	X		X		X		X		X
	TPH CWG GC (S)	All	NDPs: 0 Tests: 18	X		X		X		X		X
	VOC MS (S)	All	NDPs: 0 Tests: 18		X		X		X		X	



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
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	Inclusions	Inclusions 2
23039335	TP007	1.50 - 1.60	Dark Brown	Sandy Clay	Stones	Vegetation
23039439	TP007	0.40 - 0.50	Dark Brown	Clay Loam	Stones	None
23039368	TP008	0.40 - 0.50	Dark Brown	Clay Loam	Stones	None
23039374	TP008	1.50 - 1.60	Dark Brown	Clay Loam	Stones	None
23039379	TP009	0.50 - 0.60	Dark Brown	Clay Loam	Stones	None
23039387	TP009	1.50 - 1.60	Dark Brown	Sandy Loam	Stones	Vegetation
23039330	TP202	0.50 - 0.60	Dark Brown	Loamy Sand	Stones	None
23039392	TP202	1.40 - 1.50	Light Brown	Silty Clay	None	None
23039401	TP203	0.50 - 0.60	Light Brown	Sand	Stones	None
23039408	TP203	1.60 - 1.70	Dark Brown	Sandy Loam	Stones	None
23039414	TP311	0.40 - 0.50	Dark Brown	Sandy Loam	Vegetation	Stones
23039421	TP311	1.10 - 1.20	Dark Brown	Loamy Sand	Stones	Vegetation
23039427	TP311	2.10 - 2.20	Light Brown	Silty Clay	None	None
23039434	TP311	3.10 - 3.20	Grey	Silty Clay	None	None
23039342	TP319	0.40 - 0.50	Red	Loamy Sand	None	None
23039350	TP319	1.20 - 1.30	Cream	Silt Loam	Vegetation	Stones
23039356	TP319	2.30 - 2.40	Dark Brown	Silt Loam	Stones	None
23039363	TP319	3.50 - 3.60	Grey	Silt Loam	None	None

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.



# CERTIFICATE OF ANALYSIS

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Results Legend			Customer Sample Ref.	TP007	TP007	TP008	TP008	TP009	TP009
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.fit	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
			Depth (m)	0.40 - 0.50	1.50 - 1.60	0.40 - 0.50	1.50 - 1.60	0.50 - 0.60	1.50 - 1.60
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020
			Sampled Time						
			Date Received	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
			SDG Ref	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115
			Lab Sample No.(s)	23039439	23039335	23039368	23039374	23039379	23039387
			AGS Reference	ES1	ES4	ES1	ES4	ES1	ES4
Component	LOD/Units	Method							
Moisture Content Ratio (% of as received sample)	%	PM024	20	14	23	17	17	14	
Loss on ignition	<0.7 %	TM018	4.84	3.06	6.13	4.16	3.92	4.61	
Organic Carbon, Total	<0.2 %	TM132	0.309	<0.2	0.396	0.233	<0.2	<0.2	
pH	1 pH Units	TM133	7.29	8.46	7.43	8.48	7.41	8.25	
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
Cyanide, Total	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Free	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Complex	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
PCB congener 28	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 52	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 101	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 118	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 138	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 153	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 180	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21	<21	<21	<21	<21	<21	
Sulphide, Easily liberated	<15 mg/kg	TM180	<15	<15	<15	<15	<15	<15	
Chromium, Trivalent	<0.9 mg/kg	TM181	37.2	26.9	43.3	30	36.5	27	
Antimony	<0.6 mg/kg	TM181	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
Arsenic	<0.6 mg/kg	TM181	18.5	10.6	19.9	14.7	17.1	13	
Barium	<0.6 mg/kg	TM181	58.3	63.7	74.9	76	51.6	76.7	
Cadmium	<0.02 mg/kg	TM181	<0.02	0.0955	0.0347	0.126	<0.02	0.0545	
Chromium	<0.9 mg/kg	TM181	37.2	26.9	43.3	30	36.5	27	
Copper	<1.4 mg/kg	TM181	17.9	18.3	15.7	23.2	25.8	19.9	
Lead	<0.7 mg/kg	TM181	18.8	13.8	22.3	18.4	17.1	15.2	
Mercury	<0.14 mg/kg	TM181	<0.14	<0.14	<0.14	<0.14	0.15	<0.14	
Molybdenum	<0.1 mg/kg	TM181	0.489	0.337	0.451	0.43	0.511	0.364	
Nickel	<0.2 mg/kg	TM181	28.8	33	29.7	40.2	28.5	36.3	
Selenium	<1 mg/kg	TM181	<1	<1	<1	<1	<1	<1	
Zinc	<1.9 mg/kg	TM181	62.4	56.6	57.1	69.9	70	56	
PAH, Total Detected USEPA 16 + Coronene	<318 µg/kg	TM410	<318	<318	<318	<318	<318	<318	
Coronene	<200 µg/kg	TM410	<200	<200	<200	<200	<200	<200	





CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115
Location: Arklow Bank

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Table with columns for Component, LOD/Units, Method, and multiple Customer Sample Ref. (TP007, TP008, TP009). Includes a Results Legend and data for EPH >C8-C40.



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

Results Legend			Customer Sample Ref.	TP202	TP202	TP203	TP203	TP311	TP311
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
			Depth (m)	0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.60 - 1.70	0.40 - 0.50	1.10 - 1.20
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020
			Sampled Time						
			Date Received	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
			SDG Ref	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115
			Lab Sample No.(s)	23039330	23039392	23039401	23039408	23039414	23039421
			AGS Reference	ES1	ES4	ES1	ES4	ES1	ES2
Component	LOD/Units	Method							
Moisture Content Ratio (% of as received sample)	%	PM024	9	14	12	16	6.2	12	
Loss on ignition	<0.7 %	TM018	1.99	2.29	1.48	2.87	1.62	4.57	
Organic Carbon, Total	<0.2 %	TM132	0.248	<0.2	0.303	<0.2	0.397	0.355	
pH	1 pH Units	TM133	7.45	7.32	7.05	6.7	8.4	6.84	
Chromium, Hexavalent	<0.6 mg/kg	TM151	<3	<0.6	<0.6	<0.6	<0.6	<0.6	
Cyanide, Total	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Free	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Complex	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
PCB congener 28	<3 µg/kg	TM168	<3	<3	<3	<3	<15	<3	
PCB congener 52	<3 µg/kg	TM168	<3	<3	<3	<3	<15	<3	
PCB congener 101	<3 µg/kg	TM168	<3	<3	<3	<3	<15	<3	
PCB congener 118	<3 µg/kg	TM168	<3	<3	<3	<3	<15	<3	
PCB congener 138	<3 µg/kg	TM168	<3	<3	<3	<3	<15	<3	
PCB congener 153	<3 µg/kg	TM168	<3	<3	<3	<3	<15	<3	
PCB congener 180	<3 µg/kg	TM168	<3	<3	<3	<3	<15	<3	
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21	<21	<21	<21	<105	<21	
Sulphide, Easily liberated	<15 mg/kg	TM180	<15	<15	<15	<15	<15	55.7	
Chromium, Trivalent	<0.9 mg/kg	TM181	20.2	23	10.2	26.3	3.96	12.2	
Antimony	<0.6 mg/kg	TM181	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
Arsenic	<0.6 mg/kg	TM181	12.6	11.1	5.06	9.19	23.8	30.6	
Barium	<0.6 mg/kg	TM181	29.6	43.3	17	64.5	43.4	42.1	
Cadmium	<0.02 mg/kg	TM181	0.141	0.0676	0.0496	0.071	0.426	0.246	
Chromium	<0.9 mg/kg	TM181	20.2	23	10.2	26.3	3.96	12.2	
Copper	<1.4 mg/kg	TM181	12.9	16.3	3.11	16	72.1	58	
Lead	<0.7 mg/kg	TM181	12	12.5	8.12	19.3	31.8	37.5	
Mercury	<0.14 mg/kg	TM181	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	
Molybdenum	<0.1 mg/kg	TM181	0.439	0.315	0.177	0.489	1.77	0.345	
Nickel	<0.2 mg/kg	TM181	27.8	24.6	6.52	21.6	19.4	39.4	
Selenium	<1 mg/kg	TM181	<1	<1	<1	<1	<1	<1	
Zinc	<1.9 mg/kg	TM181	66.9	44.8	16.5	34.7	263	128	
PAH, Total Detected USEPA 16 + Coronene	<318 µg/kg	TM410	<318	<318	<318	<318	<318	<318	
Coronene	<200 µg/kg	TM410	<200	<200	<200	<200	<200	<200	



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Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

Results Legend			Customer Sample Ref.	TP202	TP202	TP203	TP203	TP311	TP311
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / filtered sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1.4.4.5@	Sample deviation (see appendix)								
	<b>Depth (m)</b>		0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.60 - 1.70	0.40 - 0.50	1.10 - 1.20	
	<b>Sample Type</b>		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
	<b>Date Sampled</b>		12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	
	<b>Sampled Time</b>								
	<b>Date Received</b>		15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	
	<b>SDG Ref</b>		201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	
	<b>Lab Sample No.(s)</b>		23039330	23039392	23039401	23039408	23039414	23039421	
	<b>AGS Reference</b>		ES1	ES4	ES1	ES4	ES1	ES2	
<b>Component</b>	<b>LOD/Units</b>	<b>Method</b>							
EPH >C8-C40	<35 mg/kg	TM415	<35	<35	<35	<35	195	<35	



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**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

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Results Legend			Customer Sample Ref.	TP311	TP311	TP319	TP319	TP319	TP319
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
		Depth (m)	2.10 - 2.20	3.10 - 3.20	0.40 - 0.50	1.20 - 1.30	2.30 - 2.40	3.50 - 3.60	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
		Date Sampled	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	
		Sampled Time							
		Date Received	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	
		SDG Ref	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	
		Lab Sample No.(s)	23039427	23039434	23039342	23039350	23039356	23039363	
		AGS Reference	ES4	ES4	ES1	ES2	ES3	ES5	
Component	LOD/Units	Method							
Moisture Content Ratio (% of as received sample)	%	PM024	32	37	28	31	31	26	
Loss on ignition	<0.7 %	TM018	3.7	11.1	<0.7	5.56	7.55	14.3	
Organic Carbon, Total	<0.2 %	TM132	0.361	1.6	<0.2	0.493	0.376	0.608	
pH	1 pH Units	TM133	6.83	6.3	6.84	6.37	5.16	5.33	
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6	<0.6	<0.6	<3	<3	<0.6	
Cyanide, Total	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Free	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Complex	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
PCB congener 28	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 52	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 101	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 118	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 138	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 153	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 180	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21	<21	<21	<21	<21	<21	
Sulphide, Easily liberated	<15 mg/kg	TM180	<15	<15	<15	<15	<15	63.5	
Chromium, Trivalent	<0.9 mg/kg	TM181	12.7	30.4	<0.9	9.45	7.57	<0.9	
Antimony	<0.6 mg/kg	TM181	<0.6	<0.6	36.5	<0.6	<0.6	<0.6	
Arsenic	<0.6 mg/kg	TM181	50.4	30.5	2910	85.1	74	97.3	
Barium	<0.6 mg/kg	TM181	50.5	86.4	20.7	42.6	87.6	40.1	
Cadmium	<0.02 mg/kg	TM181	0.133	0.0858	13.7	2.25	1.67	<0.02	
Chromium	<0.9 mg/kg	TM181	12.7	30.4	<0.9	9.45	7.57	<0.9	
Copper	<1.4 mg/kg	TM181	25.9	28.8	6240	803	648	22.9	
Lead	<0.7 mg/kg	TM181	43.8	55.9	4760	100	56.2	62.7	
Mercury	<0.14 mg/kg	TM181	<0.14	<0.14	2.51	<0.14	0.283	<0.14	
Molybdenum	<0.1 mg/kg	TM181	1.04	0.261	99.1	1.68	0.946	1.55	
Nickel	<0.2 mg/kg	TM181	20.9	32.2	<0.2	19.8	23.8	18.2	
Selenium	<1 mg/kg	TM181	<1	<1	<1	<1	<1	<1	
Zinc	<1.9 mg/kg	TM181	95.7	128	5890	1500	1290	87	
PAH, Total Detected USEPA 16 + Coronene	<318 µg/kg	TM410	<318	<318	<318	<318	<318	<318	
Coronene	<200 µg/kg	TM410	<200	<200	<200	<200	<200	<200	





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## PAH by GCMS

Results Legend			Customer Sample Ref.	TP007	TP007	TP008	TP008	TP009	TP009
#	ISO17025 accredited.		<b>Depth (m)</b> <b>Sample Type</b> <b>Date Sampled</b> <b>Sampled Time</b> <b>Date Received</b> <b>SDG Ref</b> <b>Lab Sample No.(s)</b> <b>AGS Reference</b>	0.40 - 0.50	1.50 - 1.60	0.40 - 0.50	1.50 - 1.60	0.50 - 0.60	1.50 - 1.60
M	mCERTS accredited.			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
aq	Aqueous / settled sample.			13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
*	Subcontracted - refer to subcontractor report for accreditation status.			201015-115	201015-115	201015-115	201015-115	201015-115	201015-115
**	% 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			23039439	23039335	23039368	23039374	23039379	23039387
(F)	Trigger breach confirmed			ES1	ES4	ES1	ES4	ES1	ES4
1-4*§@	Sample deviation (see appendix)								
Component	LOD/Units	Method							
Naphthalene-d8 % recovery**	%	TM218	70.3	92.7	70.7	70.9	72.4	96.6	
Acenaphthene-d10 % recovery**	%	TM218	70.6	83	70.2	71.2	71	86.7	
Phenanthrene-d10 % recovery**	%	TM218	71.7	90.1	75.5	71.9	71.2	92.4	
Chrysene-d12 % recovery**	%	TM218	82.6	90.7	92.6	81.7	83.7	92.4	
Perylene-d12 % recovery**	%	TM218	81.3	85.9	87.6	78.7	80.3	83.9	
Naphthalene	<9 µg/kg	TM218	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M	
Acenaphthylene	<12 µg/kg	TM218	<12 M	<12 M	<12 M	<12 M	<12 M	<12 M	
Acenaphthene	<8 µg/kg	TM218	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M	
Fluorene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	
Phenanthrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	
Anthracene	<16 µg/kg	TM218	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M	
Fluoranthene	<17 µg/kg	TM218	<17 M	<17 M	<17 M	<17 M	<17 M	<17 M	
Pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	
Benz(a)anthracene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	
Chrysene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	
Benzo(b)fluoranthene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	
Benzo(k)fluoranthene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	
Benzo(a)pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	<18 M	<18 M	<18 M	<18 M	<18 M	<18 M	
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23 M	<23 M	<23 M	<23 M	<23 M	<23 M	
Benzo(g,h,i)perylene	<24 µg/kg	TM218	<24 M	<24 M	<24 M	<24 M	<24 M	<24 M	
PAH, Total Detected USEPA 16	<118 µg/kg	TM218	<118	<118	<118	<118	<118	<118	



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## PAH by GCMS

Results Legend			Customer Sample Ref.	TP202	TP202	TP203	TP203	TP311	TP311
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*§@	Sample deviation (see appendix)								
	Depth (m)		0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.60 - 1.70	0.40 - 0.50	1.10 - 1.20	
	Sample Type		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
	Date Sampled		12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	
	Sampled Time								
	Date Received		15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	
	SDG Ref		201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	
	Lab Sample No.(s)		23039330	23039392	23039401	23039408	23039414	23039421	
	AGS Reference		ES1	ES4	ES1	ES4	ES1	ES2	
Component	LOD/Units	Method							
Naphthalene-d8 % recovery**	%	TM218	71.7	95.1	72.8	72.4	93.2	72.2	
Acenaphthene-d10 % recovery**	%	TM218	70.2	85.9	71.2	70.8	84.7	70.4	
Phenanthrene-d10 % recovery**	%	TM218	73.3	93.2	73.8	77.5	92.8	77.1	
Chrysene-d12 % recovery**	%	TM218	85.5	95.3	84.3	95.7	102	93.6	
Perylene-d12 % recovery**	%	TM218	86.6	87	84	91.1	93.3	89.5	
Naphthalene	<9 µg/kg	TM218	<9 M	<9 M	<9 M	<9 M	<45 M	<9 M	
Acenaphthylene	<12 µg/kg	TM218	<12 M	<12 M	<12 M	<12 M	<60 M	<12 M	
Acenaphthene	<8 µg/kg	TM218	<8 M	<8 M	<8 M	<8 M	<40 M	<8 M	
Fluorene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<50 M	<10 M	
Phenanthrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<75 M	<15 M	
Anthracene	<16 µg/kg	TM218	<16 M	<16 M	<16 M	<16 M	<80 M	<16 M	
Fluoranthene	<17 µg/kg	TM218	<17 M	<17 M	<17 M	<17 M	<85 M	<17 M	
Pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<75 M	<15 M	
Benz(a)anthracene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<70 M	<14 M	
Chrysene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<50 M	<10 M	
Benzo(b)fluoranthene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<75 M	<15 M	
Benzo(k)fluoranthene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<70 M	<14 M	
Benzo(a)pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<75 M	<15 M	
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	<18 M	<18 M	<18 M	<18 M	<90 M	<18 M	
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23 M	<23 M	<23 M	<23 M	<115 M	<23 M	
Benzo(g,h,i)perylene	<24 µg/kg	TM218	<24 M	<24 M	<24 M	<24 M	<120 M	<24 M	
PAH, Total Detected USEPA 16	<118 µg/kg	TM218	<118	<118	<118	<118	<590	<118	



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## PAH by GCMS

Results Legend			Customer Sample Ref.	TP311	TP311	TP319	TP319	TP319	TP319
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*§@	Sample deviation (see appendix)								
		Depth (m)	2.10 - 2.20	3.10 - 3.20	0.40 - 0.50	1.20 - 1.30	2.30 - 2.40	3.50 - 3.60	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
		Date Sampled	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	
		Sampled Time							
		Date Received	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	
		SDG Ref	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	
		Lab Sample No.(s)	23039427	23039434	23039342	23039350	23039356	23039363	
		AGS Reference	ES4	ES4	ES1	ES2	ES3	ES5	
Component	LOD/Units	Method							
Naphthalene-d8 % recovery**	%	TM218	96.2	94.8	71.7	72.7	72.5	72.1	
Acenaphthene-d10 % recovery**	%	TM218	88.3	88.3	70.5	71.9	71.2	70.3	
Phenanthrene-d10 % recovery**	%	TM218	94.1	95.8	75.7	79	74.7	81.7	
Chrysene-d12 % recovery**	%	TM218	98.1	97.4	90.8	97.3	88.2	92.7	
Perylene-d12 % recovery**	%	TM218	86.8	86.8	85.1	95.7	88.8	89.3	
Naphthalene	<9 µg/kg	TM218	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M
Acenaphthylene	<12 µg/kg	TM218	<12 M	<12 M	<12 M	<12 M	<12 M	<12 M	<12 M
Acenaphthene	<8 µg/kg	TM218	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
Fluorene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Phenanthrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Anthracene	<16 µg/kg	TM218	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M
Fluoranthene	<17 µg/kg	TM218	<17 M	<17 M	<17 M	<17 M	<17 M	<17 M	<17 M
Pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benz(a)anthracene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Chrysene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Benzo(b)fluoranthene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benzo(k)fluoranthene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Benzo(a)pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	<18 M	<18 M	<18 M	<18 M	<18 M	<18 M	<18 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23 M	<23 M	<23 M	<23 M	<23 M	<23 M	<23 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218	<24 M	<24 M	<24 M	<24 M	<24 M	<24 M	<24 M
PAH, Total Detected USEPA 16	<118 µg/kg	TM218	<118	<118	<118	<118	<118	<118	<118





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP007	TP007	TP008	TP008	TP009	TP009
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
	<b>Depth (m)</b>		0.40 - 0.50	1.50 - 1.60	0.40 - 0.50	1.50 - 1.60	0.50 - 0.60	1.50 - 1.60	
	<b>Sample Type</b>		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
	<b>Date Sampled</b>		13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020	
	<b>Sampled Time</b>								
	<b>Date Received</b>		15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	
	<b>SDG Ref</b>		201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	
	<b>Lab Sample No.(s)</b>		23039439	23039335	23039368	23039374	23039379	23039387	
	<b>AGS Reference</b>		ES1	ES4	ES1	ES4	ES1	ES4	
Component	LOD/Units	Method							
Phenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Pentachlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Nitrobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Isophorone	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Hexachloroethane	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Hexachlorocyclopentadiene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Hexachlorobutadiene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Hexachlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
n-Dioctyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Dimethyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Diethyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
n-Dibutyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Dibenzofuran	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Carbazole	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Butylbenzyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
bis(2-Chloroethyl)ether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Azobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Nitrophenol	<100 µg/kg	TM157	<500	<100	<500	<500	<500	<100	
4-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Chlorophenylphenylether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Chloroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Chloro-3-methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Bromophenylphenylether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
3-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2-Methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
1,2,4-Trichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	



**CERTIFICATE OF ANALYSIS**

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

**Semi Volatile Organic Compounds**

Results Legend			Customer Sample Ref.	TP007	TP007	TP008	TP008	TP009	TP009
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / filtered sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
**	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1.4.5@	Sample deviation (see appendix)								
		Customer Sample Ref.	TP007	TP007	TP008	TP008	TP009	TP009	TP009
		Depth (m)	0.40 - 0.50	1.50 - 1.60	0.40 - 0.50	1.50 - 1.60	0.50 - 0.60	1.50 - 1.60	1.50 - 1.60
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
		Date Sampled	13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020
		Sampled Time	.	.	.	.	.	.	.
		Date Received	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
		SDG Ref	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115
		Lab Sample No.(s)	23039439	23039335	23039368	23039374	23039379	23039387	23039387
		AGS Reference	ES1	ES4	ES1	ES4	ES1	ES4	ES4
Component	LOD/Units	Method							
2-Chlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,6-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dimethylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4,6-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4,5-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,4-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,3-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,2-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2-Chloronaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2-Methylnaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Acenaphthylene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Acenaphthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(a)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(b)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(k)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(a)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(g,h,i)perylene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Chrysene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Fluorene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Indeno(1,2,3-cd)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Phenanthrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Naphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Dibenzo(a,h)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Bis(2-chloroisopropyl) ether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
TIC report		TM157	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Total SVOC TIC	<100 µg/kg	TM157	<1000	<1000	<1000	<1000	<1000	<1000	<1000



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP202	TP202	TP203	TP203	TP311	TP311
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
	<b>Depth (m)</b>		0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.60 - 1.70	0.40 - 0.50	1.10 - 1.20	
	<b>Sample Type</b>		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
	<b>Date Sampled</b>		12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	
	<b>Sampled Time</b>								
	<b>Date Received</b>		15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	
	<b>SDG Ref</b>		201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	
	<b>Lab Sample No.(s)</b>		23039330	23039392	23039401	23039408	23039414	23039421	
	<b>AGS Reference</b>		ES1	ES4	ES1	ES4	ES1	ES2	
Component	LOD/Units	Method							
Phenol	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Pentachlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Nitrobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Isophorone	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Hexachloroethane	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Hexachlorocyclopentadiene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Hexachlorobutadiene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Hexachlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
n-Dioctyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Dimethyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Diethyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
n-Dibutyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Dibenzofuran	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Carbazole	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Butylbenzyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
bis(2-Chloroethyl)ether	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Azobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
4-Nitrophenol	<100 µg/kg	TM157	<500	<100	<100	<500	<200	<500	
4-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
4-Methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
4-Chlorophenylphenylether	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
4-Chloroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
4-Chloro-3-methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
4-Bromophenylphenylether	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
3-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
2-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
2-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
2-Methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
1,2,4-Trichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP202	TP202	TP203	TP203	TP311	TP311
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / filtered sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
**	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1.4.5@	Sample deviation (see appendix)								
		Customer Sample Ref.	TP202	TP202	TP203	TP203	TP311	TP311	
		Depth (m)	0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.60 - 1.70	0.40 - 0.50	1.10 - 1.20	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
		Date Sampled	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	
		Sampled Time							
		Date Received	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	
		SDG Ref	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	
		Lab Sample No.(s)	23039330	23039392	23039401	23039408	23039414	23039421	
		AGS Reference	ES1	ES4	ES1	ES4	ES1	ES2	
Component	LOD/Units	Method							
2-Chlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
2,6-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
2,4-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
2,4-Dimethylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
2,4-Dichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
2,4,6-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
2,4,5-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
1,4-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
1,3-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
1,2-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
2-Chloronaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
2-Methylnaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Acenaphthylene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Acenaphthene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Benzo(a)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Benzo(b)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Benzo(k)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Benzo(a)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Benzo(g,h,i)perylene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Chrysene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Fluoranthene	<100 µg/kg	TM157	<100	123	<100	<100	<200	<100	
Fluorene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Indeno(1,2,3-cd)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Phenanthrene	<100 µg/kg	TM157	<100	185	<100	<100	<200	<100	
Pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Naphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Dibenzo(a,h)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
Bis(2-chloroisopropyl) ether	<100 µg/kg	TM157	<100	<100	<100	<100	<200	<100	
TIC report		TM157	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Total SVOC TIC	<100 µg/kg	TM157	<1000	<1000	<1000	<1000	<2000	<1000	



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP311	TP311	TP319	TP319	TP319	TP319
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m)	2.10 - 2.20	3.10 - 3.20	0.40 - 0.50	1.20 - 1.30	2.30 - 2.40	3.50 - 3.60
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020
			Sampled Time						
			Date Received	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
			SDG Ref	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115
			Lab Sample No.(s)	23039427	23039434	23039342	23039350	23039356	23039363
			AGS Reference	ES4	ES4	ES1	ES2	ES3	ES5
Phenol	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Pentachlorophenol	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Nitrobenzene	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Isophorone	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Hexachloroethane	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Hexachlorocyclopentadiene	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Hexachlorobutadiene	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Hexachlorobenzene	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
n-Dioctyl phthalate	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Dimethyl phthalate	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Diethyl phthalate	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
n-Dibutyl phthalate	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Dibenzofuran	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Carbazole	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Butylbenzyl phthalate	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
bis(2-Chloroethyl)ether	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
Azobenzene	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
4-Nitrophenol	<100 µg/kg	TM157		<100	<100	<500	<500	<500	<500
4-Nitroaniline	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
4-Methylphenol	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
4-Chlorophenylphenylether	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
4-Chloroaniline	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
4-Chloro-3-methylphenol	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
4-Bromophenylphenylether	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
3-Nitroaniline	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
2-Nitrophenol	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
2-Nitroaniline	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
2-Methylphenol	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100
1,2,4-Trichlorobenzene	<100 µg/kg	TM157		<100	<100	<100	<100	<100	<100



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP311	TP311	TP319	TP319	TP319	TP319
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / filtered sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
**	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1.4.5@	Sample deviation (see appendix)								
		Customer Sample Ref.	TP311	TP311	TP319	TP319	TP319	TP319	TP319
		Depth (m)	2.10 - 2.20	3.10 - 3.20	0.40 - 0.50	1.20 - 1.30	2.30 - 2.40	3.50 - 3.60	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
		Date Sampled	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020
		Sampled Time							
		Date Received	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
		SDG Ref	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115
		Lab Sample No.(s)	23039427	23039434	23039342	23039350	23039356	23039363	23039363
		AGS Reference	ES4	ES4	ES1	ES2	ES3	ES5	
Component	LOD/Units	Method							
2-Chlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,6-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dimethylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4,6-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4,5-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,4-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,3-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,2-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2-Chloronaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2-Methylnaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Acenaphthylene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Acenaphthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(a)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(b)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(k)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(a)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(g,h,i)perylene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Chrysene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Fluorene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Indeno(1,2,3-cd)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Phenanthrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Naphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Dibenzo(a,h)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Bis(2-chloroisopropyl) ether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
TIC report		TM157	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Total SVOC TIC	<100 µg/kg	TM157	<1000	<1000	<1000	<1000	<1000	<1000	<1000



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

### TPH CWG (S)

Results Legend			Customer Sample Ref.	TP007	TP007	TP008	TP008	TP009	TP009
# ISO17025 accredited.				0.40 - 0.50	1.50 - 1.60	0.40 - 0.50	1.50 - 1.60	0.50 - 0.60	1.50 - 1.60
M MCERTS accredited.				Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
aq Aqueous / settled sample.				13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020
diss.fit Dissolved / filtered sample.				15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
tot.unfilt Total / unfiltered sample.				201015-115	201015-115	201015-115	201015-115	201015-115	201015-115
* Subcontracted - refer to subcontractor report for accreditation status.				23039439	23039335	23039368	23039374	23039379	23039387
** % 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				ES1	ES4	ES1	ES4	ES1	ES4
(F) Trigger breach confirmed									
1-4*8@ Sample deviation (see appendix)									
Component	LOD/Units	Method							
GRO Surrogate % recovery**	%	TM089	89.3	92.1	104	98.1	104	91.8	
Aliphatics >C5-C6	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C8-C10	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C10-C12	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aliphatics >C12-C16	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aliphatics >C16-C21	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aliphatics >C21-C35	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aliphatics >C35-C44	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Total Aliphatics >C10-C44	<5000 µg/kg	TM414	<5000	<5000	<5000	<5000	<5000	<5000	<5000
Total Aliphatics & Aromatics >C10-C44	<10000 µg/kg	TM414	<10000	<10000	<10000	<10000	<10000	<10000	<10000
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aromatics > EC10-EC12	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC12-EC16	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC16-EC21	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC21-EC35	<1000 µg/kg	TM414	<1000	1280	<1000	<1000	<1000	<1000	3390
Aromatics >EC35-EC44	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC40-EC44	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Total Aromatics > EC10-EC44	<5000 µg/kg	TM414	<5000	<5000	<5000	<5000	<5000	<5000	<5000
Total Aliphatics & Aromatics >C5-C44	<10000 µg/kg	TM414	<10000	<10000	<10000	<10000	<10000	<10000	<10000
Total Aliphatics >C5-C10	<50 µg/kg	TM089	<50	<50	<50	<50	<50	<50	<50
Total Aromatics >EC5-EC10	<50 µg/kg	TM089	<50	<50	<50	<50	<50	<50	<50
GRO >C5-C10	<20 µg/kg	TM089	<20	<20	<20	<20	<20	<20	<20



CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115
Location: Arklow Bank

Client Reference: 2020WW102
Order Number: 9028

Report Number: 579794
Superseded Report:

TPH CWG (S)

Table with columns: Results Legend, Customer Sample Ref., TP202, TP202, TP203, TP203, TP311, TP311. Rows include components like GRO Surrogate % recovery, Aliphatics >C5-C6, and Aromatics >EC5-EC7 with corresponding LOD/Units and Method values.





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## TPH CWG (S)

Results Legend			Customer Sample Ref.	TP311	TP311	TP319	TP319	TP319	TP319
#	ISO17025 accredited.			2.10 - 2.20	3.10 - 3.20	0.40 - 0.50	1.20 - 1.30	2.30 - 2.40	3.50 - 3.60
M	mCERTS accredited.			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
aq	Aqueous / settled sample.			12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020
diss.filt	Dissolved / filtered sample.			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
tot.unfilt	Total / unfiltered sample.			201015-115	201015-115	201015-115	201015-115	201015-115	201015-115
*	Subcontracted - refer to subcontractor report for accreditation status.			23039427	23039434	23039342	23039350	23039356	23039363
**	% 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			ES4	ES4	ES1	ES2	ES3	ES5
(F)	Trigger breach confirmed								
1-4*8@	Sample deviation (see appendix)								
Component	LOD/Units	Method							
GRO Surrogate % recovery**	%	TM089	95.4	80.6	80.4	90.2	74.2	91.8	
Aliphatics >C5-C6	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8	<10 µg/kg	TM089	<10	<10	13.9	<10	<10	<10	<10
Aliphatics >C8-C10	<10 µg/kg	TM089	<10	<10	26.4	<10	<10	<10	<10
Aliphatics >C10-C12	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aliphatics >C12-C16	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aliphatics >C16-C21	<1000 µg/kg	TM414	<1000	1020	<1000	<1000	<1000	<1000	<1000
Aliphatics >C21-C35	<1000 µg/kg	TM414	<1000	34000	<1000	<1000	<1000	<1000	5530
Aliphatics >C35-C44	<1000 µg/kg	TM414	<1000	3580	<1000	<1000	<1000	<1000	<1000
Total Aliphatics >C10-C44	<5000 µg/kg	TM414	<5000	39200	<5000	<5000	<5000	<5000	6070
Total Aliphatics & Aromatics >C10-C44	<10000 µg/kg	TM414	<10000	68400	<10000	<10000	<10000	<10000	15000
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089	<10	<10	16.7	<10	<10	<10	<10
Aromatics > EC10-EC12	<1000 µg/kg	TM414	<1000	1380	<1000	<1000	<1000	<1000	<1000
Aromatics > EC12-EC16	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC16-EC21	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC21-EC35	<1000 µg/kg	TM414	<1000	17400	<1000	2560	<1000	<1000	7670
Aromatics >EC35-EC44	<1000 µg/kg	TM414	<1000	9850	<1000	<1000	<1000	<1000	1110
Aromatics > EC40-EC44	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Total Aromatics > EC10-EC44	<5000 µg/kg	TM414	<5000	29200	<5000	<5000	<5000	<5000	8890
Total Aliphatics & Aromatics >C5-C44	<10000 µg/kg	TM414	<10000	68400	<10000	<10000	<10000	<10000	15000
Total Aliphatics >C5-C10	<50 µg/kg	TM089	<50	<50	<50	<50	<50	<50	<50
Total Aromatics >EC5-EC10	<50 µg/kg	TM089	<50	<50	<50	<50	<50	<50	<50
GRO >C5-C10	<20 µg/kg	TM089	<20	<20	<20	<20	<20	<20	<20



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.	TP007	TP007	TP008	TP008	TP009	TP009
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.fit	Dissolved / filtered sample.								
tot.unfit	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*§@	Sample deviation (see appendix)								
		Depth (m)	0.40 - 0.50	1.50 - 1.60	0.40 - 0.50	1.50 - 1.60	0.50 - 0.60	1.50 - 1.60	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
		Date Sampled	13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020	
		Sampled Time							
		Date Received	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	
		SDG Ref	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	
		Lab Sample No.(s)	23039439	23039335	23039368	23039374	23039379	23039387	
		AGS Reference	ES1	ES4	ES1	ES4	ES1	ES4	
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM116	109	111	106	102	116	107	
Toluene-d8**	%	TM116	98.9	101	100	97	98.7	99.6	
4-Bromofluorobenzene**	%	TM116	86.6	86	93.1	82.3	97.6	86.4	
Dichlorodifluoromethane	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	
Chloromethane	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	
Vinyl Chloride	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	
Bromomethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
Chloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
Trichlorofluoromethane	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	
1,1-Dichloroethene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
Carbon Disulphide	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	
Dichloromethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
1,1-Dichloroethane	<8 µg/kg	TM116	<8	<8	<8	<8	<8	<8	
cis-1,2-Dichloroethene	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	
2,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
Bromochloromethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
Chloroform	<8 µg/kg	TM116	<8	<8	<8	<8	<8	<8	
1,1,1-Trichloroethane	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	
1,1-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
Carbontetrachloride	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
1,2-Dichloroethane	<5 µg/kg	TM116	<5	<5	<5	<5	<5	<5	
Benzene	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9	
Trichloroethene	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9	
1,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
Dibromomethane	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9	
Bromodichloromethane	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
Toluene	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	
1,1,2-Trichloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.	TP007	TP007	TP008	TP008	TP009	TP009
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.40 - 0.50	1.50 - 1.60	0.40 - 0.50	1.50 - 1.60	0.50 - 0.60	1.50 - 1.60
M	mCERTS accredited.			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
sg	Aqueous / settled sample.			13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020	13/10/2020
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
(F)	Trigger breach confirmed			201015-115	201015-115	201015-115	201015-115	201015-115	201015-115
1-4#&@	Sample deviation (see appendix)			23039439	23039335	23039368	23039374	23039379	23039387
				ES1	ES4	ES1	ES4	ES1	ES4
Component	LOD/Units	Method							
1,3-Dichloropropane	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	<7
Tetrachloroethene	<5 µg/kg	TM116	<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
1,2-Dibromoethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Chlorobenzene	<5 µg/kg	TM116	<5	<5	<5	<5	<5	<5	<5
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Ethylbenzene	<4 µg/kg	TM116	<4	<4	<4	<4	<4	<4	<4
p/m-Xylene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
o-Xylene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Styrene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Bromoform	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Isopropylbenzene	<5 µg/kg	TM116	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16	<16	<16	<16	<16	<16	<16
Bromobenzene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Propylbenzene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
2-Chlorotoluene	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9	<9
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8	<8	<8	<8	<8	<8	<8
4-Chlorotoluene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
tert-Butylbenzene	<14 µg/kg	TM116	<14	<14	<14	<14	<14	<14	<14
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9	<9
sec-Butylbenzene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
4-Isopropyltoluene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8	<8	<8	<8	<8	<8	<8
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5	<5	<5	<5	<5	<5	<5
n-Butylbenzene	<11 µg/kg	TM116	<11	<11	<11	<11	<11	<11	<11
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14	<14	<14	<14	<14	<14	<14
Tert-amyl methyl ether	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20	<20	<20	<20	<20	<20	<20
Hexachlorobutadiene	<20 µg/kg	TM116	<20	<20	<20	<20	<20	<20	<20
Naphthalene	<13 µg/kg	TM116	<13	<13	<13	<13	<13	<13	<13



CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115
Location: Arklow Bank

Client Reference: 2020WW102
Order Number: 9028

Report Number: 579794
Superseded Report:

VOC MS (S)

Table with columns for Component, LOD/Units, Method, and multiple sample locations (TP007, TP008, TP009). Rows include 1,2,3-Trichlorobenzene, VOC TIC, Sum of Detected Xylenes, Sum of BTEX, and Total VOC TIC. Results are generally '<20' or 'Not Detected'.



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	201015-115	<b>Client Reference:</b>	2020WW102	<b>Report Number:</b>	579794
<b>Location:</b>	Arklow Bank	<b>Order Number:</b>	9028	<b>Superseded Report:</b>	

## VOC MS (S)

Results Legend			Customer Sample Ref.	TP202	TP202	TP203	TP203	TP311	TP311
#	ISO17025 accredited.	M	Depth (m)	0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.60 - 1.70	0.40 - 0.50	1.10 - 1.20
aq	mCERTS accredited.	diss.fit	Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
tot.unfilt	Aqueous / settled sample.	*	Date Sampled	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020
**	Dissolved / filtered sample.	(F)	Sampled Time	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
1-4*§@	Total / unfiltered sample.	1-4*§@	Date Received	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115
(F)	Subcontracted - refer to subcontractor report for accreditation status.	1-4*§@	SDG Ref	23039330	23039392	23039401	23039408	23039414	23039421
1-4*§@	% 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	1-4*§@	Lab Sample No.(s)	ES1	ES4	ES1	ES4	ES1	ES2
1-4*§@	Trigger breach confirmed	1-4*§@	AGS Reference	ES1	ES4	ES1	ES4	ES1	ES2
1-4*§@	Sample deviation (see appendix)	1-4*§@	AGS Reference	ES1	ES4	ES1	ES4	ES1	ES2
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM116	106	117	101	112	106	125	
Toluene-d8**	%	TM116	99.8	101	97.4	99.4	94	100	
4-Bromofluorobenzene**	%	TM116	93.6	95.2	80.2	90.6	76.9	89.1	
Dichlorodifluoromethane	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	<6
Chloromethane	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	<7
Vinyl Chloride	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	<6
Bromomethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Chloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	<6
1,1-Dichloroethene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Carbon Disulphide	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	<7
Dichloromethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
1,1-Dichloroethane	<8 µg/kg	TM116	<8	<8	<8	<8	<8	<8	<8
cis-1,2-Dichloroethene	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	<6
2,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Bromochloromethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Chloroform	<8 µg/kg	TM116	<8	<8	<8	<8	<8	<8	<8
1,1,1-Trichloroethane	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	<7
1,1-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Carbontetrachloride	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
1,2-Dichloroethane	<5 µg/kg	TM116	<5	<5	<5	<5	<5	<5	<5
Benzene	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9	<9
Trichloroethene	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9	<9
1,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Dibromomethane	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9	<9
Bromodichloromethane	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	<7
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Toluene	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	<7
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
1,1,2-Trichloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.		TP202	TP202	TP203	TP203	TP311	TP311
# ISO17025 accredited. M mCERTS accredited. sg Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1.4.5@ Sample deviation (see appendix)	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.50 - 0.60 Soil/Solid (S) 12/10/2020 . 15/10/2020 201015-115 23039330 ES1	1.40 - 1.50 Soil/Solid (S) 12/10/2020 . 15/10/2020 201015-115 23039392 ES4	0.50 - 0.60 Soil/Solid (S) 12/10/2020 . 15/10/2020 201015-115 23039401 ES1	1.60 - 1.70 Soil/Solid (S) 12/10/2020 . 15/10/2020 201015-115 23039408 ES4	0.40 - 0.50 Soil/Solid (S) 12/10/2020 . 15/10/2020 201015-115 23039414 ES1	1.10 - 1.20 Soil/Solid (S) 12/10/2020 . 15/10/2020 201015-115 23039421 ES2		
Component	LOD/Units	Method								
1,3-Dichloropropane	<7 µg/kg	TM116	<7 M	<7 M	<7 M	<7 M	<7 M	<7 M	<7 M	<7 M
Tetrachloroethene	<5 µg/kg	TM116	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M
Dibromochloromethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
1,2-Dibromoethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Chlorobenzene	<5 µg/kg	TM116	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Ethylbenzene	<4 µg/kg	TM116	<4 M	<4 M	<4 M	<4 M	<4 M	<4 M	<4 M	<4 M
p/m-Xylene	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #
o-Xylene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Styrene	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #
Bromoform	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Isopropylbenzene	<5 µg/kg	TM116	<5 #	<5 #	<5 #	<5 #	<5 #	<5 #	<5 #	<5 #
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M
Bromobenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Propylbenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
2-Chlorotoluene	<9 µg/kg	TM116	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
4-Chlorotoluene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
tert-Butylbenzene	<14 µg/kg	TM116	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<9 #	<9 #	<9 #	<9 #	<9 #	<9 #	<9 #	<9 #
sec-Butylbenzene	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #
4-Isopropyltoluene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M
n-Butylbenzene	<11 µg/kg	TM116	<11 #	<11 #	<11 #	<11 #	<11 #	<11 #	<11 #	<11 #
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Tert-amyl methyl ether	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20 #	<20 #	<20 #	<20 #	<20 #	<20 #	<20 #	<20 #
Hexachlorobutadiene	<20 µg/kg	TM116	<20 #	<20 #	<20 #	<20 #	<20 #	<20 #	<20 #	<20 #
Naphthalene	<13 µg/kg	TM116	<13 M	<13 M	<13 M	<13 M	<13 M	<13 M	<13 M	<13 M



CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115
Location: Arklow Bank

Client Reference: 2020WW102
Order Number: 9028

Report Number: 579794
Superseded Report:

VOC MS (S)

Table with columns for Results Legend, Customer Sample Ref., Depth (m), Sample Type, Date Sampled, Sampled Time, Date Received, SDG Ref, Lab Sample No.(s), AGS Reference, Component, LOD/Units, Method, and VOC concentrations for various samples (TP202, TP203, TP311).



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.	TP311	TP311	TP319	TP319	TP319	TP319
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*§@	Sample deviation (see appendix)								
		Depth (m)	2.10 - 2.20	3.10 - 3.20	0.40 - 0.50	1.20 - 1.30	2.30 - 2.40	3.50 - 3.60	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
		Date Sampled	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	
		Sampled Time							
		Date Received	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	
		SDG Ref	201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	
		Lab Sample No.(s)	23039427	23039434	23039342	23039350	23039356	23039363	
		AGS Reference	ES4	ES4	ES1	ES2	ES3	ES5	
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM116	117	115	108	113	105	109	
Toluene-d8**	%	TM116	102	101	101	101	99.9	97.6	
4-Bromofluorobenzene**	%	TM116	97.6	92.6	91.9	90.2	90.6	80.4	
Dichlorodifluoromethane	<6 µg/kg	TM116	<6	<60	<6	<6	<6	<6	M
Chloromethane	<7 µg/kg	TM116	<7	<70	<7	<7	<7	<7	#
Vinyl Chloride	<6 µg/kg	TM116	<6	<60	<6	<6	<6	<6	M
Bromomethane	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	M
Chloroethane	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	M
Trichlorofluoromethane	<6 µg/kg	TM116	<6	<60	<6	<6	<6	<6	M
1,1-Dichloroethene	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	#
Carbon Disulphide	<7 µg/kg	TM116	<7	<70	<7	<7	<7	<7	M
Dichloromethane	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	#
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	M
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	M
1,1-Dichloroethane	<8 µg/kg	TM116	<8	<80	<8	<8	<8	<8	M
cis-1,2-Dichloroethene	<6 µg/kg	TM116	<6	<60	<6	<6	<6	<6	M
2,2-Dichloropropane	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	
Bromochloromethane	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	M
Chloroform	<8 µg/kg	TM116	<8	<80	<8	<8	<8	<8	M
1,1,1-Trichloroethane	<7 µg/kg	TM116	<7	<70	<7	<7	<7	<7	M
1,1-Dichloropropene	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	M
Carbontetrachloride	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	M
1,2-Dichloroethane	<5 µg/kg	TM116	<5	<50	<5	<5	<5	<5	M
Benzene	<9 µg/kg	TM116	<9	<90	<9	<9	<9	<9	M
Trichloroethene	<9 µg/kg	TM116	<9	<90	<9	<9	<9	<9	#
1,2-Dichloropropane	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	M
Dibromomethane	<9 µg/kg	TM116	<9	<90	<9	<9	<9	<9	M
Bromodichloromethane	<7 µg/kg	TM116	<7	<70	<7	<7	<7	<7	M
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	M
Toluene	<7 µg/kg	TM116	<7	<70	<7	<7	<7	<7	M
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	
1,1,2-Trichloroethane	<10 µg/kg	TM116	<10	<100	<10	<10	<10	<10	M





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.	TP311	TP311	TP319	TP319	TP319	TP319
# ISO17025 accredited. M mCERTS accredited. sg Aqueous / filtered sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1.4.5@ Sample deviation (see appendix)	Depth (m)	Sample Type	2.10 - 2.20 Soil/Solid (S) 12/10/2020	3.10 - 3.20 Soil/Solid (S) 12/10/2020	0.40 - 0.50 Soil/Solid (S) 12/10/2020	1.20 - 1.30 Soil/Solid (S) 12/10/2020	2.30 - 2.40 Soil/Solid (S) 12/10/2020	3.50 - 3.60 Soil/Solid (S) 12/10/2020	
Date Sampled	Date Received	SDG Ref	15/10/2020 201015-115 23039427	15/10/2020 201015-115 23039434	15/10/2020 201015-115 23039342	15/10/2020 201015-115 23039350	15/10/2020 201015-115 23039356	15/10/2020 201015-115 23039363	
Lab Sample No.(s)	AGS Reference		ES4	ES4	ES1	ES2	ES3	ES5	
Component	LOD/Units	Method							
1,3-Dichloropropane	<7 µg/kg	TM116	<7 M	<70 M	<7 M	<7 M	<7 M	<7 M	<7 M
Tetrachloroethene	<5 µg/kg	TM116	<5 M	<50 M	<5 M	<5 M	<5 M	<5 M	<5 M
Dibromochloromethane	<10 µg/kg	TM116	<10 M	<100 M	<10 M	<10 M	<10 M	<10 M	<10 M
1,2-Dibromoethane	<10 µg/kg	TM116	<10 M	<100 M	<10 M	<10 M	<10 M	<10 M	<10 M
Chlorobenzene	<5 µg/kg	TM116	<5 M	<50 M	<5 M	<5 M	<5 M	<5 M	<5 M
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10 M	<100 M	<10 M	<10 M	<10 M	<10 M	<10 M
Ethylbenzene	<4 µg/kg	TM116	<4 M	<40 M	<4 M	<4 M	<4 M	<4 M	<4 M
p/m-Xylene	<10 µg/kg	TM116	<10 #	<100 #	<10 #	<10 #	<10 #	<10 #	<10 #
o-Xylene	<10 µg/kg	TM116	<10 M	<100 M	<10 M	<10 M	<10 M	<10 M	<10 M
Styrene	<10 µg/kg	TM116	<10 #	<100 #	<10 #	<10 #	<10 #	<10 #	<10 #
Bromoform	<10 µg/kg	TM116	<10 M	<100 M	<10 M	<10 M	<10 M	<10 M	<10 M
Isopropylbenzene	<5 µg/kg	TM116	<5 #	<50 #	<5 #	<5 #	<5 #	<5 #	<5 #
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10 #	<100 #	<10 #	<10 #	<10 #	<10 #	<10 #
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16 M	<160 M	<16 M	<16 M	<16 M	<16 M	<16 M
Bromobenzene	<10 µg/kg	TM116	<10 M	<100 M	<10 M	<10 M	<10 M	<10 M	<10 M
Propylbenzene	<10 µg/kg	TM116	<10 M	<100 M	<10 M	<10 M	<10 M	<10 M	<10 M
2-Chlorotoluene	<9 µg/kg	TM116	<9 M	<90 M	<9 M	<9 M	<9 M	<9 M	<9 M
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8 M	<80 M	<8 M	<8 M	<8 M	<8 M	<8 M
4-Chlorotoluene	<10 µg/kg	TM116	<10 M	<100 M	<10 M	<10 M	<10 M	<10 M	<10 M
tert-Butylbenzene	<14 µg/kg	TM116	<14 M	<140 M	<14 M	<14 M	<14 M	<14 M	<14 M
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<9 #	<90 #	<9 #	<9 #	<9 #	<9 #	<9 #
sec-Butylbenzene	<10 µg/kg	TM116	<10 M	<100 M	<10 M	<10 M	<10 M	<10 M	<10 M
4-Isopropyltoluene	<10 µg/kg	TM116	<10 M	<100 M	<10 M	<10 M	<10 M	<10 M	<10 M
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8 M	<80 M	<8 M	<8 M	<8 M	<8 M	<8 M
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5 M	<50 M	<5 M	<5 M	<5 M	<5 M	<5 M
n-Butylbenzene	<11 µg/kg	TM116	<11 M	<110 M	<11 M	<11 M	<11 M	<11 M	<11 M
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10 M	<100 M	<10 M	<10 M	<10 M	<10 M	<10 M
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14 M	<140 M	<14 M	<14 M	<14 M	<14 M	<14 M
Tert-amyl methyl ether	<10 µg/kg	TM116	<10 #	<100 #	<10 #	<10 #	<10 #	<10 #	<10 #
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20 M	<200 M	<20 M	<20 M	<20 M	<20 M	<20 M
Hexachlorobutadiene	<20 µg/kg	TM116	<20 M	<200 M	<20 M	<20 M	<20 M	<20 M	<20 M
Naphthalene	<13 µg/kg	TM116	<13 M	<130 M	<13 M	<13 M	<13 M	<13 M	<13 M



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579794  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.						
#	ISO17025 accredited.		TP311	TP311	TP319	TP319	TP319	TP319	
M	mCERTS accredited.								
aq	Aqueous / settled sample.		2.10 - 2.20	3.10 - 3.20	0.40 - 0.50	1.20 - 1.30	2.30 - 2.40	3.50 - 3.60	
dis.filt	Dissolved / filtered sample.		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
tot.unfilt	Total / unfiltered sample.		12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	12/10/2020	
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery.		15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	
(F)	Trigger breach confirmed		201015-115	201015-115	201015-115	201015-115	201015-115	201015-115	
1.4.4.6@	Sample deviation (see appendix)		23039427	23039434	23039342	23039350	23039356	23039363	
			ES4	ES4	ES1	ES2	ES3	ES5	
Component	LOD/Units	Method							
1,2,3-Trichlorobenzene	<20 µg/kg	TM116	<20 #	<200 #	<20 #	<20 #	<20 #	<20 #	
VOC TIC		TM116	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	
Sum of Detected Xylenes	<0.02 mg/kg	TM116	<0.02	<0.2	<0.02	<0.02	<0.02	<0.02	
Sum of BTEX	<40 µg/kg	TM116	<40	<400	<40	<40	<40	<40	
Total VOC TIC	<50 µg/kg	TM116	<50	<500	<50	<50	<50	<50	



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	201015-115	<b>Client Reference:</b>	2020WW102	<b>Report Number:</b>	579794
<b>Location:</b>	Arklow Bank	<b>Order Number:</b>	9028	<b>Superseded Report:</b>	

## Asbestos Identification - Solid Samples

### Results Legend

- # ISO17025 accredited.
- M mCERTS accredited.
- \* Subcontracted test.
- (F) Trigger breach confirmed
- 1-5&\*@ Sample deviation (see appendix)

	Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. TP007E51 Depth (m) 0.40 - 0.50 Sample Type SOLID Date Sampled 13/10/2020 00:00:00 Date Received 15/10/2020 09:00:00 SDG 201015-115 Original Sample 23039439 Method Number TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP007E54 Depth (m) 1.50 - 1.60 Sample Type SOLID Date Sampled 13/10/2020 00:00:00 Date Received 15/10/2020 09:00:00 SDG 201015-115 Original Sample 23039335 Method Number TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP008E51 Depth (m) 0.40 - 0.50 Sample Type SOLID Date Sampled 13/10/2020 00:00:00 Date Received 15/10/2020 09:00:00 SDG 201015-115 Original Sample 23039368 Method Number TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP008E54 Depth (m) 1.50 - 1.60 Sample Type SOLID Date Sampled 13/10/2020 00:00:00 Date Received 15/10/2020 09:00:00 SDG 201015-115 Original Sample 23039374 Method Number TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP009E51 Depth (m) 0.50 - 0.60 Sample Type SOLID Date Sampled 13/10/2020 00:00:00 Date Received 15/10/2020 09:00:00 SDG 201015-115 Original Sample 23039379 Method Number TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP009E54 Depth (m) 1.50 - 1.60 Sample Type SOLID Date Sampled 13/10/2020 00:00:00 Date Received 15/10/2020 09:00:00 SDG 201015-115 Original Sample 23039387 Method Number TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP202E51 Depth (m) 0.50 - 0.60 Sample Type SOLID Date Sampled 12/10/2020 00:00:00 Date Received 15/10/2020 09:00:00 SDG 201015-115 Original Sample 23039330 Method Number TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP202E54 Depth (m) 1.40 - 1.50 Sample Type SOLID Date Sampled 12/10/2020 00:00:00 Date Received 15/10/2020 09:00:00 SDG 201015-115 Original Sample 23039392 Method Number TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b> 201015-115	<b>Client Reference:</b> 2020WW102	<b>Report Number:</b> 579794
<b>Location:</b> Arklow Bank	<b>Order Number:</b> 9028	<b>Superseded Report:</b>

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP203E51 0.50 - 0.60 SOLID 12/10/2020 00:00:00 15/10/2020 09:00:00 201015-115 23039401 TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP203E54 1.60 - 1.70 SOLID 12/10/2020 00:00:00 15/10/2020 09:00:00 201015-115 23039408 TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP311E51 0.40 - 0.50 SOLID 12/10/2020 00:00:00 15/10/2020 09:00:00 201015-115 23039414 TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP311E52 1.10 - 1.20 SOLID 12/10/2020 00:00:00 15/10/2020 09:00:00 201015-115 23039421 TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP311E54 2.10 - 2.20 SOLID 12/10/2020 00:00:00 15/10/2020 09:00:00 201015-115 23039427 TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP311E54 3.10 - 3.20 SOLID 12/10/2020 00:00:00 15/10/2020 09:00:00 201015-115 23039434 TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP319E51 0.40 - 0.50 SOLID 12/10/2020 00:00:00 15/10/2020 09:00:00 201015-115 23039342 TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP319E52 1.20 - 1.30 SOLID 12/10/2020 00:00:00 15/10/2020 09:00:00 201015-115 23039350 TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP319E53 2.30 - 2.40 SOLID 12/10/2020 00:00:00 15/10/2020 09:00:00 201015-115 23039356 TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201015-115      **Client Reference:** 2020WW102      **Report Number:** 579794  
**Location:** Arklow Bank      **Order Number:** 9028      **Superseded Report:**

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP319E55 3.50 - 3.60 SOLID 12/10/2020 00:00:00 15/10/2020 09:00:00 201015-115 23039363 TM048	25/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.101  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 11.9  
Dry Matter Content (%) 89.3

#### Case

SDG 201015-115  
Lab Sample Number(s) 23039330  
Sampled Date 12-Oct-2020  
Customer Sample Ref. TP202 ES1  
Depth (m) 0.50 - 0.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	4.43	<3	44.3	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	0.0000491	<0.00001	0.000491	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.00432	<0.0005	0.0432	<0.005	-	-	-
Barium	0.0132	<0.0002	0.132	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00786	<0.001	0.0786	<0.01	-	-	-
Copper	0.0071	<0.0003	0.071	<0.003	-	-	-
Lead	0.00463	<0.0002	0.0463	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.00434	<0.0004	0.0434	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0158	<0.001	0.158	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	18.2	<5	182	<50	-	-	-

### Leach Test Information

Date Prepared 22-Oct-2020  
pH (pH Units) 8.65  
Conductivity (µS/cm) 18.90  
Temperature (°C) 19.20  
Volume Leachant (Litres) 0.889

Mcerts Certification does not apply to leachates

14/12/2020 15:31:58

15:30:11 14/12/2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.105  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 16.3  
Dry Matter Content (%) 86

#### Case

SDG 201015-115  
Lab Sample Number(s) 23039335  
Sampled Date 13-Oct-2020  
Customer Sample Ref. TP007 ES4  
Depth (m) 1.50 - 1.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	0.724	<0.5	7.24	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.000516	<0.0005	0.00516	<0.005	-	-	-
Barium	0.368	<0.0002	3.68	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00163	<0.001	0.0163	<0.01	-	-	-
Copper	0.00159	<0.0003	0.0159	<0.003	-	-	-
Lead	0.000248	<0.0002	0.00248	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.000542	<0.0004	0.00542	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0191	<0.001	0.191	<0.01	-	-	-
Chloride	3.4	<2	34	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	87.9	<5	879	<50	-	-	-

#### Leach Test Information

Date Prepared 24-Oct-2020  
pH (pH Units) 8.70  
Conductivity (µS/cm) 109.00  
Temperature (°C) 15.10  
Volume Leachant (Litres) 0.885

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.122  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 35.8  
Dry Matter Content (%) 73.6

#### Case

SDG 201015-115  
Lab Sample Number(s) 23039342  
Sampled Date 12-Oct-2020  
Customer Sample Ref. TP319 ES1  
Depth (m) 0.40 - 0.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	0.0000322	<0.00001	0.000322	<0.0001	-	-	-
Antimony	0.00214	<0.001	0.0214	<0.01	-	-	-
Arsenic	0.323	<0.00253	3.23	<0.0253	-	-	-
Barium	0.00215	<0.0002	0.0215	<0.002	-	-	-
Cadmium	0.000922	<0.00008	0.00922	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.00509	<0.0003	0.0509	<0.003	-	-	-
Lead	0.000977	<0.0002	0.00977	<0.002	-	-	-
Molybdenum	0.18	<0.003	1.8	<0.03	-	-	-
Nickel	0.000948	<0.0004	0.00948	<0.004	-	-	-
Selenium	0.00198	<0.001	0.0198	<0.01	-	-	-
Zinc	0.168	<0.001	1.68	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	39	<2	390	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	82.9	<5	829	<50	-	-	-

#### Leach Test Information

Date Prepared 22-Oct-2020  
pH (pH Units) 8.53  
Conductivity (µS/cm) 104.00  
Temperature (°C) 20.00  
Volume Leachant (Litres) 0.868

Mcerts Certification does not apply to leachates

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15:30:11 14/12/2020





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

<b>Client Reference</b>		<b>Site Location</b>	Arklow Bank
<b>Mass Sample taken (kg)</b>	0.125	<b>Natural Moisture Content (%)</b>	39.2
<b>Mass of dry sample (kg)</b>	0.090	<b>Dry Matter Content (%)</b>	71.8
<b>Particle Size &lt;4mm</b>	>95%		

### Case

<b>SDG</b>	201015-115
<b>Lab Sample Number(s)</b>	23039350
<b>Sampled Date</b>	12-Oct-2020
<b>Customer Sample Ref.</b>	TP319 ES2
<b>Depth (m)</b>	1.20 - 1.30

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	7.04	<3	70.4	<30	-	-	-
Fluoride	0.733	<0.5	7.33	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.00498	<0.0005	0.0498	<0.005	-	-	-
Barium	0.0264	<0.0002	0.264	<0.002	-	-	-
Cadmium	0.0021	<0.00008	0.021	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.0181	<0.0003	0.181	<0.003	-	-	-
Lead	0.000269	<0.0002	0.00269	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.000997	<0.0004	0.00997	<0.004	-	-	-
Selenium	0.00278	<0.001	0.0278	<0.01	-	-	-
Zinc	0.43	<0.001	4.3	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	66.5	<2	665	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	137	<5	1370	<50	-	-	-

### Leach Test Information

Date Prepared	22-Oct-2020
pH (pH Units)	7.75
Conductivity (µS/cm)	178.00
Temperature (°C)	19.30
Volume Leachant (Litres)	0.865

Mcerts Certification does not apply to leachates

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15:30:11 14/12/2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.137  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 50.8  
Dry Matter Content (%) 66.3

#### Case

SDG 201015-115  
Lab Sample Number(s) 23039356  
Sampled Date 12-Oct-2020  
Customer Sample Ref. TP319 ES3  
Depth (m) 2.30 - 2.40

#### Eluate Analysis

	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	2.3	<0.5	23	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.0246	<0.0002	0.246	<0.002	-	-	-
Cadmium	0.0327	<0.00008	0.327	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.284	<0.0003	2.84	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.0137	<0.0004	0.137	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	12.6	<0.00394	126	<0.0394	-	-	-
Chloride	2.2	<2	22	<20	-	-	-
Sulphate (soluble)	150	<2	1500	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	247	<5	2470	<50	-	-	-

#### Leach Test Information

Date Prepared 22-Oct-2020  
pH (pH Units) 7.42  
Conductivity (µS/cm) 307.00  
Temperature (°C) 17.80  
Volume Leachant (Litres) 0.854

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.131  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 45.5  
Dry Matter Content (%) 68.7

#### Case

SDG 201015-115  
Lab Sample Number(s) 23039363  
Sampled Date 12-Oct-2020  
Customer Sample Ref. TP319 ES5  
Depth (m) 3.50 - 3.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	7.11	<3	71.1	<30	-	-	-
Fluoride	8.47	<2.5	84.7	<25	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.133	<0.00154	1.33	<0.0154	-	-	-
Barium	0.383	<0.0002	3.83	<0.002	-	-	-
Cadmium	0.0000856	<0.00008	0.000856	<0.0008	-	-	-
Chromium	0.00457	<0.001	0.0457	<0.01	-	-	-
Copper	0.00708	<0.0003	0.0708	<0.003	-	-	-
Lead	0.0112	<0.0002	0.112	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.00244	<0.0004	0.0244	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.306	<0.001	3.06	<0.01	-	-	-
Chloride	4.5	<2	45	<20	-	-	-
Sulphate (soluble)	95.8	<2	958	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	164	<5	1640	<50	-	-	-

#### Leach Test Information

Date Prepared 22-Oct-2020  
pH (pH Units) 5.61  
Conductivity (µS/cm) 223.00  
Temperature (°C) 20.50  
Volume Leachant (Litres) 0.860

Mcerts Certification does not apply to leachates

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15:30:11 14/12/2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.122  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 35.7  
Dry Matter Content (%) 73.7

#### Case

SDG 201015-115  
Lab Sample Number(s) 23039368  
Sampled Date 13-Oct-2020  
Customer Sample Ref. TP008 ES1  
Depth (m) 0.40 - 0.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	3.1	<3	31	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	0.000012	<0.00001	0.00012	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.000967	<0.0005	0.00967	<0.005	-	-	-
Barium	0.367	<0.0002	3.67	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00429	<0.001	0.0429	<0.01	-	-	-
Copper	0.00194	<0.0003	0.0194	<0.003	-	-	-
Lead	0.00407	<0.0002	0.0407	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.000564	<0.0004	0.00564	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.135	<0.001	1.35	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	2.9	<2	29	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	27.9	<5	279	<50	-	-	-

#### Leach Test Information

Date Prepared 22-Oct-2020  
pH (pH Units) 7.84  
Conductivity (µS/cm) 34.10  
Temperature (°C) 16.70  
Volume Leachant (Litres) 0.868

Mcerts Certification does not apply to leachates

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15:30:11 14/12/2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.111
Mass of dry sample (kg)	0.090
Particle Size <4mm	>95%

Site Location	Arklow Bank
Natural Moisture Content (%)	23.7
Dry Matter Content (%)	80.8

### Case

SDG	201015-115
Lab Sample Number(s)	23039374
Sampled Date	13-Oct-2020
Customer Sample Ref.	TP008 ES4
Depth (m)	1.50 - 1.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	0.608	<0.5	6.08	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.00377	<0.0002	0.0377	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.00087	<0.0003	0.0087	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00297	<0.001	0.0297	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	80.9	<5	809	<50	-	-	-

### Leach Test Information

Date Prepared	22-Oct-2020
pH (pH Units)	8.52
Conductivity (µS/cm)	99.50
Temperature (°C)	18.30
Volume Leachant (Litres)	0.879

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.110  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 21.3  
Dry Matter Content (%) 82.5

#### Case

SDG 201015-115  
Lab Sample Number(s) 23039379  
Sampled Date 13-Oct-2020  
Customer Sample Ref. TP009 ES1  
Depth (m) 0.50 - 0.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.00104	<0.0005	0.0104	<0.005	-	-	-
Barium	0.379	<0.0002	3.79	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00339	<0.001	0.0339	<0.01	-	-	-
Copper	0.00196	<0.0003	0.0196	<0.003	-	-	-
Lead	0.00351	<0.0002	0.0351	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.000712	<0.0004	0.00712	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.114	<0.001	1.14	<0.01	-	-	-
Chloride	2.6	<2	26	<20	-	-	-
Sulphate (soluble)	2.6	<2	26	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	49.7	<5	497	<50	-	-	-

#### Leach Test Information

Date Prepared 22-Oct-2020  
pH (pH Units) 8.21  
Conductivity (µS/cm) 33.10  
Temperature (°C) 2.80  
Volume Leachant (Litres) 0.880

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.108  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 20.9  
Dry Matter Content (%) 82.7

#### Case

SDG 201015-115  
Lab Sample Number(s) 23039387  
Sampled Date 13-Oct-2020  
Customer Sample Ref. TP009 ES4  
Depth (m) 1.50 - 1.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	0.678	<0.5	6.78	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.00618	<0.0002	0.0618	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000907	<0.0003	0.00907	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00678	<0.001	0.0678	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	75.6	<5	756	<50	-	-	-

#### Leach Test Information

Date Prepared 22-Oct-2020  
pH (pH Units) 8.59  
Conductivity (µS/cm) 94.20  
Temperature (°C) 17.70  
Volume Leachant (Litres) 0.882

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.106  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 17.3  
Dry Matter Content (%) 85.2

#### Case

SDG 201015-115  
Lab Sample Number(s) 23039392  
Sampled Date 12-Oct-2020  
Customer Sample Ref. TP202 ES4  
Depth (m) 1.40 - 1.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.000909	<0.0005	0.00909	<0.005	-	-	-
Barium	0.063	<0.0002	0.63	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000395	<0.0003	0.00395	<0.003	-	-	-
Lead	0.000395	<0.0002	0.00395	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.00043	<0.0004	0.0043	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00564	<0.001	0.0564	<0.01	-	-	-
Chloride	2.4	<2	24	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	20	<5	200	<50	-	-	-

#### Leach Test Information

Date Prepared 22-Oct-2020  
pH (pH Units) 9.13  
Conductivity (µS/cm) 19.00  
Temperature (°C) 19.50  
Volume Leachant (Litres) 0.884

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

<b>Client Reference</b>		<b>Site Location</b>	Arklow Bank
<b>Mass Sample taken (kg)</b>	0.102	<b>Natural Moisture Content (%)</b>	14
<b>Mass of dry sample (kg)</b>	0.090	<b>Dry Matter Content (%)</b>	87.7
<b>Particle Size &lt;4mm</b>	>95%		

### Case

<b>SDG</b>	201015-115
<b>Lab Sample Number(s)</b>	23039401
<b>Sampled Date</b>	12-Oct-2020
<b>Customer Sample Ref.</b>	TP203 ES1
<b>Depth (m)</b>	0.50 - 0.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	4.31	<3	43.1	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	0.0000125	<0.00001	0.000125	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.00158	<0.0005	0.0158	<0.005	-	-	-
Barium	0.00375	<0.0002	0.0375	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00144	<0.001	0.0144	<0.01	-	-	-
Copper	0.0023	<0.0003	0.023	<0.003	-	-	-
Lead	0.00105	<0.0002	0.0105	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.000959	<0.0004	0.00959	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00398	<0.001	0.0398	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	14.5	<5	145	<50	-	-	-

### Leach Test Information

Date Prepared	22-Oct-2020
pH (pH Units)	7.65
Conductivity (µS/cm)	13.60
Temperature (°C)	20.30
Volume Leachant (Litres)	0.888

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

<b>Client Reference</b>		<b>Site Location</b>	Arklow Bank
<b>Mass Sample taken (kg)</b>	0.110	<b>Natural Moisture Content (%)</b>	21.3
<b>Mass of dry sample (kg)</b>	0.090	<b>Dry Matter Content (%)</b>	82.5
<b>Particle Size &lt;4mm</b>	>95%		

### Case

<b>SDG</b>	201015-115
<b>Lab Sample Number(s)</b>	23039408
<b>Sampled Date</b>	12-Oct-2020
<b>Customer Sample Ref.</b>	TP203 ES4
<b>Depth (m)</b>	1.60 - 1.70

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.003	<0.0005	0.03	<0.005	-	-	-
Barium	0.018	<0.0002	0.18	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000606	<0.0003	0.00606	<0.003	-	-	-
Lead	0.00335	<0.0002	0.0335	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0116	<0.001	0.116	<0.01	-	-	-
Chloride	2.2	<2	22	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	20.5	<5	205	<50	-	-	-

### Leach Test Information

Date Prepared	22-Oct-2020
pH (pH Units)	8.41
Conductivity (µS/cm)	12.50
Temperature (°C)	19.90
Volume Leachant (Litres)	0.880

Mcerts Certification does not apply to leachates

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15:30:11 14/12/2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

<b>Client Reference</b>		<b>Site Location</b>	Arklow Bank
<b>Mass Sample taken (kg)</b>	0.109	<b>Natural Moisture Content (%)</b>	21.1
<b>Mass of dry sample (kg)</b>	0.090	<b>Dry Matter Content (%)</b>	82.5
<b>Particle Size &lt;4mm</b>	>95%		

### Case

<b>SDG</b>	201015-115
<b>Lab Sample Number(s)</b>	23039414
<b>Sampled Date</b>	12-Oct-2020
<b>Customer Sample Ref.</b>	TP311 ES1
<b>Depth (m)</b>	0.40 - 0.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	3.69	<3	36.9	<30	-	-	-
Fluoride	0.657	<0.5	6.57	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.00691	<0.0005	0.0691	<0.005	-	-	-
Barium	0.00827	<0.0002	0.0827	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.00571	<0.0003	0.0571	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	0.0101	<0.003	0.101	<0.03	-	-	-
Nickel	0.000433	<0.0004	0.00433	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	<0.001	<0.001	<0.01	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	139	<2	1390	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	266	<5	2660	<50	-	-	-

### Leach Test Information

Date Prepared	23-Oct-2020
pH (pH Units)	8.50
Conductivity (µS/cm)	348.00
Temperature (°C)	19.10
Volume Leachant (Litres)	0.882

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.103
Mass of dry sample (kg)	0.090
Particle Size <4mm	>95%

Site Location	Arklow Bank
Natural Moisture Content (%)	15.4
Dry Matter Content (%)	86.6

### Case

SDG	201015-115
Lab Sample Number(s)	23039421
Sampled Date	12-Oct-2020
Customer Sample Ref.	TP311 ES2
Depth (m)	1.10 - 1.20

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	3.02	<3	30.2	<30	-	-	-
Fluoride	1.09	<0.5	10.9	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	0.00112	<0.001	0.0112	<0.01	-	-	-
Arsenic	0.00135	<0.0005	0.0135	<0.005	-	-	-
Barium	0.0407	<0.0002	0.407	<0.002	-	-	-
Cadmium	0.000402	<0.00008	0.00402	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.00227	<0.0003	0.0227	<0.003	-	-	-
Lead	0.000519	<0.0002	0.00519	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.0215	<0.0004	0.215	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0178	<0.001	0.178	<0.01	-	-	-
Chloride	2	<2	20	<20	-	-	-
Sulphate (soluble)	1490	<10	14900	<100	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	1550	<5	15500	<50	-	-	-

### Leach Test Information

Date Prepared	22-Oct-2020
pH (pH Units)	6.37
Conductivity (µS/cm)	2,060.00
Temperature (°C)	18.60
Volume Leachant (Litres)	0.887

Mcerts Certification does not apply to leachates

14/12/2020 15:31:58

15:30:11 14/12/2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.133  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 47.7  
Dry Matter Content (%) 67.7

#### Case

SDG 201015-115  
Lab Sample Number(s) 23039427  
Sampled Date 12-Oct-2020  
Customer Sample Ref. TP311 ES4  
Depth (m) 2.10 - 2.20

#### Eluate Analysis

	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	3.38	<3	33.8	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.00874	<0.0002	0.0874	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.00144	<0.0003	0.0144	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00285	<0.001	0.0285	<0.01	-	-	-
Chloride	2.4	<2	24	<20	-	-	-
Sulphate (soluble)	49.7	<2	497	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	131	<5	1310	<50	-	-	-

#### Leach Test Information

Date Prepared 23-Oct-2020  
pH (pH Units) 7.97  
Conductivity (µS/cm) 170.00  
Temperature (°C) 18.10  
Volume Leachant (Litres) 0.858

Mcerts Certification does not apply to leachates

14/12/2020 15:31:58

15:30:11 14/12/2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.164  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 81.7  
Dry Matter Content (%) 55

#### Case

SDG 201015-115  
Lab Sample Number(s) 23039434  
Sampled Date 12-Oct-2020  
Customer Sample Ref. TP311 ES4  
Depth (m) 3.10 - 3.20

#### Eluate Analysis

	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	4.22	<3	42.2	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	0.00109	<0.001	0.0109	<0.01	-	-	-
Arsenic	0.0807	<0.0005	0.807	<0.005	-	-	-
Barium	0.228	<0.0002	2.28	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00135	<0.001	0.0135	<0.01	-	-	-
Copper	0.00323	<0.0003	0.0323	<0.003	-	-	-
Lead	0.00282	<0.0002	0.0282	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.00158	<0.0004	0.0158	<0.004	-	-	-
Selenium	0.00105	<0.001	0.0105	<0.01	-	-	-
Zinc	0.138	<0.001	1.38	<0.01	-	-	-
Chloride	5.9	<2	59	<20	-	-	-
Sulphate (soluble)	9	<2	90	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	48.2	<5	482	<50	-	-	-

#### Leach Test Information

Date Prepared 22-Oct-2020  
pH (pH Units) 8.72  
Conductivity (µS/cm) 42.70  
Temperature (°C) 18.30  
Volume Leachant (Litres) 0.826

Mcerts Certification does not apply to leachates

14/12/2020 15:31:58

15:30:11 14/12/2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

<b>Client Reference</b>		<b>Site Location</b>	Arklow Bank
<b>Mass Sample taken (kg)</b>	0.117	<b>Natural Moisture Content (%)</b>	29.1
<b>Mass of dry sample (kg)</b>	0.090	<b>Dry Matter Content (%)</b>	77.5
<b>Particle Size &lt;4mm</b>	>95%		

### Case

<b>SDG</b>	201015-115
<b>Lab Sample Number(s)</b>	23039439
<b>Sampled Date</b>	13-Oct-2020
<b>Customer Sample Ref.</b>	TP007 ES1
<b>Depth (m)</b>	0.40 - 0.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	4.38	<3	43.8	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.00129	<0.0005	0.0129	<0.005	-	-	-
Barium	0.0223	<0.0002	0.223	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.0037	<0.001	0.037	<0.01	-	-	-
Copper	0.00322	<0.0003	0.0322	<0.003	-	-	-
Lead	0.00296	<0.0002	0.0296	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.00159	<0.0004	0.0159	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00561	<0.001	0.0561	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	5.3	<2	53	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	41.3	<5	413	<50	-	-	-

### Leach Test Information

Date Prepared	22-Oct-2020
pH (pH Units)	8.53
Conductivity (µS/cm)	58.60
Temperature (°C)	19.80
Volume Leachant (Litres)	0.873

Mcerts Certification does not apply to leachates

14/12/2020 15:31:58

15:30:11 14/12/2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579794  
Superseded Report:

## Table of Results - Appendix

Method No	Reference	Description
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
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) 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
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
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
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM157	HP 6890 Gas Chromatograph (GC) system and HP 5973 Mass Selective Detector (MSD).	Determination of SVOC in Soils by GC-MS extracted by sonication in DCM/Acetone
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
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
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC
TM410	Shaker extraction-In house coronene method	Determination of Coronene in soils by GCMS
TM414	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID
TM415	Analysis of Petroleum Hydrocarbons in Environmental Media.	Determination of Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).







# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

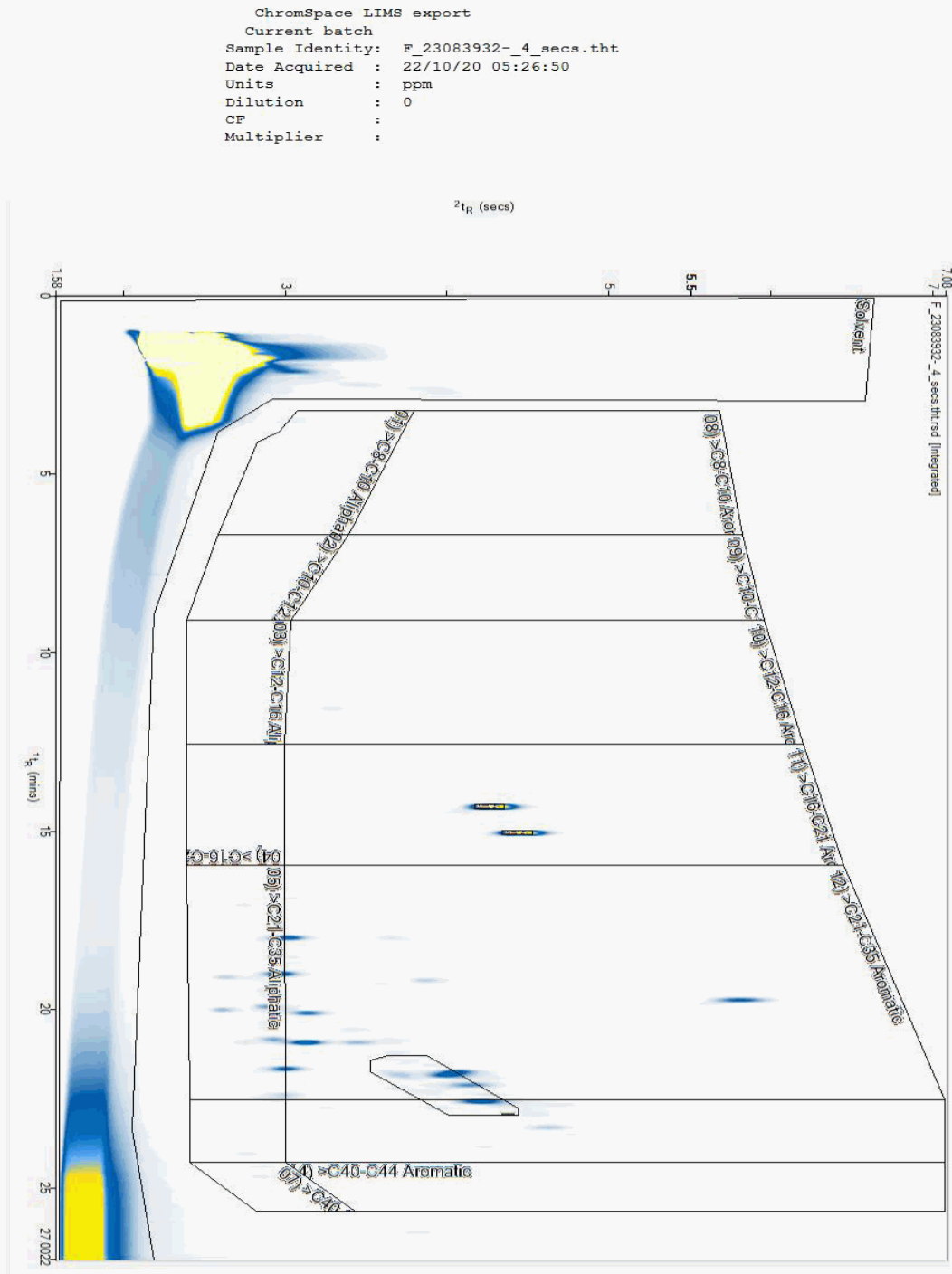
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23083932  
Sample ID : TP319

Depth : 3.50 - 3.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

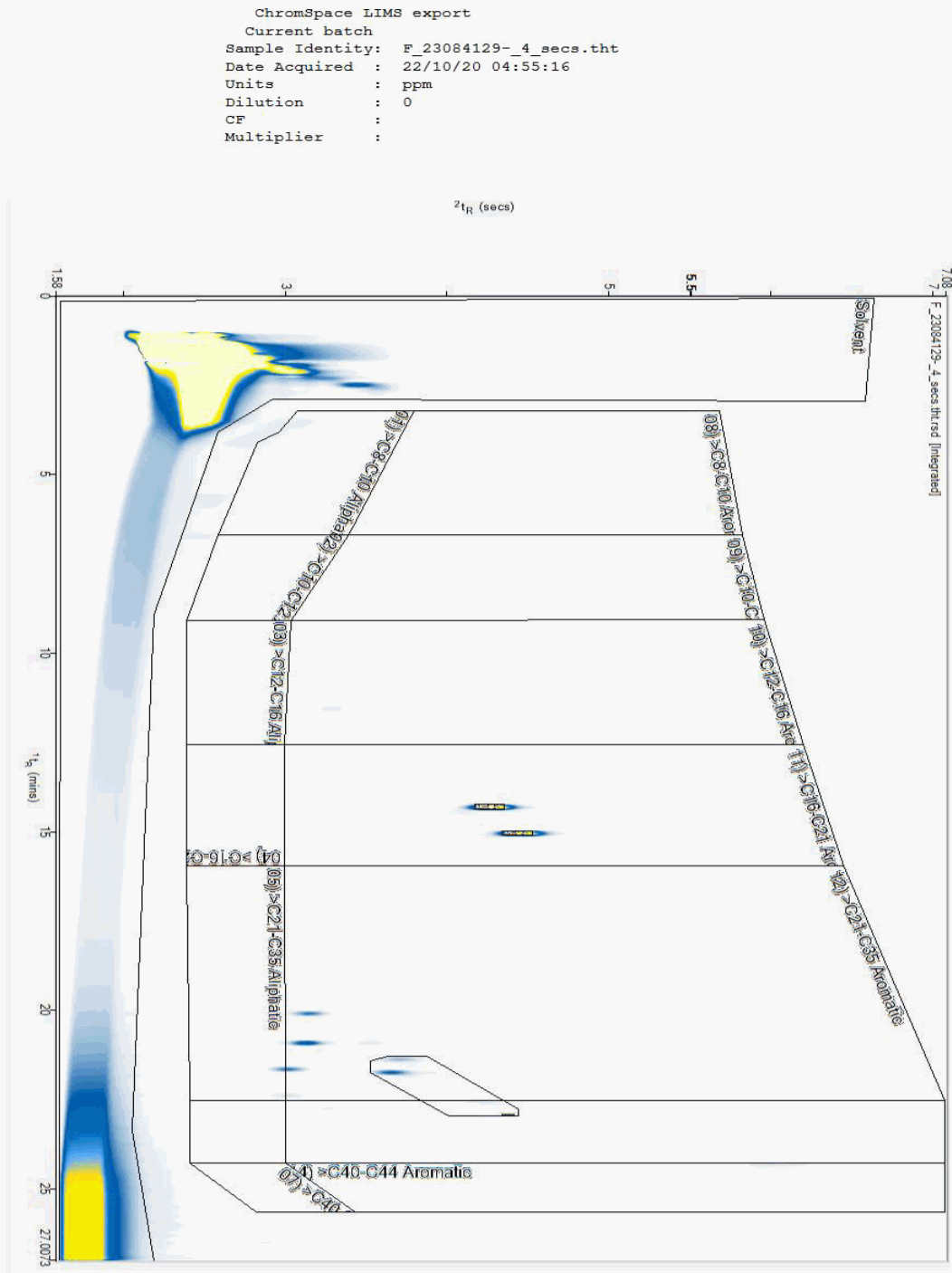
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23084129  
Sample ID : TP319

Depth : 1.20 - 1.30





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

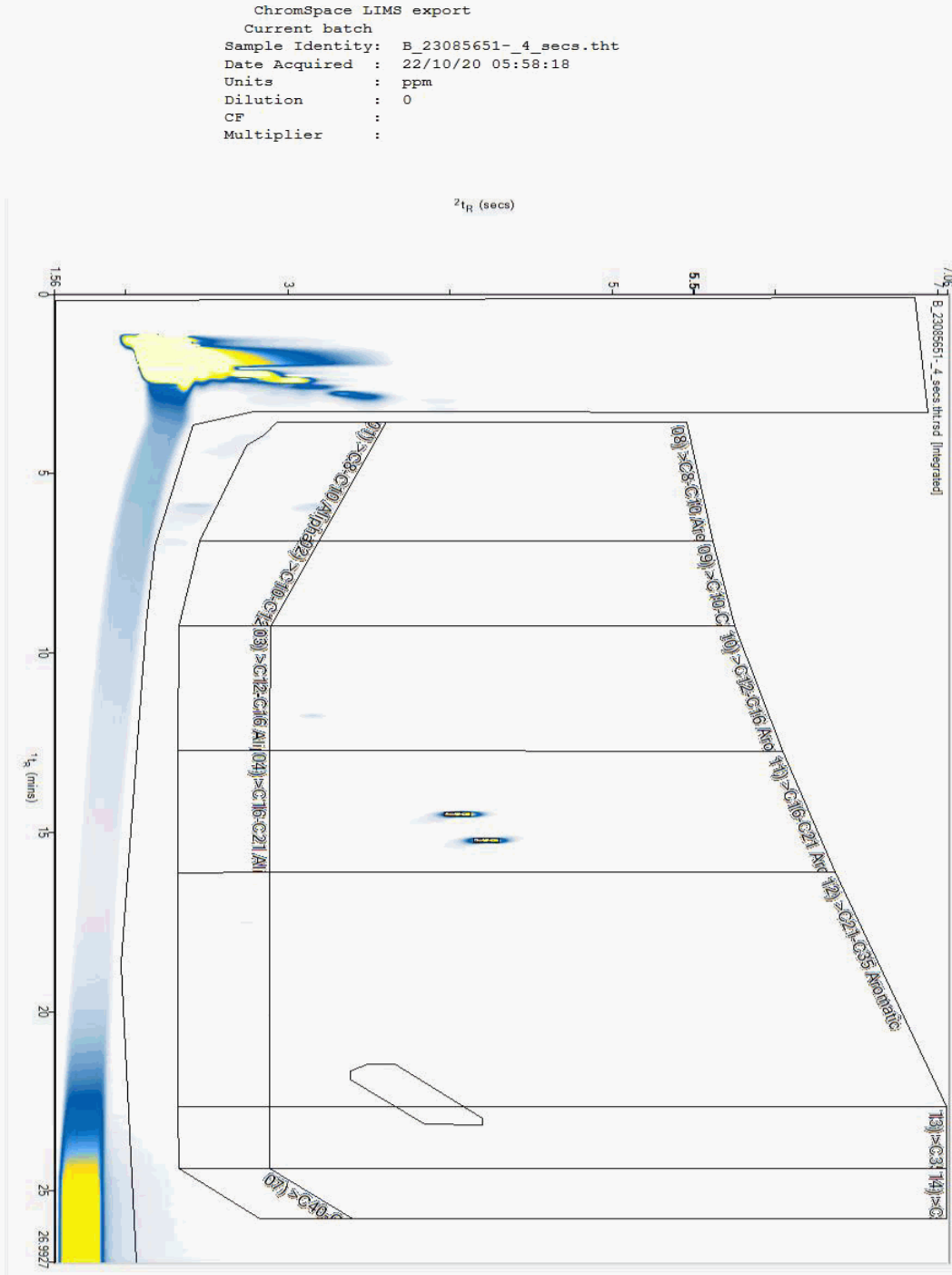
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23085651  
Sample ID : TP008

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

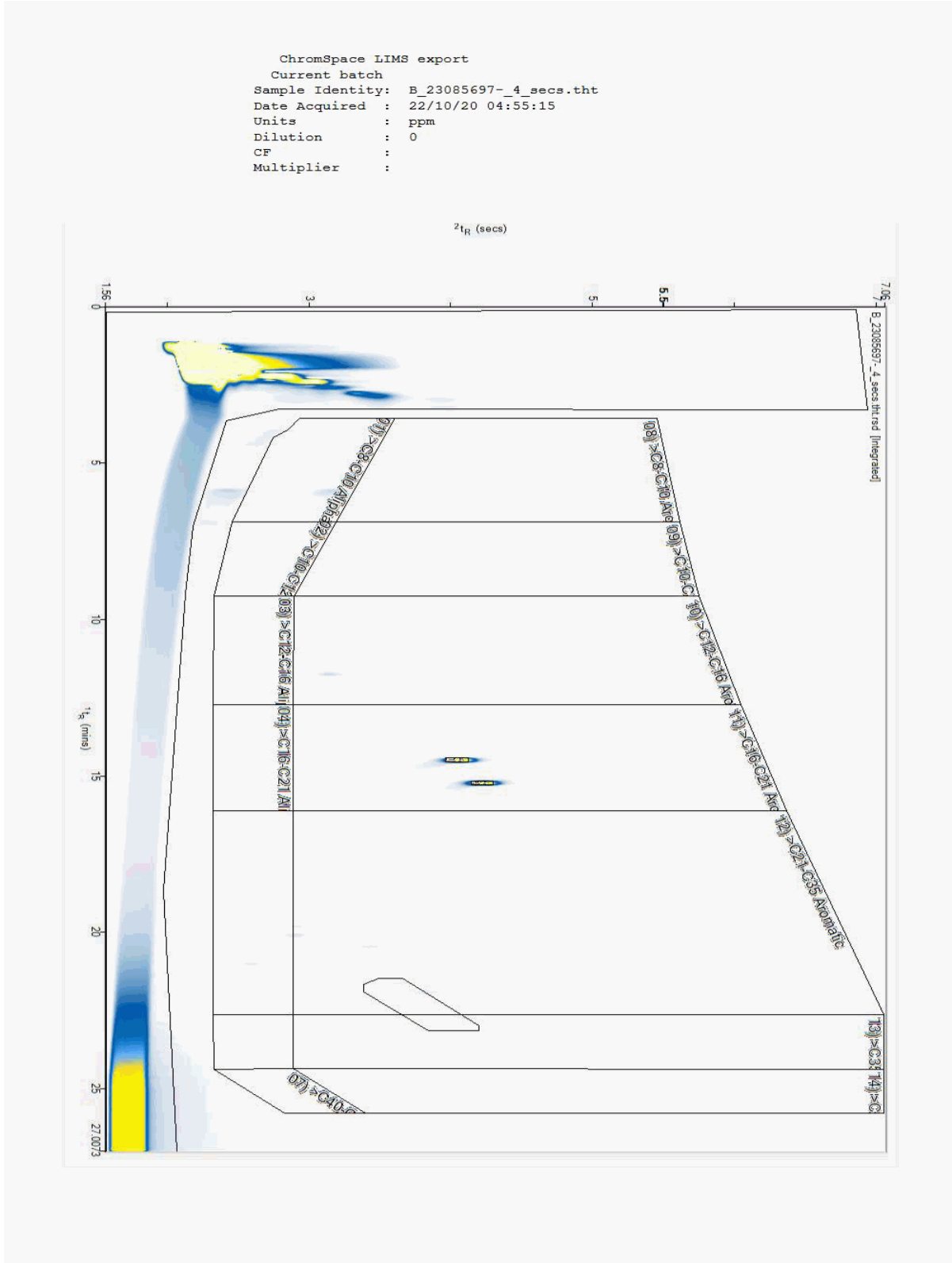
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23085697  
Sample ID : TP007

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

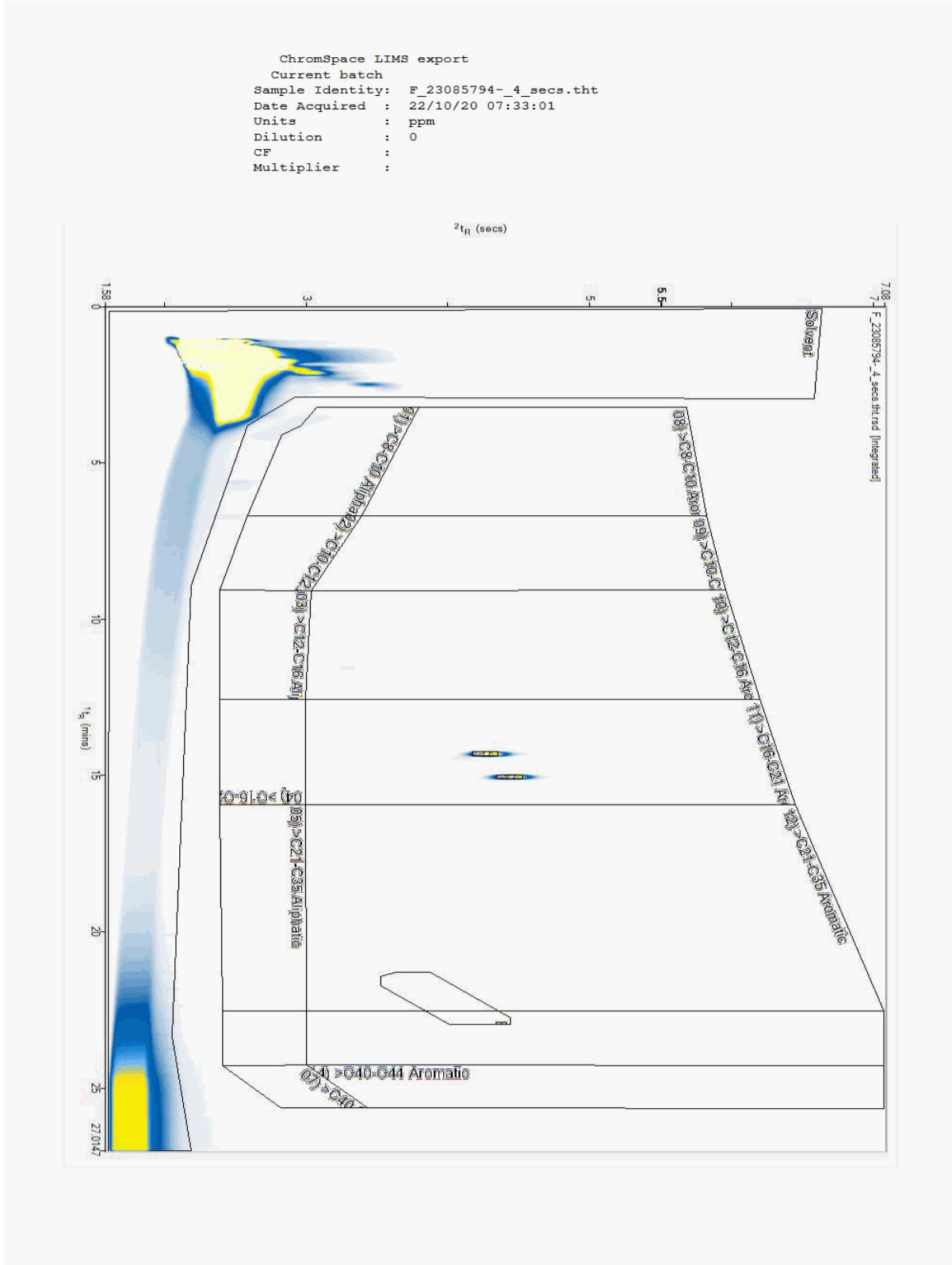
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23085794  
Sample ID : TP319

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

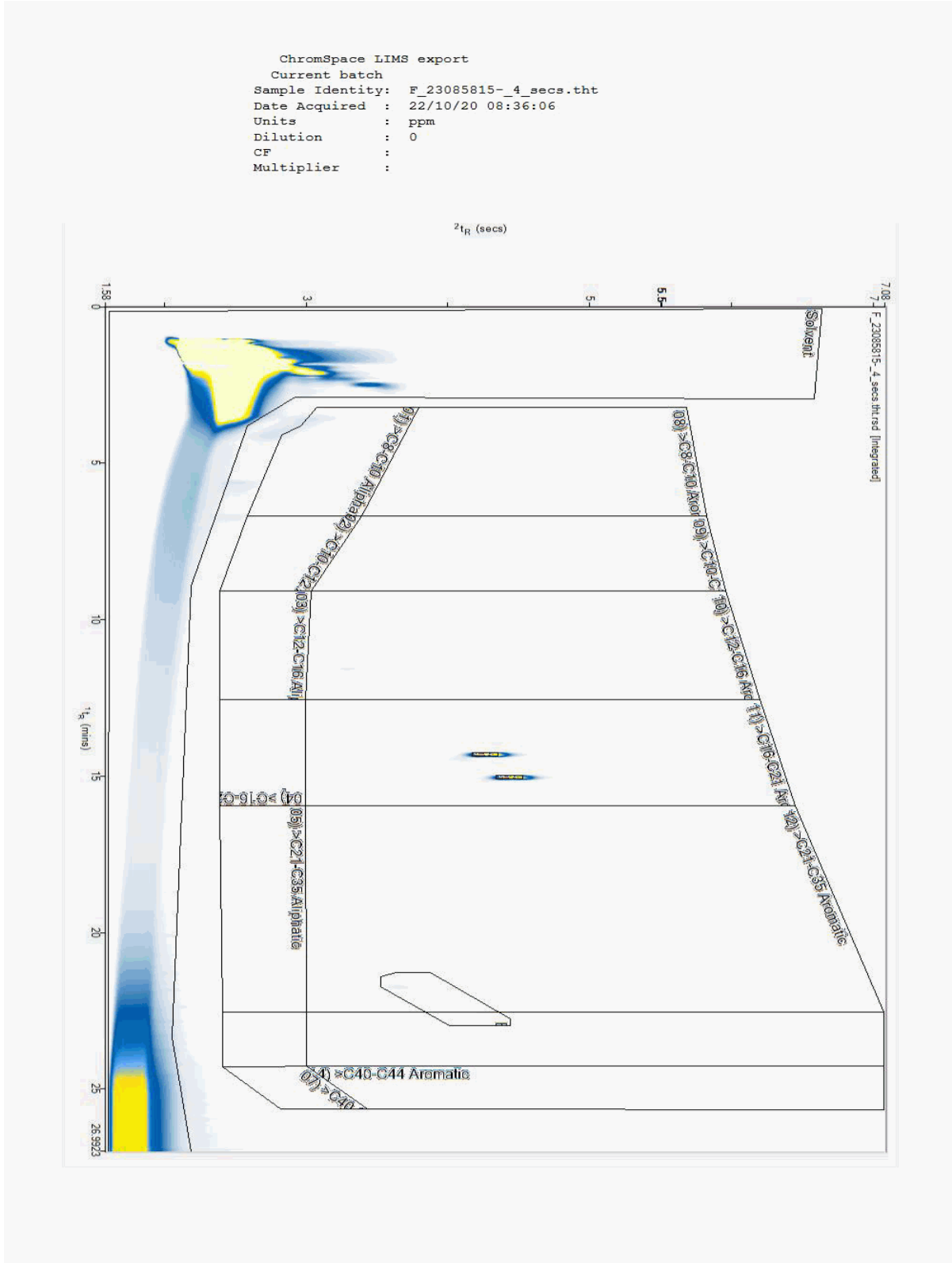
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23085815  
Sample ID : TP319

Depth : 2.30 - 2.40





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

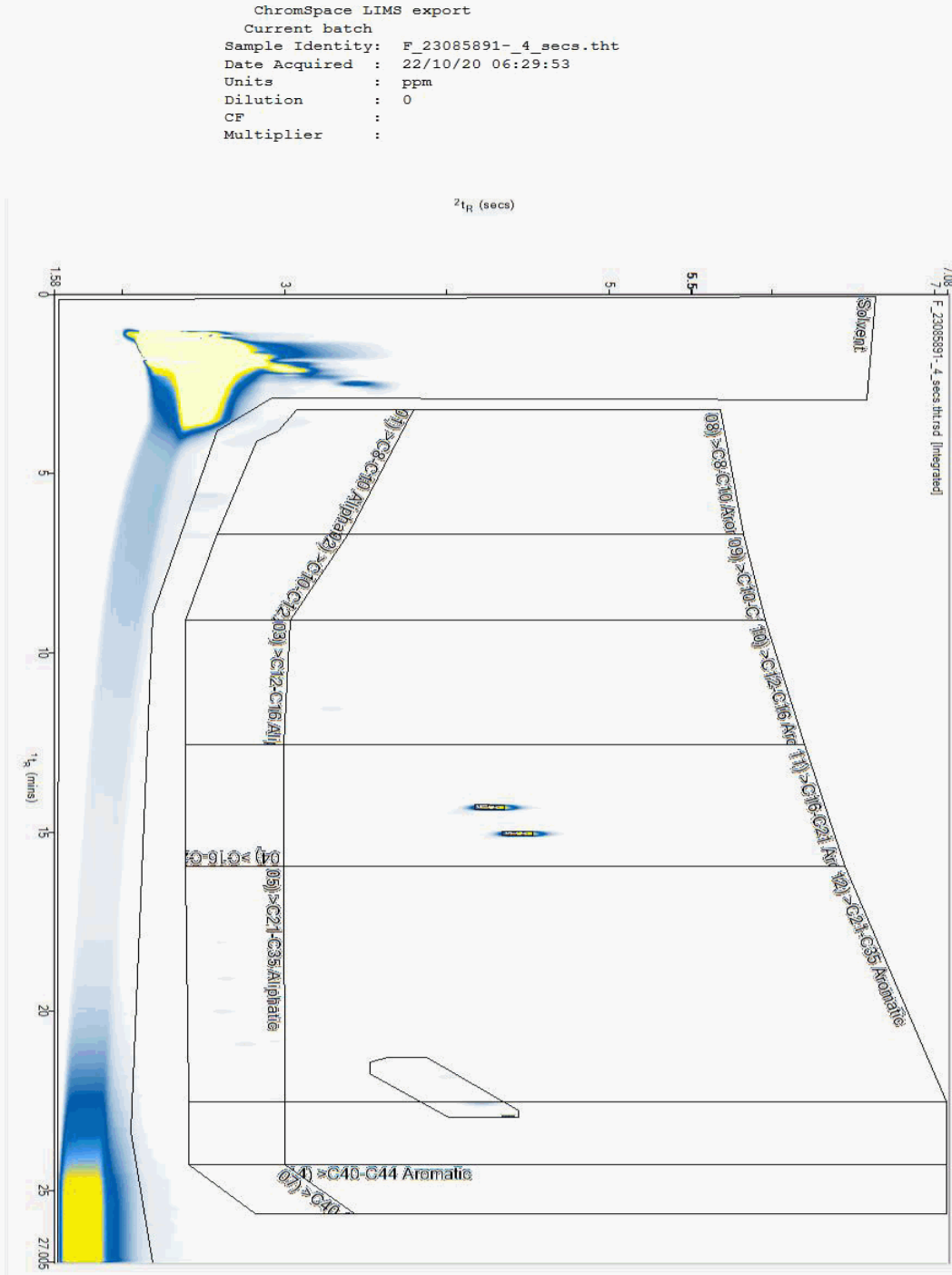
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23085891  
Sample ID : TP008

Depth : 1.50 - 1.60







# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

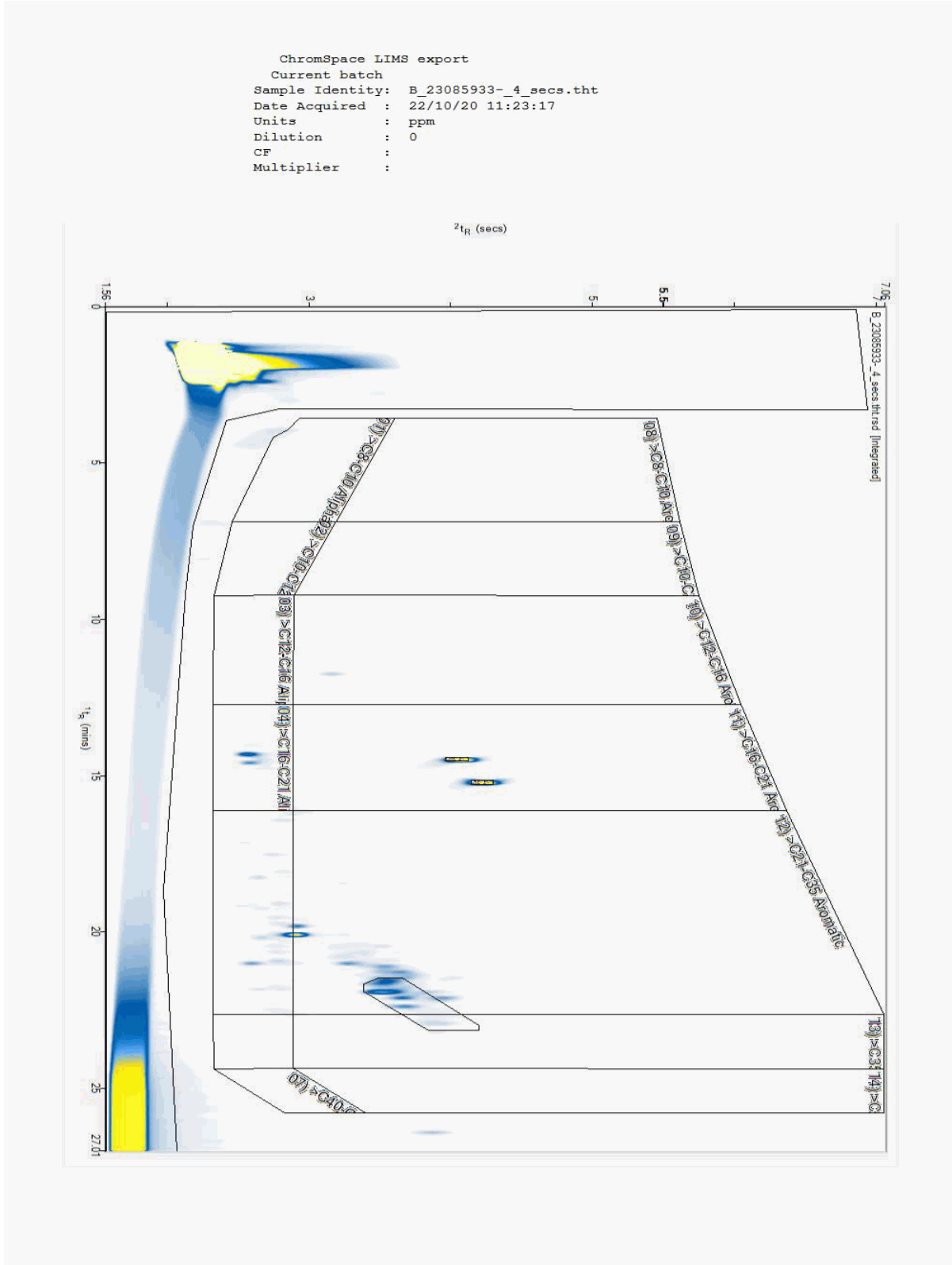
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23085933  
Sample ID : TP311

Depth : 1.10 - 1.20





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

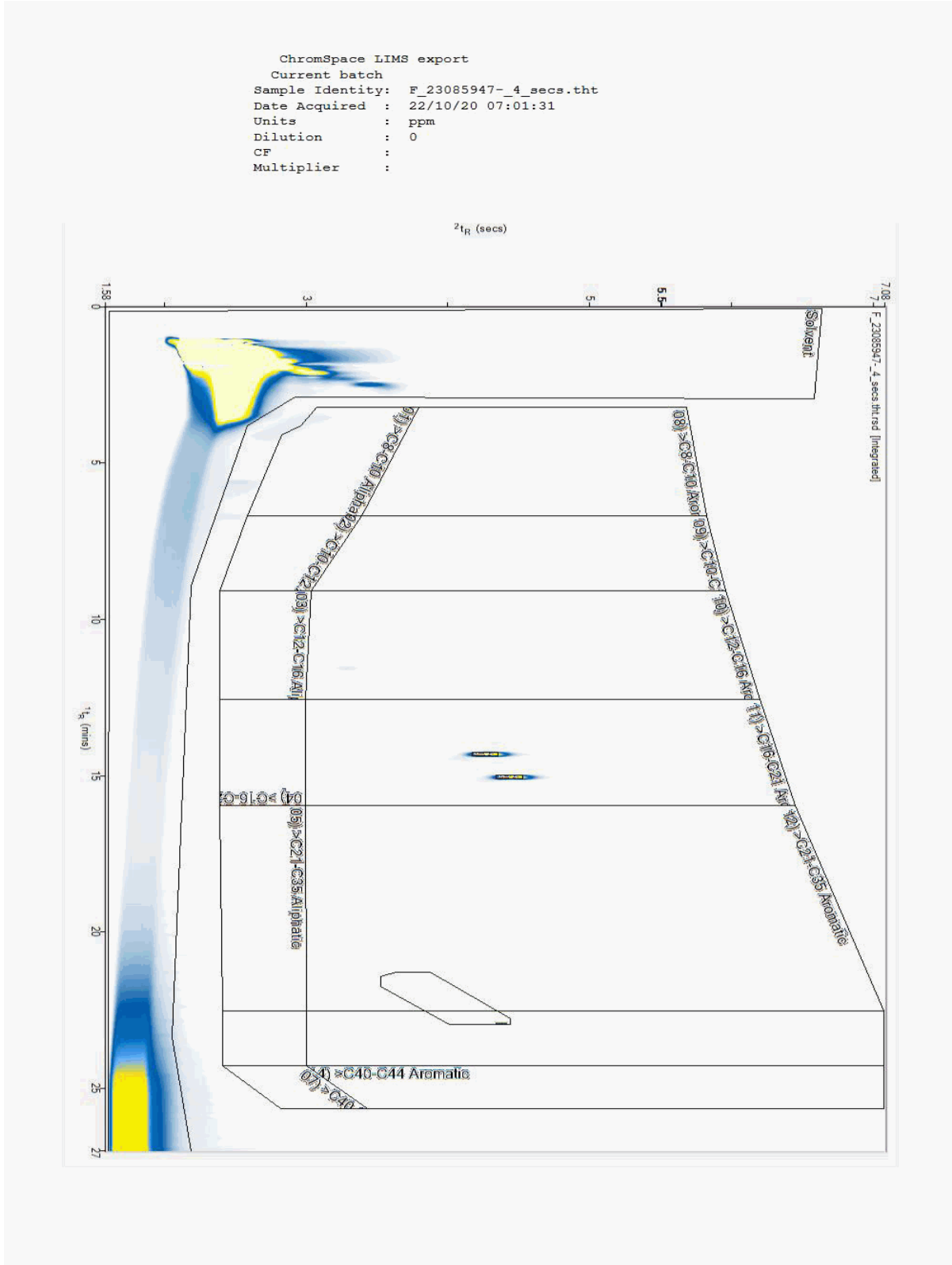
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23085947  
Sample ID : TP009

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

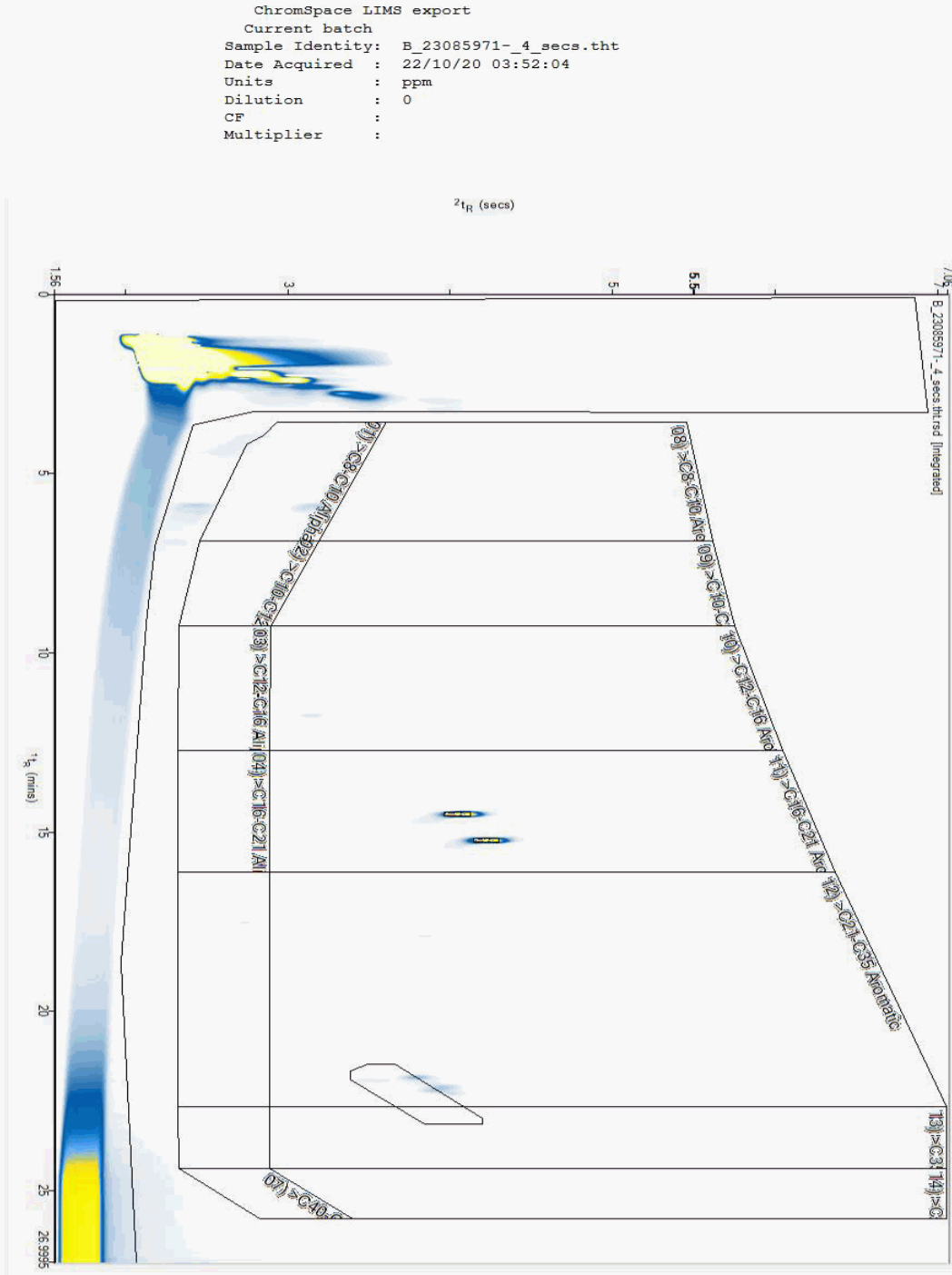
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23085971  
Sample ID : TP203

Depth : 1.60 - 1.70





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

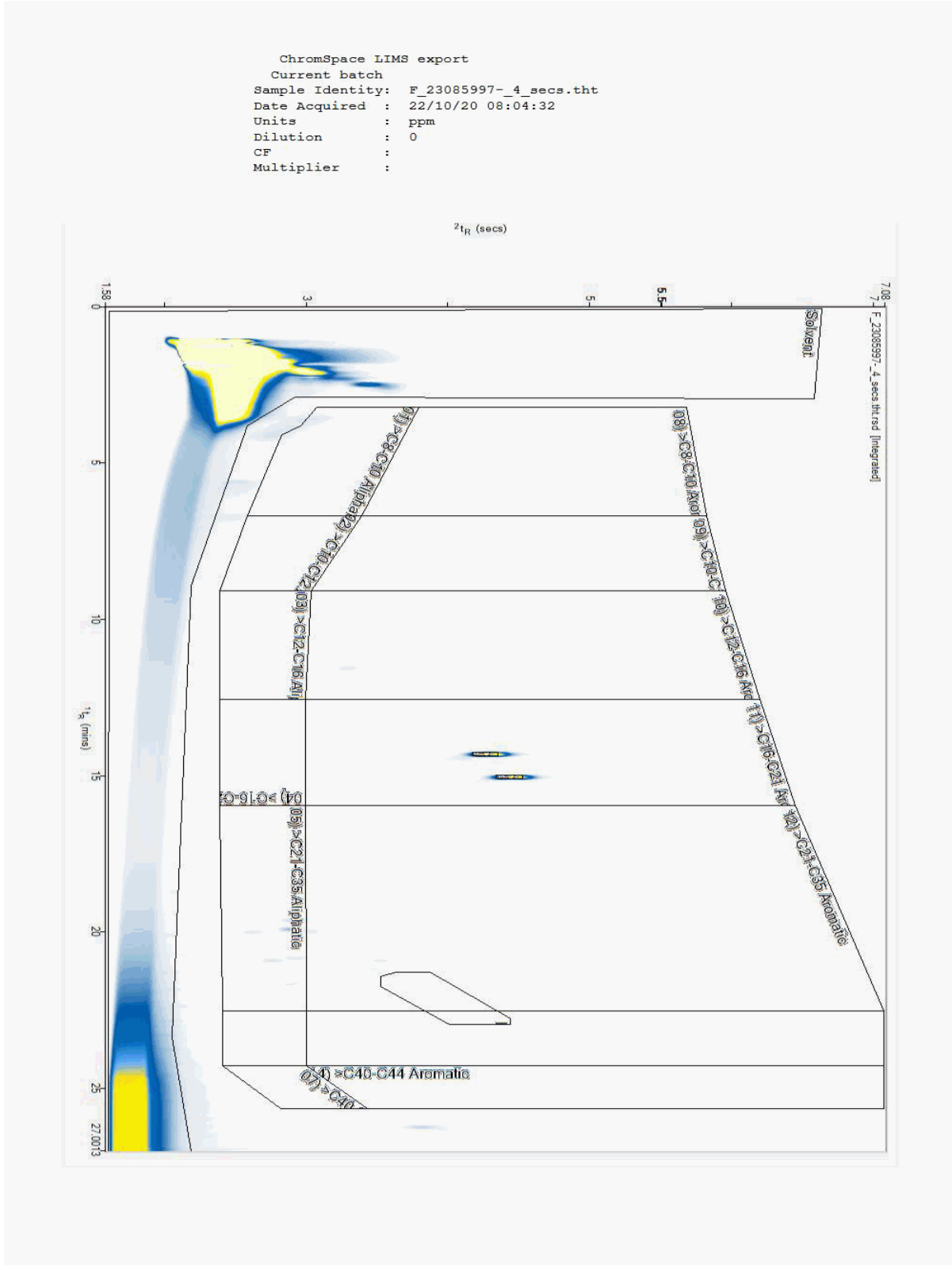
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23085997  
Sample ID : TP202

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

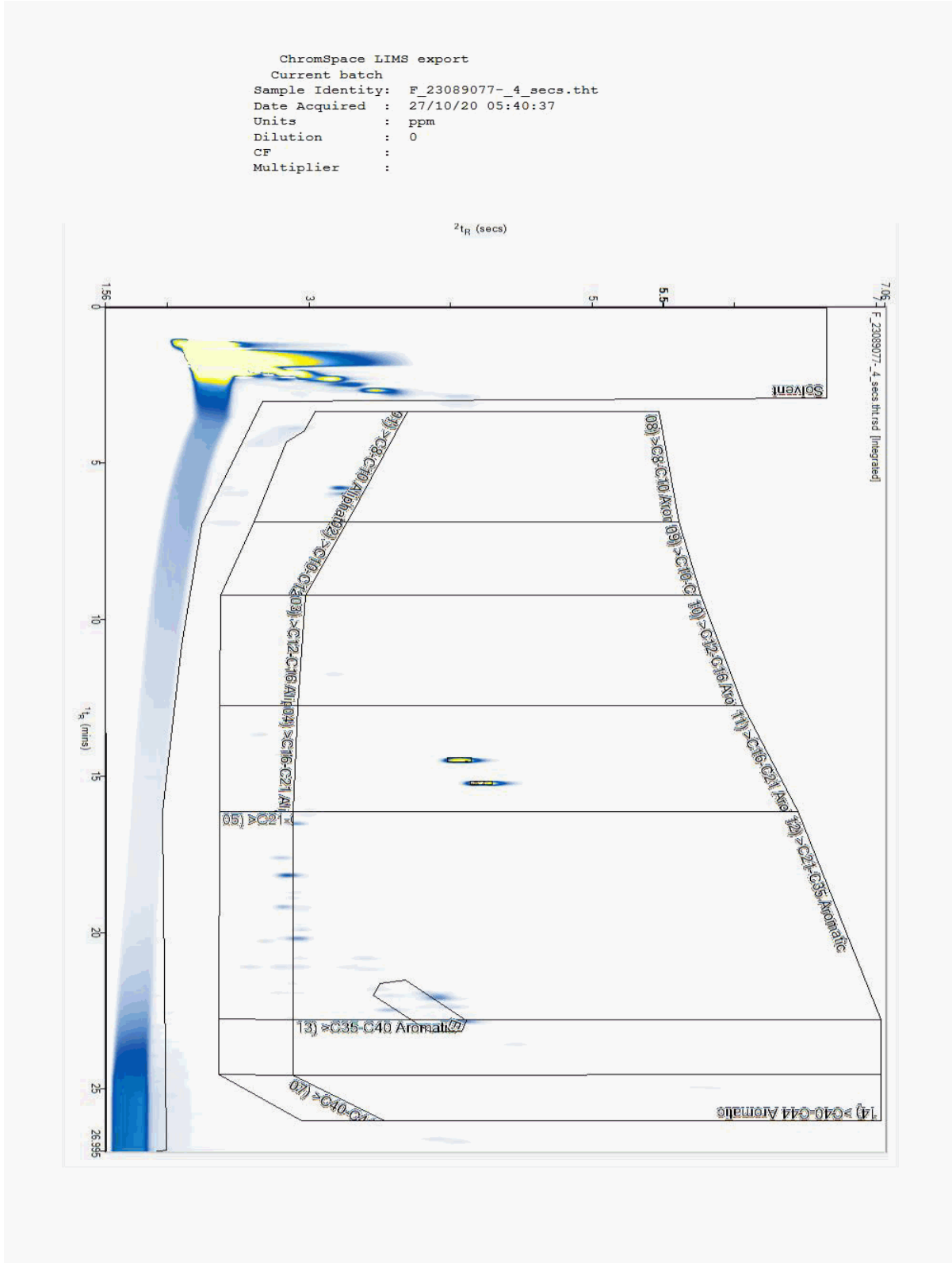
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23089077  
Sample ID : TP203

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

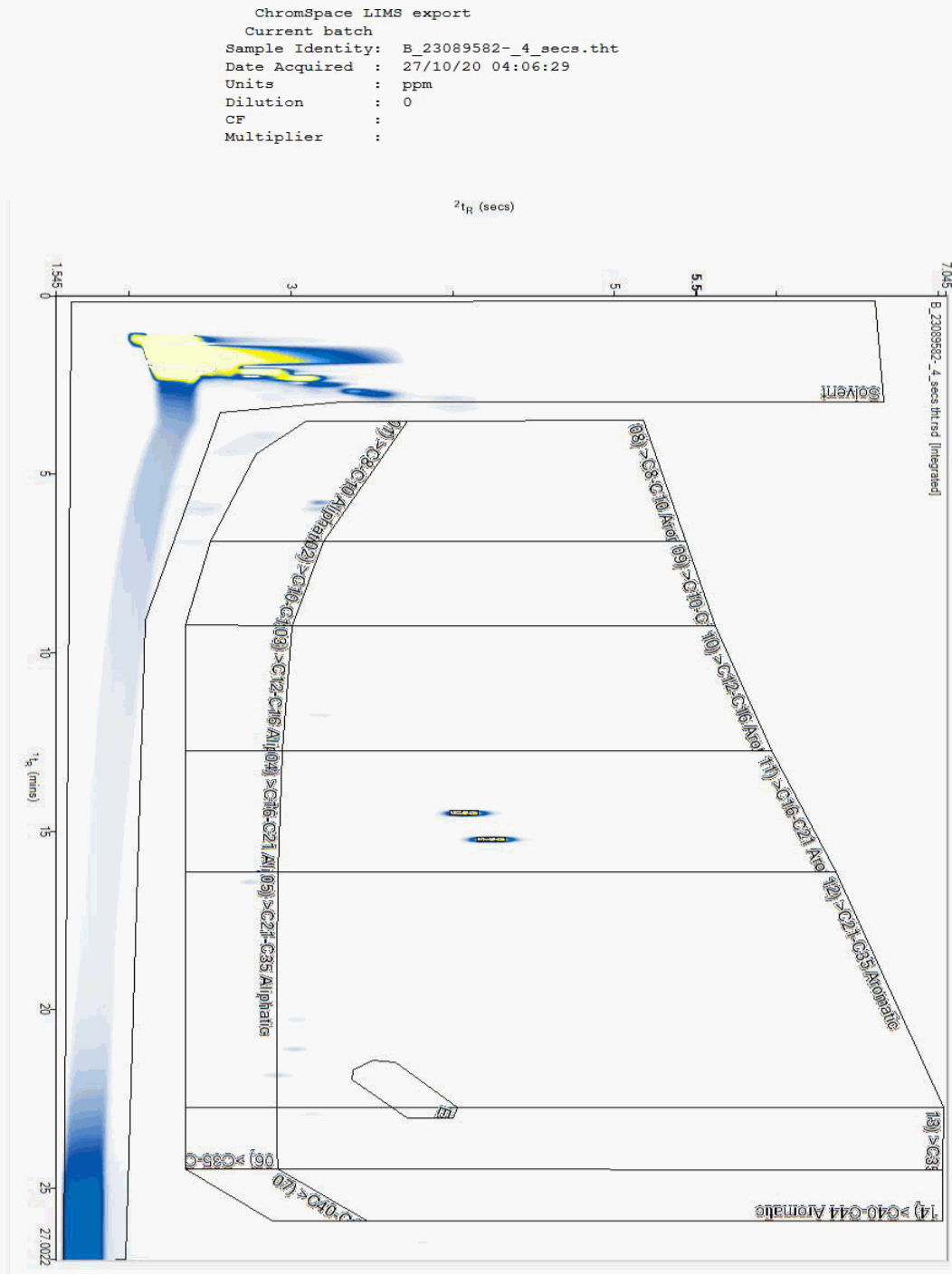
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23089582  
Sample ID : TP311

Depth : 2.10 - 2.20





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

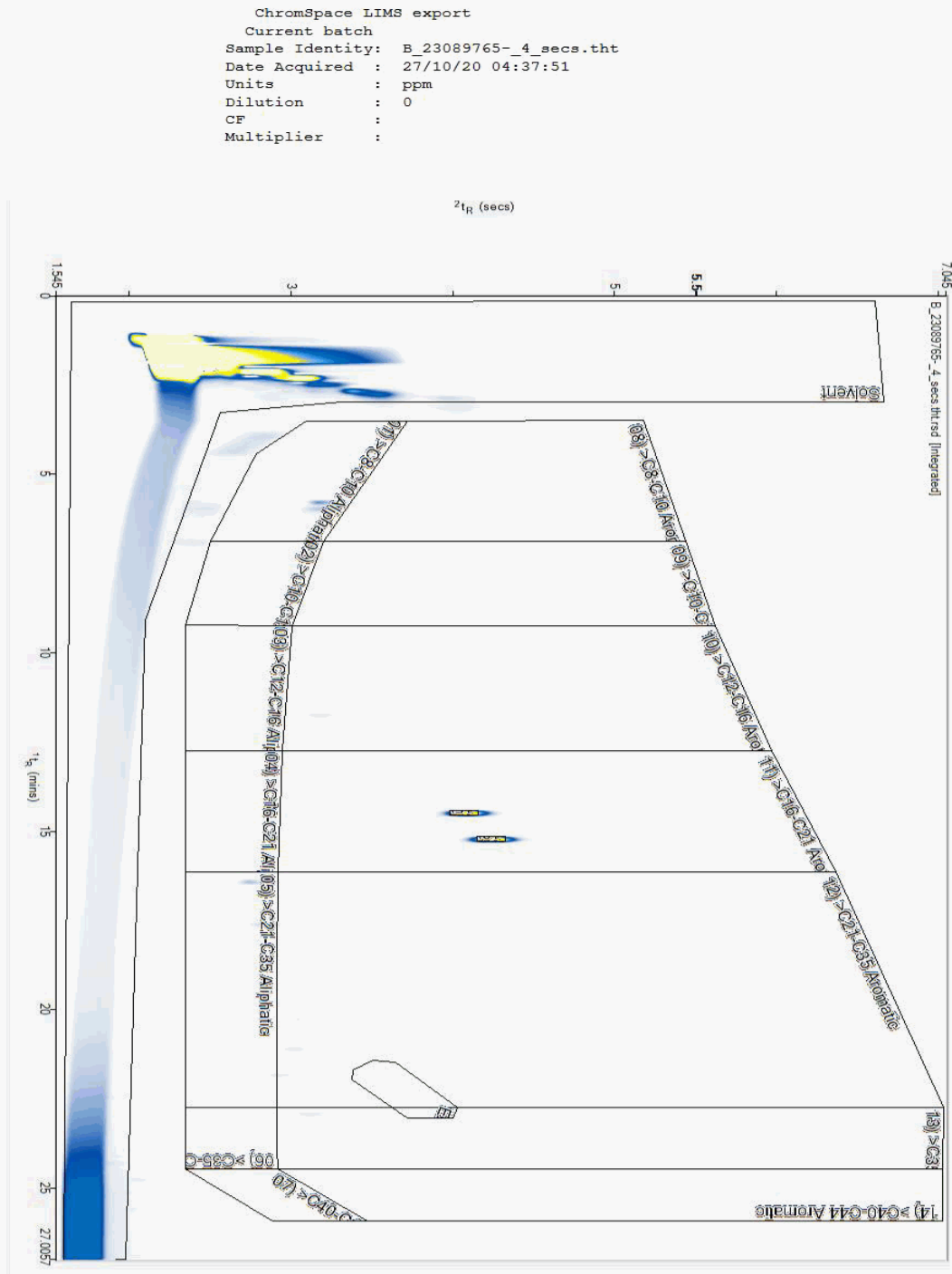
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23089765  
Sample ID : TP202

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

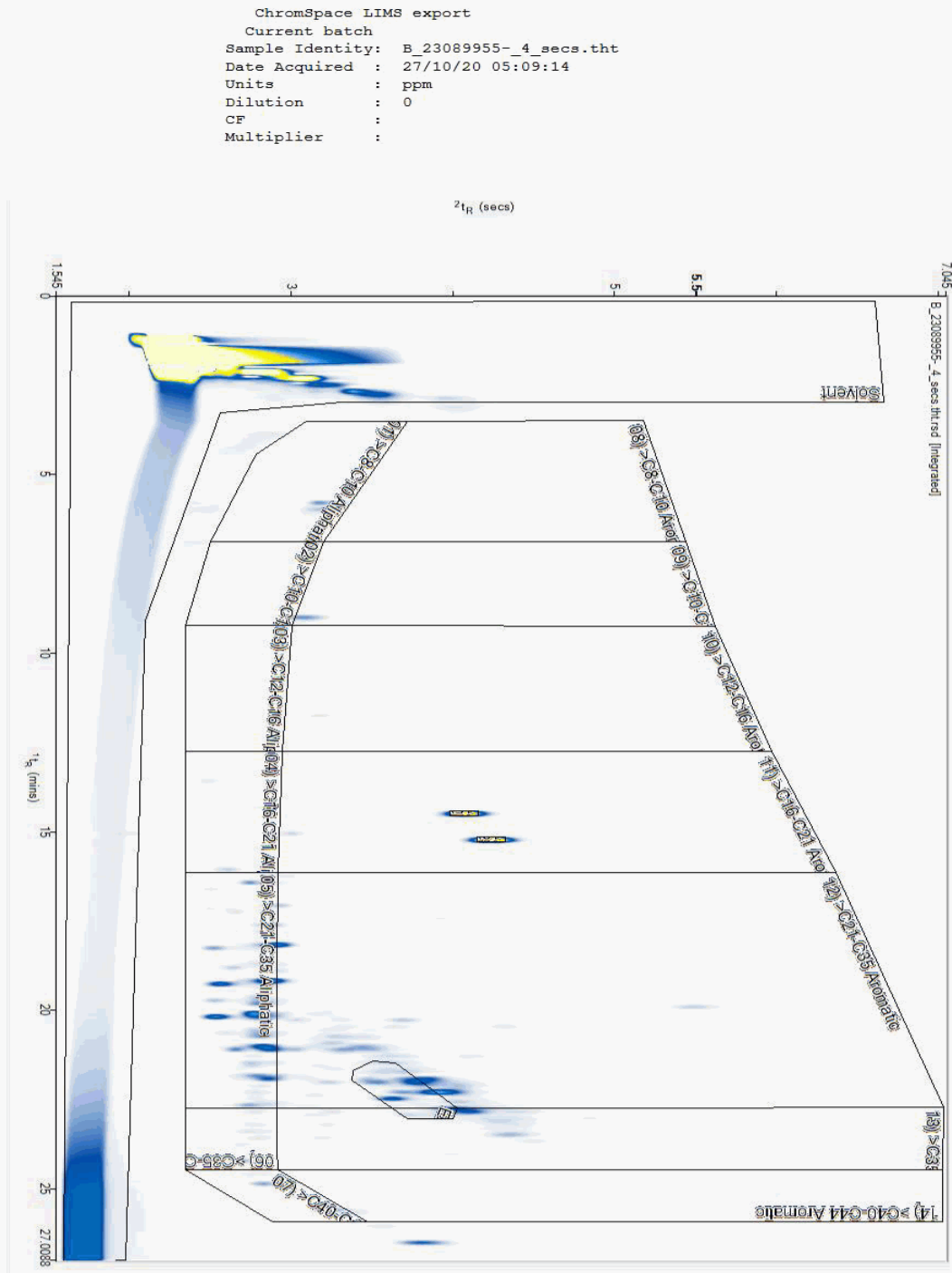
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23089955  
Sample ID : TP311

Depth : 3.10 - 3.20







# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

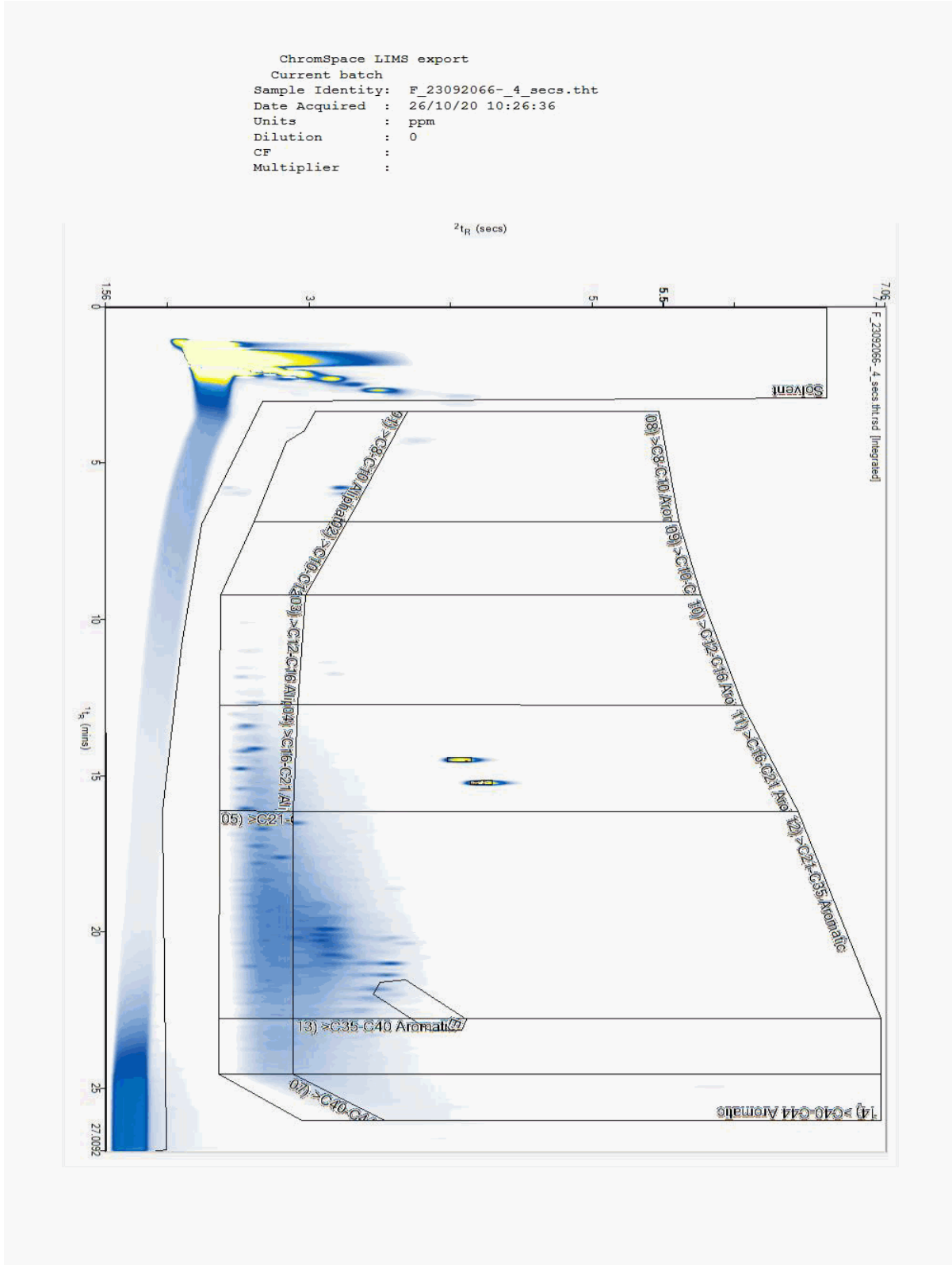
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23092066  
Sample ID : TP311

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

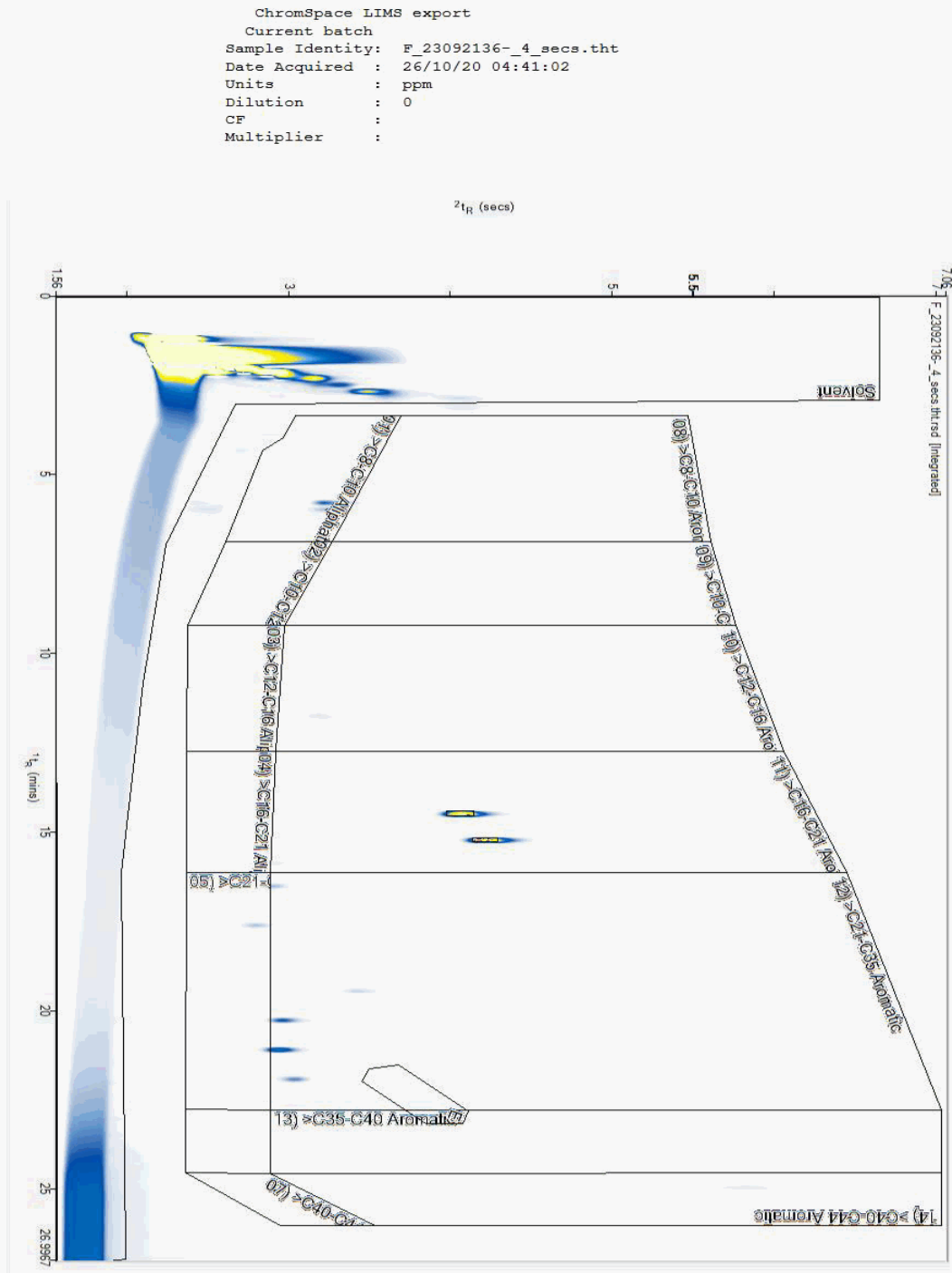
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23092136  
Sample ID : TP009

Depth : 1.50 - 1.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

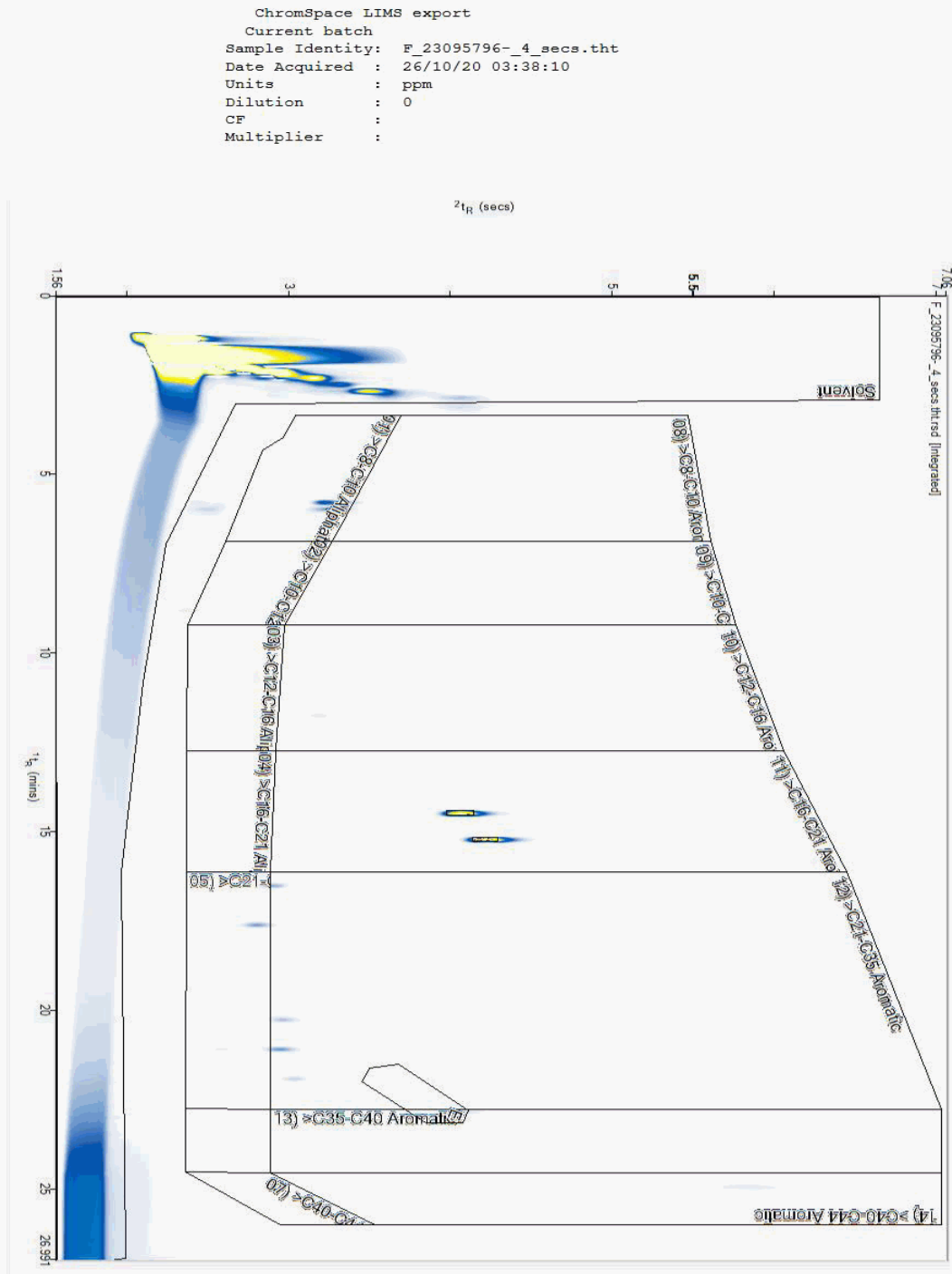
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23095796  
Sample ID : TP007

Depth : 1.50 - 1.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

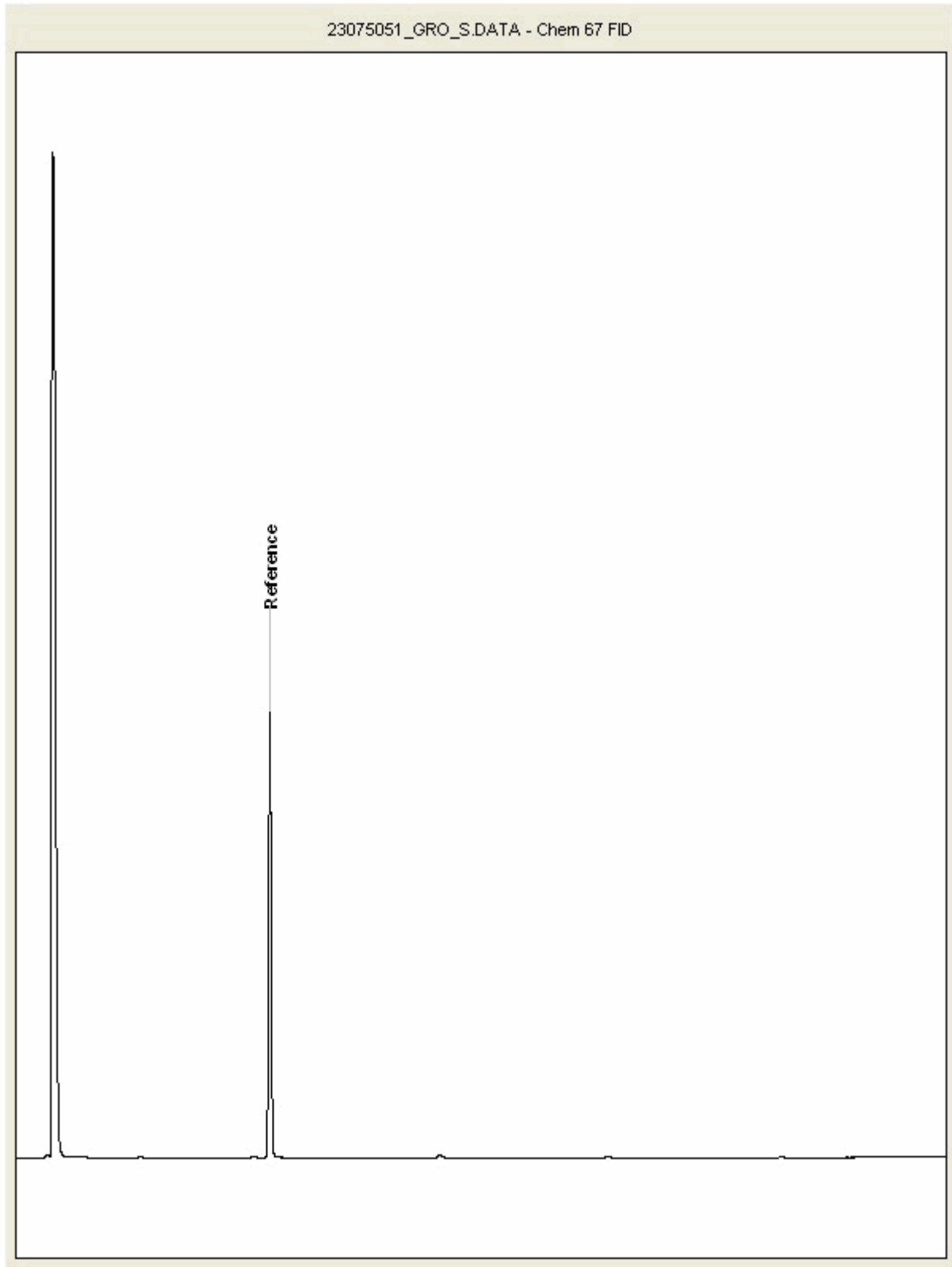
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075051  
Sample ID : TP311

Depth : 2.10 - 2.20





CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

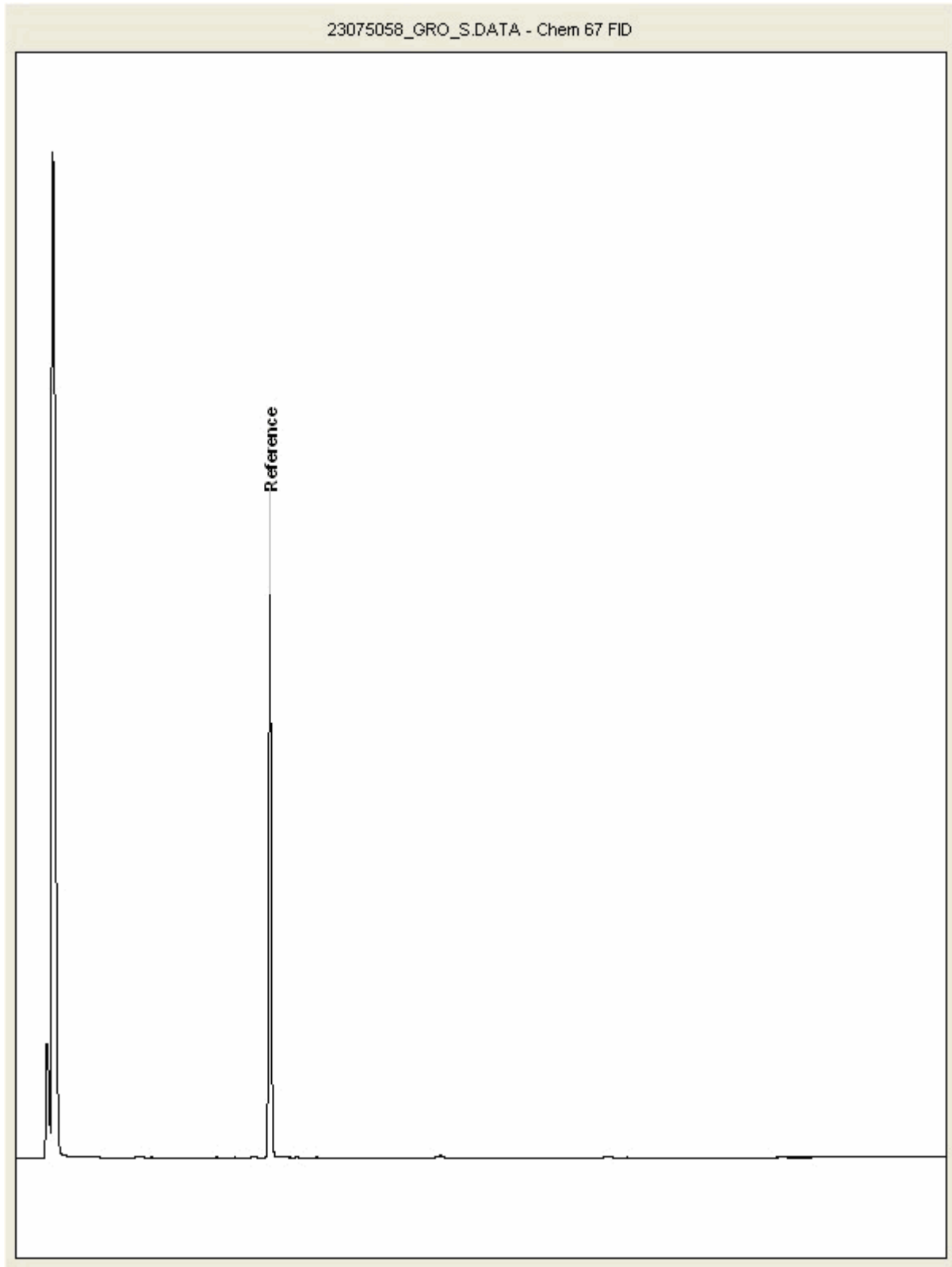
Report Number: 579794  
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075058  
Sample ID : TP311

Depth : 3.10 - 3.20





CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

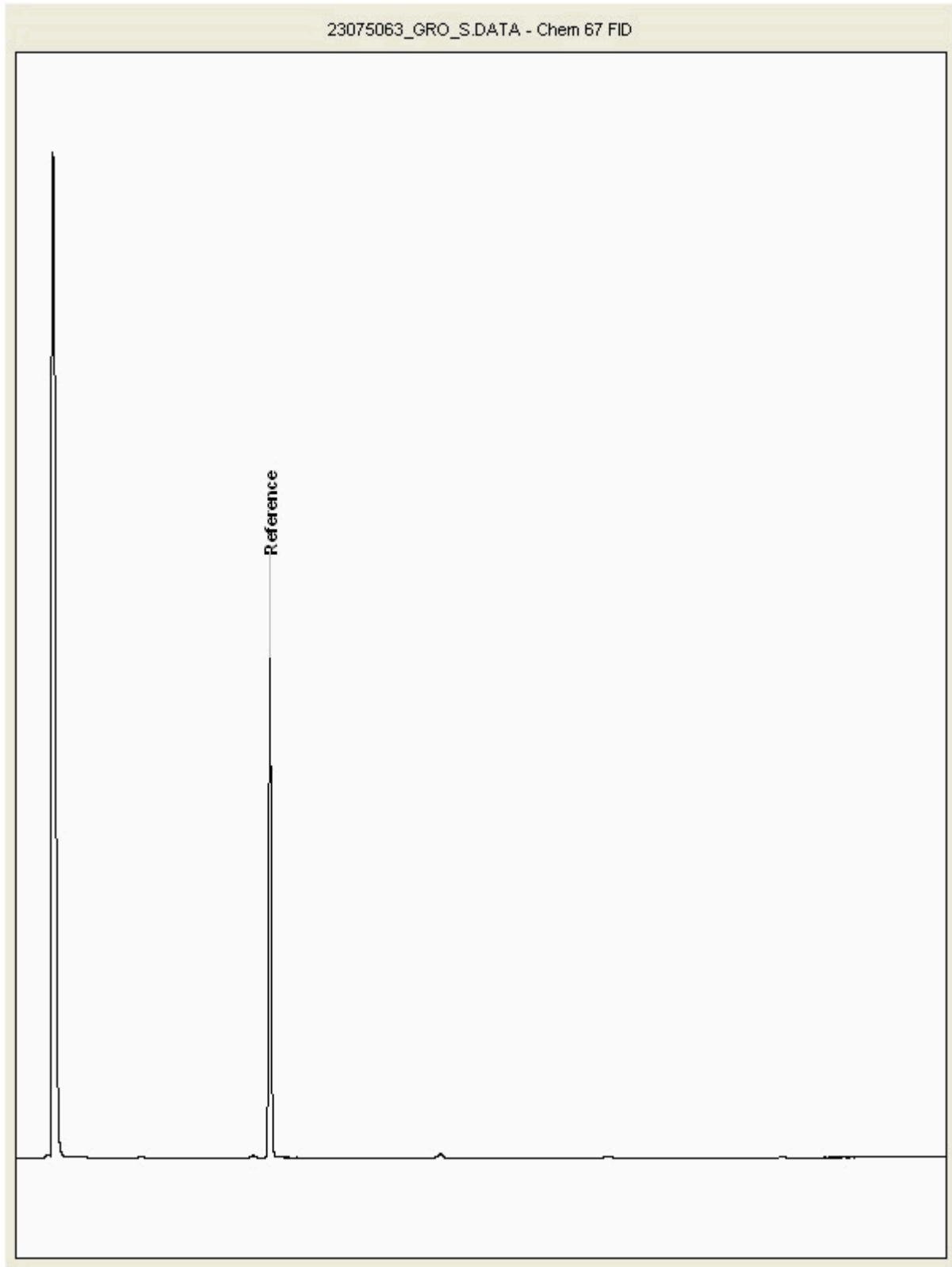
Report Number: 579794  
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075063  
Sample ID : TP009

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

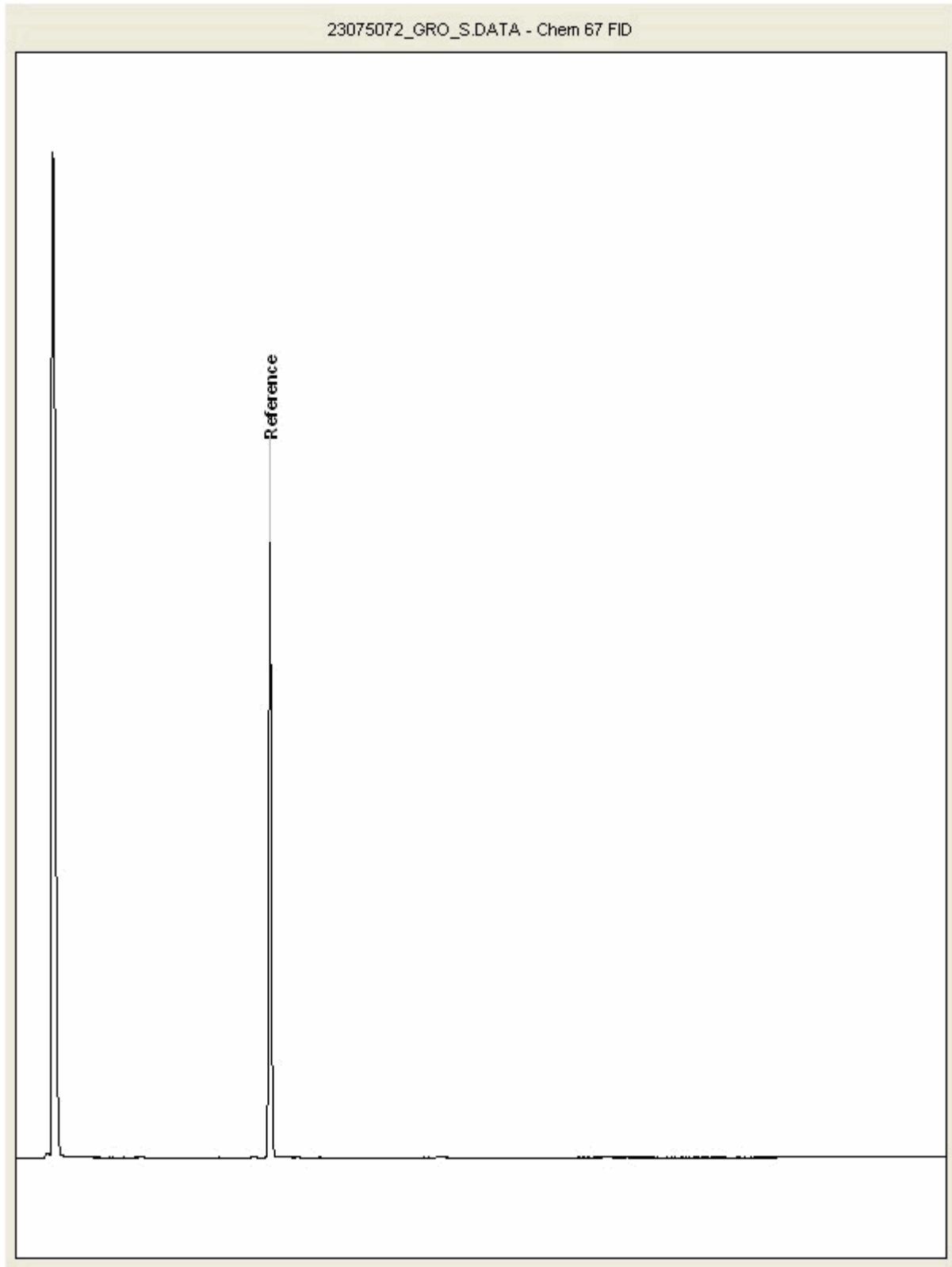
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075072  
Sample ID : TP202

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

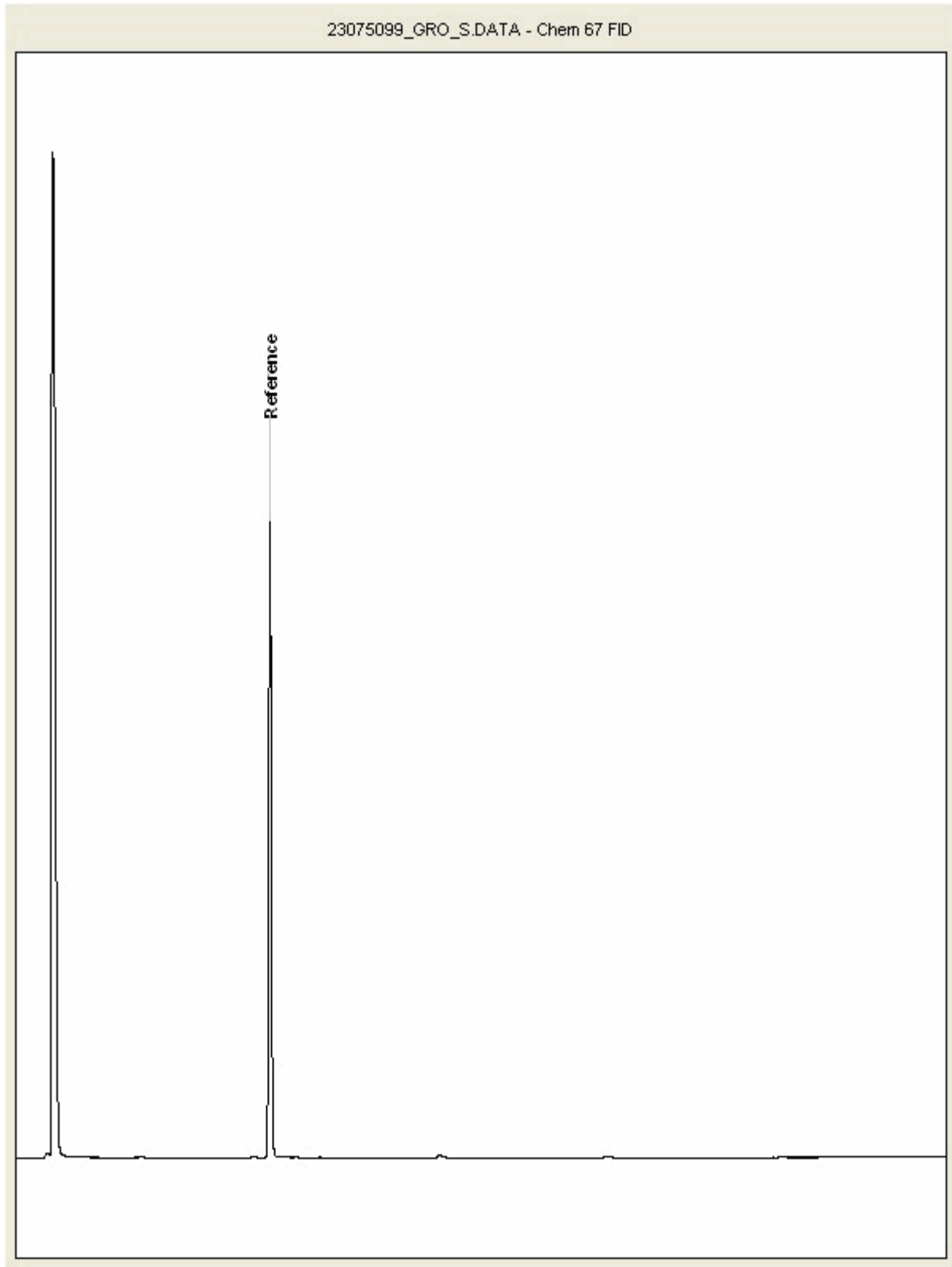
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075099  
Sample ID : TP202

Depth : 1.40 - 1.50







# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

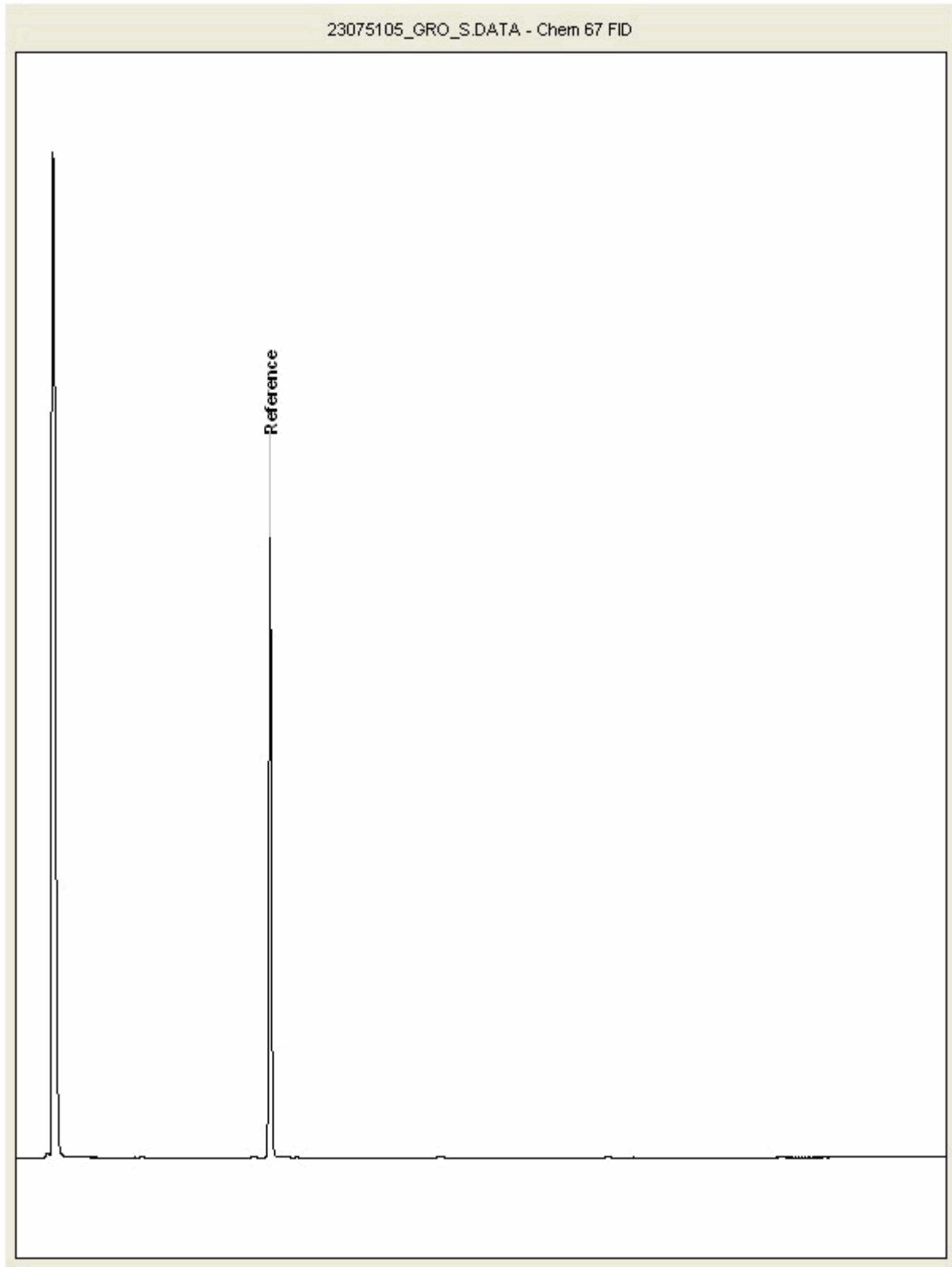
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075105  
Sample ID : TP203

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

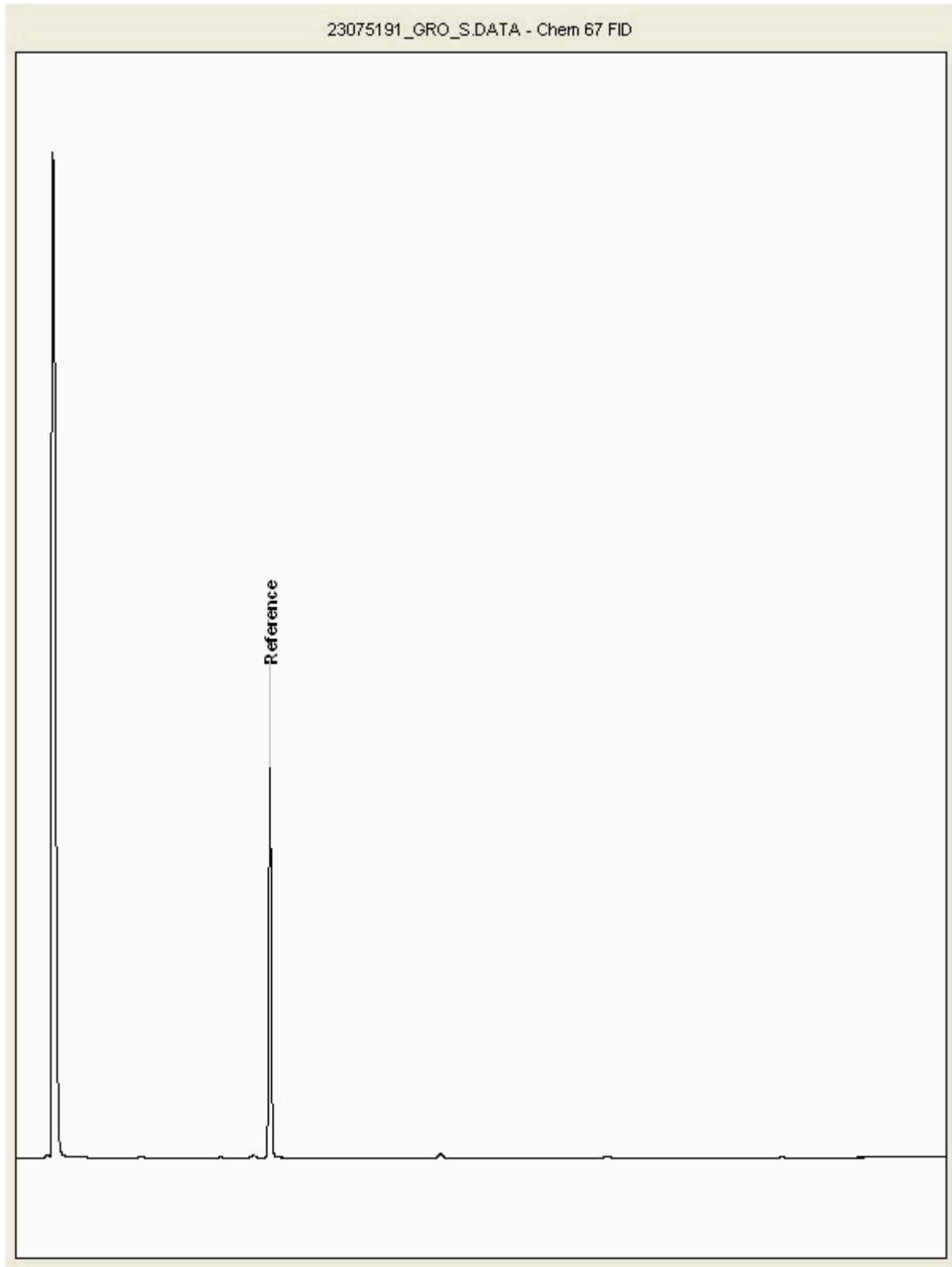
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075191  
Sample ID : TP009

Depth : 1.50 - 1.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

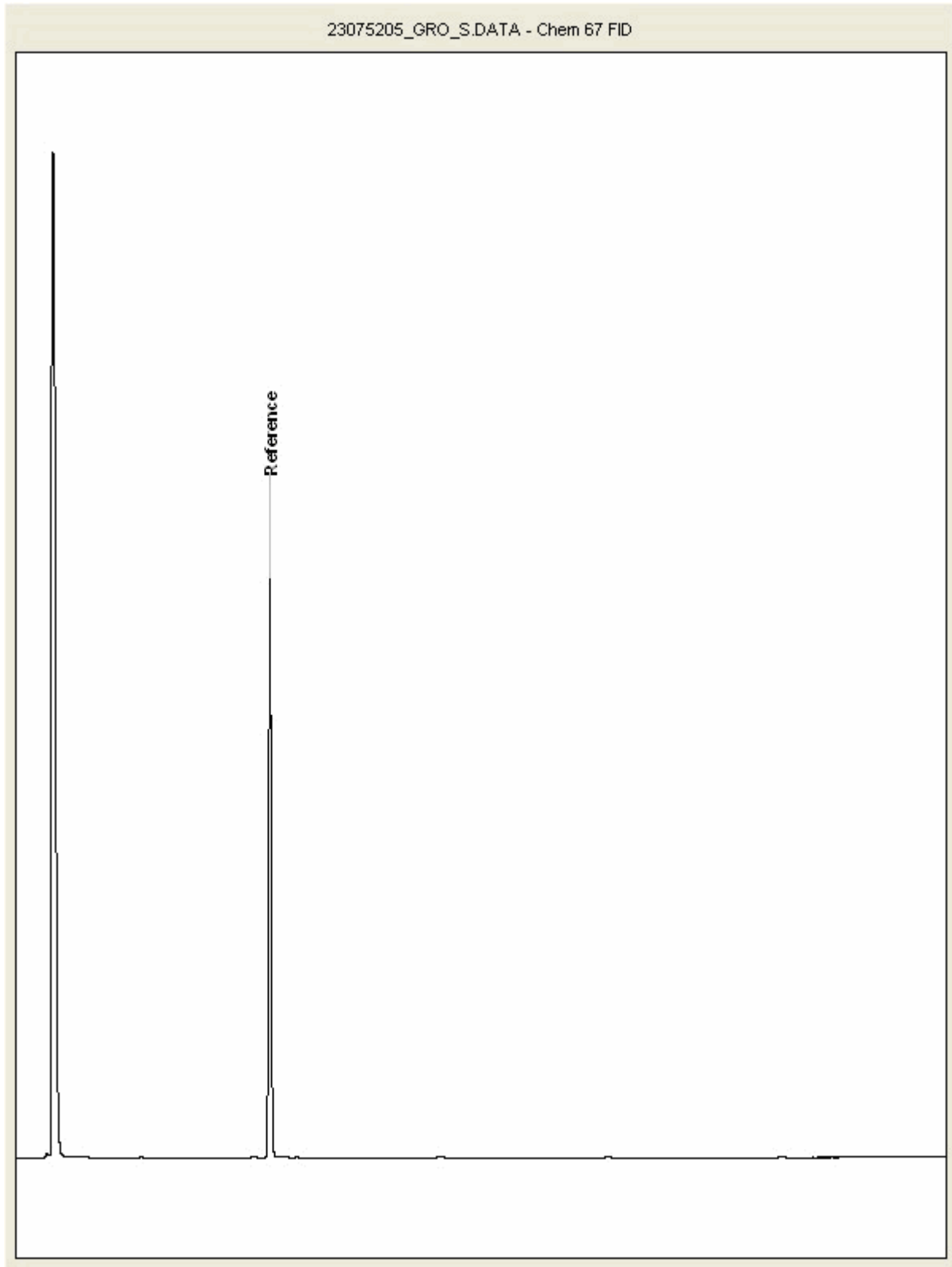
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075205  
Sample ID : TP203

Depth : 1.60 - 1.70





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

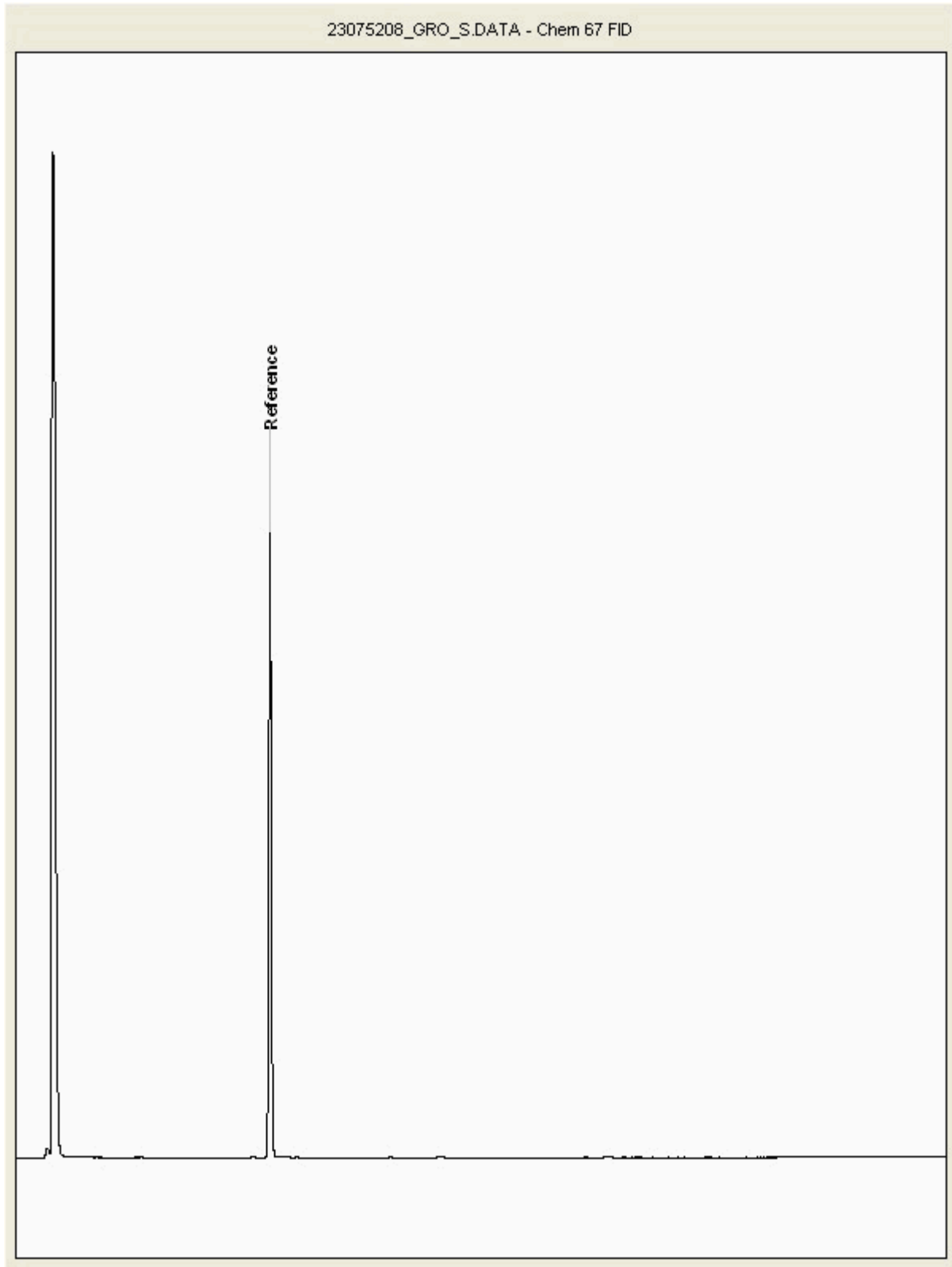
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075208  
Sample ID : TP311

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

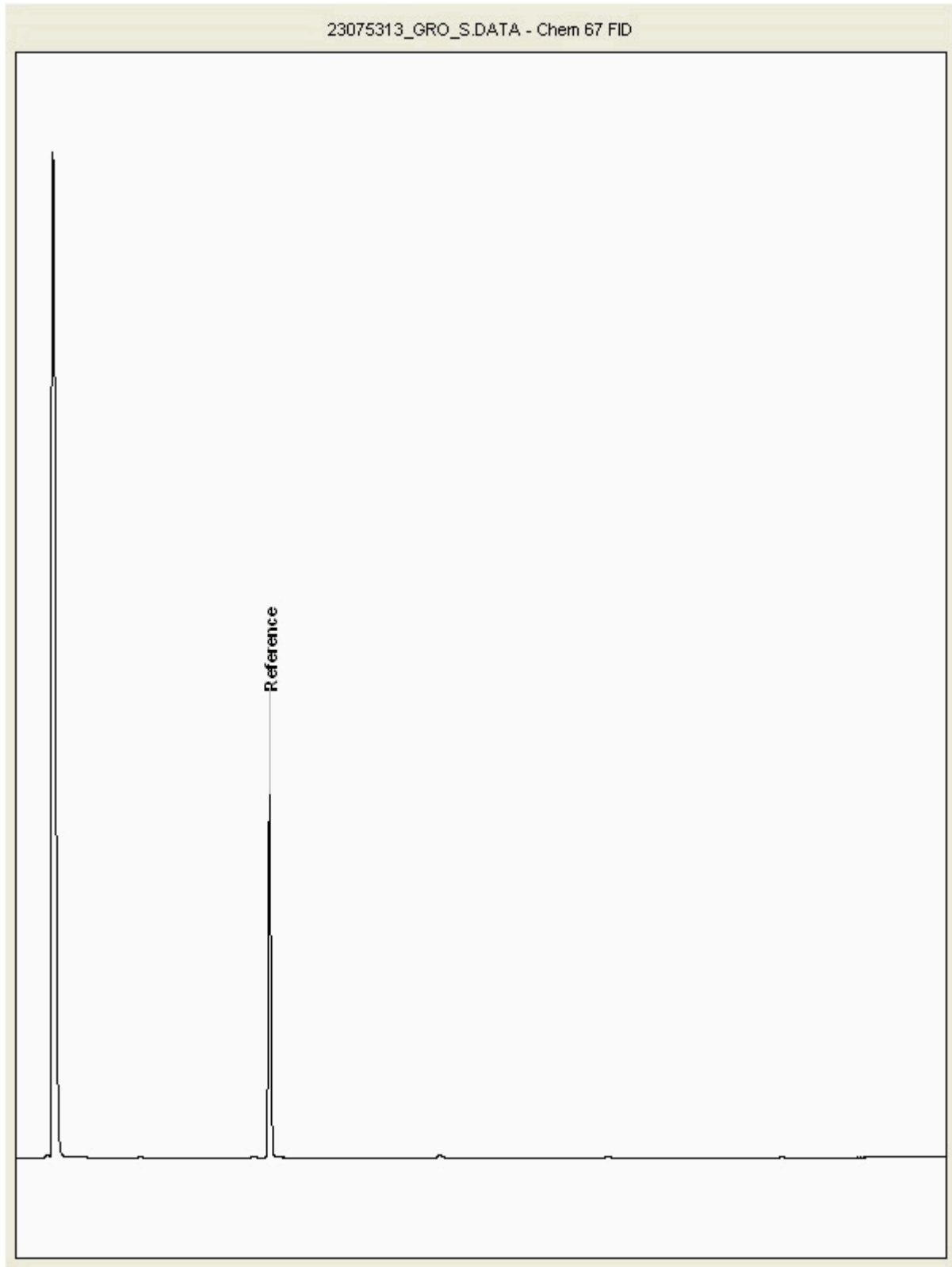
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075313  
Sample ID : TP007

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

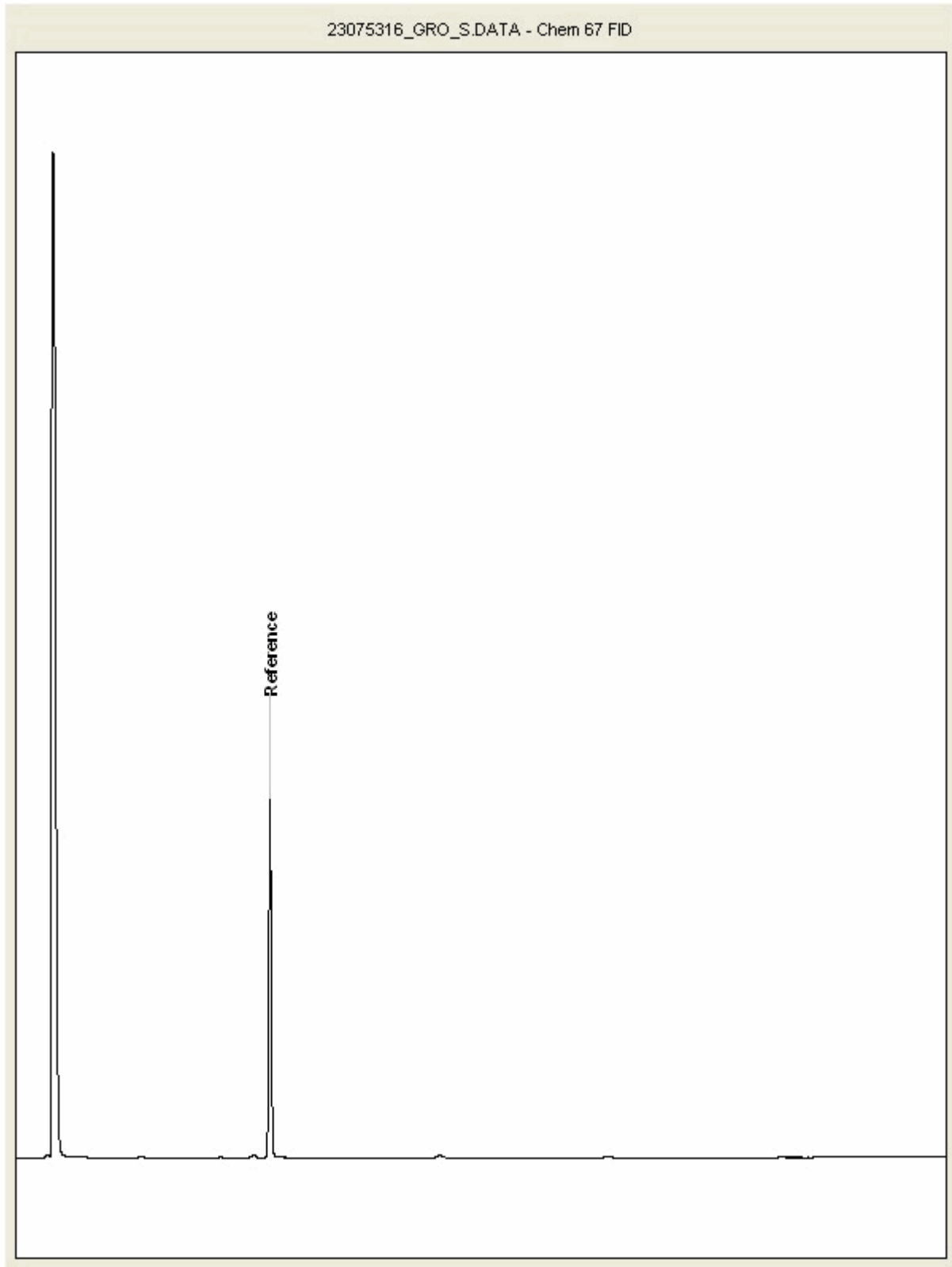
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075316  
Sample ID : TP319

Depth : 0.40 - 0.50





CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

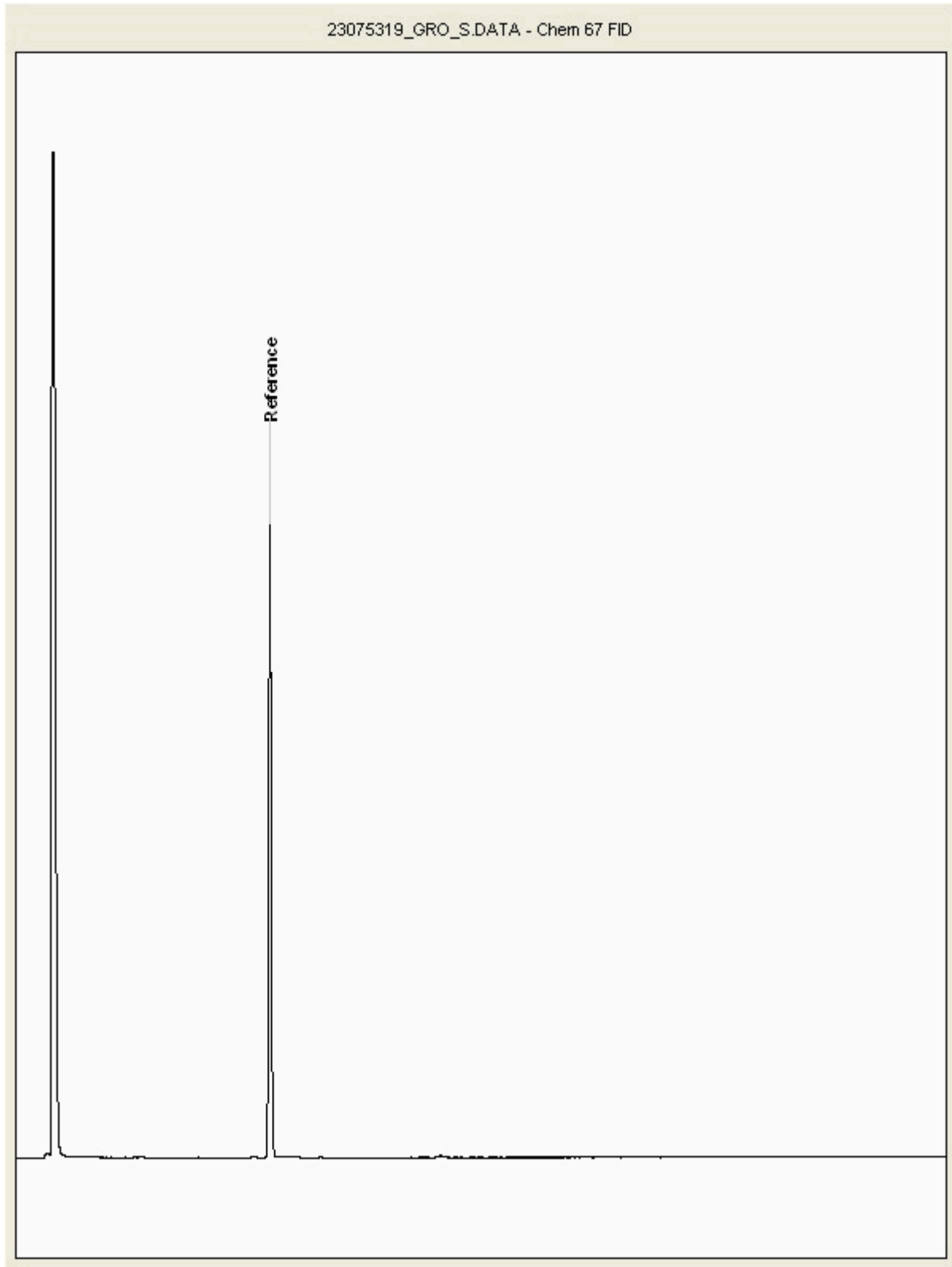
Report Number: 579794  
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075319  
Sample ID : TP007

Depth : 1.50 - 1.60





CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

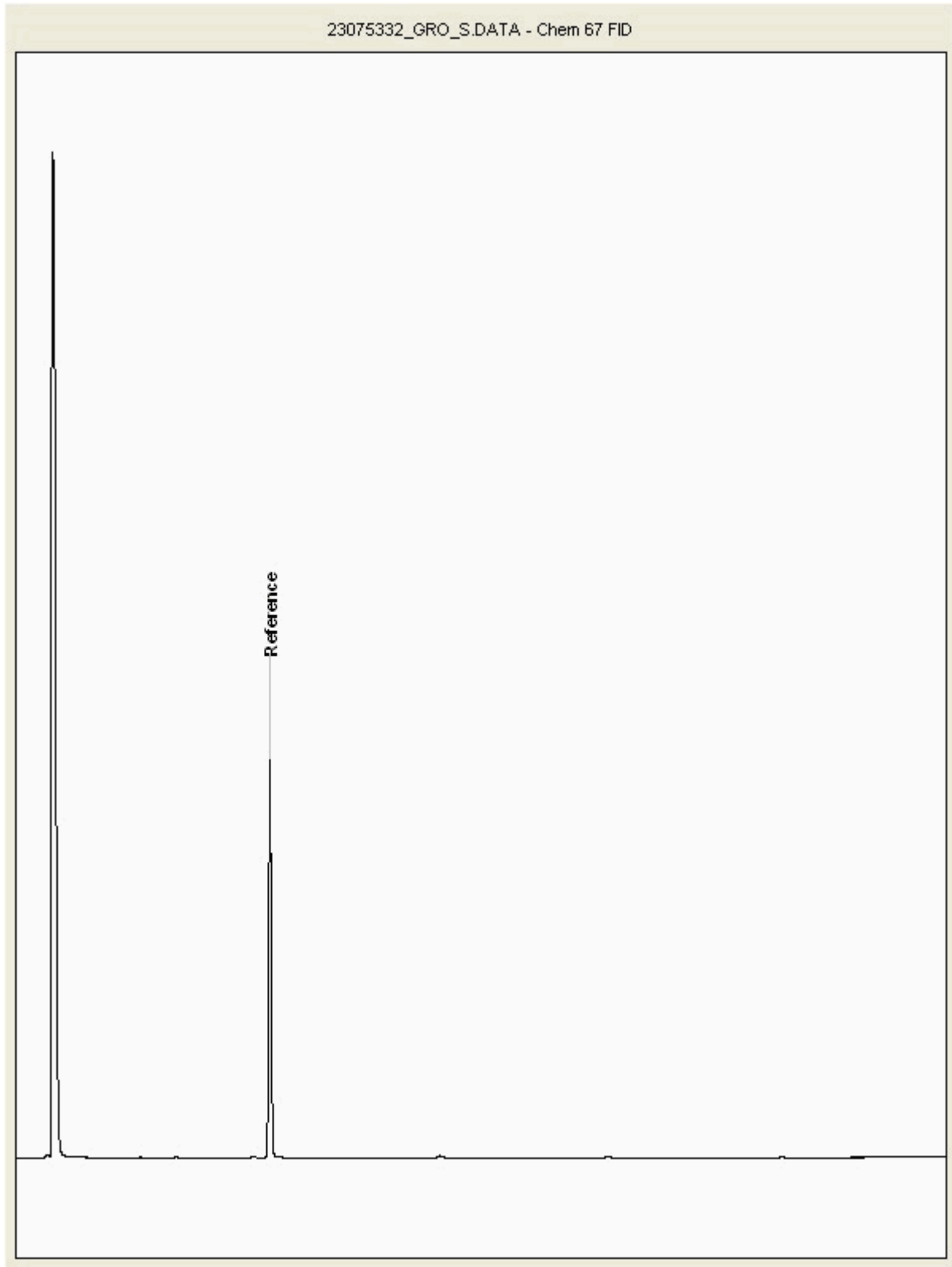
Report Number: 579794  
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075332  
Sample ID : TP319

Depth : 1.20 - 1.30







# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

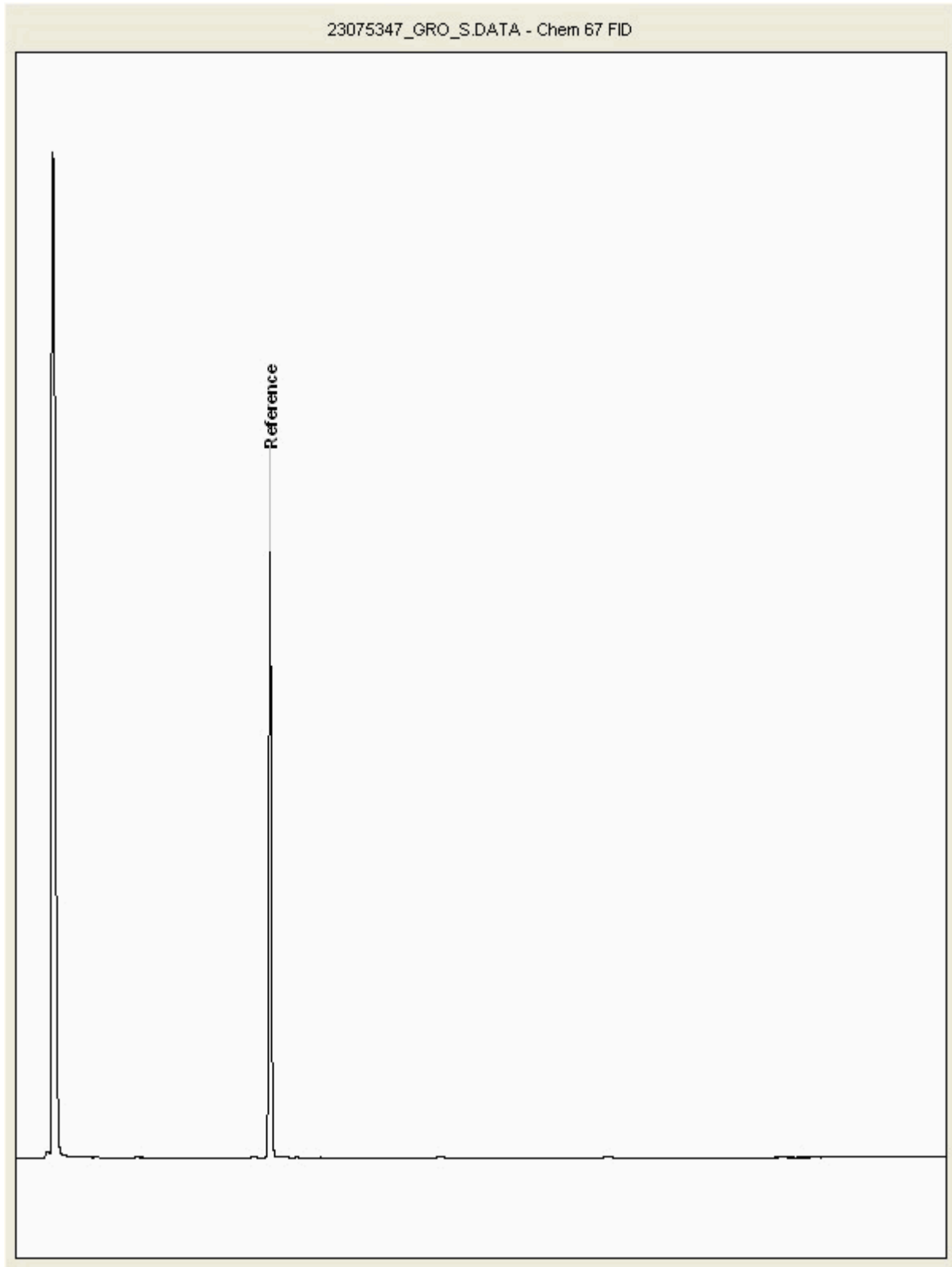
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075347  
Sample ID : TP319

Depth : 3.50 - 3.60





CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

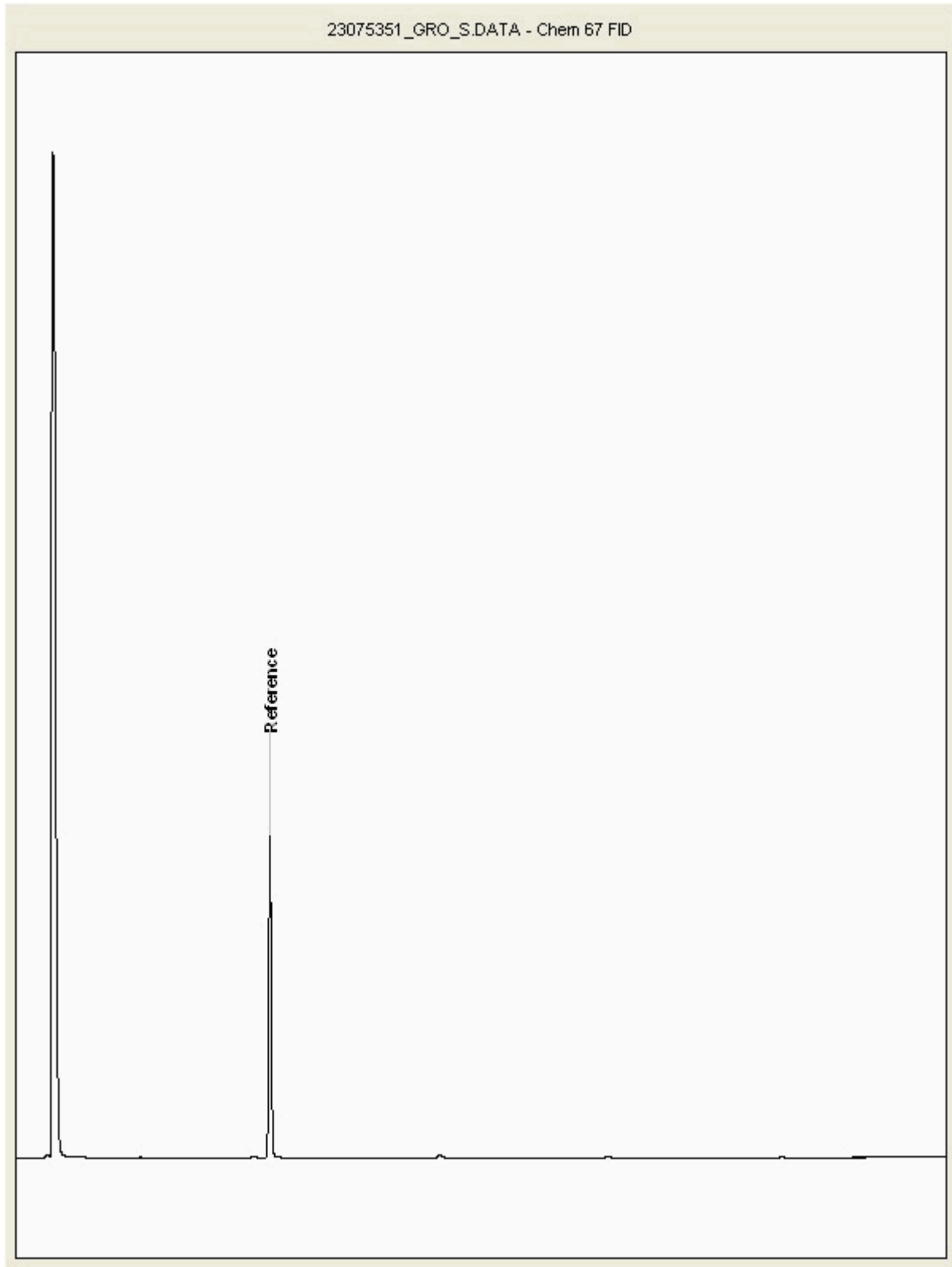
Report Number: 579794  
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075351  
Sample ID : TP319

Depth : 2.30 - 2.40





CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

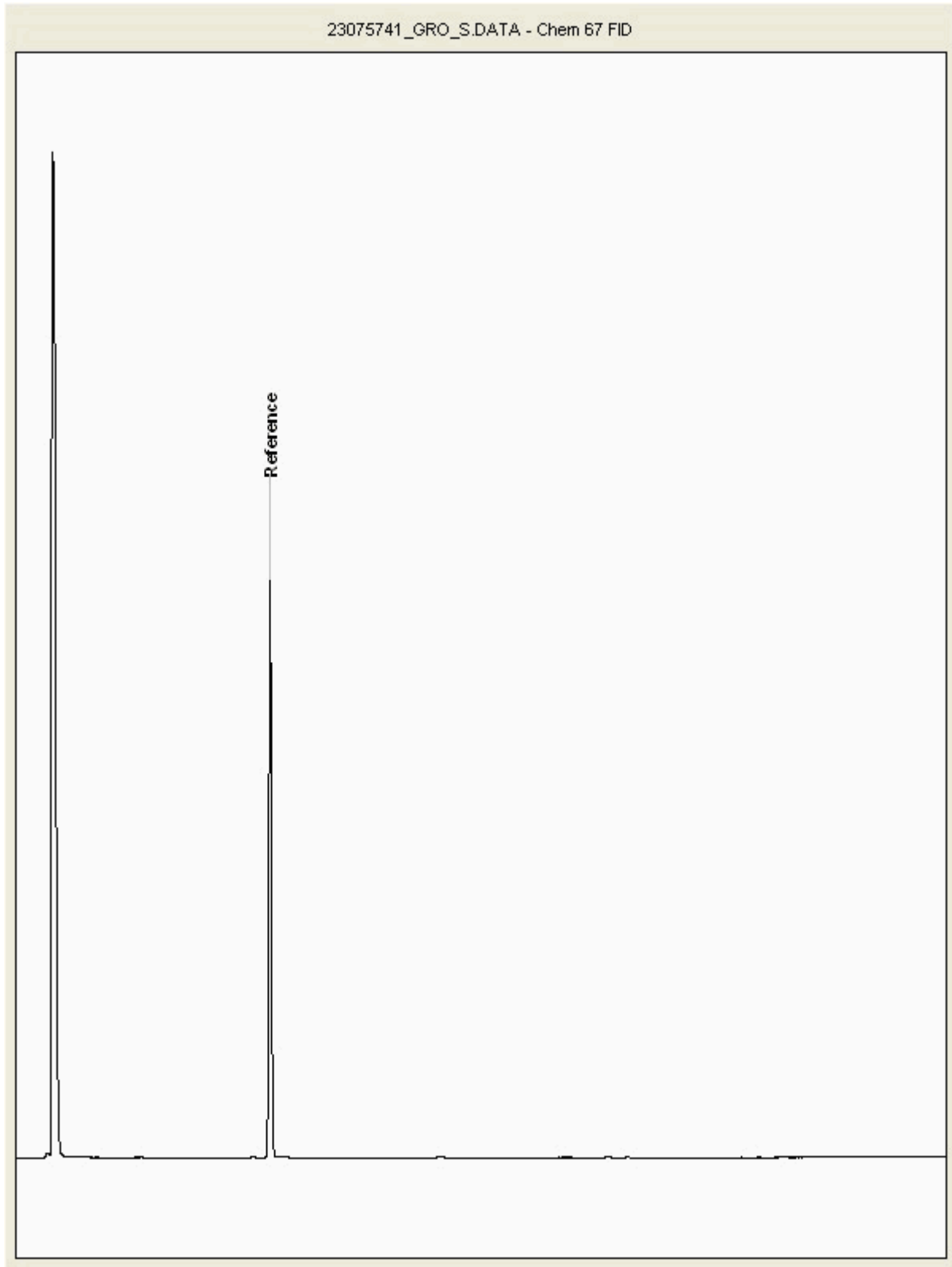
Report Number: 579794  
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075741  
Sample ID : TP008

Depth : 1.50 - 1.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

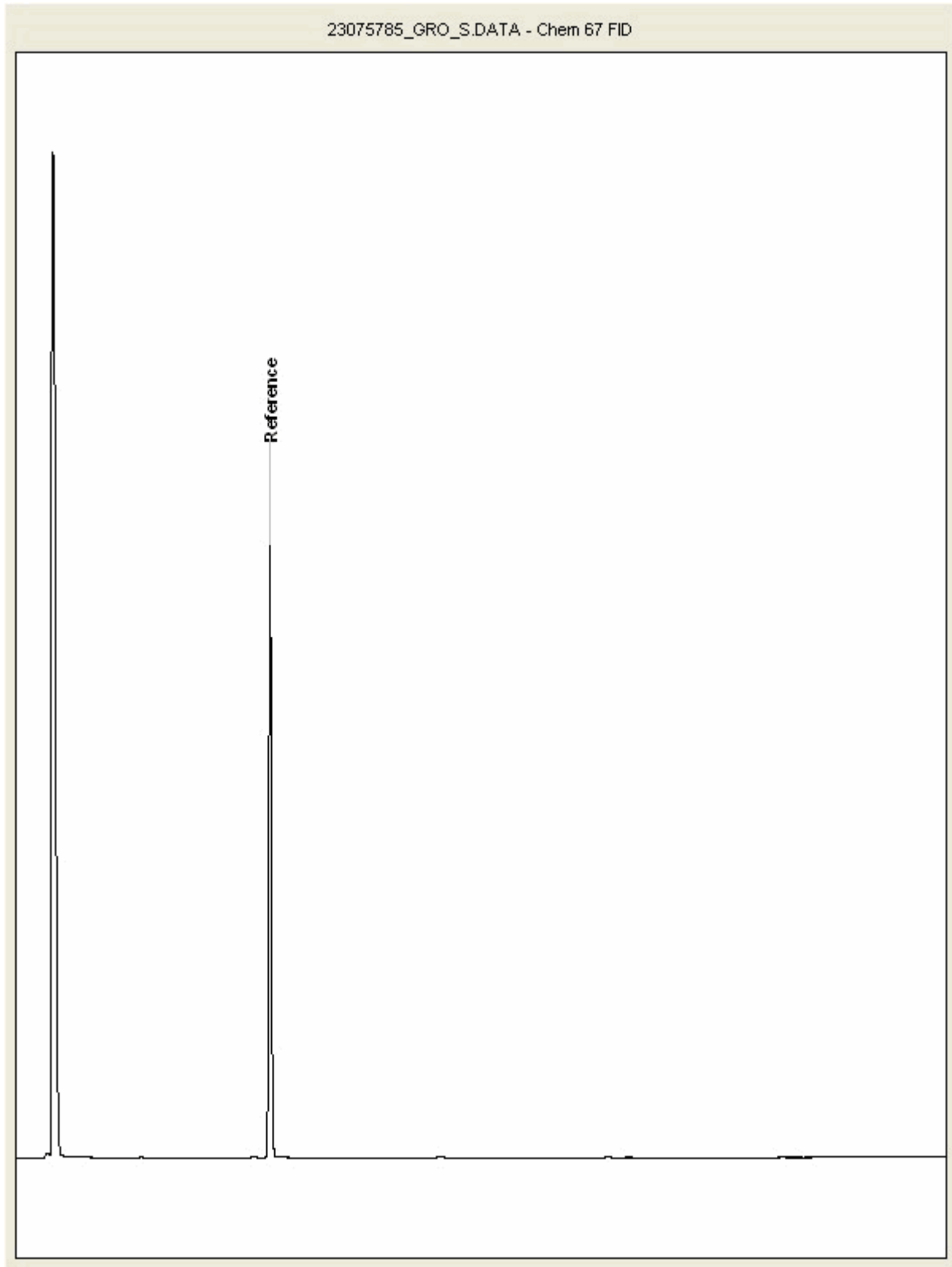
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23075785  
Sample ID : TP008

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201015-115  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

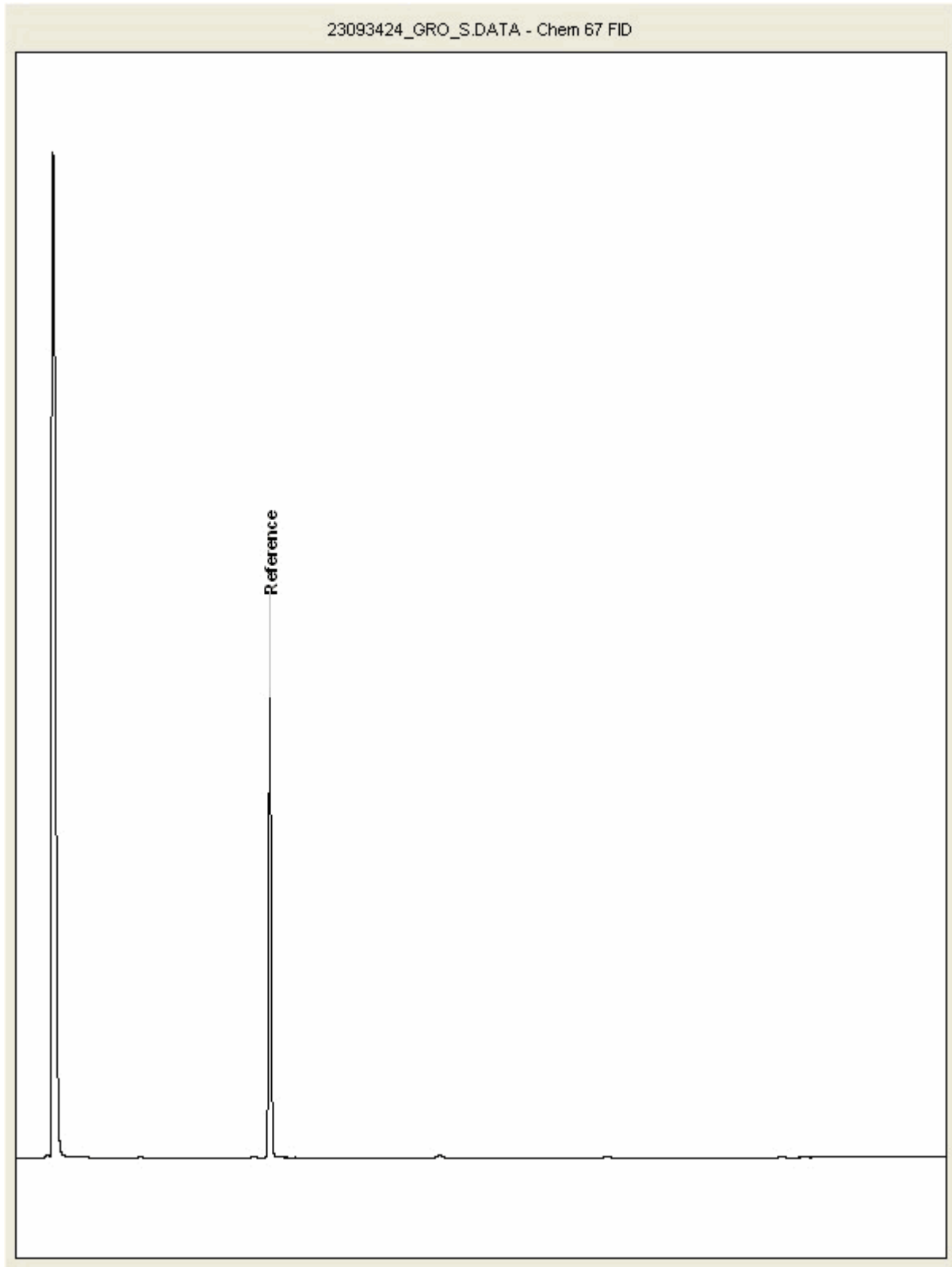
Report Number: 579794  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23093424  
Sample ID : TP311

Depth : 1.10 - 1.20





# CERTIFICATE OF ANALYSIS

<b>SDG:</b> 201015-115	<b>Client Reference:</b> 2020WW102	<b>Report Number:</b> 579794
<b>Location:</b> Arklow Bank	<b>Order Number:</b> 9028	<b>Superseded Report:</b>

## Appendix

## General

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

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

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

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

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

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

7. Results relate only to the items tested.

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

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

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

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

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

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

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

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

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

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

### 18. Sample Deviations

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

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

### 19. Asbestos

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

#### Identification of Asbestos in Bulk Materials & Soils

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

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

#### Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung. Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2017)*.

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

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



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

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

Irish Drilling Limited  
Old Galway Road  
Loughrea  
Co. Galway

**Attention:** Dympna Darcy

## CERTIFICATE OF ANALYSIS

**Date of report Generation:** 14 December 2020  
**Customer:** Irish Drilling Limited  
**Sample Delivery Group (SDG):** 201021-100  
**Your Reference:** 2020WW102  
**Location:** Arklow Bank  
**Report No:** 579754

We received 20 samples on Wednesday October 21, 2020 and 20 of these samples were scheduled for analysis which was completed on Monday December 14, 2020. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

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

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

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

Approved By:

**Sonia McWhan**

Operations Manager





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23081642	TP001	ES1	0.40 - 0.50	15/10/2020
23081508	TP001	ES3	1.40 - 1.50	15/10/2020
23081514	TP002	ES1	0.50 - 0.60	15/10/2020
23081519	TP002	ES3	1.40 - 1.50	15/10/2020
23081502	TP003	ES1	0.50 - 0.60	15/10/2020
23081580	TP003	ES4	1.50 - 1.60	15/10/2020
23081629	TP004	ES1	0.40 - 0.50	15/10/2020
23081636	TP004	ES2	1.40 - 1.50	15/10/2020
23081593	TP005	ES1	0.40 - 0.50	15/10/2020
23081599	TP005	ES4	1.50 - 1.60	15/10/2020
23081526	TP006	ES1	0.40 - 0.50	14/10/2020
23081533	TP006	ES4	1.40 - 1.50	14/10/2020
23081538	TP010	ES1	0.40 - 0.50	14/10/2020
23081550	TP010	ES4	1.40 - 1.50	14/10/2020
23081573	TP011	ES1	0.40 - 0.50	14/10/2020
23081587	TP011	ES4	1.40 - 1.50	14/10/2020
23081559	TP012	ES1	0.50 - 0.60	14/10/2020
23081567	TP012	ES4	1.40 - 1.50	14/10/2020
23081608	TP201	ES1	0.50 - 0.60	15/10/2020
23081621	TP201	ES4	1.50 - 1.60	15/10/2020

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





CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100
Location: Arklow Bank

Client Reference: 2020WW102
Order Number: 9028

Report Number:
Superseded Report:

579754

Results Legend

- X Test
N No Determination Possible

Sample Types -

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

Table with columns: Lab Sample No(s), Customer Sample Reference, AGS Reference, Depth (m), Container, Sample Type, and various chemical tests (Anions by Kone, Asbestos ID, CEN Readings, etc.) with 'X' or 'N' results.





# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b> 201021-100	<b>Client Reference:</b> 2020WW102	<b>Report Number:</b> 579754
<b>Location:</b> Arklow Bank	<b>Order Number:</b> 9028	<b>Superseded Report:</b>

<b>Results Legend</b>  <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; align-items: center;"><span style="background-color: yellow; border: 1px solid black; width: 15px; height: 15px; margin-right: 5px;"></span> Test</div> <div style="display: flex; align-items: center;"><span style="background-color: red; color: white; border: 1px solid black; width: 15px; height: 15px; margin-right: 5px;"></span> No Determination Possible</div> </div> <b>Sample Types -</b> S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	
		23081629	TP004	ES1	0.40 - 0.50	250g Amber Jar (ALE210)	S
		23081580	TP003	ES4	1.50 - 1.60	1kg TUB with Handle (ALE280)	S
		23081502	TP003	ES1	0.50 - 0.60	60g VOC (ALE215)	S
		23081519	TP002	ES3	1.40 - 1.50	250g Amber Jar (ALE210)	S
		23081514	TP002	ES1	0.50 - 0.60	1kg TUB with Handle (ALE280)	S
		23081508	TP001	ES3	1.40 - 1.50	60g VOC (ALE215)	S
	23081642	TP001	ES1	0.40 - 0.50	1kg TUB with Handle (ALE280)	S	
Mercury Dissolved	All	NDPs: 0 Tests: 20					
Metals in solid samples by OES	All	NDPs: 0 Tests: 20					
PAH 16 & 17 Calc	All	NDPs: 0 Tests: 20					
PAH by GCMS	All	NDPs: 0 Tests: 20					
PCBs by GCMS	All	NDPs: 0 Tests: 20					
pH	All	NDPs: 0 Tests: 20					
Phenols by HPLC (W)	All	NDPs: 0 Tests: 20					
Sample description	All	NDPs: 0 Tests: 20					
Semi Volatile Organic Compounds	All	NDPs: 0 Tests: 20					
Total Dissolved Solids	All	NDPs: 0 Tests: 20					
Total Organic Carbon	All	NDPs: 0 Tests: 20					
TPH CWG GC (S)	All	NDPs: 0 Tests: 20					
VOC MS (S)	All	NDPs: 0 Tests: 20					





CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100
Location: Arklow Bank

Client Reference: 2020WW102
Order Number: 9028

Report Number: 579754
Superseded Report:

Results Legend

- X Test
N No Determination Possible

Sample Types -

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

Table with columns: Lab Sample No(s), Customer Sample Reference, AGS Reference, Depth (m), Container, Sample Type, and various test results (e.g., Anions by Kone, Asbestos ID, CEN Readings, etc.).



**CERTIFICATE OF ANALYSIS**

Validated

**SDG:** 201021-100      **Client Reference:** 2020WW102      **Report Number:** 579754  
**Location:** Arklow Bank      **Order Number:** 9028      **Superseded Report:**

**Results Legend**

- X Test
- N No Determination Possible

**Sample Types -**

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

	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type														
							23081550	23081573	23081587	23081559	23081567	23081608	23081621	23081550	23081573	23081587	23081559	23081567	23081608	23081621
Mercury Dissolved	All	NDPs: 0 Tests: 20						X		X		X		X		X				
Metals in solid samples by OES	All	NDPs: 0 Tests: 20	X		X		X		X		X		X		X		X			X
PAH 16 & 17 Calc	All	NDPs: 0 Tests: 20	X		X		X		X		X		X		X		X			X
PAH by GCMS	All	NDPs: 0 Tests: 20	X		X		X		X		X		X		X		X			X
PCBs by GCMS	All	NDPs: 0 Tests: 20	X		X		X		X		X		X		X		X			X
pH	All	NDPs: 0 Tests: 20	X		X		X		X		X		X		X		X			X
Phenols by HPLC (W)	All	NDPs: 0 Tests: 20			X		X		X		X		X		X		X			X
Sample description	All	NDPs: 0 Tests: 20	X		X		X		X		X		X		X		X			X
Semi Volatile Organic Compounds	All	NDPs: 0 Tests: 20	X		X		X		X		X		X		X		X			X
Total Dissolved Solids	All	NDPs: 0 Tests: 20			X		X		X		X		X		X		X			X
Total Organic Carbon	All	NDPs: 0 Tests: 20	X		X		X		X		X		X		X		X			X
TPH CWG GC (S)	All	NDPs: 0 Tests: 20	X		X		X		X		X		X		X		X			X
VOC MS (S)	All	NDPs: 0 Tests: 20			X		X		X		X		X		X		X			X



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
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	Inclusions	Inclusions 2
23081508	TP001	1.40 - 1.50	Dark Brown	Sand	None	Stones
23081642	TP001	0.40 - 0.50	Light Brown	Silt Loam	Vegetation	Stones
23081514	TP002	0.50 - 0.60	Light Brown	Sand	None	Stones
23081519	TP002	1.40 - 1.50	Dark Brown	Sand	None	Stones
23081502	TP003	0.50 - 0.60	Light Brown	Sandy Silt Loam	None	Stones
23081580	TP003	1.50 - 1.60	Light Brown	Sand	None	Stones
23081629	TP004	0.40 - 0.50	Light Brown	Silt Loam	Stones	Vegetation
23081636	TP004	1.40 - 1.50	Light Brown	Loamy Sand	Stones	Vegetation
23081593	TP005	0.40 - 0.50	Dark Brown	Clay	Stones	Vegetation
23081599	TP005	1.50 - 1.60	Light Brown	Sandy Clay Loam	Vegetation	None
23081526	TP006	0.40 - 0.50	Light Brown	Silt Loam	Stones	Vegetation
23081533	TP006	1.40 - 1.50	Dark Brown	Silt Loam	None	None
23081538	TP010	0.40 - 0.50	Light Brown	Clay	Vegetation	None
23081550	TP010	1.40 - 1.50	Light Brown	Clay	Stones	None
23081573	TP011	0.40 - 0.50	Light Brown	Sand	None	Stones
23081587	TP011	1.40 - 1.50	Light Brown	Clay	Stones	None
23081559	TP012	0.50 - 0.60	Light Brown	Clay	Vegetation	None
23081567	TP012	1.40 - 1.50	Light Brown	Clay	Stones	None
23081608	TP201	0.50 - 0.60	Dark Brown	Sandy Clay Loam	Stones	Vegetation
23081621	TP201	1.50 - 1.60	Light Brown	Loamy Sand	Vegetation	Stones

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.



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

Results Legend			Customer Sample Ref.	TP001	TP001	TP002	TP002	TP003	TP003
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
		Depth (m)	0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.50 - 1.60	1.50 - 1.60
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
		Date Sampled	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
		Sampled Time							
		Date Received	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020
		SDG Ref	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100
		Lab Sample No.(s)	23081642	23081508	23081514	23081519	23081502	23081580	23081580
		AGS Reference	ES1	ES3	ES1	ES3	ES1	ES4	ES4
Component	LOD/Units	Method							
Moisture Content Ratio (% of as received sample)	%	PM024	19	17	23	18	18	13	
Loss on ignition	<0.7 %	TM018	7.88	3.5	6.99	3.43	8.95	5.08	
Organic Carbon, Total	<0.2 %	TM132	0.344	0.273	0.407	0.312	0.339	<0.2	
pH	1 pH Units	TM133	7.15	8.41	7.72	8.44	7.56	8.72	
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
Cyanide, Total	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Free	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Complex	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
PCB congener 28	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 52	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 101	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 118	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 138	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 153	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 180	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21	<21	<21	<21	<21	<21	
Sulphide, Easily liberated	<15 mg/kg	TM180	<15	<15	<15	<15	<15	<15	
Chromium, Trivalent	<0.9 mg/kg	TM181	42.6	36.9	47.5	35.9	48.6	30.7	
Antimony	<0.6 mg/kg	TM181	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
Arsenic	<0.6 mg/kg	TM181	17.9	15.4	19.9	16.4	17.9	14.1	
Barium	<0.6 mg/kg	TM181	86.1	88.7	114	83.8	110	73	
Cadmium	<0.02 mg/kg	TM181	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Chromium	<0.9 mg/kg	TM181	42.6	36.9	47.5	35.9	48.6	30.7	
Copper	<1.4 mg/kg	TM181	15.6	24.3	32.3	24.7	27.5	21.2	
Lead	<0.7 mg/kg	TM181	21.7	17.5	27.1	17.4	23.8	15.7	
Mercury	<0.14 mg/kg	TM181	0.163	<0.14	0.194	<0.14	0.153	<0.14	
Molybdenum	<0.1 mg/kg	TM181	0.373	0.232	1.72	0.188	0.232	0.339	
Nickel	<0.2 mg/kg	TM181	34.2	44.2	62.9	43.4	52.1	39.5	
Selenium	<1 mg/kg	TM181	<1	<1	<1	<1	<1	<1	
Zinc	<1.9 mg/kg	TM181	64.2	74.7	103	75.5	75.6	67.4	
PAH, Total Detected USEPA 16 + Coronene	<318 µg/kg	TM410	<318	<318	<318	<318	<318	<318	
Coronene	<200 µg/kg	TM410	<200	<200	<200	<200	<200	<200	







# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

Results Legend			Customer Sample Ref.	TP004	TP004	TP005	TP005	TP006	TP006
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.fit	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
		Depth (m)	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.50 - 1.60	0.40 - 0.50	1.40 - 1.50	1.40 - 1.50
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
		Date Sampled	15/10/2020	15/10/2020	15/10/2020	15/10/2020	14/10/2020	14/10/2020	14/10/2020
		Sampled Time							
		Date Received	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020
		SDG Ref	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100
		Lab Sample No.(s)	23081629	23081636	23081593	23081599	23081526	23081533	23081533
		AGS Reference	ES1	ES2	ES1	ES4	ES1	ES4	ES4
Component	LOD/Units	Method							
Moisture Content Ratio (% of as received sample)	%	PM024	17	12	19	16	16	15	
Loss on ignition	<0.7 %	TM018	5.51	2.16	6.16	2.1	3.12	5.23	
Organic Carbon, Total	<0.2 %	TM132	0.483	<0.2	0.36	<0.2	0.226	0.293	
pH	1 pH Units	TM133	6.97	7.55	7.11	7.82	7.15	7.82	
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
Cyanide, Total	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Free	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Complex	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
PCB congener 28	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 52	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 101	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 118	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 138	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 153	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 180	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21	<21	<21	<21	<21	<21	
Sulphide, Easily liberated	<15 mg/kg	TM180	<15	<15	<15	<15	<15	<15	
Chromium, Trivalent	<0.9 mg/kg	TM181	50.7	23.8	48	27.3	32.4	51.7	
Antimony	<0.6 mg/kg	TM181	<0.6	<0.6	0.909	<0.6	<0.6	0.654	
Arsenic	<0.6 mg/kg	TM181	17.8	10.6	14.9	10.5	11.4	19.4	
Barium	<0.6 mg/kg	TM181	60.9	46.7	64.3	55.4	38	107	
Cadmium	<0.02 mg/kg	TM181	<0.02	0.115	<0.02	0.0645	<0.02	0.129	
Chromium	<0.9 mg/kg	TM181	50.7	24	48	27.3	32.4	51.7	
Copper	<1.4 mg/kg	TM181	16.5	15.1	18.6	17.4	12.5	32.6	
Lead	<0.7 mg/kg	TM181	11.6	10.1	12.5	10.6	9.47	17.6	
Mercury	<0.14 mg/kg	TM181	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	
Molybdenum	<0.1 mg/kg	TM181	0.399	0.152	0.36	0.236	0.289	0.296	
Nickel	<0.2 mg/kg	TM181	33.1	31.6	28.8	28.2	21.2	61.1	
Selenium	<1 mg/kg	TM181	<1	<1	<1	<1	<1	<1	
Zinc	<1.9 mg/kg	TM181	76.2	39.3	55	39	40.6	85.2	
PAH, Total Detected USEPA 16 + Coronene	<318 µg/kg	TM410	<318	<318	<318	<318	<318	<318	
Coronene	<200 µg/kg	TM410	<200	<200	<200	<200	<200	<200	





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

Results Legend			Customer Sample Ref.	TP010	TP010	TP011	TP011	TP012	TP012
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.fit	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
		Depth (m)	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
		Date Sampled	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	
		Sampled Time							
		Date Received	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	
		SDG Ref	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	
		Lab Sample No.(s)	23081538	23081550	23081573	23081587	23081559	23081567	
		AGS Reference	ES1	ES4	ES1	ES4	ES1	ES4	
Component	LOD/Units	Method							
Moisture Content Ratio (% of as received sample)	%	PM024	19	14	18	20	17	17	
Loss on ignition	<0.7 %	TM018	7.18	4.52	7.95	4.51	5.26	5.75	
Organic Carbon, Total	<0.2 %	TM132	0.333	<0.2	0.355	<0.2	0.35	0.202	
pH	1 pH Units	TM133	7.4	8.85	7.93	8.77	7.42	8.65	
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
Cyanide, Total	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Free	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
Cyanide, Complex	<1 mg/kg	TM153	<1	<1	<1	<1	<1	<1	
PCB congener 28	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 52	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 101	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 118	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 138	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 153	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
PCB congener 180	<3 µg/kg	TM168	<3	<3	<3	<3	<3	<3	
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21	<21	<21	<21	<21	<21	
Sulphide, Easily liberated	<15 mg/kg	TM180	<15	<15	<15	<15	<15	<15	
Chromium, Trivalent	<0.9 mg/kg	TM181	43.5	29.3	44.8	33.6	28.4	40.8	
Antimony	<0.6 mg/kg	TM181	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
Arsenic	<0.6 mg/kg	TM181	17.7	12.8	18.8	14.6	16.2	15.6	
Barium	<0.6 mg/kg	TM181	86.2	68.1	115	89.9	49.4	111	
Cadmium	<0.02 mg/kg	TM181	<0.02	<0.02	<0.02	0.274	<0.02	<0.02	
Chromium	<0.9 mg/kg	TM181	43.5	29.3	44.8	33.6	28.4	40.8	
Copper	<1.4 mg/kg	TM181	23.9	19.9	28.6	23.7	10	26.4	
Lead	<0.7 mg/kg	TM181	22.6	13.9	23.3	21.3	14.9	17.8	
Mercury	<0.14 mg/kg	TM181	0.151	<0.14	<0.14	<0.14	<0.14	<0.14	
Molybdenum	<0.1 mg/kg	TM181	0.247	0.25	0.226	0.235	0.375	0.365	
Nickel	<0.2 mg/kg	TM181	42.4	37.3	70.6	41.3	25.3	50.3	
Selenium	<1 mg/kg	TM181	<1	<1	<1	<1	<1	<1	
Zinc	<1.9 mg/kg	TM181	72.8	63.8	78.8	66.8	56.3	81.8	
PAH, Total Detected USEPA 16 + Coronene	<318 µg/kg	TM410	<318	<318	<318	<318	<318	<318	
Coronene	<200 µg/kg	TM410	<200	<200	<200	<200	<200	<200	





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

Results Legend		Customer Sample Ref.	TP201	TP201			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.50 - 0.60	1.50 - 1.60			
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)			
aq	Aqueous / settled sample.		15/10/2020	15/10/2020			
diss.filt	Dissolved / filtered sample.		21/10/2020	21/10/2020			
tot.unfilt	Total / unfiltered sample.		201021-100	201021-100			
*	Subcontracted - refer to subcontractor report for accreditation status.		23081608	23081621			
**	% 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		ES1	ES4			
(F)	Trigger breach confirmed						
1-4*3@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Moisture Content Ratio (% of as received sample)	%	PM024	16	16			
Loss on ignition	<0.7 %	TM018	5.21	4.1	M	M	
Organic Carbon, Total	<0.2 %	TM132	0.223	0.258	M	M	
pH	1 pH Units	TM133	7.42	8.6	M	M	
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6	<0.6	#	#	
Cyanide, Total	<1 mg/kg	TM153	<1	<1	M	M	
Cyanide, Free	<1 mg/kg	TM153	<1	<1	M	M	
Cyanide, Complex	<1 mg/kg	TM153	<1	<1			
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			
Sulphide, Easily liberated	<15 mg/kg	TM180	<15	<15	@ M	@ M	
Chromium, Trivalent	<0.9 mg/kg	TM181	44.9	35.9			
Antimony	<0.6 mg/kg	TM181	0.708	<0.6	#	#	
Arsenic	<0.6 mg/kg	TM181	14.2	15	M	M	
Barium	<0.6 mg/kg	TM181	101	85.2	#	#	
Cadmium	<0.02 mg/kg	TM181	<0.02	0.0466	M	M	
Chromium	<0.9 mg/kg	TM181	44.9	35.9	M	M	
Copper	<1.4 mg/kg	TM181	24.3	23.1	M	M	
Lead	<0.7 mg/kg	TM181	15.4	10.7	M	M	
Mercury	<0.14 mg/kg	TM181	<0.14	<0.14	M	M	
Molybdenum	<0.1 mg/kg	TM181	0.223	0.49	#	#	
Nickel	<0.2 mg/kg	TM181	42.9	39.7	M	M	
Selenium	<1 mg/kg	TM181	<1	<1	#	#	
Zinc	<1.9 mg/kg	TM181	65.3	62.6	M	M	
PAH, Total Detected USEPA 16 + Coronene	<318 µg/kg	TM410	<318	<318			
Coronene	<200 µg/kg	TM410	<200	<200			



CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100
Location: Arklow Bank

Client Reference: 2020WW102
Order Number: 9028

Report Number: 579754
Superseded Report:

Table with columns: Results Legend, Customer Sample Ref., Depth (m), Sample Type, Date Sampled, Sampled Time, Date Received, SDG Ref, Lab Sample No.(s), AGS Reference, Component, LOD/Units, Method, and data rows for EPH >C8-C40.



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## PAH by GCMS

Results Legend			Customer Sample Ref.	TP001	TP001	TP002	TP002	TP003	TP003
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
	Depth (m)		0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.50 - 1.60	1.50 - 1.60
	Sample Type		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
	Date Sampled		15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
	Sampled Time								
	Date Received		21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020
	SDG Ref		201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100
	Lab Sample No.(s)		23081642	23081508	23081514	23081519	23081502	23081580	23081580
	AGS Reference		ES1	ES3	ES1	ES3	ES1	ES4	ES4
Component	LOD/Units	Method							
Naphthalene-d8 % recovery**	%	TM218	91.4	93.8	94.7	96	93	91.7	
Acenaphthene-d10 % recovery**	%	TM218	92.2	85	86.3	85.8	83.6	83.9	
Phenanthrene-d10 % recovery**	%	TM218	95.1	93	93.5	92.6	91.3	92.4	
Chrysene-d12 % recovery**	%	TM218	89.7	91.8	91.3	91.9	90.8	91.7	
Perylene-d12 % recovery**	%	TM218	93.6	80.2	80.3	79.2	82.9	83	
Naphthalene	<9 µg/kg	TM218	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M
Acenaphthylene	<12 µg/kg	TM218	<12 M	<12 M	<12 M	<12 M	<12 M	<12 M	<12 M
Acenaphthene	<8 µg/kg	TM218	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
Fluorene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Phenanthrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Anthracene	<16 µg/kg	TM218	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M
Fluoranthene	<17 µg/kg	TM218	<17 M	<17 M	<17 M	<17 M	<17 M	<17 M	<17 M
Pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benz(a)anthracene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Chrysene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Benzo(b)fluoranthene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benzo(k)fluoranthene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Benzo(a)pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	<18 M	<18 M	<18 M	<18 M	<18 M	<18 M	<18 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23 M	<23 M	<23 M	<23 M	<23 M	<23 M	<23 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218	<24 M	<24 M	<24 M	<24 M	<24 M	<24 M	<24 M
PAH, Total Detected USEPA 16	<118 µg/kg	TM218	<118	<118	<118	<118	<118	<118	<118





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## PAH by GCMS

Results Legend			Customer Sample Ref.	TP004	TP004	TP005	TP005	TP006	TP006
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
	Depth (m)		0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.50 - 1.60	0.40 - 0.50	1.40 - 1.50	1.40 - 1.50
	Sample Type		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
	Date Sampled		15/10/2020	15/10/2020	15/10/2020	15/10/2020	14/10/2020	14/10/2020	14/10/2020
	Sampled Time								
	Date Received		21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020
	SDG Ref		201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100
	Lab Sample No.(s)		23081629	23081636	23081593	23081599	23081526	23081533	23081533
	AGS Reference		ES1	ES2	ES1	ES4	ES1	ES1	ES4
Component	LOD/Units	Method							
Naphthalene-d8 % recovery**	%	TM218	94.9	96.5	95.4	93.5	94.2	97.6	
Acenaphthene-d10 % recovery**	%	TM218	89.4	90.6	85.4	85.1	88.7	89.1	
Phenanthrene-d10 % recovery**	%	TM218	93.1	94.5	88.6	93.9	96.4	94.7	
Chrysene-d12 % recovery**	%	TM218	76.3	80.1	88.7	90.3	79.5	79.3	
Perylene-d12 % recovery**	%	TM218	70.8	73.3	85.4	84.4	71.2	71.4	
Naphthalene	<9 µg/kg	TM218	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M
Acenaphthylene	<12 µg/kg	TM218	<12 M	<12 M	<12 M	<12 M	<12 M	<12 M	<12 M
Acenaphthene	<8 µg/kg	TM218	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
Fluorene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Phenanthrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Anthracene	<16 µg/kg	TM218	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M
Fluoranthene	<17 µg/kg	TM218	<17 M	<17 M	<17 M	<17 M	<17 M	<17 M	<17 M
Pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benz(a)anthracene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Chrysene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Benzo(b)fluoranthene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benzo(k)fluoranthene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Benzo(a)pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	<18 M	<18 M	<18 M	<18 M	<18 M	<18 M	<18 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23 M	<23 M	<23 M	<23 M	<23 M	<23 M	<23 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218	<24 M	<24 M	<24 M	<24 M	<24 M	<24 M	<24 M
PAH, Total Detected USEPA 16	<118 µg/kg	TM218	<118	<118	<118	<118	<118	<118	<118



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## PAH by GCMS

Results Legend			Customer Sample Ref.	TP010	TP010	TP011	TP011	TP012	TP012
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
		Depth (m)	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
		Date Sampled	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020
		Sampled Time							
		Date Received	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020
		SDG Ref	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100
		Lab Sample No.(s)	23081538	23081550	23081573	23081587	23081559	23081567	23081567
		AGS Reference	ES1	ES4	ES1	ES4	ES1	ES4	ES4
Component	LOD/Units	Method							
Naphthalene-d8 % recovery**	%	TM218	93.4	94.1	93.6	93.8	96	90.9	
Acenaphthene-d10 % recovery**	%	TM218	83.7	85.1	84.8	91.8	87.3	82.8	
Phenanthrene-d10 % recovery**	%	TM218	91.4	93.5	92.4	92.5	95.8	90.5	
Chrysene-d12 % recovery**	%	TM218	88.3	91.7	96.5	87.4	95.5	88.1	
Perylene-d12 % recovery**	%	TM218	81.3	83.7	89.3	90	87.2	79.3	
Naphthalene	<9 µg/kg	TM218	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M
Acenaphthylene	<12 µg/kg	TM218	<12 M	<12 M	<12 M	<12 M	<12 M	<12 M	<12 M
Acenaphthene	<8 µg/kg	TM218	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
Fluorene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Phenanthrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Anthracene	<16 µg/kg	TM218	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M
Fluoranthene	<17 µg/kg	TM218	<17 M	<17 M	<17 M	<17 M	<17 M	<17 M	<17 M
Pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benz(a)anthracene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Chrysene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Benzo(b)fluoranthene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Benzo(k)fluoranthene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Benzo(a)pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M	<15 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	<18 M	<18 M	<18 M	<18 M	<18 M	<18 M	<18 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23 M	<23 M	<23 M	<23 M	<23 M	<23 M	<23 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218	<24 M	<24 M	<24 M	<24 M	<24 M	<24 M	<24 M
PAH, Total Detected USEPA 16	<118 µg/kg	TM218	<118	<118	<118	<118	<118	<118	<118





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP001	TP001	TP002	TP002	TP003	TP003
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.fit	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
	<b>Depth (m)</b>		0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.50 - 1.60	
	<b>Sample Type</b>		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
	<b>Date Sampled</b>		15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	
	<b>Sampled Time</b>								
	<b>Date Received</b>		21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	
	<b>SDG Ref</b>		201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	
	<b>Lab Sample No.(s)</b>		23081642	23081508	23081514	23081519	23081502	23081580	
	<b>AGS Reference</b>		ES1	ES3	ES1	ES3	ES1	ES4	
Component	LOD/Units	Method							
Phenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Pentachlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Nitrobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Isophorone	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Hexachloroethane	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Hexachlorocyclopentadiene	<100 µg/kg	TM157	<400	<100	<100	<100	<100	<200	<200
Hexachlorobutadiene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Hexachlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
n-Dioctyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Dimethyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Diethyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
n-Dibutyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Dibenzofuran	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Carbazole	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Butylbenzyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
bis(2-Chloroethyl)ether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Azobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
4-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
4-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
4-Methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
4-Chlorophenylphenylether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
4-Chloroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
4-Chloro-3-methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
4-Bromophenylphenylether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
3-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2-Methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,2,4-Trichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP001	TP001	TP002	TP002	TP003	TP003
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / filtered sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1.4.4.6@	Sample deviation (see appendix)								
		Customer Sample Ref.	TP001	TP001	TP002	TP002	TP003	TP003	TP003
		Depth (m)	0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.50 - 1.60	1.50 - 1.60
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
		Date Sampled	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
		Sampled Time	.	.	.	.	.	.	.
		Date Received	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020
		SDG Ref	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100
		Lab Sample No.(s)	23081642	23081508	23081514	23081519	23081502	23081580	23081580
		AGS Reference	ES1	ES3	ES1	ES3	ES1	ES4	ES4
Component	LOD/Units	Method							
2-Chlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,6-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dimethylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4,6-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4,5-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,4-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,3-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,2-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2-Chloronaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2-Methylnaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Acenaphthylene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Acenaphthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(a)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(b)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(k)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(a)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(g,h,i)perylene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Chrysene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Fluorene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Indeno(1,2,3-cd)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Phenanthrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Naphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Dibenzo(a,h)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Bis(2-chloroisopropyl) ether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
TIC report		TM157	Detected	Detected	Not Detected	Detected	Not Detected	Not Detected	Not Detected
Total SVOC TIC	<100 µg/kg	TM157	7380	2200	<1000	16400	<1000	<1000	<1000
Unknown	µg/kg	TM157	7380	2200		16400			



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP004	TP004	TP005	TP005	TP006	TP006
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*§@	Sample deviation (see appendix)								
	<b>Depth (m)</b>		0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.50 - 1.60	0.40 - 0.50	1.40 - 1.50	
	<b>Sample Type</b>		Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
	<b>Date Sampled</b>		15/10/2020	15/10/2020	15/10/2020	15/10/2020	14/10/2020	14/10/2020	
	<b>Sampled Time</b>								
	<b>Date Received</b>		21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	
	<b>SDG Ref</b>		201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	
	<b>Lab Sample No.(s)</b>		23081629	23081636	23081593	23081599	23081526	23081533	
	<b>AGS Reference</b>		ES1	ES2	ES1	ES4	ES1	ES4	
Component	LOD/Units	Method							
Phenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Pentachlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Nitrobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Isophorone	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Hexachloroethane	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Hexachlorocyclopentadiene	<100 µg/kg	TM157	<200	<200	<200	<200	<200	<200	
Hexachlorobutadiene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Hexachlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
n-Dioctyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Dimethyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Diethyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
n-Dibutyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Dibenzofuran	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Carbazole	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Butylbenzyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
bis(2-Chloroethyl)ether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Azobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Chlorophenylphenylether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Chloroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Chloro-3-methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Bromophenylphenylether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
3-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2-Methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
1,2,4-Trichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP004	TP004	TP005	TP005	TP006	TP006
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / filtered sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
**	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1.4.5@	Sample deviation (see appendix)								
		Depth (m)	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.50 - 1.60	0.40 - 0.50	1.40 - 1.50	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
		Date Sampled	15/10/2020	15/10/2020	15/10/2020	15/10/2020	14/10/2020	14/10/2020	
		Sampled Time	.	.	.	.	.	.	
		Date Received	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	
		SDG Ref	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	
		Lab Sample No.(s)	23081629	23081636	23081593	23081599	23081526	23081533	
		AGS Reference	ES1	ES2	ES1	ES4	ES1	ES4	
Component	LOD/Units	Method							
2-Chlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2,6-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2,4-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2,4-Dimethylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2,4-Dichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2,4,6-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2,4,5-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
1,4-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
1,3-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
1,2-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2-Chloronaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2-Methylnaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Acenaphthylene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Acenaphthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Benzo(a)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Benzo(b)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Benzo(k)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Benzo(a)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Benzo(g,h,i)perylene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Chrysene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Fluorene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Indeno(1,2,3-cd)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Phenanthrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Naphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Dibenzo(a,h)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Bis(2-chloroisopropyl) ether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
TIC report		TM157	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	
Total SVOC TIC	<100 µg/kg	TM157	<1000	<1000	<1000	<1000	<1000	<1000	



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP010	TP010	TP011	TP011	TP012	TP012
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*3@	Sample deviation (see appendix)								
		Depth (m)	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
		Date Sampled	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	
		Sampled Time							
		Date Received	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	
		SDG Ref	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	
		Lab Sample No.(s)	23081538	23081550	23081573	23081587	23081559	23081567	
		AGS Reference	ES1	ES4	ES1	ES4	ES1	ES4	
Component	LOD/Units	Method							
Phenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Pentachlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Nitrobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Isophorone	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Hexachloroethane	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Hexachlorocyclopentadiene	<100 µg/kg	TM157	<200	<200	<200	<200	<200	<200	
Hexachlorobutadiene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Hexachlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
n-Dioctyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Dimethyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Diethyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
n-Dibutyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Dibenzofuran	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Carbazole	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Butylbenzyl phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
bis(2-Chloroethyl)ether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
Azobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Chlorophenylphenylether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Chloroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Chloro-3-methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
4-Bromophenylphenylether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
3-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
2-Methylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	
1,2,4-Trichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP010	TP010	TP011	TP011	TP012	TP012
#	ISO17025 accredited.								
M	mCERTS accredited.								
sq	Aqueous / filtered sample.								
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1.4.5@	Sample deviation (see appendix)								
		Customer Sample Ref.	TP010	TP010	TP011	TP011	TP012	TP012	
		Depth (m)	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
		Date Sampled	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	
		Sampled Time	.	.	.	.	.	.	
		Date Received	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	
		SDG Ref	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	
		Lab Sample No.(s)	23081538	23081550	23081573	23081587	23081559	23081567	
		AGS Reference	ES1	ES4	ES1	ES4	ES1	ES4	
Component	LOD/Units	Method							
2-Chlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,6-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dimethylphenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4-Dichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4,6-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2,4,5-Trichlorophenol	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,4-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,3-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
1,2-Dichlorobenzene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2-Chloronaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
2-Methylnaphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Acenaphthylene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Acenaphthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(a)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(b)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(k)fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(a)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Benzo(g,h,i)perylene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Chrysene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Fluoranthene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Fluorene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Indeno(1,2,3-cd)pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Phenanthrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Pyrene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Naphthalene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Dibenzo(a,h)anthracene	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
Bis(2-chloroisopropyl) ether	<100 µg/kg	TM157	<100	<100	<100	<100	<100	<100	<100
TIC report		TM157	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Total SVOC TIC	<100 µg/kg	TM157	<1000	<1000	<1000	<1000	<1000	<1000	<1000



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.	TP201	TP201			
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted - refer to subcontractor report for accreditation status.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-4*\$@	Sample deviation (see appendix)							
		Depth (m)	0.50 - 0.60	1.50 - 1.60				
		Sample Type	Soil/Solid (S)	Soil/Solid (S)				
		Date Sampled	15/10/2020	15/10/2020				
		Sampled Time						
		Date Received	21/10/2020	21/10/2020				
		SDG Ref	201021-100	201021-100				
		Lab Sample No.(s)	23081608	23081621				
		AGS Reference	ES1	ES4				
Component	LOD/Units	Method						
Phenol	<100 µg/kg	TM157	<100	<100				
Pentachlorophenol	<100 µg/kg	TM157	<100	<100				
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157	<100	<100				
Nitrobenzene	<100 µg/kg	TM157	<100	<100				
Isophorone	<100 µg/kg	TM157	<100	<100				
Hexachloroethane	<100 µg/kg	TM157	<100	<100				
Hexachlorocyclopentadiene	<100 µg/kg	TM157	<100	<200				
Hexachlorobutadiene	<100 µg/kg	TM157	<100	<100				
Hexachlorobenzene	<100 µg/kg	TM157	<100	<100				
n-Dioctyl phthalate	<100 µg/kg	TM157	<100	<100				
Dimethyl phthalate	<100 µg/kg	TM157	<100	<100				
Diethyl phthalate	<100 µg/kg	TM157	<100	<100				
n-Dibutyl phthalate	<100 µg/kg	TM157	<100	<100				
Dibenzofuran	<100 µg/kg	TM157	<100	<100				
Carbazole	<100 µg/kg	TM157	<100	<100				
Butylbenzyl phthalate	<100 µg/kg	TM157	<100	<100				
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157	<100	<100				
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157	<100	<100				
bis(2-Chloroethyl)ether	<100 µg/kg	TM157	<100	<100				
Azobenzene	<100 µg/kg	TM157	<100	<100				
4-Nitrophenol	<100 µg/kg	TM157	<100	<100				
4-Nitroaniline	<100 µg/kg	TM157	<100	<100				
4-Methylphenol	<100 µg/kg	TM157	<100	<100				
4-Chlorophenylphenylether	<100 µg/kg	TM157	<100	<100				
4-Chloroaniline	<100 µg/kg	TM157	<100	<100				
4-Chloro-3-methylphenol	<100 µg/kg	TM157	<100	<100				
4-Bromophenylphenylether	<100 µg/kg	TM157	<100	<100				
3-Nitroaniline	<100 µg/kg	TM157	<100	<100				
2-Nitrophenol	<100 µg/kg	TM157	<100	<100				
2-Nitroaniline	<100 µg/kg	TM157	<100	<100				
2-Methylphenol	<100 µg/kg	TM157	<100	<100				
1,2,4-Trichlorobenzene	<100 µg/kg	TM157	<100	<100				



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## Semi Volatile Organic Compounds

Results Legend			Customer Sample Ref.					
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / filtered sample. diss.fit Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1.4.4.6@ Sample deviation (see appendix)	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	TP201 0.50 - 0.60 Soil/Solid (S) 15/10/2020 . 21/10/2020 201021-100 23081608 ES1	TP201 1.50 - 1.60 Soil/Solid (S) 15/10/2020 . 21/10/2020 201021-100 23081621 ES4					
Component	LOD/Units	Method						
2-Chlorophenol	<100 µg/kg	TM157	<100	<100				
2,6-Dinitrotoluene	<100 µg/kg	TM157	<100	<100				
2,4-Dinitrotoluene	<100 µg/kg	TM157	<100	<100				
2,4-Dimethylphenol	<100 µg/kg	TM157	<100	<100				
2,4-Dichlorophenol	<100 µg/kg	TM157	<100	<100				
2,4,6-Trichlorophenol	<100 µg/kg	TM157	<100	<100				
2,4,5-Trichlorophenol	<100 µg/kg	TM157	<100	<100				
1,4-Dichlorobenzene	<100 µg/kg	TM157	<100	<100				
1,3-Dichlorobenzene	<100 µg/kg	TM157	<100	<100				
1,2-Dichlorobenzene	<100 µg/kg	TM157	<100	<100				
2-Chloronaphthalene	<100 µg/kg	TM157	<100	<100				
2-Methylnaphthalene	<100 µg/kg	TM157	<100	<100				
Acenaphthylene	<100 µg/kg	TM157	<100	<100				
Acenaphthene	<100 µg/kg	TM157	<100	<100				
Anthracene	<100 µg/kg	TM157	<100	<100				
Benzo(a)anthracene	<100 µg/kg	TM157	<100	<100				
Benzo(b)fluoranthene	<100 µg/kg	TM157	<100	<100				
Benzo(k)fluoranthene	<100 µg/kg	TM157	<100	<100				
Benzo(a)pyrene	<100 µg/kg	TM157	<100	<100				
Benzo(g,h,i)perylene	<100 µg/kg	TM157	<100	<100				
Chrysene	<100 µg/kg	TM157	<100	<100				
Fluoranthene	<100 µg/kg	TM157	<100	<100				
Fluorene	<100 µg/kg	TM157	<100	<100				
Indeno(1,2,3-cd)pyrene	<100 µg/kg	TM157	<100	<100				
Phenanthrene	<100 µg/kg	TM157	<100	<100				
Pyrene	<100 µg/kg	TM157	<100	<100				
Naphthalene	<100 µg/kg	TM157	<100	<100				
Dibenzo(a,h)anthracene	<100 µg/kg	TM157	<100	<100				
Bis(2-chloroisopropyl) ether	<100 µg/kg	TM157	<100	<100				
TIC report		TM157	Not Detected	Not Detected				
Total SVOC TIC	<100 µg/kg	TM157	<1000	<1000				



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## TPH CWG (S)

Results Legend			Customer Sample Ref.	TP001	TP001	TP002	TP002	TP003	TP003
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*\$@	Sample deviation (see appendix)								
		Depth (m)	0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.50 - 1.60	1.50 - 1.60
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
		Date Sampled	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
		Sampled Time							
		Date Received	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020
		SDG Ref	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100
		Lab Sample No.(s)	23081642	23081508	23081514	23081519	23081502	23081580	23081580
		AGS Reference	ES1	ES3	ES1	ES3	ES1	ES1	ES4
Component	LOD/Units	Method							
GRO Surrogate % recovery**	%	TM089	101	93	99.6	90	101	101	101
Aliphatics >C5-C6	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C8-C10	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aliphatics >C10-C12	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aliphatics >C12-C16	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aliphatics >C16-C21	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aliphatics >C21-C35	<1000 µg/kg	TM414	<1000	3890	4090	5350	4020	2300	2300
Aliphatics >C35-C44	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Total Aliphatics >C10-C44	<5000 µg/kg	TM414	<5000	<5000	<5000	5420	<5000	<5000	<5000
Total Aliphatics & Aromatics >C10-C44	<10000 µg/kg	TM414	<10000	<10000	10300	14300	<10000	<10000	<10000
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	<10
Aromatics > EC10-EC12	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC12-EC16	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC16-EC21	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC21-EC35	<1000 µg/kg	TM414	1300	2370	5000	7800	1270	<1000	<1000
Aromatics >EC35-EC44	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Aromatics > EC40-EC44	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Total Aromatics > EC10-EC44	<5000 µg/kg	TM414	<5000	<5000	6240	8900	<5000	<5000	<5000
Total Aliphatics & Aromatics >C5-C44	<10000 µg/kg	TM414	<10000	<10000	<10000	14300	<10000	<10000	<10000
Total Aliphatics >C5-C10	<50 µg/kg	TM089	<50	<50	<50	<50	<50	<50	<50
Total Aromatics >EC5-EC10	<50 µg/kg	TM089	<50	<50	<50	<50	<50	<50	<50
GRO >C5-C10	<20 µg/kg	TM089	<20	<20	<20	<20	<20	<20	<20





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## TPH CWG (S)

Results Legend			Customer Sample Ref.	TP010	TP010	TP011	TP011	TP012	TP012
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50
M	mCERTS accredited.			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
aq	Aqueous / settled sample.			14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.			21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020
*	Subcontracted - refer to subcontractor report for accreditation status.			201021-100	201021-100	201021-100	201021-100	201021-100	201021-100
**	% 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			23081538	23081550	23081573	23081587	23081559	23081567
(F)	Trigger breach confirmed			ES1	ES4	ES1	ES4	ES1	ES4
1-4*8@	Sample deviation (see appendix)								
Component	LOD/Units	Method							
GRO Surrogate % recovery**	%	TM089	122	102	123	104	104	105	
Aliphatics >C5-C6	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	
Aliphatics >C6-C8	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	
Aliphatics >C8-C10	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	
Aliphatics >C10-C12	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	
Aliphatics >C12-C16	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	
Aliphatics >C16-C21	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	
Aliphatics >C21-C35	<1000 µg/kg	TM414	2470	2110	2300	<1000	3000	2960	
Aliphatics >C35-C44	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	
Total Aliphatics >C10-C44	<5000 µg/kg	TM414	<5000	<5000	<5000	<5000	<5000	<5000	
Total Aliphatics & Aromatics >C10-C44	<10000 µg/kg	TM414	<10000	<10000	<10000	<10000	<10000	<10000	
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	
Aromatics >EC8-EC10	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	
Aromatics > EC10-EC12	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	
Aromatics > EC12-EC16	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	
Aromatics > EC16-EC21	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	
Aromatics > EC21-EC35	<1000 µg/kg	TM414	1270	<1000	1570	5250	1600	2670	
Aromatics >EC35-EC44	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	
Aromatics > EC40-EC44	<1000 µg/kg	TM414	<1000	<1000	<1000	<1000	<1000	<1000	
Total Aromatics > EC10-EC44	<5000 µg/kg	TM414	<5000	<5000	<5000	6380	<5000	<5000	
Total Aliphatics & Aromatics >C5-C44	<10000 µg/kg	TM414	<10000	<10000	<10000	<10000	<10000	<10000	
Total Aliphatics >C5-C10	<50 µg/kg	TM089	<50	<50	<50	<50	<50	<50	
Total Aromatics >EC5-EC10	<50 µg/kg	TM089	<50	<50	<50	<50	<50	<50	
GRO >C5-C10	<20 µg/kg	TM089	<20	<20	<20	<20	<20	<20	





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.	TP001	TP001	TP002	TP002	TP003	TP003
#	ISO17025 accredited.			0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.50 - 1.60
M	mCERTS accredited.			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
aq	Aqueous / settled sample.			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
diss.filt	Dissolved / filtered sample.			15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020	15/10/2020
tot.unfilt	Total / unfiltered sample.			21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020
*	Subcontracted - refer to subcontractor report for accreditation status.			201021-100	201021-100	201021-100	201021-100	201021-100	201021-100
**	% 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			23081642	23081508	23081514	23081519	23081502	23081580
(F)	Trigger breach confirmed			ES1	ES3	ES1	ES3	ES1	ES4
1-4*§@	Sample deviation (see appendix)								
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM116	113	109	114	103	103	111	
Toluene-d8**	%	TM116	96.1	96	94.6	98	95.9	94.5	
4-Bromofluorobenzene**	%	TM116	84.7	72.9	79.7	89.1	86.3	75.2	
Dichlorodifluoromethane	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	<6
Chloromethane	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	<7
Vinyl Chloride	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	<6
Bromomethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Chloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	<6
1,1-Dichloroethene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Carbon Disulphide	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	<7
Dichloromethane	<10 µg/kg	TM116	<10	20.7	<10	<10	<10	<10	22.6
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
1,1-Dichloroethane	<8 µg/kg	TM116	<8	<8	<8	<8	<8	<8	<8
cis-1,2-Dichloroethene	<6 µg/kg	TM116	<6	<6	<6	<6	<6	<6	<6
2,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Bromochloromethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Chloroform	<8 µg/kg	TM116	<8	<8	<8	<8	<8	<8	<8
1,1,1-Trichloroethane	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	<7
1,1-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Carbontetrachloride	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
1,2-Dichloroethane	<5 µg/kg	TM116	<5	<5	<5	<5	<5	<5	<5
Benzene	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9	<9
Trichloroethene	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9	<9
1,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Dibromomethane	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9	<9
Bromodichloromethane	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	<7
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
Toluene	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7	<7
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10
1,1,2-Trichloroethane	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10	<10





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.	TP001	TP001	TP002	TP002	TP003	TP003
# ISO17025 accredited. M mCERTS accredited. sg Aqueous / settled sample. dis.fit Dissolved / filtered sample. tot.unfit Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1.4.5@ Sample deviation (see appendix)	Depth (m)	Sample Type	TP001	TP001	TP002	TP002	TP003	TP003	TP003
	Date Sampled	Date Received	0.40 - 0.50 Soil/Solid (S) 15/10/2020	1.40 - 1.50 Soil/Solid (S) 15/10/2020	0.50 - 0.60 Soil/Solid (S) 15/10/2020	1.40 - 1.50 Soil/Solid (S) 15/10/2020	0.50 - 0.60 Soil/Solid (S) 15/10/2020	1.50 - 1.60 Soil/Solid (S) 15/10/2020	1.50 - 1.60 Soil/Solid (S) 15/10/2020
	SDG Ref	Lab Sample No.(s)	21/10/2020 201021-100 23081642 ES1	21/10/2020 201021-100 23081508 ES3	21/10/2020 201021-100 23081514 ES1	21/10/2020 201021-100 23081519 ES3	21/10/2020 201021-100 23081502 ES1	21/10/2020 201021-100 23081580 ES4	21/10/2020 201021-100 23081580 ES4
Component	LOD/Units	Method							
1,3-Dichloropropane	<7 µg/kg	TM116	<7 M	<7 M	<7 M	<7 M	<7 M	<7 M	<7 M
Tetrachloroethene	<5 µg/kg	TM116	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M
Dibromochloromethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
1,2-Dibromoethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Chlorobenzene	<5 µg/kg	TM116	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Ethylbenzene	<4 µg/kg	TM116	<4 M	<4 M	<4 M	<4 M	<4 M	<4 M	<4 M
p/m-Xylene	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #
o-Xylene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Styrene	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #
Bromoform	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Isopropylbenzene	<5 µg/kg	TM116	<5 #	<5 #	<5 #	<5 #	<5 #	<5 #	<5 #
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M	<16 M
Bromobenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
Propylbenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
2-Chlorotoluene	<9 µg/kg	TM116	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M	<9 M
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
4-Chlorotoluene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
tert-Butylbenzene	<14 µg/kg	TM116	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<9 #	<9 #	<9 #	<9 #	<9 #	<9 #	<9 #
sec-Butylbenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
4-Isopropyltoluene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M	<5 M
n-Butylbenzene	<11 µg/kg	TM116	<11 M	<11 M	<11 M	<11 M	<11 M	<11 M	<11 M
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M	<14 M
Tert-amyl methyl ether	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #	<10 #
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20 M	<20 M	<20 M	<20 M	<20 M	<20 M	<20 M
Hexachlorobutadiene	<20 µg/kg	TM116	<20 M	<20 M	<20 M	<20 M	<20 M	<20 M	<20 M
Naphthalene	<13 µg/kg	TM116	<13 M	<13 M	<13 M	<13 M	<13 M	<13 M	<13 M





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**
**VOC MS (S)**

<b>Results Legend</b> # ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.fit Dissolved / filtered sample. tot.unfit Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery. (F) Trigger breach confirmed 1-4*§@ Sample deviation (see appendix)			Customer Sample Ref.	TP004	TP004	TP005	TP005	TP006	TP006
			Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.40 - 0.50 Soil/Solid (S) 15/10/2020	1.40 - 1.50 Soil/Solid (S) 15/10/2020	0.40 - 0.50 Soil/Solid (S) 15/10/2020	1.50 - 1.60 Soil/Solid (S) 15/10/2020	0.40 - 0.50 Soil/Solid (S) 14/10/2020	1.40 - 1.50 Soil/Solid (S) 14/10/2020
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM116	108	108	108	111	111	117	
Toluene-d8**	%	TM116	97.6	99.5	98.1	98.6	95.3	98.4	
4-Bromofluorobenzene**	%	TM116	95.8	99.2	92.7	102	84.8	91.6	
Dichlorodifluoromethane	<6 µg/kg	TM116	<6 M	<6 M	<6 M	<6 M	<6 M	<60 M	
Chloromethane	<7 µg/kg	TM116	<7 #	<7 #	<7 #	<7 #	<7 #	<70 #	
Vinyl Chloride	<6 µg/kg	TM116	<6 M	<6 M	<6 M	<6 M	<6 M	<60 M	
Bromomethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Chloroethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Trichlorofluoromethane	<6 µg/kg	TM116	<6 M	<6 M	<6 M	<6 M	<6 M	<60 M	
1,1-Dichloroethene	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<100 #	
Carbon Disulphide	<7 µg/kg	TM116	<7 M	<7 M	<7 M	<7 M	<7 M	<70 M	
Dichloromethane	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<100 #	
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
1,1-Dichloroethane	<8 µg/kg	TM116	<8 M	<8 M	<8 M	<8 M	<8 M	<80 M	
cis-1,2-Dichloroethene	<6 µg/kg	TM116	<6 M	<6 M	<6 M	<6 M	<6 M	<60 M	
2,2-Dichloropropane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Bromochloromethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Chloroform	<8 µg/kg	TM116	<8 M	<8 M	<8 M	<8 M	<8 M	<80 M	
1,1,1-Trichloroethane	<7 µg/kg	TM116	<7 M	<7 M	<7 M	<7 M	<7 M	<70 M	
1,1-Dichloropropene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Carbontetrachloride	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
1,2-Dichloroethane	<5 µg/kg	TM116	<5 M	<5 M	<5 M	<5 M	<5 M	<50 M	
Benzene	<9 µg/kg	TM116	<9 M	<9 M	<9 M	<9 M	<9 M	<90 M	
Trichloroethene	<9 µg/kg	TM116	<9 #	<9 #	<9 #	<9 #	<9 #	<90 #	
1,2-Dichloropropane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Dibromomethane	<9 µg/kg	TM116	<9 M	<9 M	<9 M	<9 M	<9 M	<90 M	
Bromodichloromethane	<7 µg/kg	TM116	<7 M	<7 M	<7 M	<7 M	<7 M	<70 M	
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Toluene	<7 µg/kg	TM116	<7 M	<7 M	<7 M	<7 M	<7 M	<70 M	
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
1,1,2-Trichloroethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.	TP004	TP004	TP005	TP005	TP006	TP006
# ISO17025 accredited. M mCERTS accredited. sg Aqueous / settled sample. dis.fit Dissolved / filtered sample. tot.unfit Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1.4.5@ Sample deviation (see appendix)	Depth (m)	Sample Type	TP004	TP004	TP005	TP005	TP006	TP006	
	Date Sampled	Date Received	0.40 - 0.50 Soil/Solid (S)	1.40 - 1.50 Soil/Solid (S)	0.40 - 0.50 Soil/Solid (S)	1.50 - 1.60 Soil/Solid (S)	0.40 - 0.50 Soil/Solid (S)	1.40 - 1.50 Soil/Solid (S)	
	SDG Ref	AGS Reference	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	
	Lab Sample No.(s)		23081629	23081636	23081593	23081599	23081526	23081533	
	Method		ES1	ES2	ES1	ES4	ES1	ES4	
Component	LOD/Units	Method							
1,3-Dichloropropane	<7 µg/kg	TM116	<7 M	<7 M	<7 M	<7 M	<7 M	<70 M	
Tetrachloroethene	<5 µg/kg	TM116	<5 M	<5 M	<5 M	<5 M	<5 M	<50 M	
Dibromochloromethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
1,2-Dibromoethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Chlorobenzene	<5 µg/kg	TM116	<5 M	<5 M	<5 M	<5 M	<5 M	<50 M	
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Ethylbenzene	<4 µg/kg	TM116	<4 M	<4 M	<4 M	<4 M	<4 M	<40 M	
p/m-Xylene	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<100 #	
o-Xylene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Styrene	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<100 #	
Bromoform	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Isopropylbenzene	<5 µg/kg	TM116	<5 #	<5 #	<5 #	<5 #	<5 #	<50 #	
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<100 #	
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16 M	<16 M	<16 M	<16 M	<16 M	<160 M	
Bromobenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
Propylbenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
2-Chlorotoluene	<9 µg/kg	TM116	<9 M	<9 M	<9 M	<9 M	<9 M	<90 M	
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8 M	<8 M	<8 M	<8 M	<8 M	<80 M	
4-Chlorotoluene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
tert-Butylbenzene	<14 µg/kg	TM116	<14 M	<14 M	<14 M	<14 M	<14 M	<140 M	
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<9 #	<9 #	<9 #	<9 #	<9 #	<90 #	
sec-Butylbenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
4-Isopropyltoluene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8 M	<8 M	<8 M	<8 M	<8 M	<80 M	
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5 M	<5 M	<5 M	<5 M	<5 M	<50 M	
n-Butylbenzene	<11 µg/kg	TM116	<11 M	<11 M	<11 M	<11 M	<11 M	<110 M	
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10 M	<10 M	<10 M	<10 M	<10 M	<100 M	
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14 M	<14 M	<14 M	<14 M	<14 M	<140 M	
Tert-amyl methyl ether	<10 µg/kg	TM116	<10 #	<10 #	<10 #	<10 #	<10 #	<100 #	
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20 M	<20 M	<20 M	<20 M	<20 M	<200 M	
Hexachlorobutadiene	<20 µg/kg	TM116	<20 M	<20 M	<20 M	<20 M	<20 M	<200 M	
Naphthalene	<13 µg/kg	TM116	<13 M	<13 M	<13 M	<13 M	<13 M	<130 M	





# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.	TP010	TP010	TP011	TP011	TP012	TP012
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.fit	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*§@	Sample deviation (see appendix)								
		Depth (m)	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
		Date Sampled	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020
		Sampled Time							
		Date Received	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020
		SDG Ref	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100	201021-100
		Lab Sample No.(s)	23081538	23081550	23081573	23081587	23081559	23081567	23081567
		AGS Reference	ES1	ES4	ES1	ES4	ES1	ES4	ES4
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM116	102	109	103	108	111	107	
Toluene-d8**	%	TM116	98.1	97.3	96.9	100	95.2	100	
4-Bromofluorobenzene**	%	TM116	91.1	83.5	87.5	102	87.2	103	
Dichlorodifluoromethane	<6 µg/kg	TM116	<6	<6	<6	<120	<6	<120	M
Chloromethane	<7 µg/kg	TM116	<7	<7	<7	<140	<7	<140	#
Vinyl Chloride	<6 µg/kg	TM116	<6	<6	<6	<120	<6	<120	M
Bromomethane	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	M
Chloroethane	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	M
Trichlorofluoromethane	<6 µg/kg	TM116	<6	<6	<6	<120	<6	<120	M
1,1-Dichloroethene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	#
Carbon Disulphide	<7 µg/kg	TM116	<7	<7	<7	<140	<7	<140	M
Dichloromethane	<10 µg/kg	TM116	<10	12.3	<10	<200	<10	<200	#
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	M
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	M
1,1-Dichloroethane	<8 µg/kg	TM116	<8	<8	<8	<160	<8	<160	M
cis-1,2-Dichloroethene	<6 µg/kg	TM116	<6	<6	<6	<120	<6	<120	M
2,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
Bromochloromethane	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	M
Chloroform	<8 µg/kg	TM116	<8	<8	<8	<160	<8	<160	M
1,1,1-Trichloroethane	<7 µg/kg	TM116	<7	<7	<7	<140	<7	<140	M
1,1-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	M
Carbontetrachloride	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	M
1,2-Dichloroethane	<5 µg/kg	TM116	<5	<5	<5	<100	<5	<100	M
Benzene	<9 µg/kg	TM116	<9	<9	<9	<180	<9	<180	M
Trichloroethene	<9 µg/kg	TM116	<9	<9	<9	<180	<9	<180	#
1,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	M
Dibromomethane	<9 µg/kg	TM116	<9	<9	<9	<180	<9	<180	M
Bromodichloromethane	<7 µg/kg	TM116	<7	<7	<7	<140	<7	<140	M
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	M
Toluene	<7 µg/kg	TM116	<7	<7	<7	<140	<7	<140	M
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	M
1,1,2-Trichloroethane	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	M



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.	TP010	TP010	TP011	TP011	TP012	TP012
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50
M	mCERTS accredited.			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
sg	Aqueous / settled sample.			14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020	14/10/2020
dis.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020	21/10/2020
(F)	Trigger breach confirmed			201021-100	201021-100	201021-100	201021-100	201021-100	201021-100
1-4*5@	Sample deviation (see appendix)			23081538	23081550	23081573	23081587	23081559	23081567
				ES1	ES4	ES1	ES4	ES1	ES4
Component	LOD/Units	Method							
1,3-Dichloropropane	<7 µg/kg	TM116	<7	<7	<7	<140	<7	<140	
Tetrachloroethene	<5 µg/kg	TM116	<5	<5	<5	<100	<5	<100	
Dibromochloromethane	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
1,2-Dibromoethane	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
Chlorobenzene	<5 µg/kg	TM116	<5	<5	<5	<100	<5	<100	
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
Ethylbenzene	<4 µg/kg	TM116	<4	<4	<4	<80	<4	<80	
p/m-Xylene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
o-Xylene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
Styrene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
Bromoform	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
Isopropylbenzene	<5 µg/kg	TM116	<5	<5	<5	<100	<5	<100	
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16	<16	<16	<320	<16	<320	
Bromobenzene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
Propylbenzene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
2-Chlorotoluene	<9 µg/kg	TM116	<9	<9	<9	<180	<9	<180	
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8	<8	<8	<160	<8	<160	
4-Chlorotoluene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
tert-Butylbenzene	<14 µg/kg	TM116	<14	<14	<14	<280	<14	<280	
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<9	<9	<9	<180	<9	<180	
sec-Butylbenzene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
4-Isopropyltoluene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8	<8	<8	<160	<8	<160	
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5	<5	<5	<100	<5	<100	
n-Butylbenzene	<11 µg/kg	TM116	<11	<11	<11	<220	<11	<220	
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14	<14	<14	<280	<14	<280	
Tert-amyl methyl ether	<10 µg/kg	TM116	<10	<10	<10	<200	<10	<200	
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20	<20	<20	<400	<20	<400	
Hexachlorobutadiene	<20 µg/kg	TM116	<20	<20	<20	<400	<20	<400	
Naphthalene	<13 µg/kg	TM116	<13	<13	<13	<260	<13	<260	







# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## VOC MS (S)

Results Legend		Customer Sample Ref.	TP201	TP201			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.50 - 0.60	1.50 - 1.60			
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)			
aq	Aqueous / settled sample.		15/10/2020	15/10/2020			
diss.filt	Dissolved / filtered sample.		21/10/2020	21/10/2020			
tot.unfilt	Total / unfiltered sample.		201021-100	201021-100			
*	Subcontracted - refer to subcontractor report for accreditation status.		23081608	23081621			
**	% 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		ES1	ES4			
(F)	Trigger breach confirmed						
1-4*§@	Sample deviation (see appendix)						
Component	LOD/Units		Method				
Dibromofluoromethane**	%	TM116	107	113			
Toluene-d8**	%	TM116	98.3	98.5			
4-Bromofluorobenzene**	%	TM116	100	93.5			
Dichlorodifluoromethane	<6 µg/kg	TM116	<6	<6	M	M	
Chloromethane	<7 µg/kg	TM116	<7	<7	#	#	
Vinyl Chloride	<6 µg/kg	TM116	<6	<6	M	M	
Bromomethane	<10 µg/kg	TM116	<10	<10	M	M	
Chloroethane	<10 µg/kg	TM116	<10	<10	M	M	
Trichlorofluoromethane	<6 µg/kg	TM116	<6	<6	M	M	
1,1-Dichloroethene	<10 µg/kg	TM116	<10	<10	#	#	
Carbon Disulphide	<7 µg/kg	TM116	<7	<7	M	M	
Dichloromethane	<10 µg/kg	TM116	<10	<10	#	#	
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10	<10	M	M	
trans-1,2-Dichloroethene	<10 µg/kg	TM116	<10	<10	M	M	
1,1-Dichloroethane	<8 µg/kg	TM116	<8	<8	M	M	
cis-1,2-Dichloroethene	<6 µg/kg	TM116	<6	<6	M	M	
2,2-Dichloropropane	<10 µg/kg	TM116	<10	<10			
Bromochloromethane	<10 µg/kg	TM116	<10	<10	M	M	
Chloroform	<8 µg/kg	TM116	<8	<8	M	M	
1,1,1-Trichloroethane	<7 µg/kg	TM116	<7	<7	M	M	
1,1-Dichloropropene	<10 µg/kg	TM116	<10	<10	M	M	
Carbontetrachloride	<10 µg/kg	TM116	<10	<10	M	M	
1,2-Dichloroethane	<5 µg/kg	TM116	<5	<5	M	M	
Benzene	<9 µg/kg	TM116	<9	<9	M	M	
Trichloroethene	<9 µg/kg	TM116	<9	<9	#	#	
1,2-Dichloropropane	<10 µg/kg	TM116	<10	<10	M	M	
Dibromomethane	<9 µg/kg	TM116	<9	<9	M	M	
Bromodichloromethane	<7 µg/kg	TM116	<7	<7	M	M	
cis-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10	M	M	
Toluene	<7 µg/kg	TM116	<7	<7	M	M	
trans-1,3-Dichloropropene	<10 µg/kg	TM116	<10	<10			
1,1,2-Trichloroethane	<10 µg/kg	TM116	<10	<10	M	M	



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201021-100  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 579754  
**Superseded Report:**

## VOC MS (S)

Results Legend			Customer Sample Ref.	TP201	TP201			
#	ISO17025 accredited.							
M	mCERTS accredited.							
sq	Aqueous / filtered sample.							
dis.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted - refer to subcontractor report for accreditation status.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-4&@	Sample deviation (see appendix)							
		Customer Sample Ref.	TP201	TP201				
		Depth (m)	0.50 - 0.60	1.50 - 1.60				
		Sample Type	Soil/Solid (S)	Soil/Solid (S)				
		Date Sampled	15/10/2020	15/10/2020				
		Sampled Time	.	.				
		Date Received	21/10/2020	21/10/2020				
		SDG Ref	201021-100	201021-100				
		Lab Sample No.(s)	23081608	23081621				
		AGS Reference	ES1	ES4				
Component	LOD/Units	Method						
1,3-Dichloropropane	<7 µg/kg	TM116	<7 M	<7 M				
Tetrachloroethene	<5 µg/kg	TM116	<5 M	<5 M				
Dibromochloromethane	<10 µg/kg	TM116	<10 M	<10 M				
1,2-Dibromoethane	<10 µg/kg	TM116	<10 M	<10 M				
Chlorobenzene	<5 µg/kg	TM116	<5 M	<5 M				
1,1,1,2-Tetrachloroethane	<10 µg/kg	TM116	<10 M	<10 M				
Ethylbenzene	<4 µg/kg	TM116	<4 M	<4 M				
p/m-Xylene	<10 µg/kg	TM116	<10 #	<10 #				
o-Xylene	<10 µg/kg	TM116	<10 M	<10 M				
Styrene	<10 µg/kg	TM116	<10 #	<10 #				
Bromoform	<10 µg/kg	TM116	<10 M	<10 M				
Isopropylbenzene	<5 µg/kg	TM116	<5 #	<5 #				
1,1,2,2-Tetrachloroethane	<10 µg/kg	TM116	<10 #	<10 #				
1,2,3-Trichloropropane	<16 µg/kg	TM116	<16 M	<16 M				
Bromobenzene	<10 µg/kg	TM116	<10 M	<10 M				
Propylbenzene	<10 µg/kg	TM116	<10 M	<10 M				
2-Chlorotoluene	<9 µg/kg	TM116	<9 M	<9 M				
1,3,5-Trimethylbenzene	<8 µg/kg	TM116	<8 M	<8 M				
4-Chlorotoluene	<10 µg/kg	TM116	<10 M	<10 M				
tert-Butylbenzene	<14 µg/kg	TM116	<14 M	<14 M				
1,2,4-Trimethylbenzene	<9 µg/kg	TM116	<9 #	<9 #				
sec-Butylbenzene	<10 µg/kg	TM116	<10	<10				
4-Isopropyltoluene	<10 µg/kg	TM116	<10 M	<10 M				
1,3-Dichlorobenzene	<8 µg/kg	TM116	<8 M	<8 M				
1,4-Dichlorobenzene	<5 µg/kg	TM116	<5 M	<5 M				
n-Butylbenzene	<11 µg/kg	TM116	<11	<11				
1,2-Dichlorobenzene	<10 µg/kg	TM116	<10 M	<10 M				
1,2-Dibromo-3-chloropropane	<14 µg/kg	TM116	<14 M	<14 M				
Tert-amyl methyl ether	<10 µg/kg	TM116	<10 #	<10 #				
1,2,4-Trichlorobenzene	<20 µg/kg	TM116	<20	<20				
Hexachlorobutadiene	<20 µg/kg	TM116	<20	<20				
Naphthalene	<13 µg/kg	TM116	<13 M	<13 M				





# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	201021-100	<b>Client Reference:</b>	2020WW102	<b>Report Number:</b>	579754
<b>Location:</b>	Arklow Bank	<b>Order Number:</b>	9028	<b>Superseded Report:</b>	

## Asbestos Identification - Solid Samples

### Results Legend

- # ISO17025 accredited.
- M mCERTS accredited.
- \* Subcontracted test.
- (F) Trigger breach confirmed
- 1-5&#9@ Sample deviation (see appendix)

	Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. TP001E51 Depth (m) 0.40 - 0.50 Sample Type SOLID Date Sampled 15/10/2020 00:00:00 Date Received 21/10/2020 09:00:00 SDG 201021-100 Original Sample 23081642 Method Number TM048	27/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP001E53 Depth (m) 1.40 - 1.50 Sample Type SOLID Date Sampled 15/10/2020 00:00:00 Date Received 21/10/2020 09:00:00 SDG 201021-100 Original Sample 23081508 Method Number TM048	27/10/2020	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP002E51 Depth (m) 0.50 - 0.60 Sample Type SOLID Date Sampled 15/10/2020 00:00:00 Date Received 21/10/2020 09:00:00 SDG 201021-100 Original Sample 23081514 Method Number TM048	28/10/2020	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP002E53 Depth (m) 1.40 - 1.50 Sample Type SOLID Date Sampled 15/10/2020 00:00:00 Date Received 21/10/2020 09:00:00 SDG 201021-100 Original Sample 23081519 Method Number TM048	27/10/2020	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP003E51 Depth (m) 0.50 - 0.60 Sample Type SOLID Date Sampled 15/10/2020 00:00:00 Date Received 21/10/2020 09:00:00 SDG 201021-100 Original Sample 23081502 Method Number TM048	27/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP003E54 Depth (m) 1.50 - 1.60 Sample Type SOLID Date Sampled 15/10/2020 00:00:00 Date Received 21/10/2020 09:00:00 SDG 201021-100 Original Sample 23081580 Method Number TM048	28/10/2020	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP004E51 Depth (m) 0.40 - 0.50 Sample Type SOLID Date Sampled 15/10/2020 00:00:00 Date Received 21/10/2020 09:00:00 SDG 201021-100 Original Sample 23081629 Method Number TM048	27/10/2020	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. TP004E52 Depth (m) 1.40 - 1.50 Sample Type SOLID Date Sampled 15/10/2020 00:00:00 Date Received 21/10/2020 09:00:00 SDG 201021-100 Original Sample 23081636 Method Number TM048	28/10/2020	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	201021-100	<b>Client Reference:</b>	2020WW102	<b>Report Number:</b>	579754
<b>Location:</b>	Arklow Bank	<b>Order Number:</b>	9028	<b>Superseded Report:</b>	

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP005E51 0.40 - 0.50 SOLID 15/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081593 TM048	28/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP005E54 1.50 - 1.60 SOLID 15/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081599 TM048	28/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP006E51 0.40 - 0.50 SOLID 14/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081526 TM048	27/10/2020	Barbara UrbaneK-Walsh	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP006E54 1.40 - 1.50 SOLID 14/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081533 TM048	28/10/2020	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP010E51 0.40 - 0.50 SOLID 14/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081538 TM048	27/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP010E54 1.40 - 1.50 SOLID 14/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081550 TM048	27/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP011E51 0.40 - 0.50 SOLID 14/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081573 TM048	28/10/2020	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP011E54 1.40 - 1.50 SOLID 14/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081587 TM048	28/10/2020	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP012E51 0.50 - 0.60 SOLID 14/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081559 TM048	27/10/2020	Barbara UrbaneK-Walsh	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	201021-100	<b>Client Reference:</b>	2020WW102	<b>Report Number:</b>	579754
<b>Location:</b>	Arklow Bank	<b>Order Number:</b>	9028	<b>Superseded Report:</b>	

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP012ES4 1.40 - 1.50 SOLID 14/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081567 TM048	27/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP201ES1 0.50 - 0.60 SOLID 15/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081608 TM048	28/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP201ES4 1.50 - 1.60 SOLID 15/10/2020 00:00:00 21/10/2020 09:00:00 201021-100 23081621 TM048	28/10/2020	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



**CERTIFICATE OF ANALYSIS**

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

**CEN 10:1 SINGLE STAGE LEACHATE TEST**

**CEN ANALYTICAL RESULTS**

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.119  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 32.1  
Dry Matter Content (%) 75.7

Case  
SDG 201021-100  
Lab Sample Number(s) 23081502  
Sampled Date 15-Oct-2020  
Customer Sample Ref. TP003 ES1  
Depth (m) 0.50 - 0.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.0815	<0.0002	0.815	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000367	<0.0003	0.00367	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00263	<0.001	0.0263	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	4.4	<2	44	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	40.7	<5	407	<50	-	-	-

**Leach Test Information**

Date Prepared 25-Oct-2020  
pH (pH Units) 7.93  
Conductivity (µS/cm) 40.90  
Temperature (°C) 20.30  
Volume Leachant (Litres) 0.872

Mcerts Certification does not apply to leachates

14/12/2020 13:21:53

13:19:43 14/12/2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.114  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 26  
Dry Matter Content (%) 79.4

#### Case

SDG 201021-100  
Lab Sample Number(s) 23081508  
Sampled Date 15-Oct-2020  
Customer Sample Ref. TP001 ES3  
Depth (m) 1.40 - 1.50

#### Eluate Analysis

	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	3.09	<3	30.9	<30	-	-	-
Fluoride	0.579	<0.5	5.79	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.00678	<0.0002	0.0678	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.00125	<0.0003	0.0125	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	0.0086	<0.003	0.086	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00148	<0.001	0.0148	<0.01	-	-	-
Chloride	2.7	<2	27	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	80.6	<5	806	<50	-	-	-

#### Leach Test Information

Date Prepared 24-Oct-2020  
pH (pH Units) 8.70  
Conductivity (µS/cm) 102.00  
Temperature (°C) 18.10  
Volume Leachant (Litres) 0.876

Mcerts Certification does not apply to leachates

14/12/2020 13:21:53

13:19:43 14/12/2020





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.122  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 35.9  
Dry Matter Content (%) 73.6

#### Case

SDG 201021-100  
Lab Sample Number(s) 23081514  
Sampled Date 15-Oct-2020  
Customer Sample Ref. TP002 ES1  
Depth (m) 0.50 - 0.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.00134	<0.0005	0.0134	<0.005	-	-	-
Barium	0.0461	<0.0002	0.461	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00238	<0.001	0.0238	<0.01	-	-	-
Copper	0.00187	<0.0003	0.0187	<0.003	-	-	-
Lead	0.00126	<0.0002	0.0126	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.00147	<0.0004	0.0147	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0185	<0.001	0.185	<0.01	-	-	-
Chloride	4.4	<2	44	<20	-	-	-
Sulphate (soluble)	4.6	<2	46	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	38.4	<5	384	<50	-	-	-

#### Leach Test Information

Date Prepared 23-Oct-2020  
pH (pH Units) 8.36  
Conductivity (µS/cm) 29.90  
Temperature (°C) 20.70  
Volume Leachant (Litres) 0.868

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.113  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 24.9  
Dry Matter Content (%) 80.1

### Case

SDG 201021-100  
Lab Sample Number(s) 23081519  
Sampled Date 15-Oct-2020  
Customer Sample Ref. TP002 ES3  
Depth (m) 1.40 - 1.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	4.29	<3	42.9	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.00264	<0.0002	0.0264	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	<0.0003	<0.0003	<0.003	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	<0.001	<0.001	<0.01	<0.01	-	-	-
Chloride	2	<2	20	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	73.3	<5	733	<50	-	-	-

### Leach Test Information

Date Prepared 24-Oct-2020  
pH (pH Units) 8.36  
Conductivity (µS/cm) 89.70  
Temperature (°C) 16.70  
Volume Leachant (Litres) 0.878

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.104  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 14.8  
Dry Matter Content (%) 87.1

#### Case

SDG 201021-100  
Lab Sample Number(s) 23081526  
Sampled Date 14-Oct-2020  
Customer Sample Ref. TP006 ES1  
Depth (m) 0.40 - 0.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.000504	<0.0005	0.00504	<0.005	-	-	-
Barium	0.000771	<0.0002	0.00771	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000769	<0.0003	0.00769	<0.003	-	-	-
Lead	0.000304	<0.0002	0.00304	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	<0.001	<0.001	<0.01	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	2.5	<2	25	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	24.9	<5	249	<50	-	-	-

#### Leach Test Information

Date Prepared 22-Oct-2020  
pH (pH Units) 8.56  
Conductivity (µS/cm) 28.10  
Temperature (°C) 20.70  
Volume Leachant (Litres) 0.887

Mcerts Certification does not apply to leachates

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**CERTIFICATE OF ANALYSIS**

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

**CEN 10:1 SINGLE STAGE LEACHATE TEST**

**CEN ANALYTICAL RESULTS**

REF : BS EN 12457/2

<b>Client Reference</b>		<b>Site Location</b>	Arklow Bank
<b>Mass Sample taken (kg)</b>	0.121	<b>Natural Moisture Content (%)</b>	34.4
<b>Mass of dry sample (kg)</b>	0.090	<b>Dry Matter Content (%)</b>	74.4
<b>Particle Size &lt;4mm</b>	>95%		

**Case**

<b>SDG</b>	201021-100
<b>Lab Sample Number(s)</b>	23081533
<b>Sampled Date</b>	14-Oct-2020
<b>Customer Sample Ref.</b>	TP006 ES4
<b>Depth (m)</b>	1.40 - 1.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	3.54	<3	35.4	<30	-	-	-
Fluoride	0.725	<0.5	7.25	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.0389	<0.0002	0.389	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000311	<0.0003	0.00311	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	<0.001	<0.001	<0.01	<0.01	-	-	-
Chloride	4.8	<2	48	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	73.5	<5	735	<50	-	-	-

**Leach Test Information**

Date Prepared	23-Oct-2020
pH (pH Units)	6.40
Conductivity (µS/cm)	99.30
Temperature (°C)	20.50
Volume Leachant (Litres)	0.868

Mcerts Certification does not apply to leachates  
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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.116  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 27.7  
Dry Matter Content (%) 78.3

#### Case

SDG 201021-100  
Lab Sample Number(s) 23081538  
Sampled Date 14-Oct-2020  
Customer Sample Ref. TP010 ES1  
Depth (m) 0.40 - 0.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.00111	<0.0002	0.0111	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000817	<0.0003	0.00817	<0.003	-	-	-
Lead	0.000562	<0.0002	0.00562	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0011	<0.001	0.011	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	4.8	<2	48	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	36	<5	360	<50	-	-	-

#### Leach Test Information

Date Prepared 23-Oct-2020  
pH (pH Units) 8.22  
Conductivity (µS/cm) 44.10  
Temperature (°C) 20.60  
Volume Leachant (Litres) 0.875

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.109
Mass of dry sample (kg)	0.090
Particle Size <4mm	>95%

Site Location	Arklow Bank
Natural Moisture Content (%)	21.1
Dry Matter Content (%)	82.6

### Case

SDG	201021-100
Lab Sample Number(s)	23081550
Sampled Date	14-Oct-2020
Customer Sample Ref.	TP010 ES4
Depth (m)	1.40 - 1.50


Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	0.631	<0.5	6.31	<5	-	-	-
Mercury Dissolved (CVAf)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.00304	<0.0002	0.0304	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000813	<0.0003	0.00813	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	<0.001	<0.001	<0.01	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	80.9	<5	809	<50	-	-	-

### Leach Test Information

Date Prepared	25-Oct-2020
pH (pH Units)	7.99
Conductivity (µS/cm)	104.00
Temperature (°C)	21.00
Volume Leachant (Litres)	0.882

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.107
Mass of dry sample (kg)	0.090
Particle Size <4mm	>95%

Site Location	Arklow Bank
Natural Moisture Content (%)	19.6
Dry Matter Content (%)	83.6

### Case

SDG	201021-100
Lab Sample Number(s)	23081559
Sampled Date	14-Oct-2020
Customer Sample Ref.	TP012 ES1
Depth (m)	0.50 - 0.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.00166	<0.0005	0.0166	<0.005	-	-	-
Barium	0.0371	<0.0002	0.371	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00167	<0.001	0.0167	<0.01	-	-	-
Copper	0.00146	<0.0003	0.0146	<0.003	-	-	-
Lead	0.000789	<0.0002	0.00789	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.000638	<0.0004	0.00638	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0175	<0.001	0.175	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	18.2	<5	182	<50	-	-	-

### Leach Test Information

Date Prepared	23-Oct-2020
pH (pH Units)	8.23
Conductivity (µS/cm)	20.30
Temperature (°C)	20.70
Volume Leachant (Litres)	0.883

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.111
Mass of dry sample (kg)	0.090
Particle Size <4mm	>95%

Site Location	Arklow Bank
Natural Moisture Content (%)	22.8
Dry Matter Content (%)	81.4

### Case

SDG	201021-100
Lab Sample Number(s)	23081567
Sampled Date	14-Oct-2020
Customer Sample Ref.	TP012 ES4
Depth (m)	1.40 - 1.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	3.48	<3	34.8	<30	-	-	-
Fluoride	0.787	<0.5	7.87	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.23	<0.0002	2.3	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000597	<0.0003	0.00597	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	0.00369	<0.003	0.0369	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0071	<0.001	0.071	<0.01	-	-	-
Chloride	3.9	<2	39	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	104	<5	1040	<50	-	-	-

### Leach Test Information

Date Prepared	25-Oct-2020
pH (pH Units)	7.85
Conductivity (µS/cm)	134.00
Temperature (°C)	20.10
Volume Leachant (Litres)	0.879

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.115  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 28.7  
Dry Matter Content (%) 77.7

#### Case

SDG 201021-100  
Lab Sample Number(s) 23081573  
Sampled Date 14-Oct-2020  
Customer Sample Ref. TP011 ES1  
Depth (m) 0.40 - 0.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.142	<0.0002	1.42	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000347	<0.0003	0.00347	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00141	<0.001	0.0141	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	3.1	<2	31	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	41.9	<5	419	<50	-	-	-

#### Leach Test Information

Date Prepared 23-Oct-2020  
pH (pH Units) 8.95  
Conductivity (µS/cm) 49.30  
Temperature (°C) 20.70  
Volume Leachant (Litres) 0.875

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

<b>Client Reference</b>		<b>Site Location</b>	Arklow Bank
<b>Mass Sample taken (kg)</b>	0.106	<b>Natural Moisture Content (%)</b>	17
<b>Mass of dry sample (kg)</b>	0.090	<b>Dry Matter Content (%)</b>	85.5
<b>Particle Size &lt;4mm</b>	>95%		

### Case

<b>SDG</b>	201021-100
<b>Lab Sample Number(s)</b>	23081580
<b>Sampled Date</b>	15-Oct-2020
<b>Customer Sample Ref.</b>	TP003 ES4
<b>Depth (m)</b>	1.50 - 1.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	0.517	<0.5	5.17	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.226	<0.0002	2.26	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.00052	<0.0003	0.0052	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00312	<0.001	0.0312	<0.01	-	-	-
Chloride	2.9	<2	29	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	75.4	<5	754	<50	-	-	-

### Leach Test Information

Date Prepared	23-Oct-2020
pH (pH Units)	8.21
Conductivity (µS/cm)	94.80
Temperature (°C)	20.80
Volume Leachant (Litres)	0.884

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.108
Mass of dry sample (kg)	0.090
Particle Size <4mm	>95%

Site Location	Arklow Bank
Natural Moisture Content (%)	20.6
Dry Matter Content (%)	82.9

### Case

SDG	201021-100
Lab Sample Number(s)	23081587
Sampled Date	14-Oct-2020
Customer Sample Ref.	TP011 ES4
Depth (m)	1.40 - 1.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	0.574	<0.5	5.74	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.00425	<0.0002	0.0425	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.0007	<0.0003	0.007	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00139	<0.001	0.0139	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	76	<5	760	<50	-	-	-

### Leach Test Information

Date Prepared	23-Oct-2020
pH (pH Units)	6.82
Conductivity (µS/cm)	94.00
Temperature (°C)	20.50
Volume Leachant (Litres)	0.882

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.115  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 28.3  
Dry Matter Content (%) 78

#### Case

SDG 201021-100  
Lab Sample Number(s) 23081593  
Sampled Date 15-Oct-2020  
Customer Sample Ref. TP005 ES1  
Depth (m) 0.40 - 0.50

#### Eluate Analysis

	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.000978	<0.0005	0.00978	<0.005	-	-	-
Barium	0.0275	<0.0002	0.275	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00149	<0.001	0.0149	<0.01	-	-	-
Copper	0.00105	<0.0003	0.0105	<0.003	-	-	-
Lead	0.000858	<0.0002	0.00858	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.00052	<0.0004	0.0052	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0209	<0.001	0.209	<0.01	-	-	-
Chloride	2.7	<2	27	<20	-	-	-
Sulphate (soluble)	3.9	<2	39	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	28.6	<5	286	<50	-	-	-

#### Leach Test Information

Date Prepared 23-Oct-2020  
pH (pH Units) 8.60  
Conductivity (µS/cm) 55.20  
Temperature (°C) 20.70  
Volume Leachant (Litres) 0.875

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.117  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 29.9  
Dry Matter Content (%) 77

#### Case

SDG 201021-100  
Lab Sample Number(s) 23081599  
Sampled Date 15-Oct-2020  
Customer Sample Ref. TP005 ES4  
Depth (m) 1.50 - 1.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	0.794	<0.5	7.94	<5	-	-	-
Mercury Dissolved (CVAF)	0.000011	<0.00001	0.00011	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.00124	<0.0005	0.0124	<0.005	-	-	-
Barium	0.0314	<0.0002	0.314	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00218	<0.001	0.0218	<0.01	-	-	-
Copper	0.00166	<0.0003	0.0166	<0.003	-	-	-
Lead	0.000889	<0.0002	0.00889	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.00118	<0.0004	0.0118	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0112	<0.001	0.112	<0.01	-	-	-
Chloride	4.6	<2	46	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	33.4	<5	334	<50	-	-	-

#### Leach Test Information

Date Prepared 23-Oct-2020  
pH (pH Units) 8.32  
Conductivity (µS/cm) 41.60  
Temperature (°C) 20.90  
Volume Leachant (Litres) 0.873

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.110
Mass of dry sample (kg)	0.090
Particle Size <4mm	>95%

Site Location	Arklow Bank
Natural Moisture Content (%)	22.5
Dry Matter Content (%)	81.6

### Case

SDG	201021-100
Lab Sample Number(s)	23081608
Sampled Date	15-Oct-2020
Customer Sample Ref.	TP201 ES1
Depth (m)	0.50 - 0.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.105	<0.0002	1.05	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.00034	<0.0003	0.0034	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0031	<0.001	0.031	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	2.5	<2	25	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	23.5	<5	235	<50	-	-	-

### Leach Test Information

Date Prepared	23-Oct-2020
pH (pH Units)	7.81
Conductivity (µS/cm)	26.10
Temperature (°C)	20.50
Volume Leachant (Litres)	0.880

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.106
Mass of dry sample (kg)	0.090
Particle Size <4mm	>95%

Site Location	Arklow Bank
Natural Moisture Content (%)	17.9
Dry Matter Content (%)	84.8

### Case

SDG	201021-100
Lab Sample Number(s)	23081621
Sampled Date	15-Oct-2020
Customer Sample Ref.	TP201 ES4
Depth (m)	1.50 - 1.60

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	0.957	<0.5	9.57	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.24	<0.0002	2.4	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000559	<0.0003	0.00559	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00364	<0.001	0.0364	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	76.5	<5	765	<50	-	-	-

### Leach Test Information

Date Prepared	23-Oct-2020
pH (pH Units)	7.09
Conductivity (µS/cm)	97.60
Temperature (°C)	20.60
Volume Leachant (Litres)	0.884

Mcerts Certification does not apply to leachates

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# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference  
Mass Sample taken (kg) 0.113  
Mass of dry sample (kg) 0.090  
Particle Size <4mm >95%

Site Location Arklow Bank  
Natural Moisture Content (%) 24.3  
Dry Matter Content (%) 80.5

#### Case

SDG 201021-100  
Lab Sample Number(s) 23081629  
Sampled Date 15-Oct-2020  
Customer Sample Ref. TP004 ES1  
Depth (m) 0.40 - 0.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	3.06	<3	30.6	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.00155	<0.0005	0.0155	<0.005	-	-	-
Barium	0.0543	<0.0002	0.543	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00254	<0.001	0.0254	<0.01	-	-	-
Copper	0.00157	<0.0003	0.0157	<0.003	-	-	-
Lead	0.00121	<0.0002	0.0121	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.000672	<0.0004	0.00672	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0189	<0.001	0.189	<0.01	-	-	-
Chloride	2.9	<2	29	<20	-	-	-
Sulphate (soluble)	3.4	<2	34	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	26.6	<5	266	<50	-	-	-

#### Leach Test Information

Date Prepared 24-Oct-2020  
pH (pH Units) 7.68  
Conductivity (µS/cm) 30.80  
Temperature (°C) 20.50  
Volume Leachant (Litres) 0.878

Mcerts Certification does not apply to leachates

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13:19:43 14/12/2020





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## CEN 10:1 SINGLE STAGE LEACHATE TEST

### CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.104
Mass of dry sample (kg)	0.090
Particle Size <4mm	>95%

Site Location	Arklow Bank
Natural Moisture Content (%)	14.4
Dry Matter Content (%)	87.4

### Case

SDG	201021-100
Lab Sample Number(s)	23081636
Sampled Date	15-Oct-2020
Customer Sample Ref.	TP004 ES2
Depth (m)	1.40 - 1.50

Eluate Analysis	C <sub>2</sub> Conc <sup>n</sup> in 10:1 eluate (mg/l)		A <sub>2</sub> 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	0.532	<0.5	5.32	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	0.00203	<0.0005	0.0203	<0.005	-	-	-
Barium	0.0413	<0.0002	0.413	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.00291	<0.001	0.0291	<0.01	-	-	-
Copper	0.00236	<0.0003	0.0236	<0.003	-	-	-
Lead	0.0012	<0.0002	0.012	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	0.00128	<0.0004	0.0128	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0135	<0.001	0.135	<0.01	-	-	-
Chloride	4.8	<2	48	<20	-	-	-
Sulphate (soluble)	<2	<2	<20	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	30.3	<5	303	<50	-	-	-

### Leach Test Information

Date Prepared	22-Oct-2020
pH (pH Units)	6.65
Conductivity (µS/cm)	34.30
Temperature (°C)	20.70
Volume Leachant (Litres)	0.887

Mcerts Certification does not apply to leachates

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**CERTIFICATE OF ANALYSIS**

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

**CEN 10:1 SINGLE STAGE LEACHATE TEST**

**CEN ANALYTICAL RESULTS**

REF : BS EN 12457/2

<b>Client Reference</b>		<b>Site Location</b>	Arklow Bank
<b>Mass Sample taken (kg)</b>	0.116	<b>Natural Moisture Content (%)</b>	28.6
<b>Mass of dry sample (kg)</b>	0.090	<b>Dry Matter Content (%)</b>	77.8
<b>Particle Size &lt;4mm</b>	>95%		

**Case**

<b>SDG</b>	201021-100
<b>Lab Sample Number(s)</b>	23081642
<b>Sampled Date</b>	15-Oct-2020
<b>Customer Sample Ref.</b>	TP001 ES1
<b>Depth (m)</b>	0.40 - 0.50

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Eluate Analysis	C2 Conc <sup>n</sup> in 10:1 eluate (mg/l)		A2 10:1 conc <sup>n</sup> leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Dissolved Organic Carbon	<3	<3	<30	<30	-	-	-
Fluoride	<0.5	<0.5	<5	<5	-	-	-
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Antimony	<0.001	<0.001	<0.01	<0.01	-	-	-
Arsenic	<0.0005	<0.0005	<0.005	<0.005	-	-	-
Barium	0.00118	<0.0002	0.0118	<0.002	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	<0.0003	<0.0003	<0.003	<0.003	-	-	-
Lead	<0.0002	<0.0002	<0.002	<0.002	-	-	-
Molybdenum	<0.003	<0.003	<0.03	<0.03	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	<0.001	<0.001	<0.01	<0.01	-	-	-
Chloride	<2	<2	<20	<20	-	-	-
Sulphate (soluble)	4.4	<2	44	<20	-	-	-
Cresols by HPLC (W)	<0.006	<0.006	<0.06	<0.06	-	-	-
Phenol by HPLC (W)	<0.002	<0.002	<0.02	<0.02	-	-	-
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	-	-	-
Xylenols by HPLC (W)	<0.008	<0.008	<0.08	<0.08	-	-	-
Total Dissolved Solids	35.5	<5	355	<50	-	-	-

**Leach Test Information**

Date Prepared	24-Oct-2020
pH (pH Units)	8.08
Conductivity (µS/cm)	38.10
Temperature (°C)	20.60
Volume Leachant (Litres)	0.875

Mcerts Certification does not apply to leachates

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13:19:43 14/12/2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 579754  
Superseded Report:

## Table of Results - Appendix

Method No	Reference	Description
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
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) 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
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
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
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM157	HP 6890 Gas Chromatograph (GC) system and HP 5973 Mass Selective Detector (MSD).	Determination of SVOC in Soils by GC-MS extracted by sonication in DCM/Acetone
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
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
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC
TM410	Shaker extraction-In house coronene method	Determination of Coronene in soils by GCMS
TM414	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID
TM415	Analysis of Petroleum Hydrocarbons in Environmental Media.	Determination of Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100 Client Reference: 2020WW102 Report Number: 579754  
 Location: Arklow Bank Order Number: 9028 Superseded Report:

## Test Completion Dates

Lab Sample No(s) Customer Sample Ref. AGS Ref. Depth Type	23081508	23081642	23081514	23081519	23081502	23081580	23081629	23081636	23081593	23081599
	TP001	TP001	TP002	TP002	TP003	TP003	TP004	TP004	TP005	TP005
	ES3	ES1	ES1	ES3	ES1	ES4	ES1	ES2	ES1	ES4
	1.40 - 1.50	0.40 - 0.50	0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.50 - 1.60	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.50 - 1.60
Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (w)	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020
Asbestos ID in Solid Samples	27-Oct-2020	27-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020
CEN 10:1 Leachate (1 Stage)	25-Oct-2020	25-Oct-2020	24-Oct-2020	25-Oct-2020	25-Oct-2020	24-Oct-2020	25-Oct-2020	24-Oct-2020	24-Oct-2020	24-Oct-2020
CEN Readings	26-Oct-2020	28-Oct-2020	28-Oct-2020	26-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020
Chromium III	28-Oct-2020	29-Oct-2020	28-Oct-2020	28-Oct-2020	29-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020
Coronene	25-Oct-2020	28-Oct-2020	25-Oct-2020	25-Oct-2020	24-Oct-2020	24-Oct-2020	27-Oct-2020	27-Oct-2020	25-Oct-2020	24-Oct-2020
Cyanide Comp/Free/Total/Thiocyanate	26-Oct-2020	28-Oct-2020	26-Oct-2020	26-Oct-2020	27-Oct-2020	27-Oct-2020	28-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020
Dissolved Metals by ICP-MS	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020
Dissolved Organic/Inorganic Carbon	29-Oct-2020	29-Oct-2020	28-Oct-2020	28-Oct-2020	29-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	29-Oct-2020	29-Oct-2020
Easily Liberated Sulphide	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020
EPH by GCxGC-FID	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020
EPH CWG GC (S)	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020
Fluoride	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020
GRO by GC-FID (S)	26-Oct-2020	27-Oct-2020	23-Oct-2020	23-Oct-2020	25-Oct-2020	25-Oct-2020	26-Oct-2020	26-Oct-2020	25-Oct-2020	25-Oct-2020
Hexavalent Chromium (s)	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	27-Oct-2020	28-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020
Loss on Ignition in soils	26-Oct-2020	28-Oct-2020	26-Oct-2020	27-Oct-2020	28-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020
Mercury Dissolved	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020
Metals in solid samples by OES	26-Oct-2020	29-Oct-2020	26-Oct-2020	26-Oct-2020	29-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020
Moisture at 105C	24-Oct-2020	24-Oct-2020	23-Oct-2020	24-Oct-2020	25-Oct-2020	23-Oct-2020	24-Oct-2020	22-Oct-2020	23-Oct-2020	23-Oct-2020
PAH 16 & 17 Calc	24-Oct-2020	28-Oct-2020	24-Oct-2020	24-Oct-2020	26-Oct-2020	26-Oct-2020	27-Oct-2020	27-Oct-2020	26-Oct-2020	26-Oct-2020
PAH by GCMS	24-Oct-2020	27-Oct-2020	24-Oct-2020	24-Oct-2020	26-Oct-2020	26-Oct-2020	27-Oct-2020	27-Oct-2020	26-Oct-2020	26-Oct-2020
PCBs by GCMS	26-Oct-2020	28-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	26-Oct-2020
pH	27-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	28-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020
Phenols by HPLC (W)	28-Oct-2020	29-Oct-2020	29-Oct-2020	28-Oct-2020	29-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020
Sample description	22-Oct-2020	24-Oct-2020	22-Oct-2020	22-Oct-2020	23-Oct-2020	23-Oct-2020	24-Oct-2020	24-Oct-2020	23-Oct-2020	23-Oct-2020
Semi Volatile Organic Compounds	26-Oct-2020	27-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	27-Oct-2020	27-Oct-2020	26-Oct-2020	26-Oct-2020
Total Dissolved Solids	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	28-Oct-2020	29-Oct-2020	28-Oct-2020	29-Oct-2020	29-Oct-2020
Total Organic Carbon	28-Oct-2020	29-Oct-2020	28-Oct-2020	27-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	27-Oct-2020	28-Oct-2020
TPH CWG GC (S)	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020
VOC MS (S)	24-Oct-2020	27-Oct-2020	24-Oct-2020	24-Oct-2020	25-Oct-2020	24-Oct-2020	26-Oct-2020	26-Oct-2020	25-Oct-2020	25-Oct-2020

Lab Sample No(s) Customer Sample Ref. AGS Ref. Depth Type	23081526	23081533	23081538	23081550	23081573	23081587	23081559	23081567	23081608	23081621
	TP006	TP006	TP010	TP010	TP011	TP011	TP012	TP012	TP021	TP021
	ES1	ES4	ES1	ES4	ES1	ES4	ES1	ES4	ES1	ES4
	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.40 - 1.50	0.40 - 0.50	1.40 - 1.50	0.50 - 0.60	1.40 - 1.50	0.50 - 0.60	1.50 - 1.60
Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (w)	27-Oct-2020	27-Oct-2020	27-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020
Asbestos ID in Solid Samples	27-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020	28-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020	28-Oct-2020	28-Oct-2020
CEN 10:1 Leachate (1 Stage)	24-Oct-2020	24-Oct-2020	24-Oct-2020	25-Oct-2020	24-Oct-2020	24-Oct-2020	24-Oct-2020	25-Oct-2020	24-Oct-2020	24-Oct-2020
CEN Readings	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020
Chromium III	28-Oct-2020	28-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	28-Oct-2020	29-Oct-2020	29-Oct-2020	28-Oct-2020	28-Oct-2020
Coronene	27-Oct-2020	27-Oct-2020	24-Oct-2020	24-Oct-2020	24-Oct-2020	28-Oct-2020	24-Oct-2020	24-Oct-2020	24-Oct-2020	24-Oct-2020
Cyanide Comp/Free/Total/Thiocyanate	28-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020
Dissolved Metals by ICP-MS	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020
Dissolved Organic/Inorganic Carbon	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	29-Oct-2020	29-Oct-2020	28-Oct-2020
Easily Liberated Sulphide	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020
EPH by GCxGC-FID	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020	14-Dec-2020
EPH CWG GC (S)	27-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020
Fluoride	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020
GRO by GC-FID (S)	26-Oct-2020	26-Oct-2020	25-Oct-2020	24-Oct-2020	25-Oct-2020	26-Oct-2020	24-Oct-2020	25-Oct-2020	25-Oct-2020	25-Oct-2020
Hexavalent Chromium (s)	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020
Loss on Ignition in soils	27-Oct-2020	27-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	29-Oct-2020	27-Oct-2020	27-Oct-2020
Mercury Dissolved	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020
Metals in solid samples by OES	27-Oct-2020	27-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	28-Oct-2020	29-Oct-2020	29-Oct-2020	27-Oct-2020	27-Oct-2020
Moisture at 105C	22-Oct-2020	23-Oct-2020	23-Oct-2020	25-Oct-2020	23-Oct-2020	23-Oct-2020	23-Oct-2020	25-Oct-2020	23-Oct-2020	23-Oct-2020
PAH 16 & 17 Calc	27-Oct-2020	27-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	28-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020
PAH by GCMS	27-Oct-2020	27-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	27-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020
PCBs by GCMS	28-Oct-2020	28-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	28-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020
pH	28-Oct-2020	28-Oct-2020	27-Oct-2020	28-Oct-2020	27-Oct-2020	28-Oct-2020	27-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020
Phenols by HPLC (W)	28-Oct-2020	29-Oct-2020	28-Oct-2020	29-Oct-2020	28-Oct-2020	28-Oct-2020	29-Oct-2020	29-Oct-2020	28-Oct-2020	28-Oct-2020
Sample description	24-Oct-2020	24-Oct-2020	23-Oct-2020	23-Oct-2020	23-Oct-2020	24-Oct-2020	23-Oct-2020	23-Oct-2020	23-Oct-2020	23-Oct-2020
Semi Volatile Organic Compounds	27-Oct-2020	27-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	27-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020	26-Oct-2020
Total Dissolved Solids	29-Oct-2020	29-Oct-2020	29-Oct-2020	29-Oct-2020	28-Oct-2020	28-Oct-2020	28-Oct-2020	29-Oct-2020	29-Oct-2020	28-Oct-2020
Total Organic Carbon	28-Oct-2020	28-Oct-2020	29-Oct-2020	28-Oct-2020	29-Oct-2020	29-Oct-2020	28-Oct-2020	29-Oct-2020	28-Oct-2020	28-Oct-2020
TPH CWG GC (S)	27-Oct-2020	28-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020	27-Oct-2020
VOC MS (S)	26-Oct-2020	26-Oct-2020	25-Oct-2020	24-Oct-2020	25-Oct-2020	26-Oct-2020	25-Oct-2020	25-Oct-2020	25-Oct-2020	25-Oct-2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

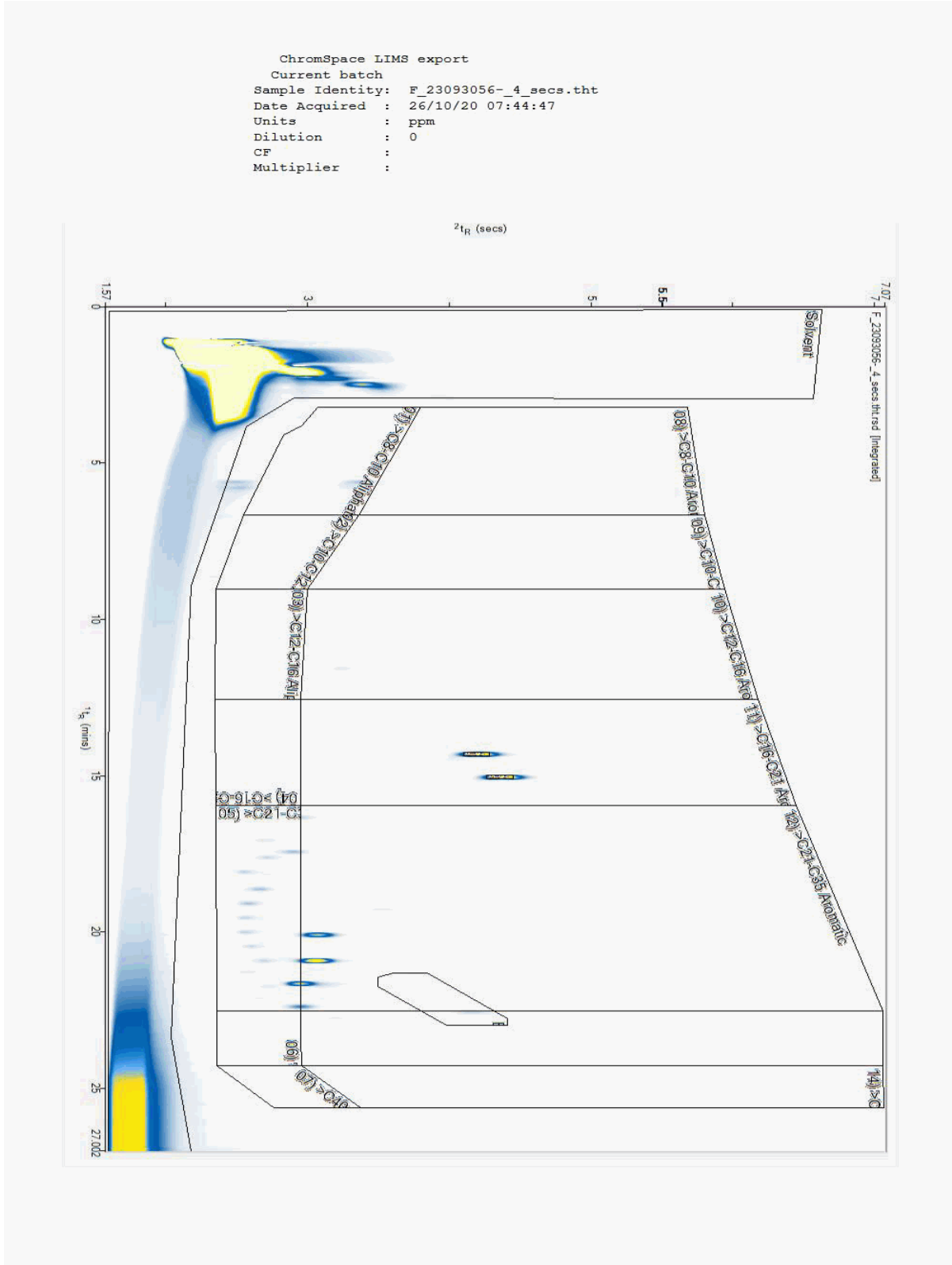
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23093056  
Sample ID : TP002

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

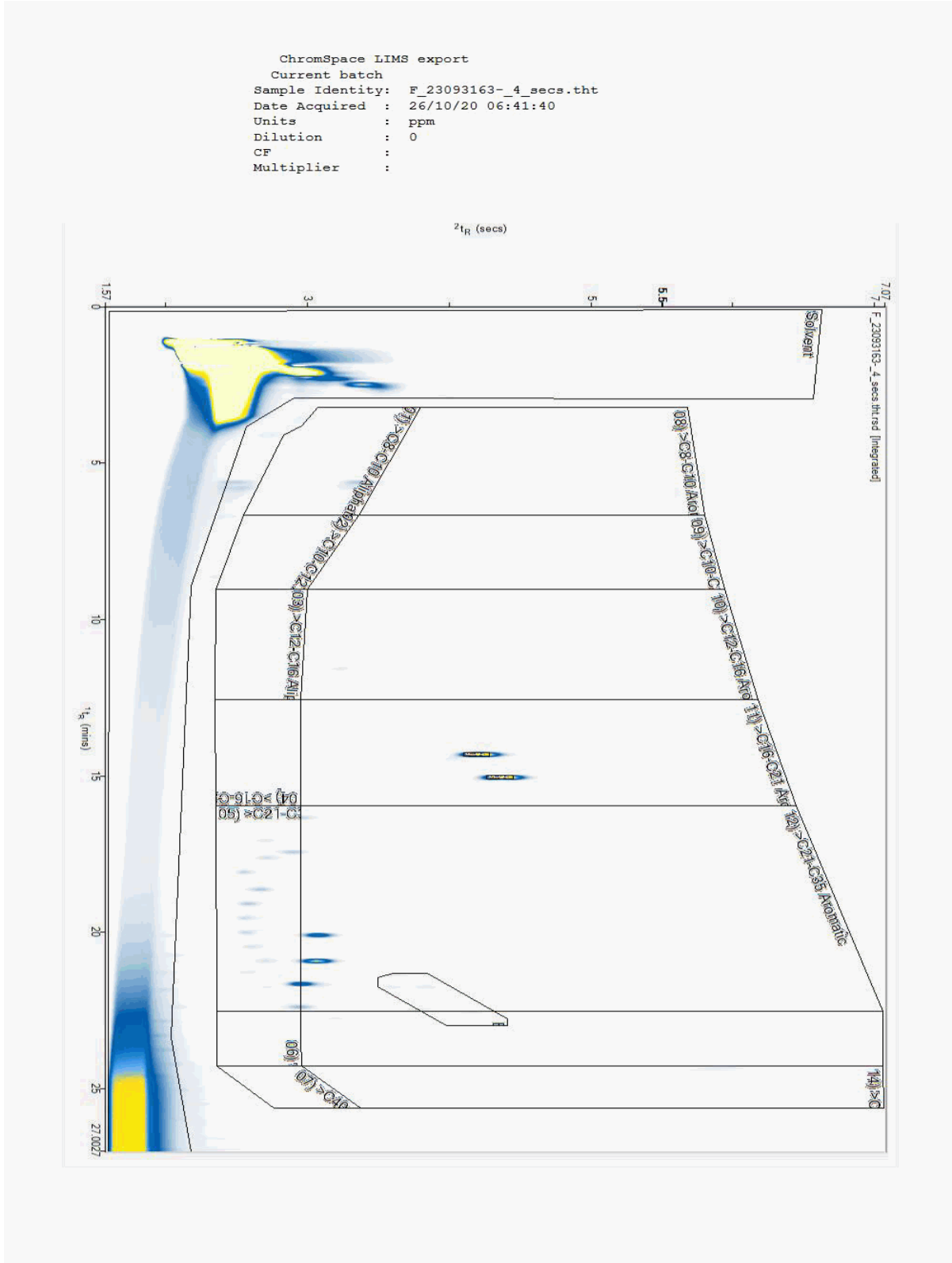
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23093163  
Sample ID : TP002

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

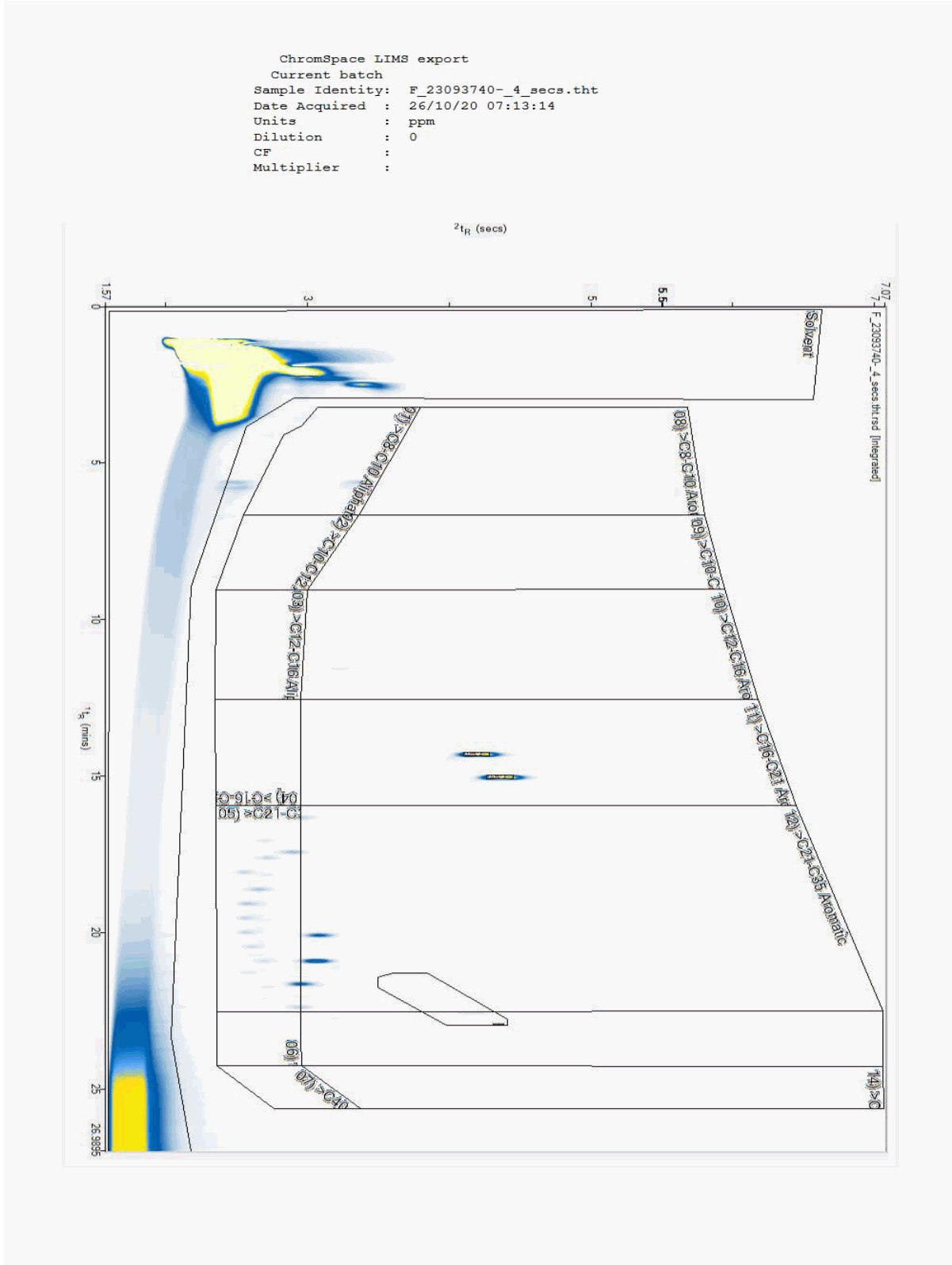
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23093740  
Sample ID : TP001

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

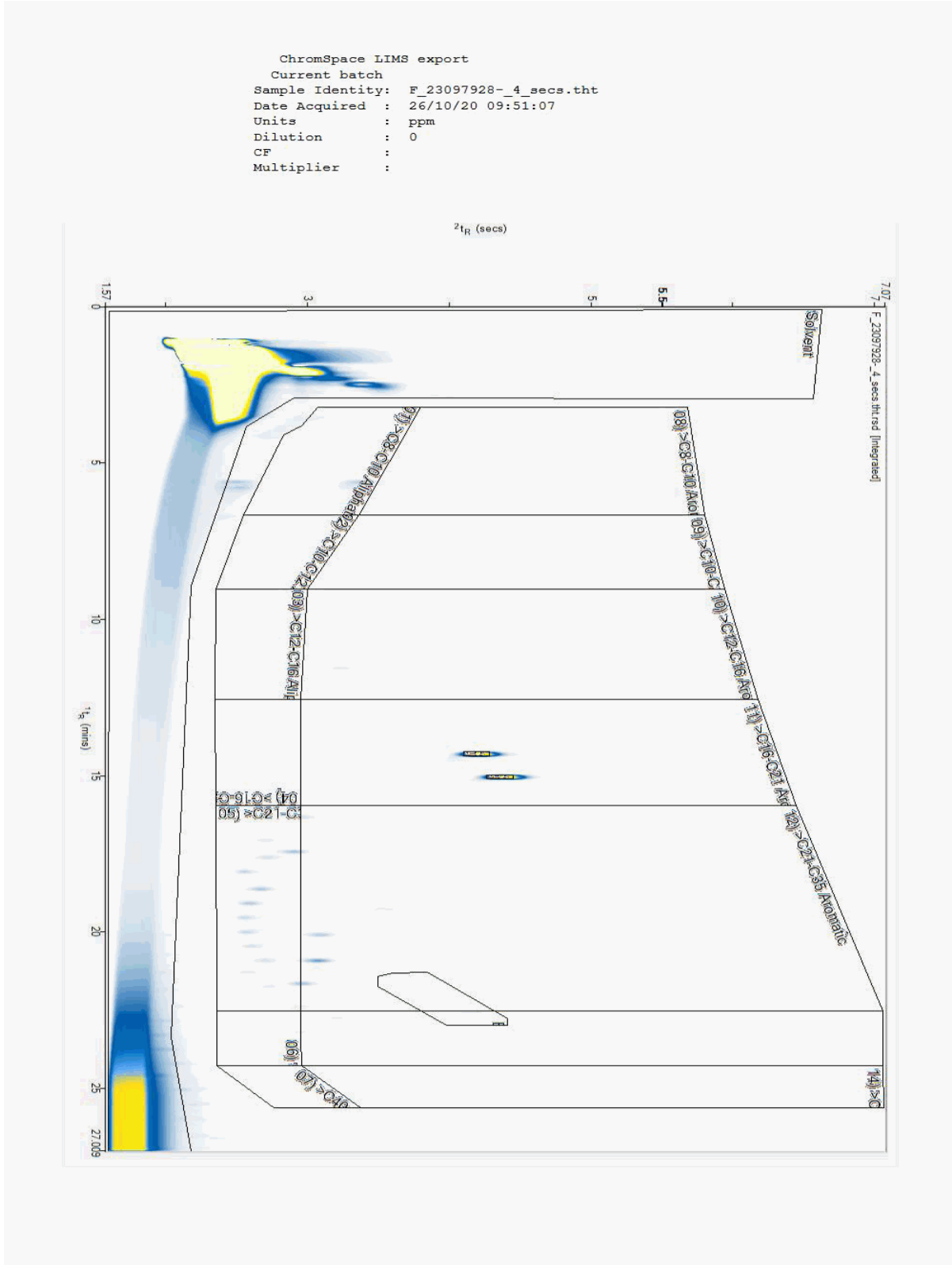
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23097928  
Sample ID : TP010

Depth : 1.40 - 1.50







# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

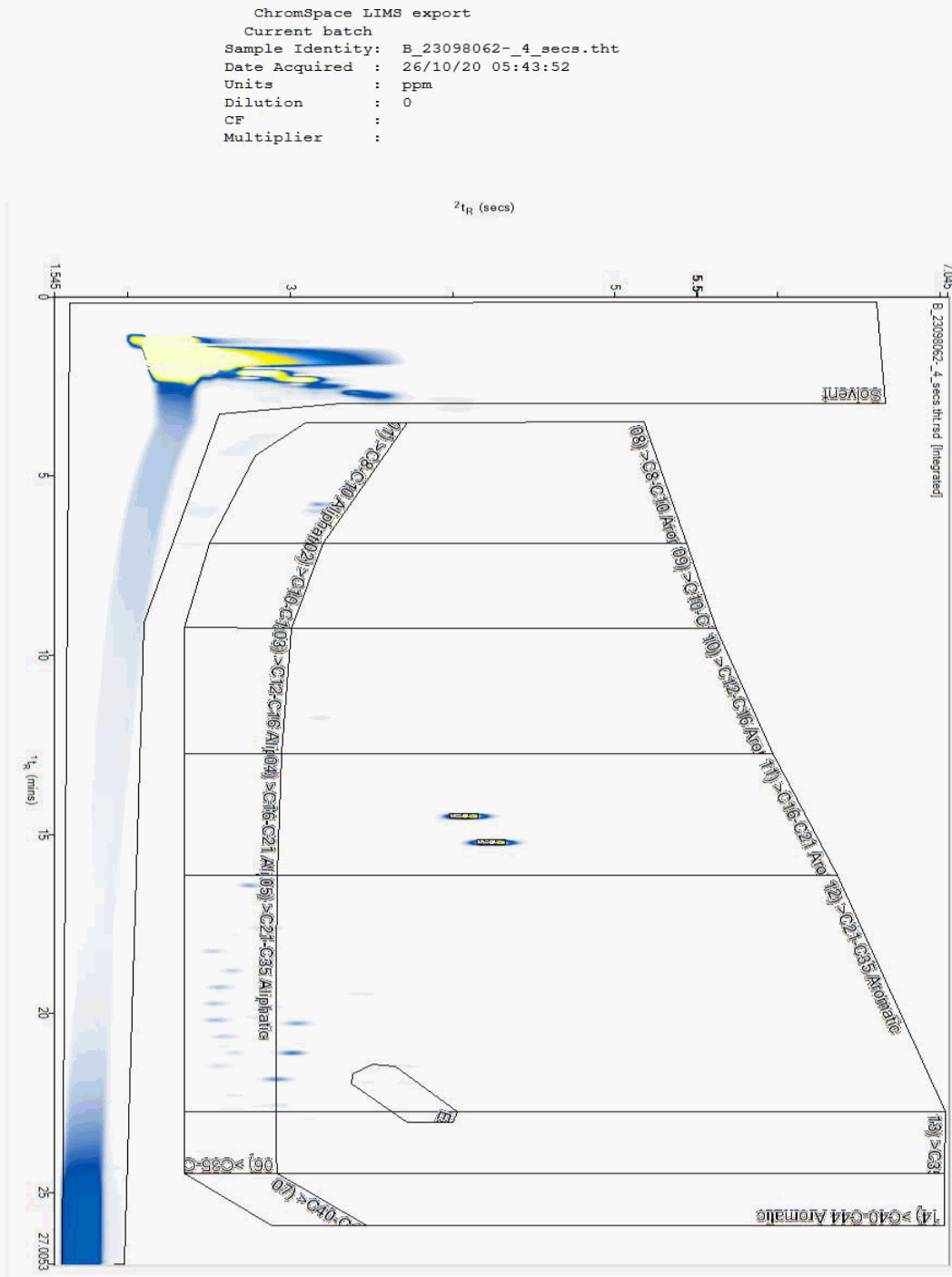
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23098062  
Sample ID : TP003

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

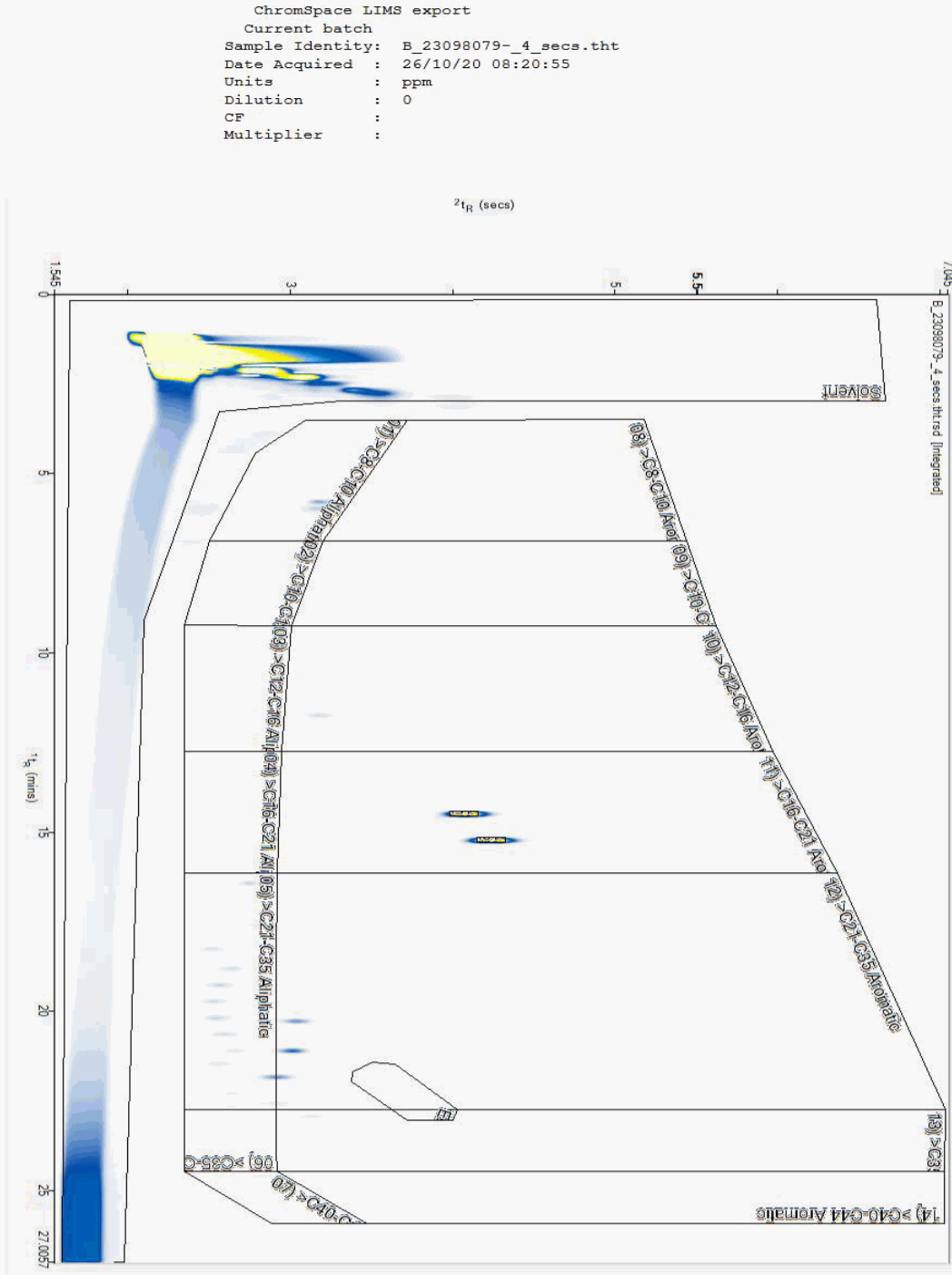
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23098079  
Sample ID : TP010

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

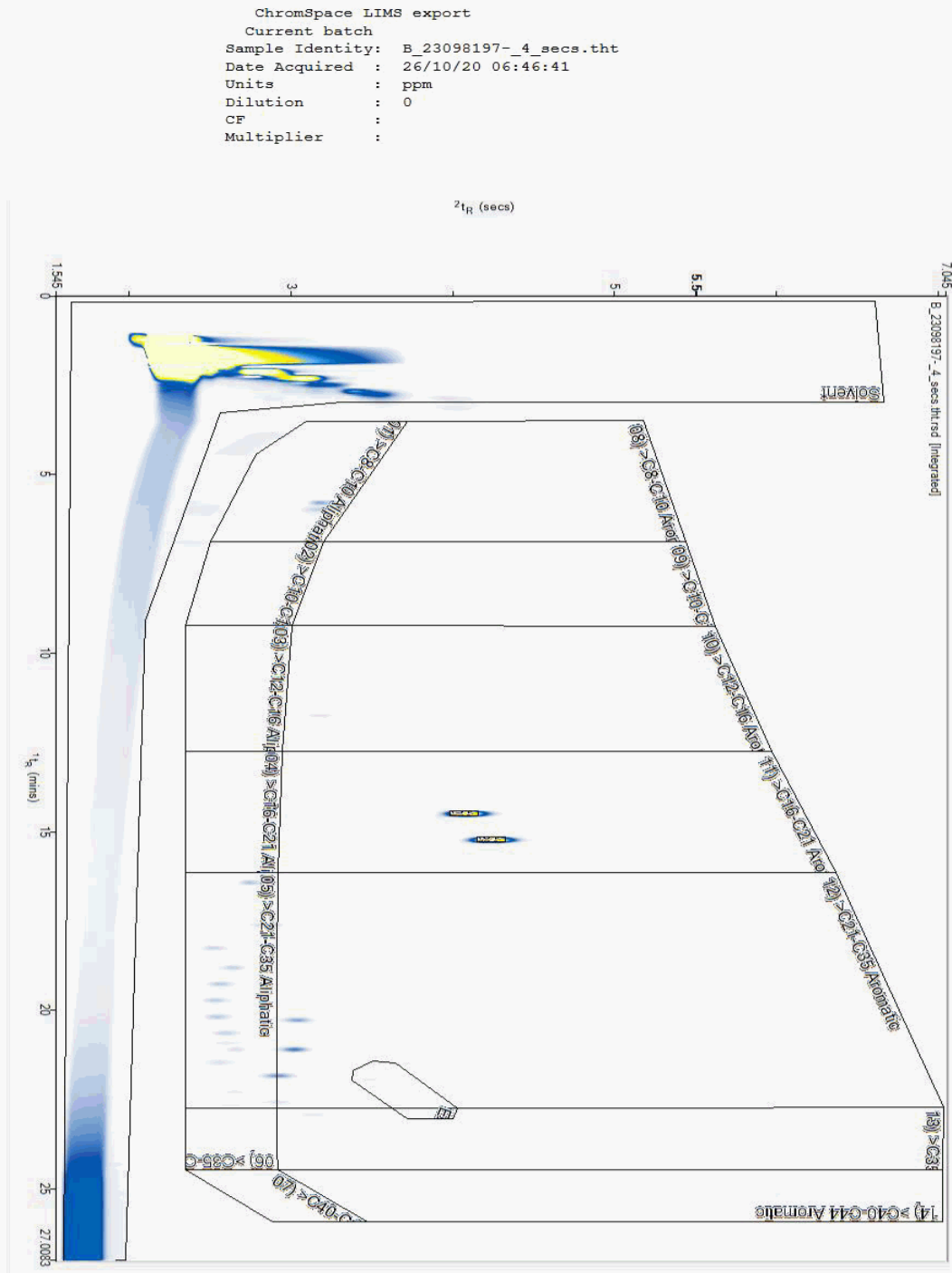
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23098197  
Sample ID : TP012

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

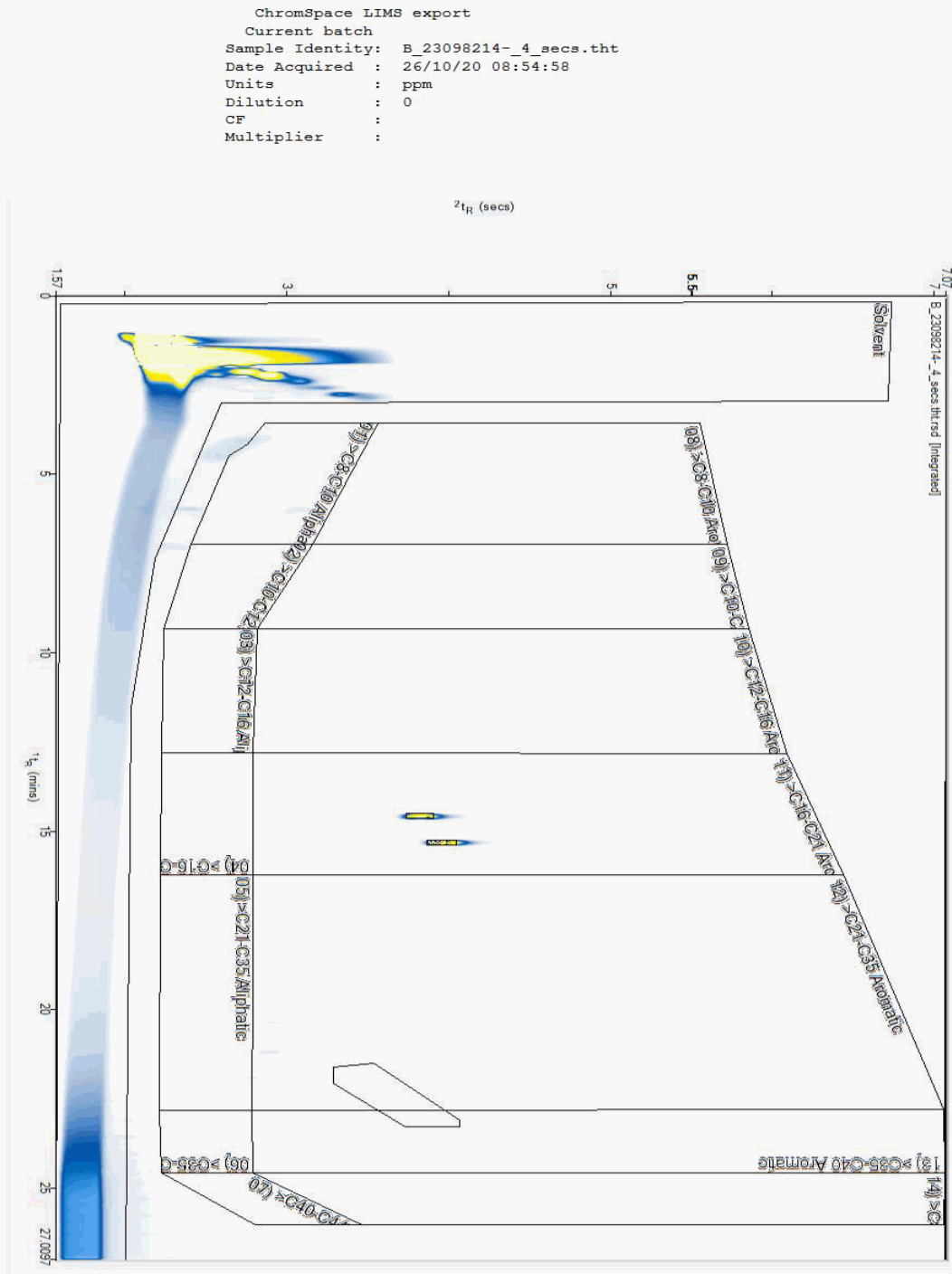
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23098214  
Sample ID : TP005

Depth : 1.50 - 1.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

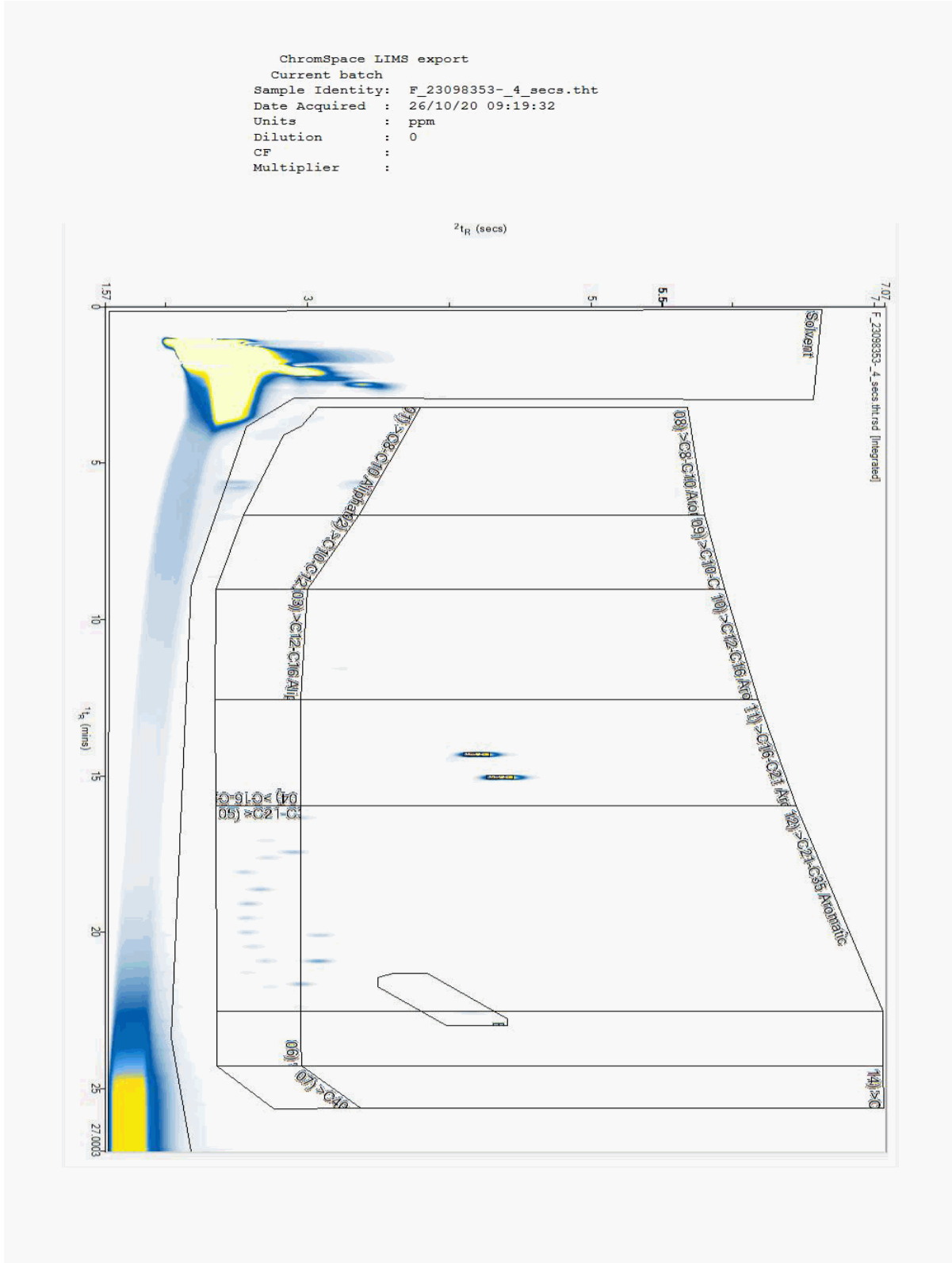
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23098353  
Sample ID : TP003

Depth : 1.50 - 1.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

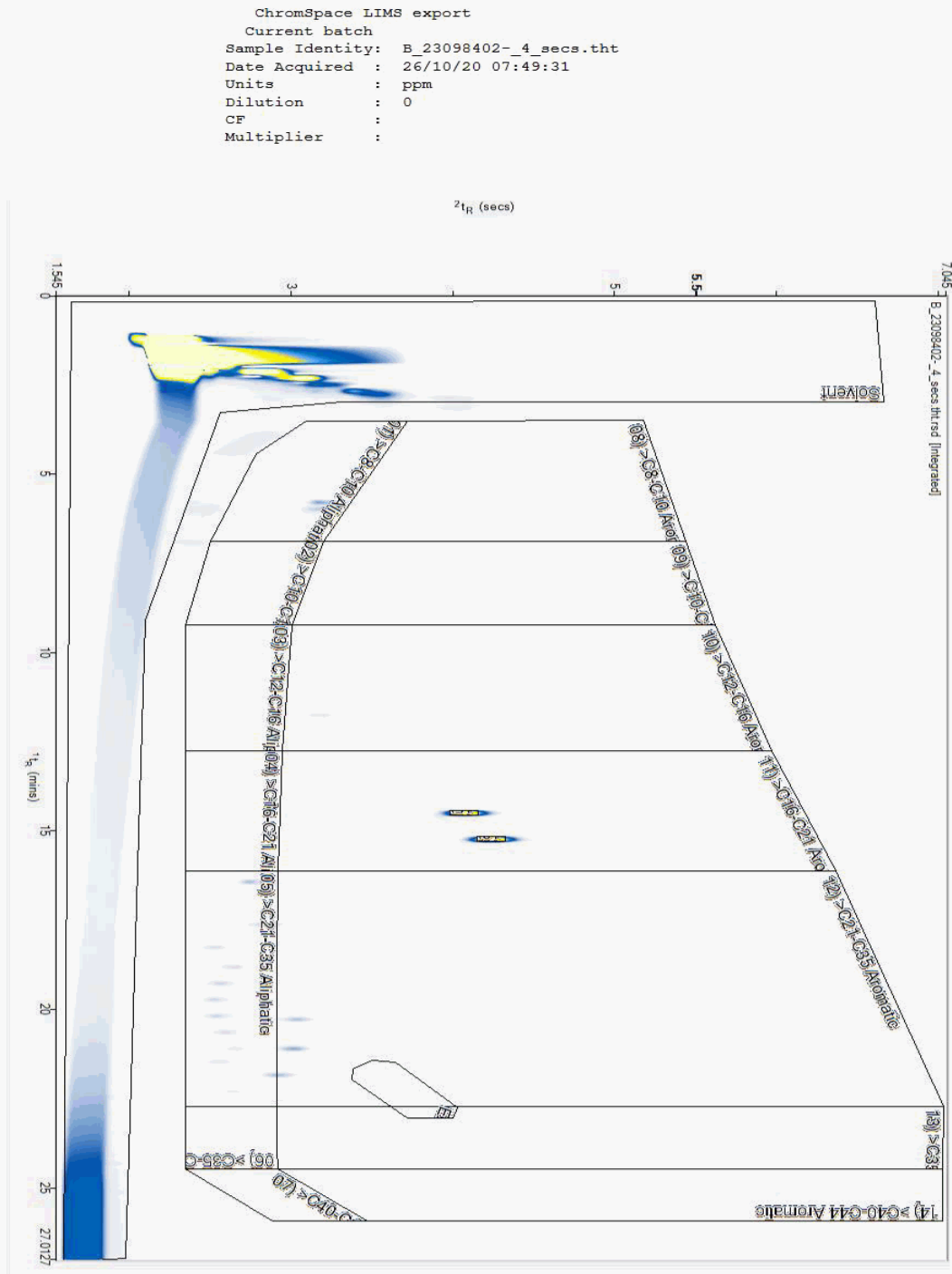
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23098402  
Sample ID : TP201

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

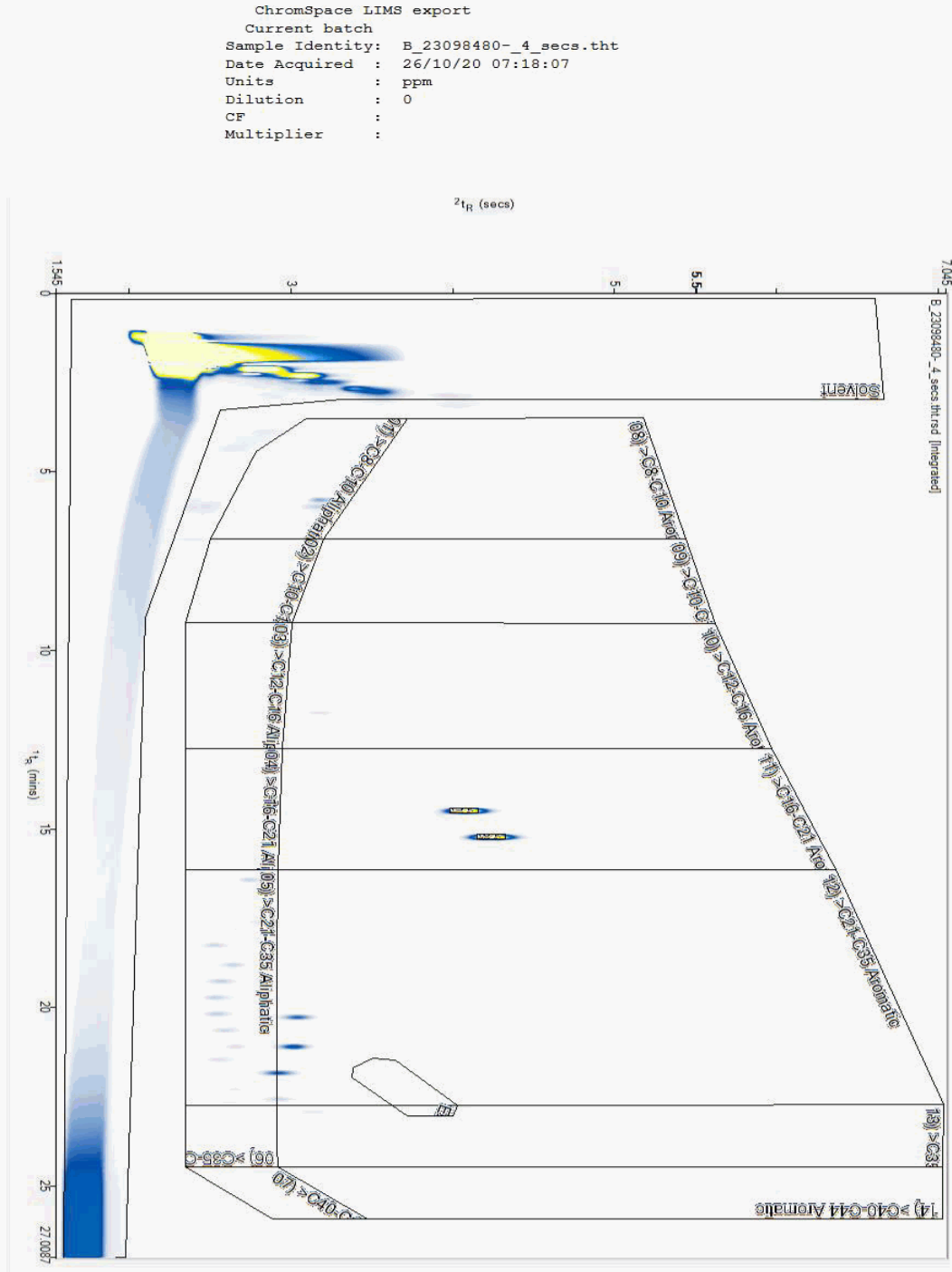
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23098480  
Sample ID : TP012

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

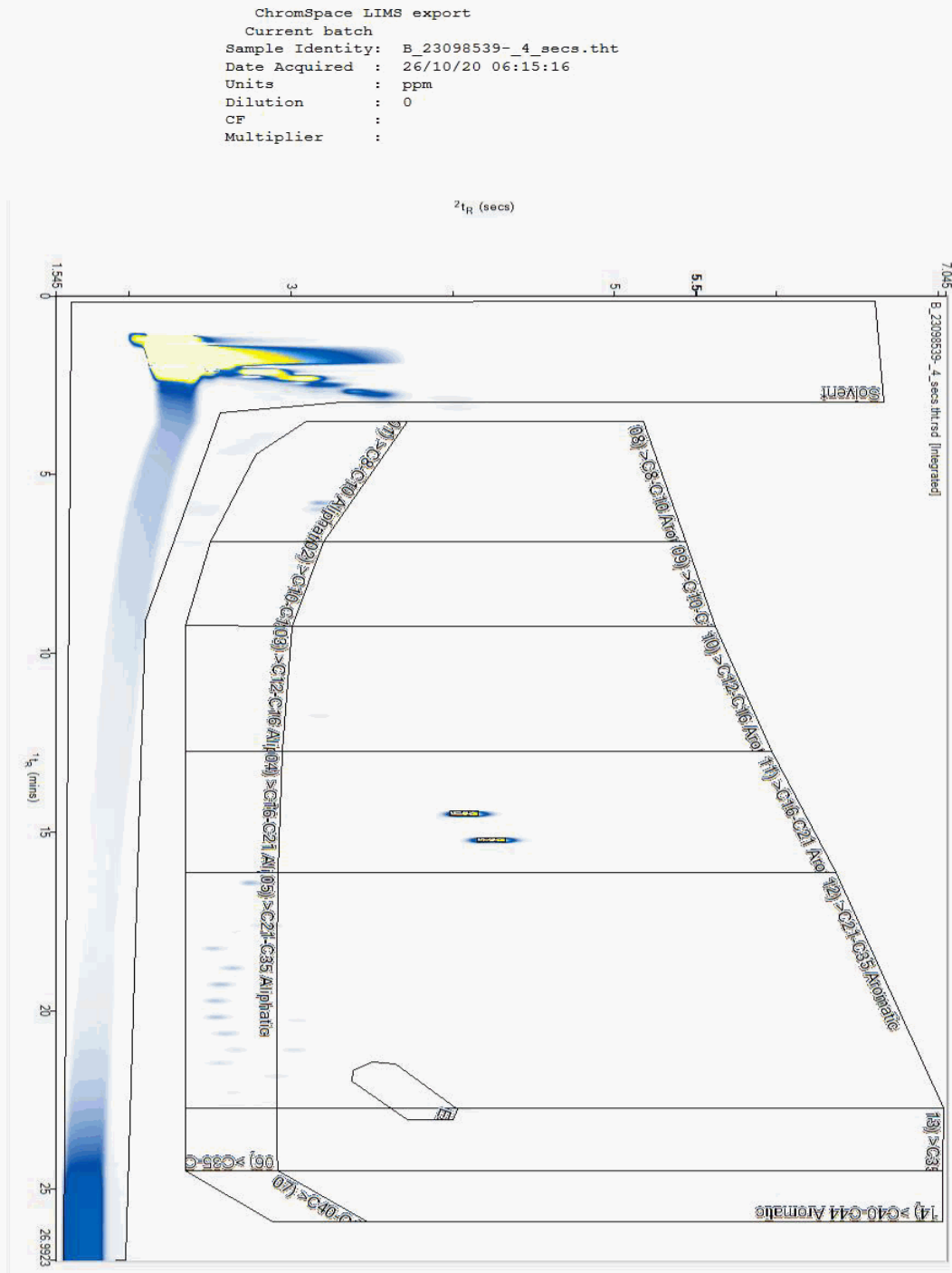
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23098539  
Sample ID : TP201

Depth : 1.50 - 1.60







# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

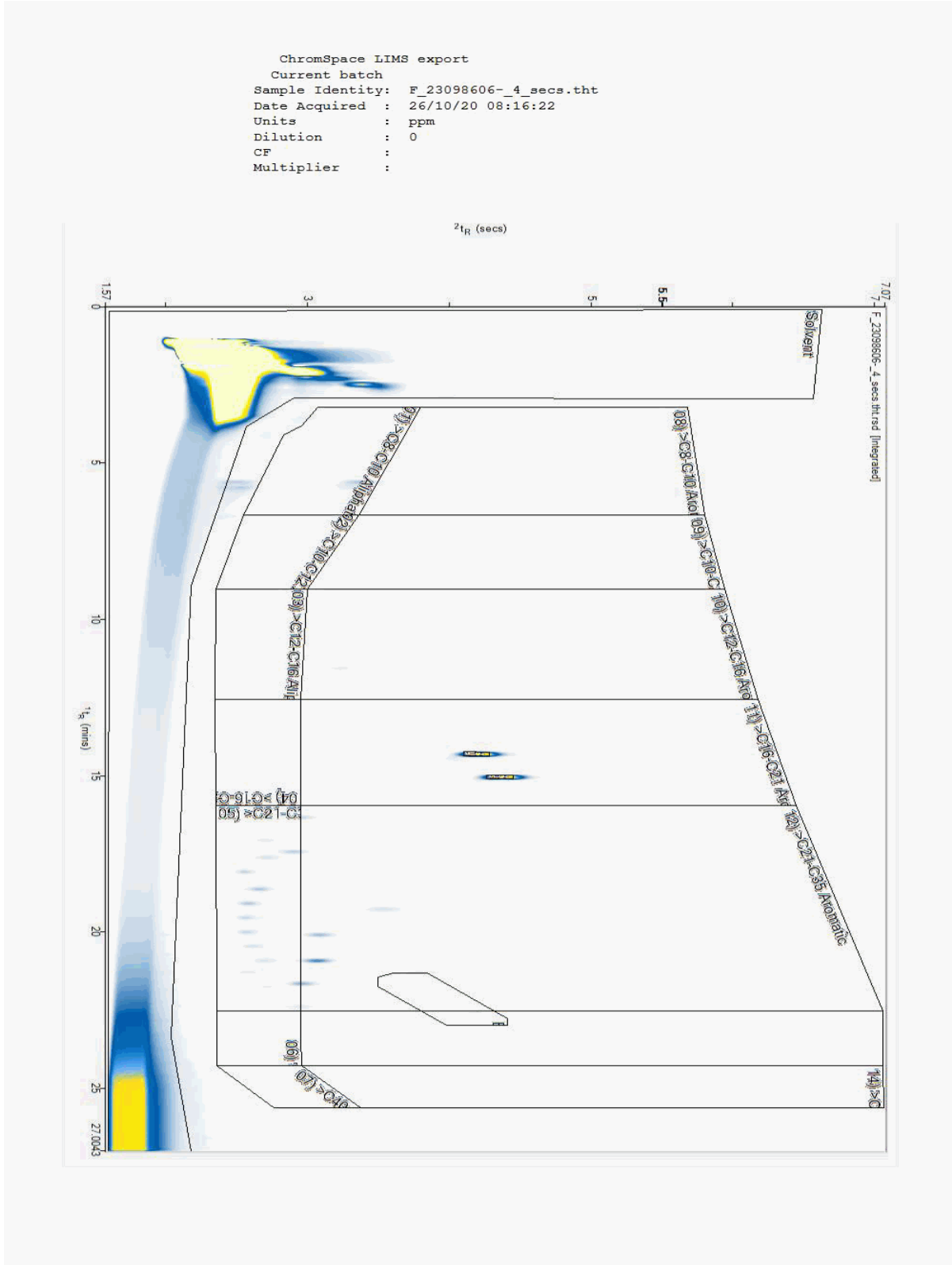
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23098606  
Sample ID : TP011

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

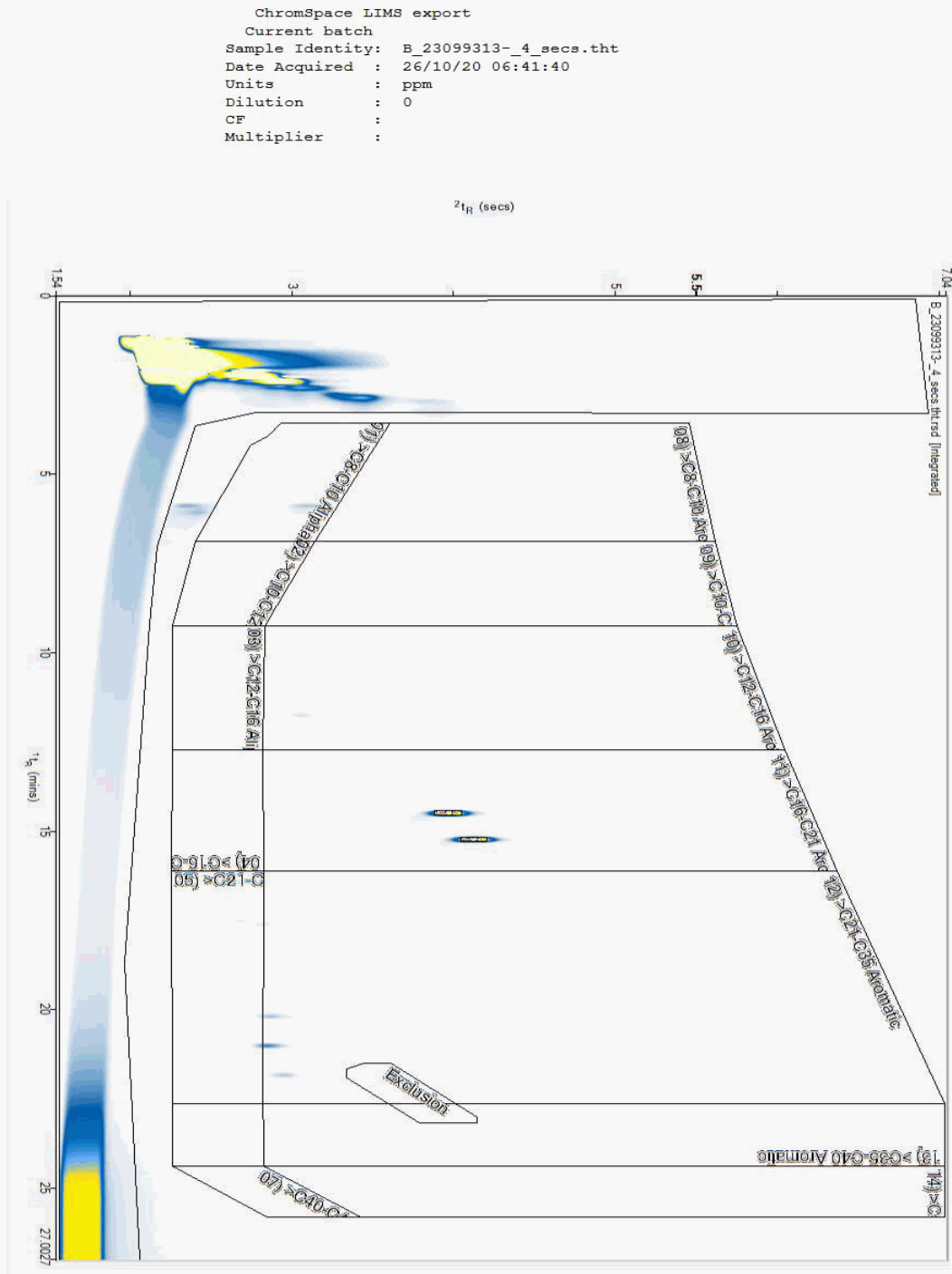
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23099313  
Sample ID : TP005

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

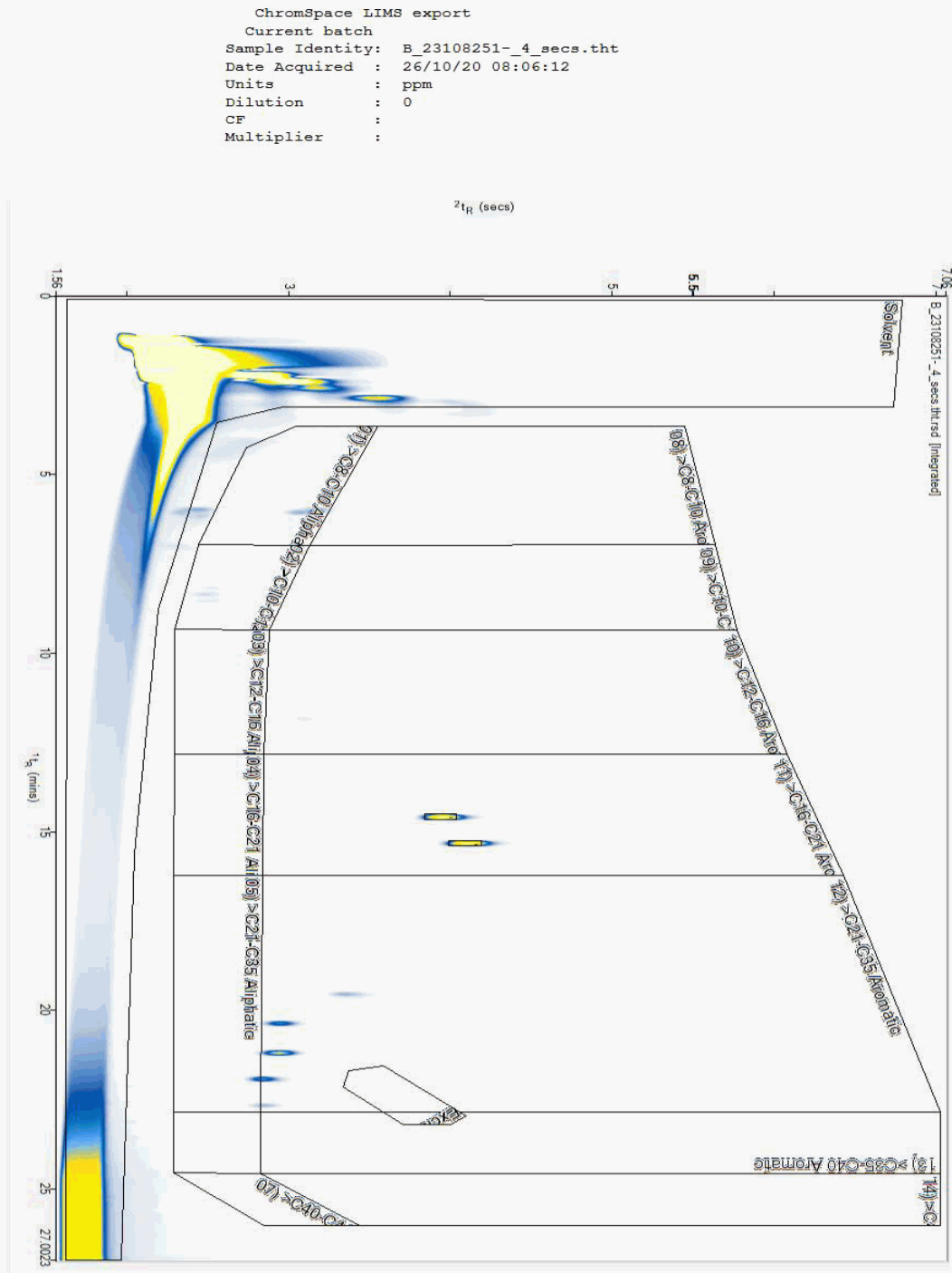
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23108251  
Sample ID : TP011

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

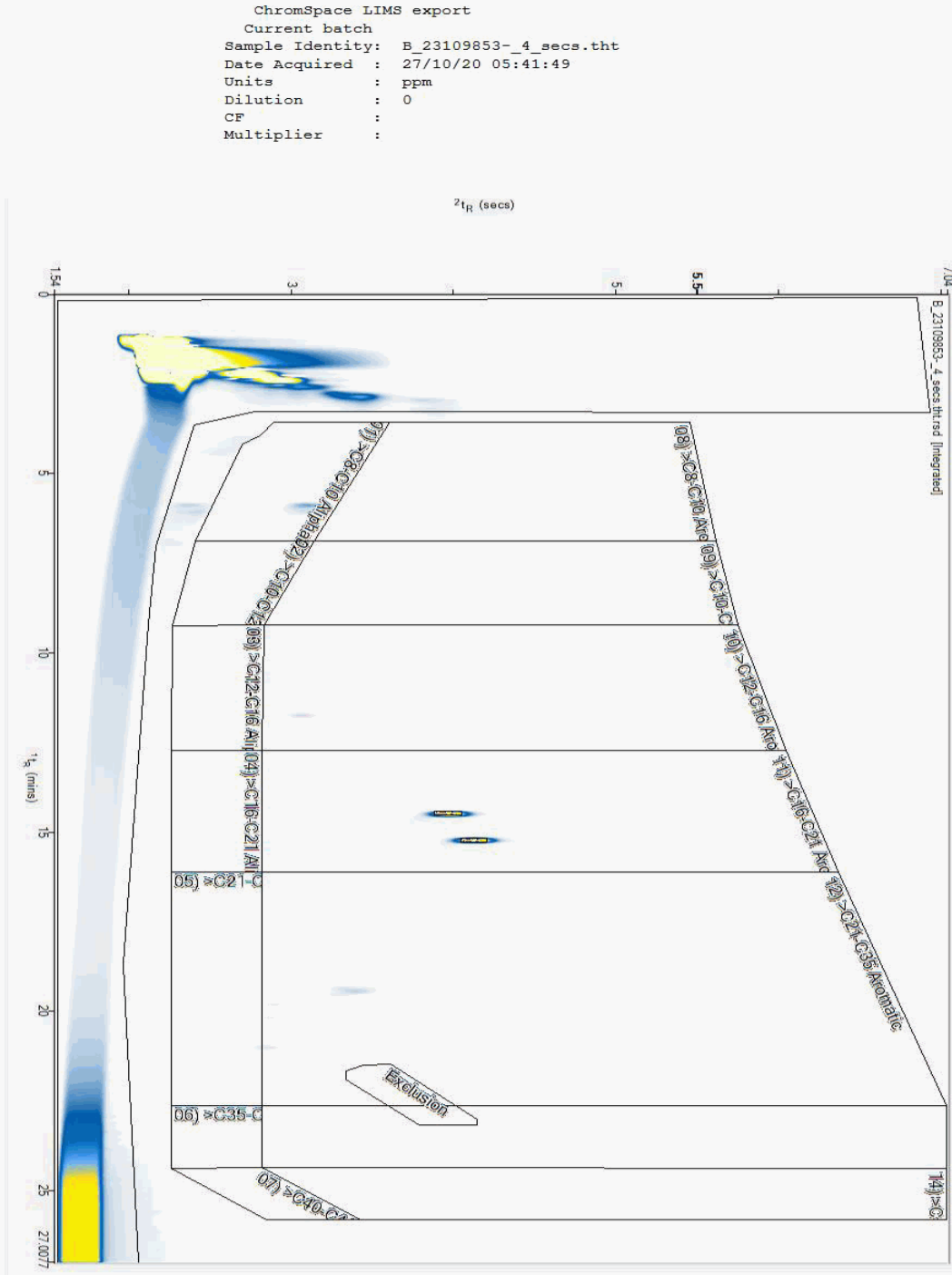
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23109853  
Sample ID : TP006

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

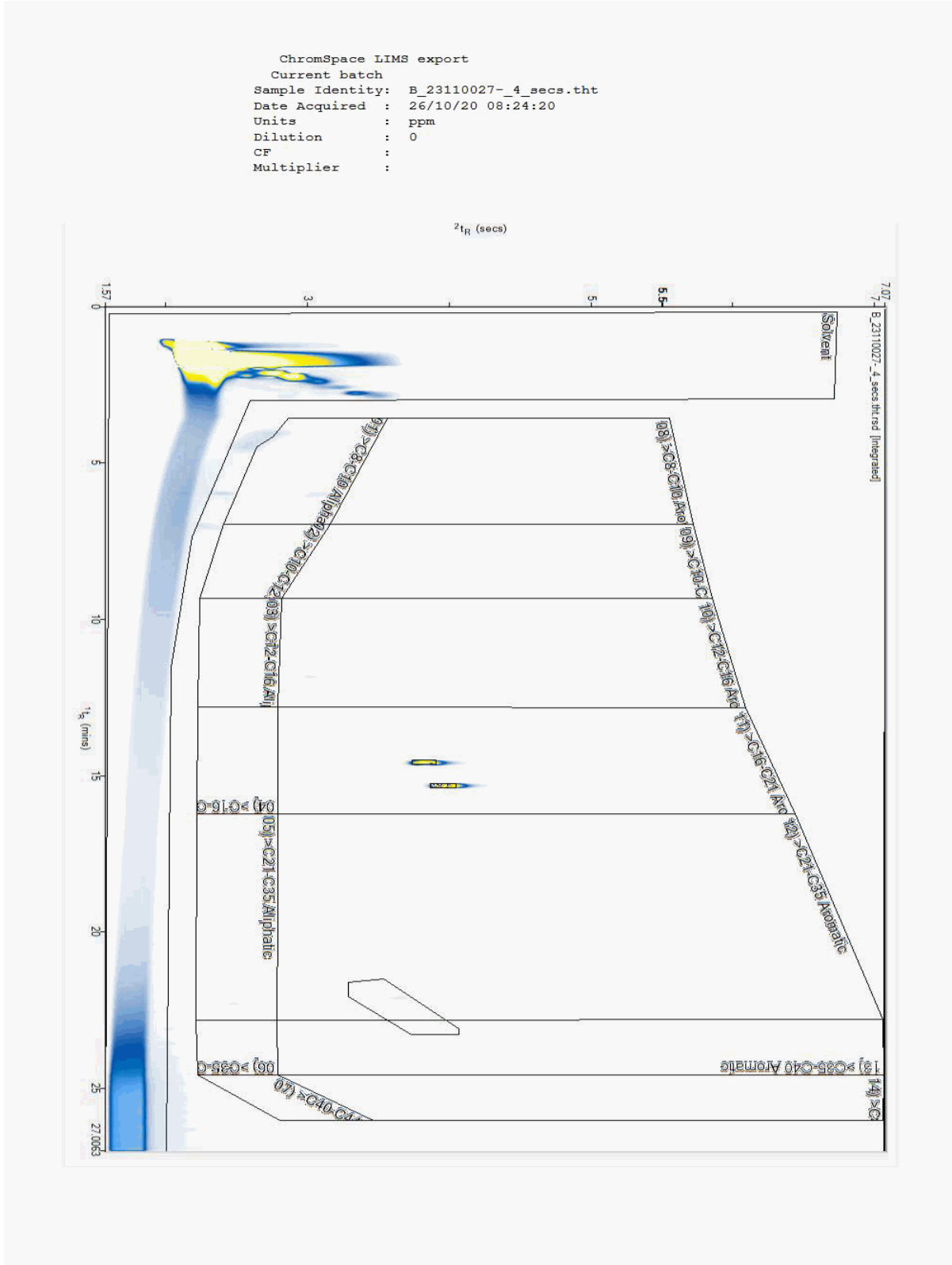
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23110027  
Sample ID : TP006

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

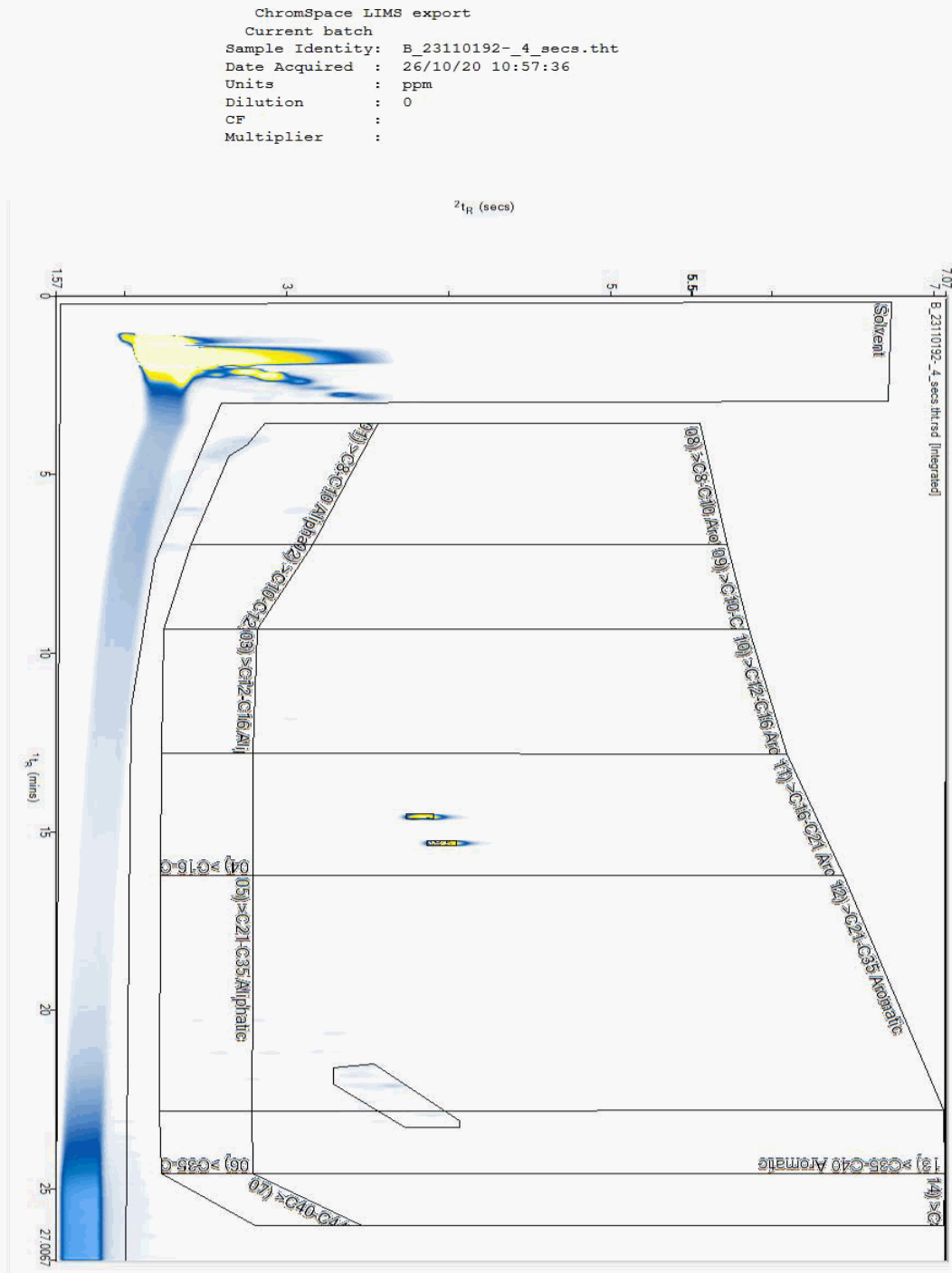
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23110192  
Sample ID : TP004

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

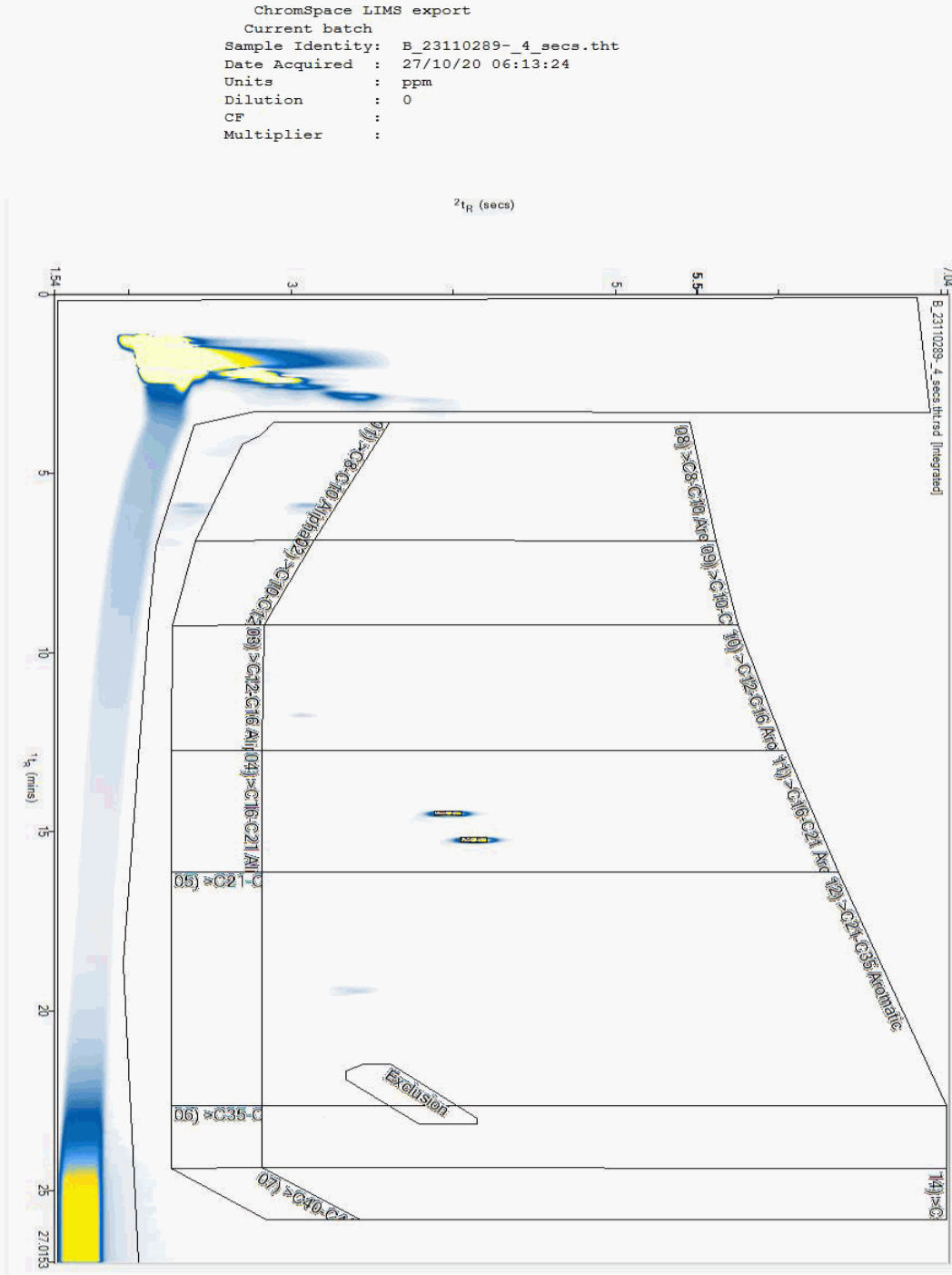
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23110289  
Sample ID : TP004

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

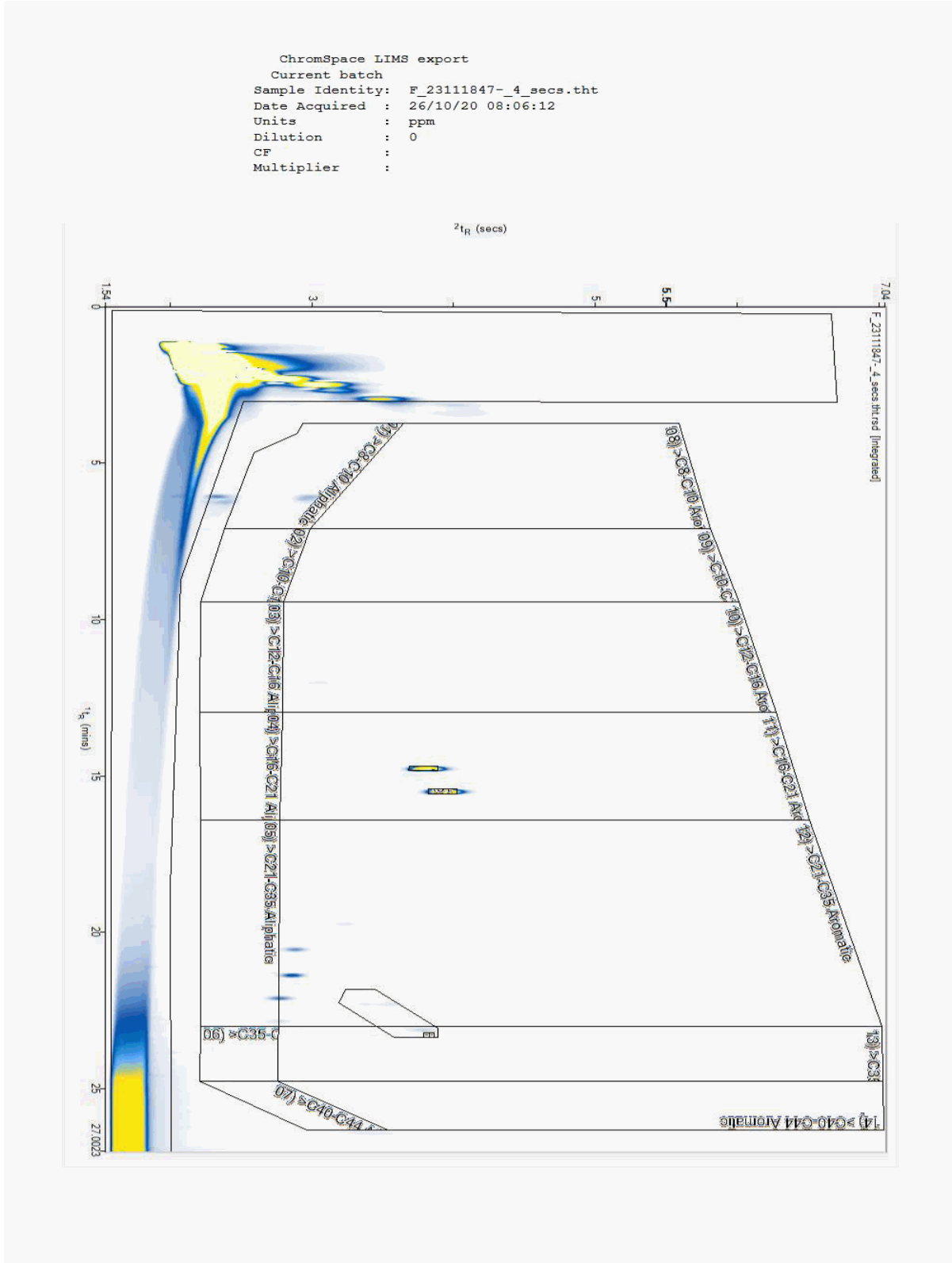
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23111847  
Sample ID : TP001

Depth : 0.40 - 0.50







CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

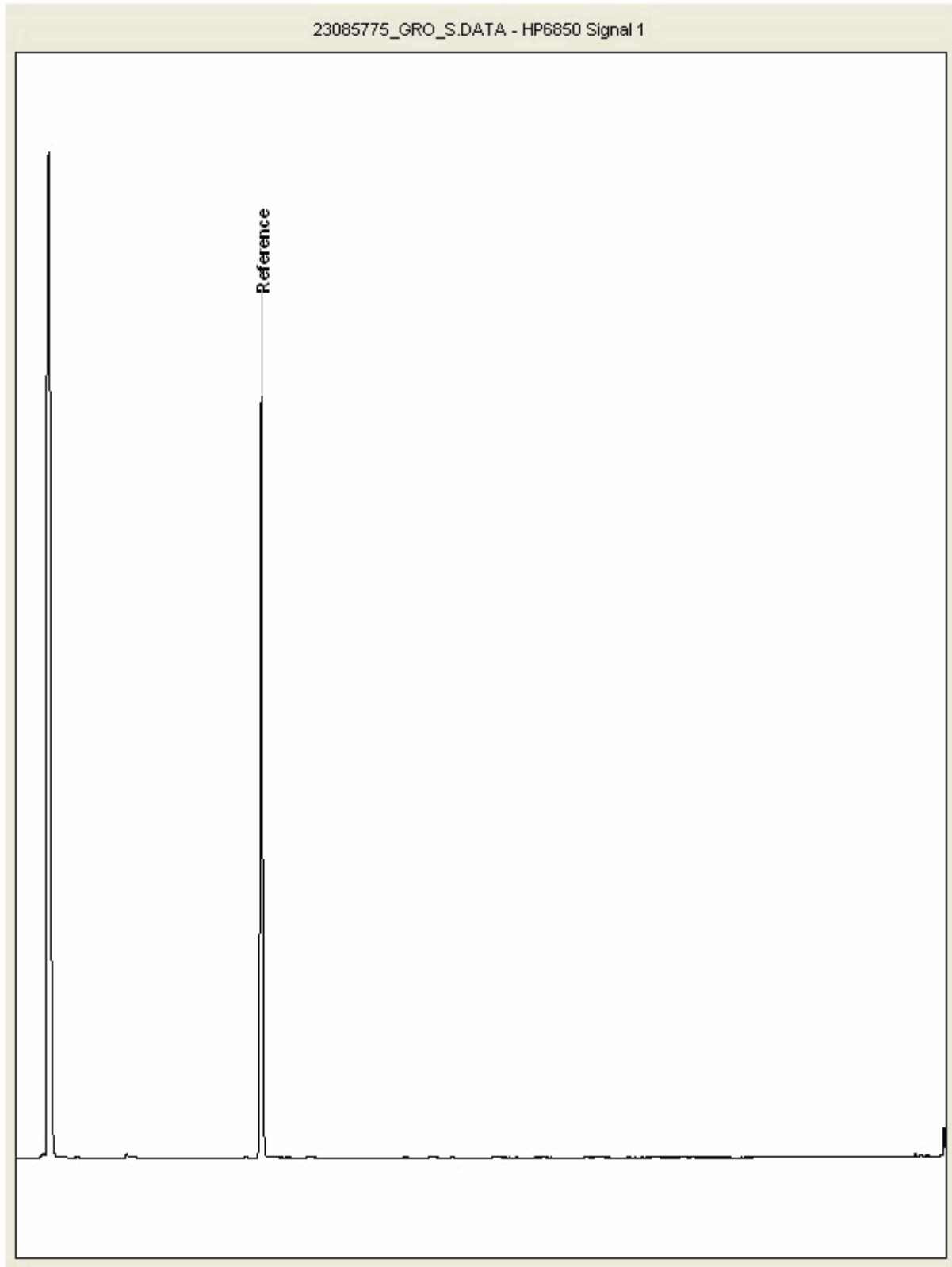
Report Number: 579754  
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23085775  
Sample ID : TP201

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

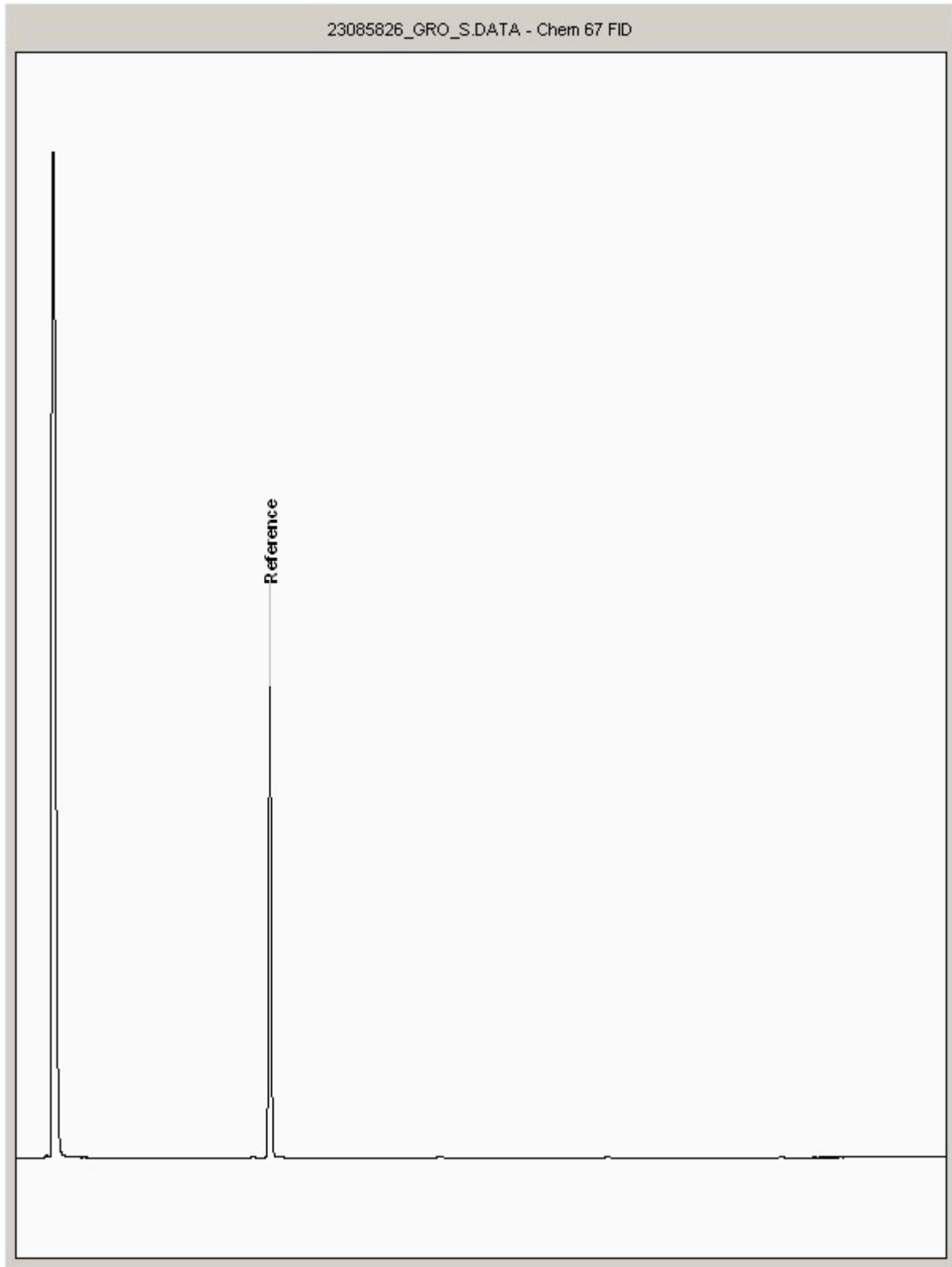
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23085826  
Sample ID : TP201

Depth : 1.50 - 1.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

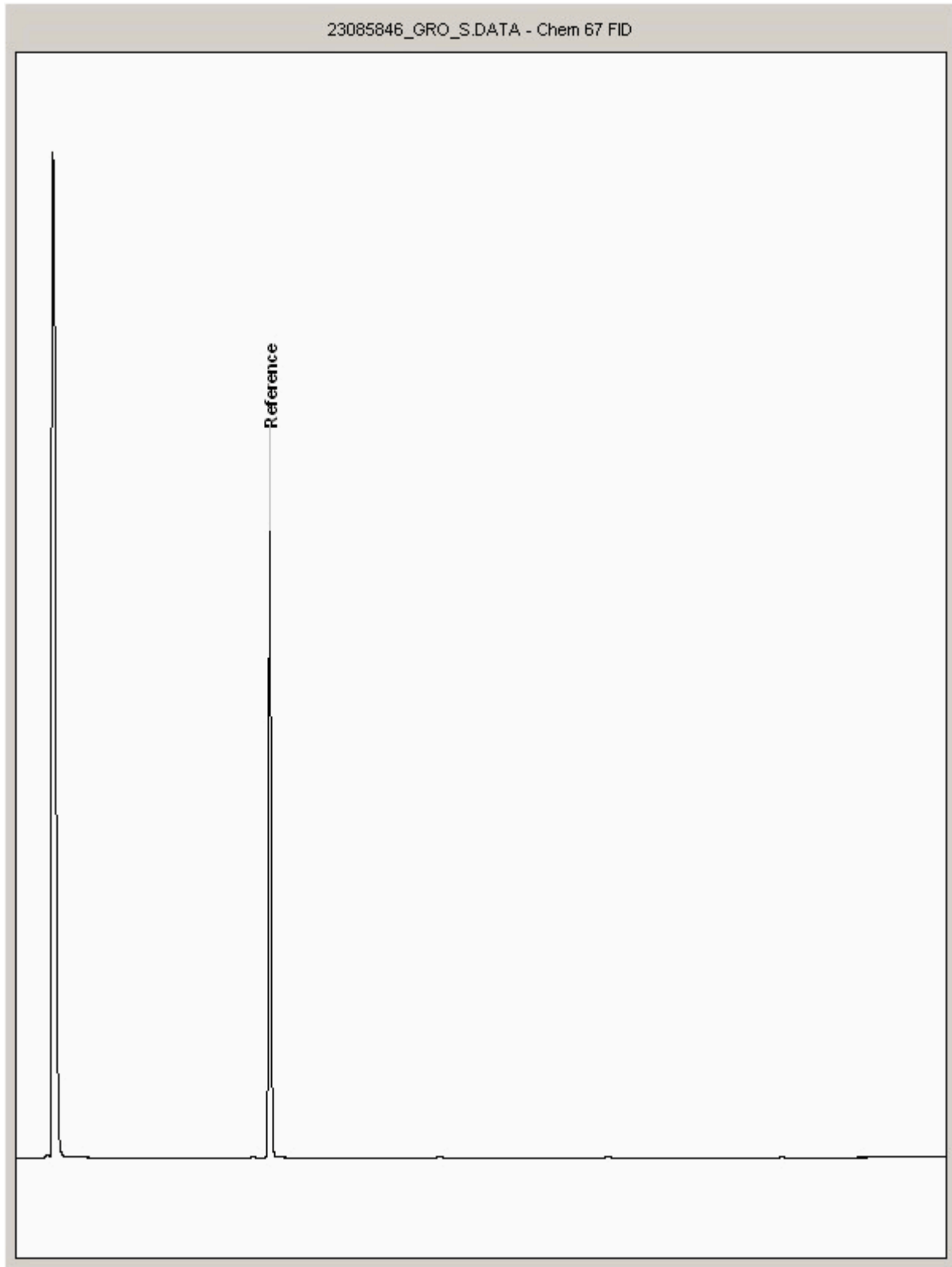
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23085846  
Sample ID : TP005

Depth : 1.50 - 1.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

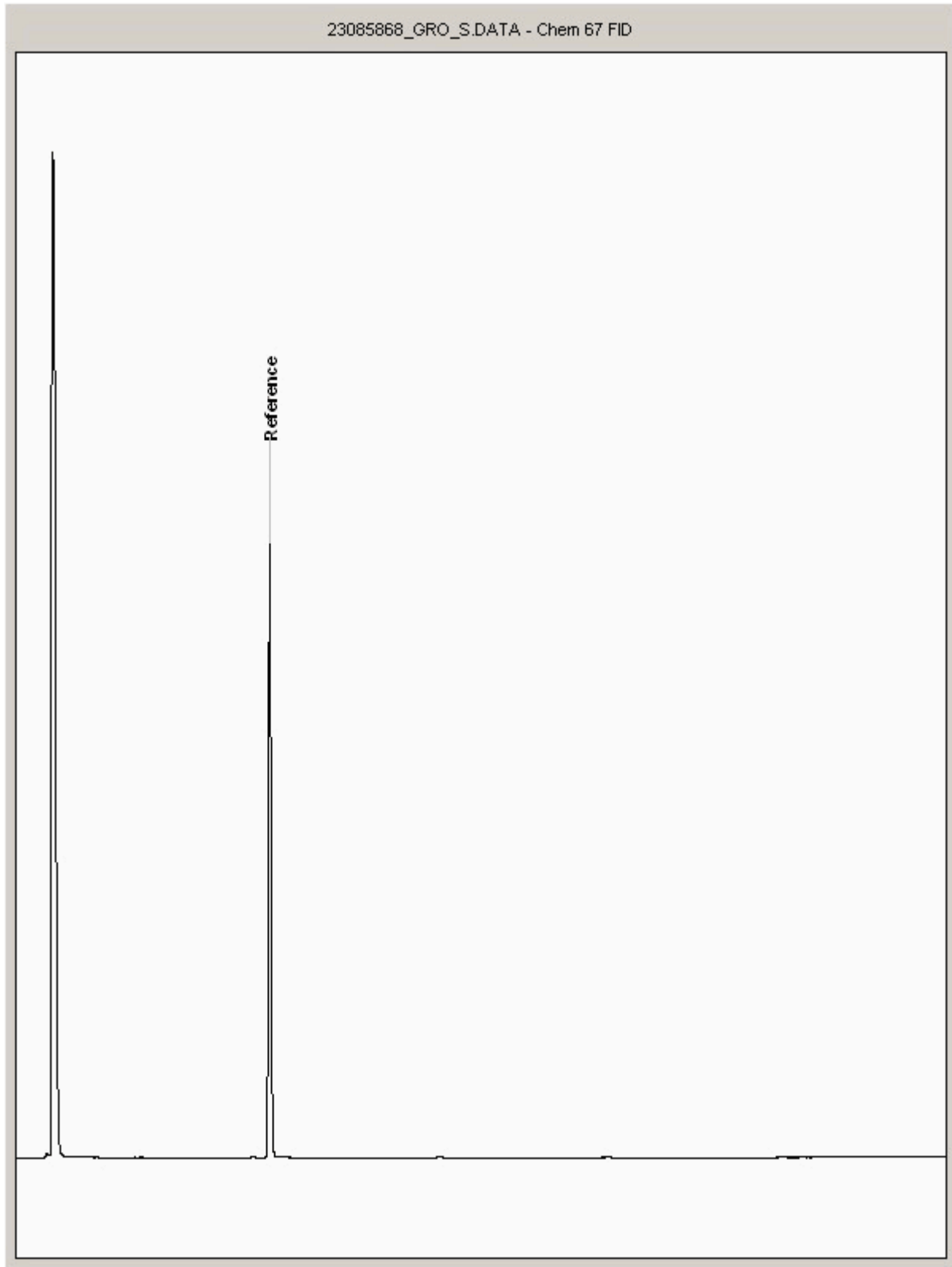
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23085868  
Sample ID : TP002

Depth : 1.40 - 1.50





CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

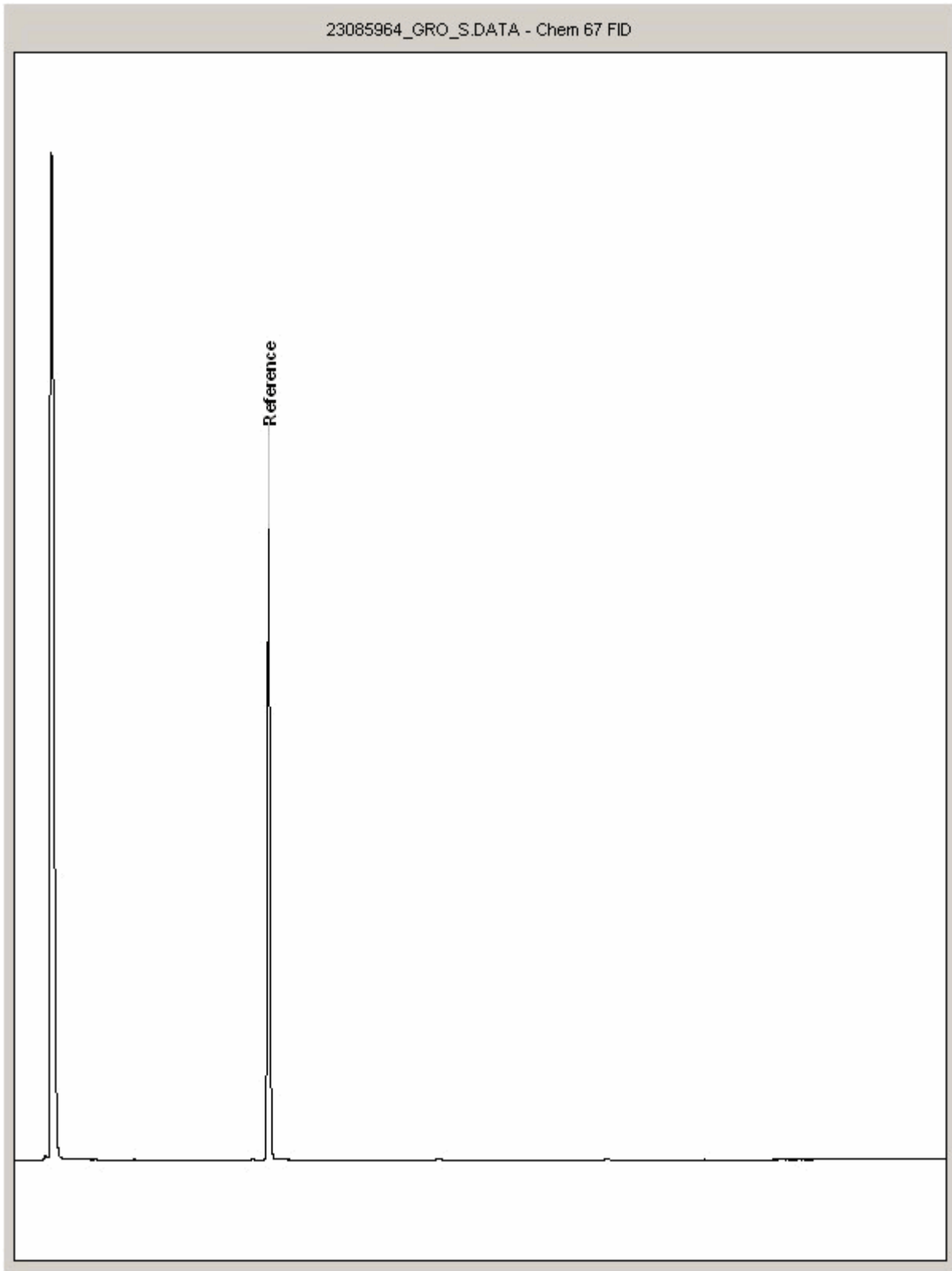
Report Number: 579754  
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23085964  
Sample ID : TP005

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

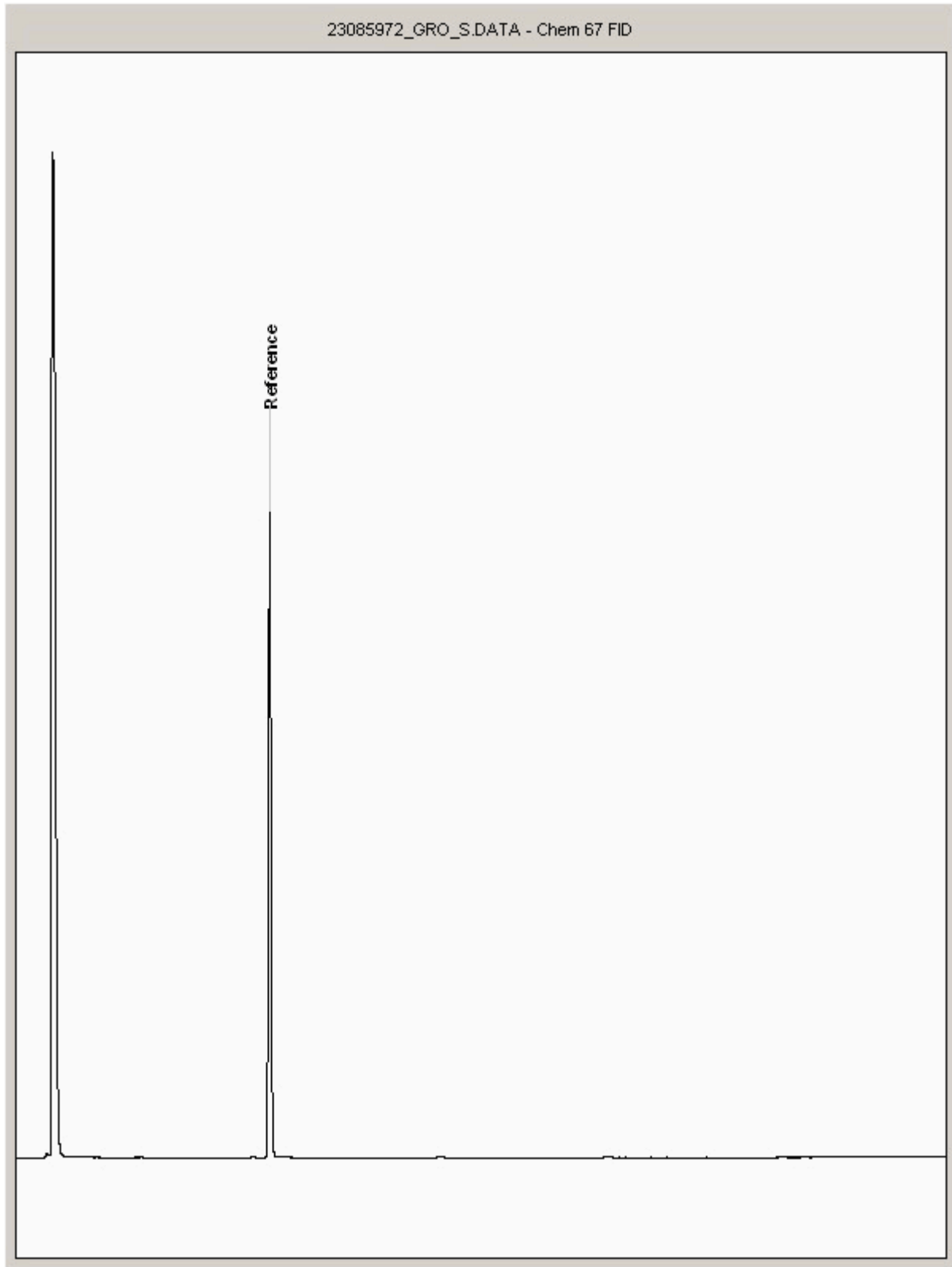
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23085972  
Sample ID : TP004

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

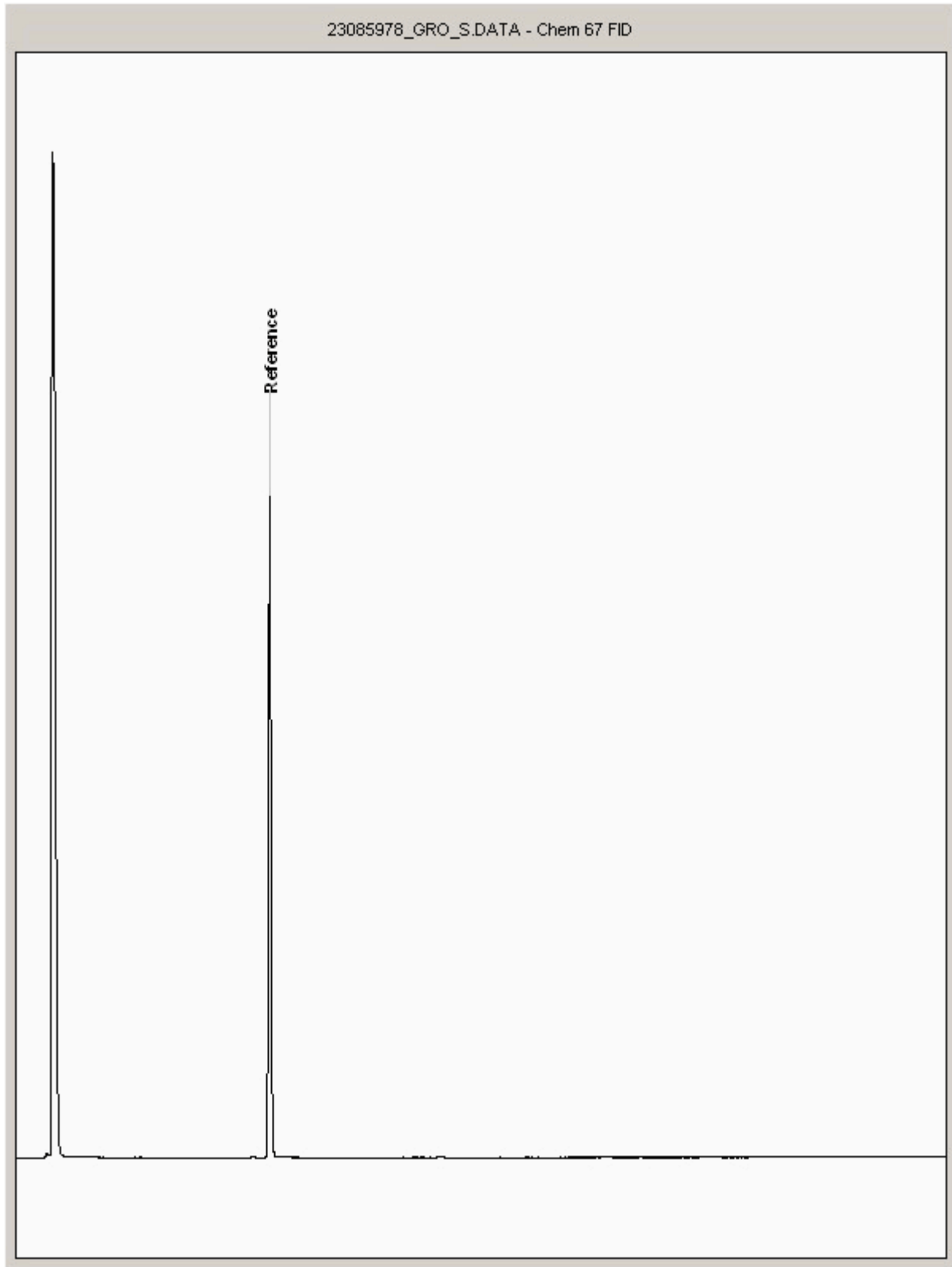
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23085978  
Sample ID : TP004

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

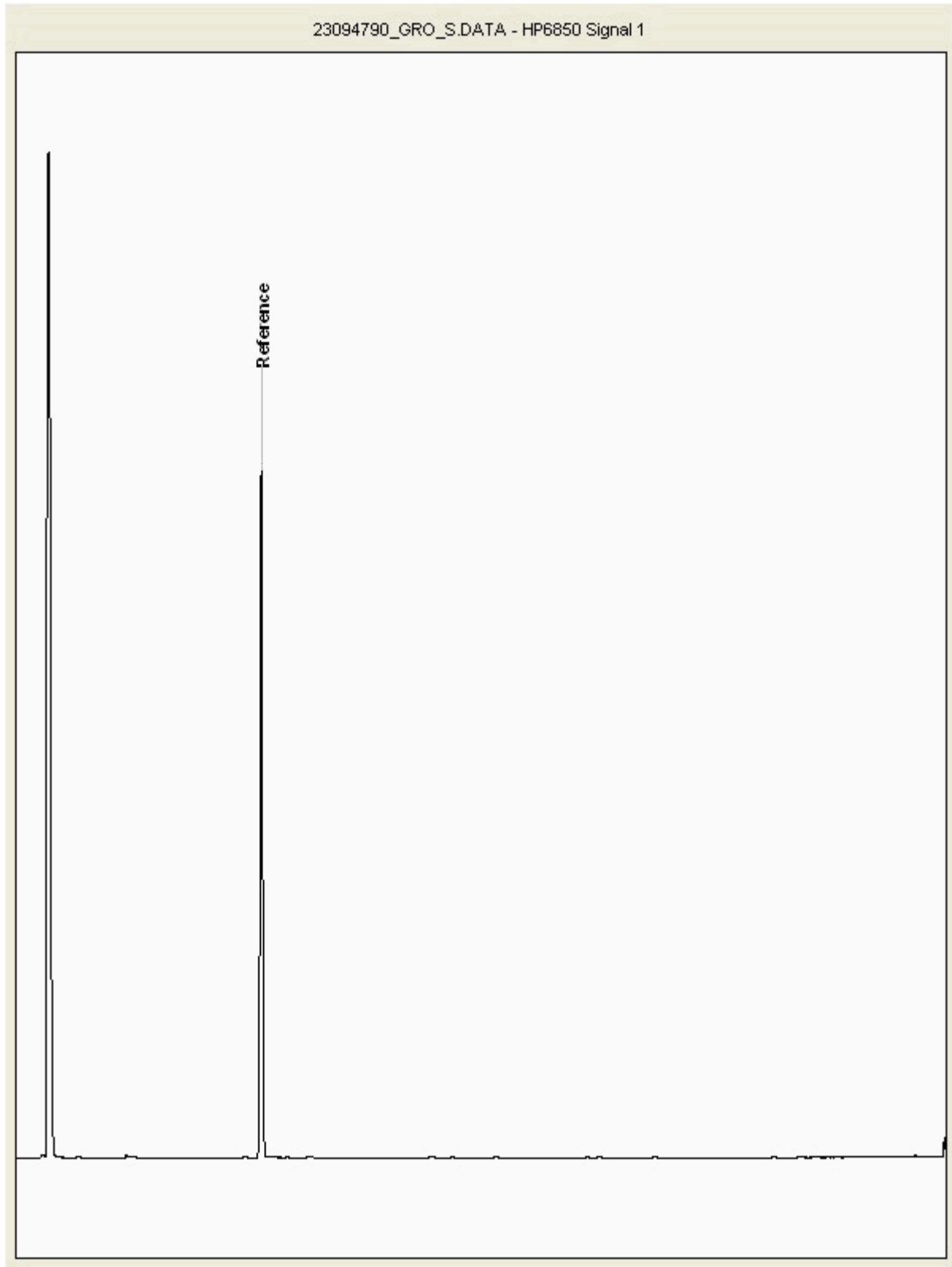
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23094790  
Sample ID : TP011

Depth : 0.40 - 0.50







# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

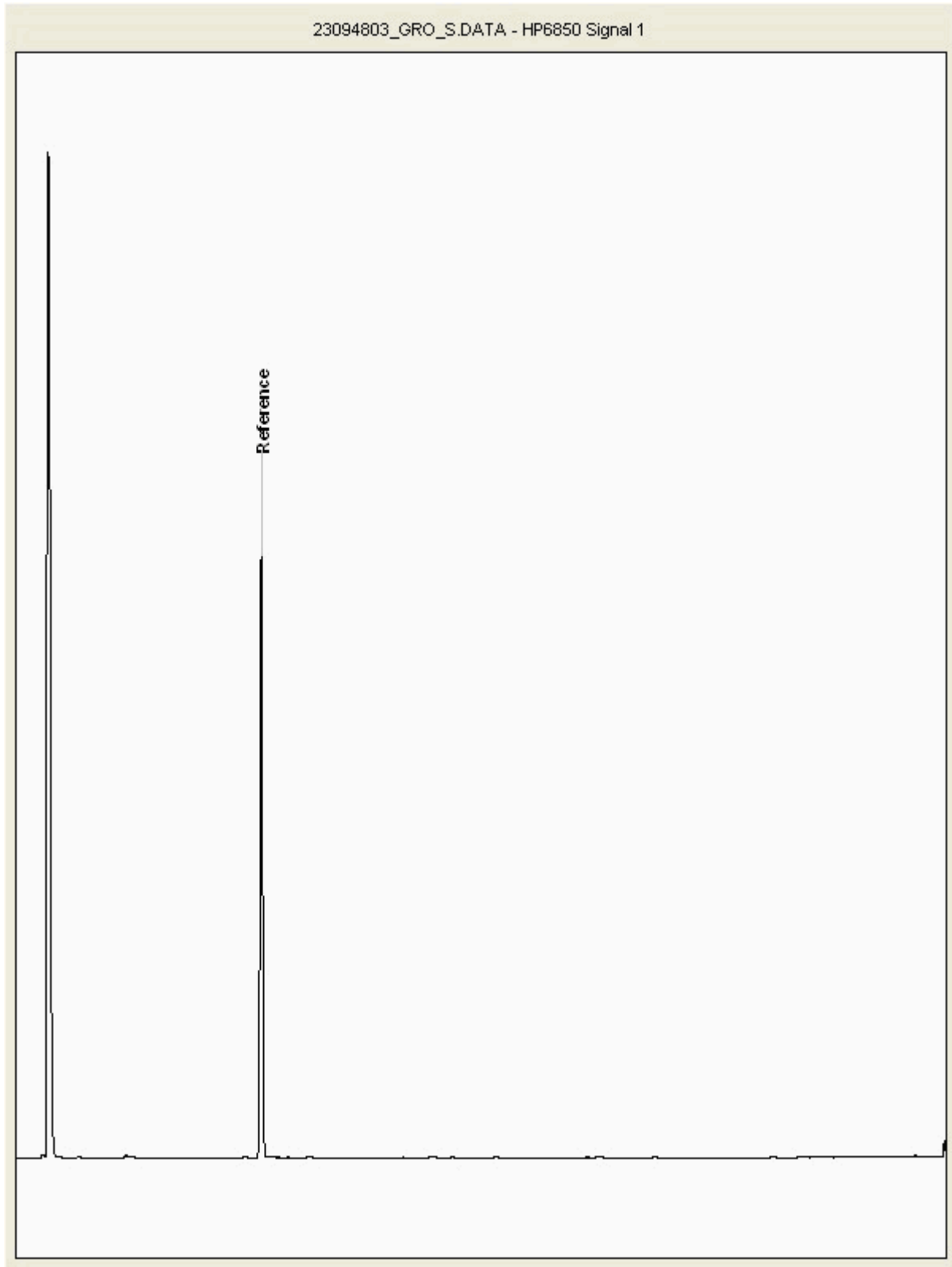
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23094803  
Sample ID : TP010

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

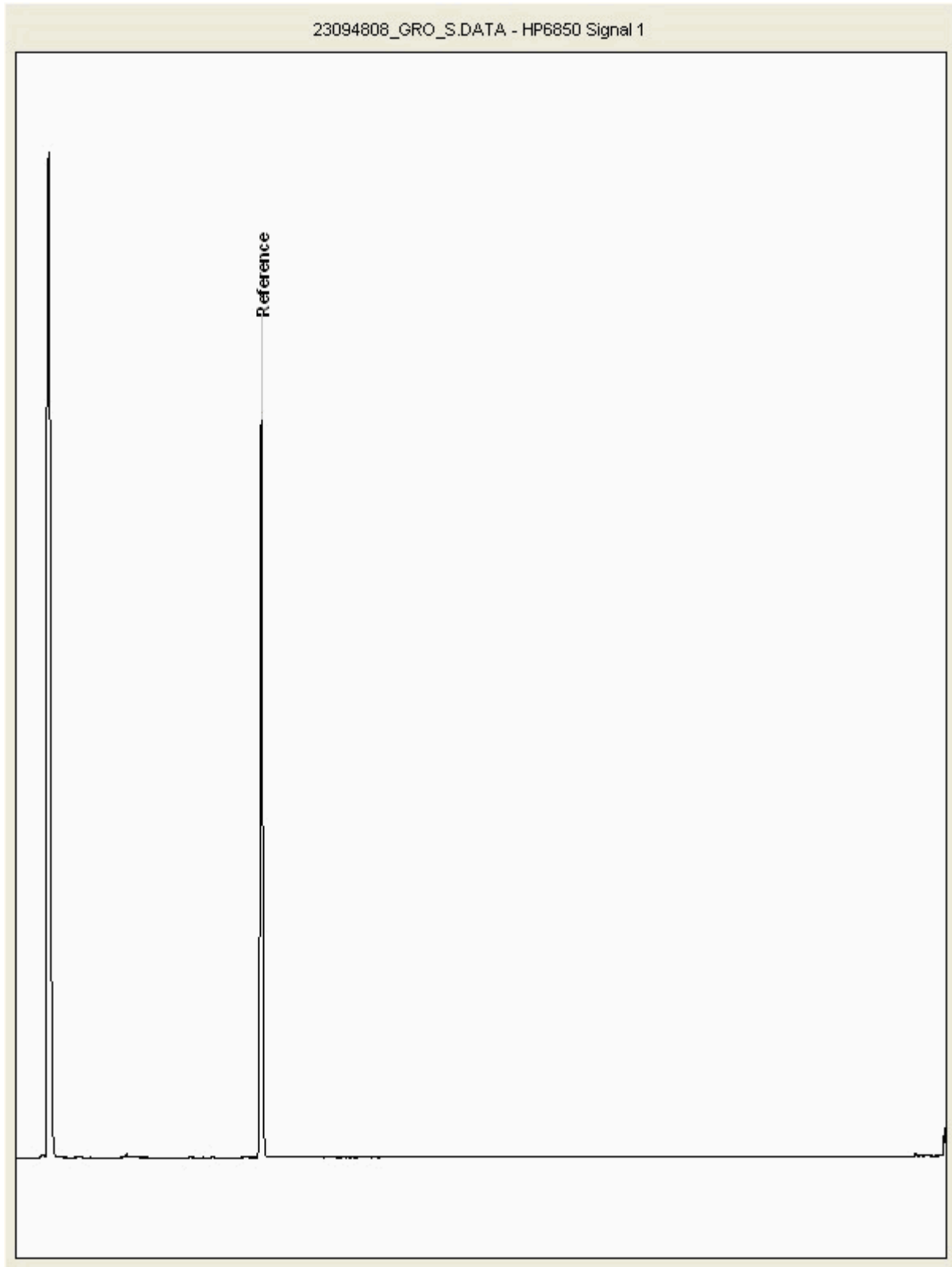
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23094808  
Sample ID : TP003

Depth : 0.50 - 0.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

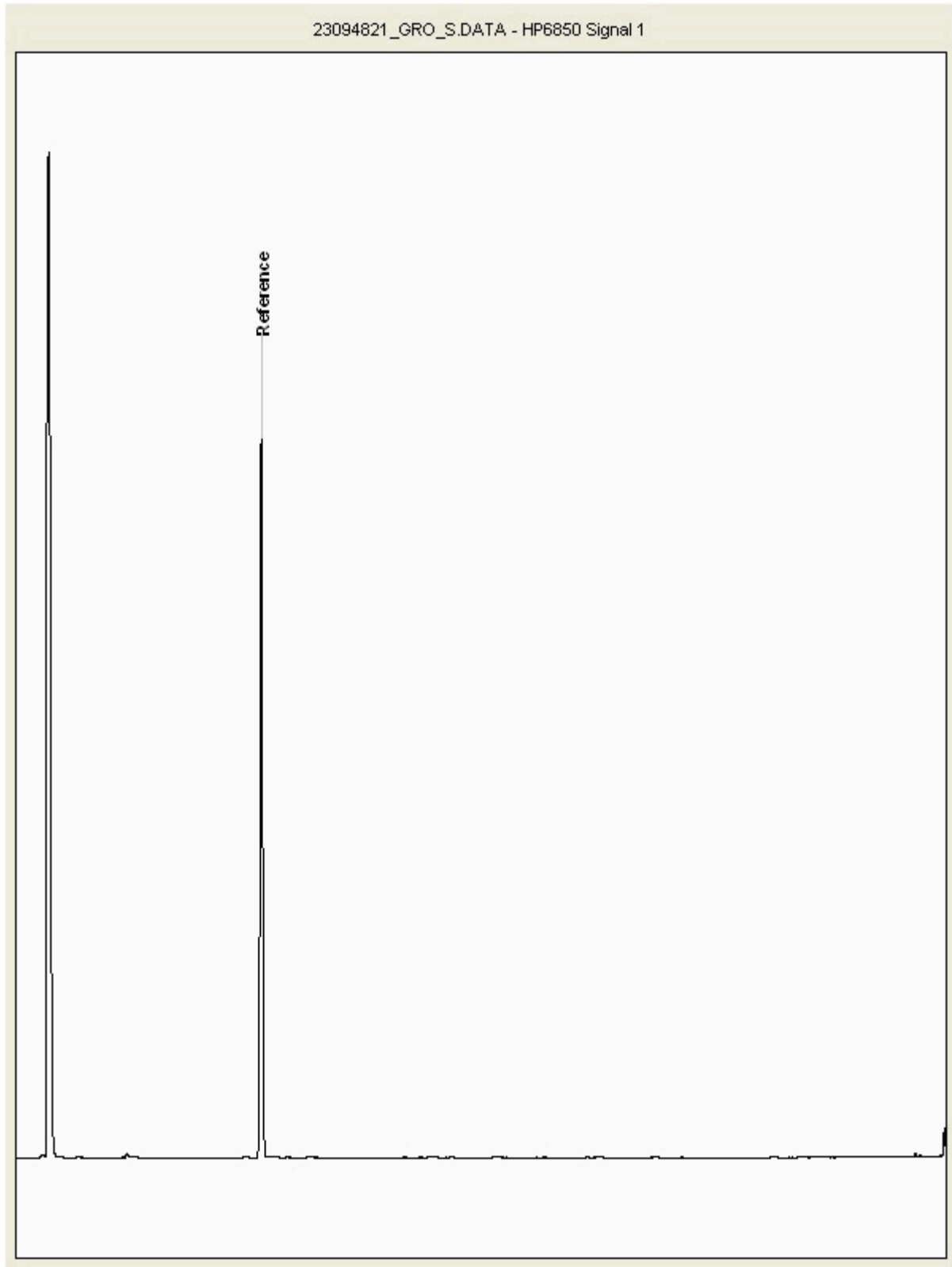
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23094821  
Sample ID : TP011

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

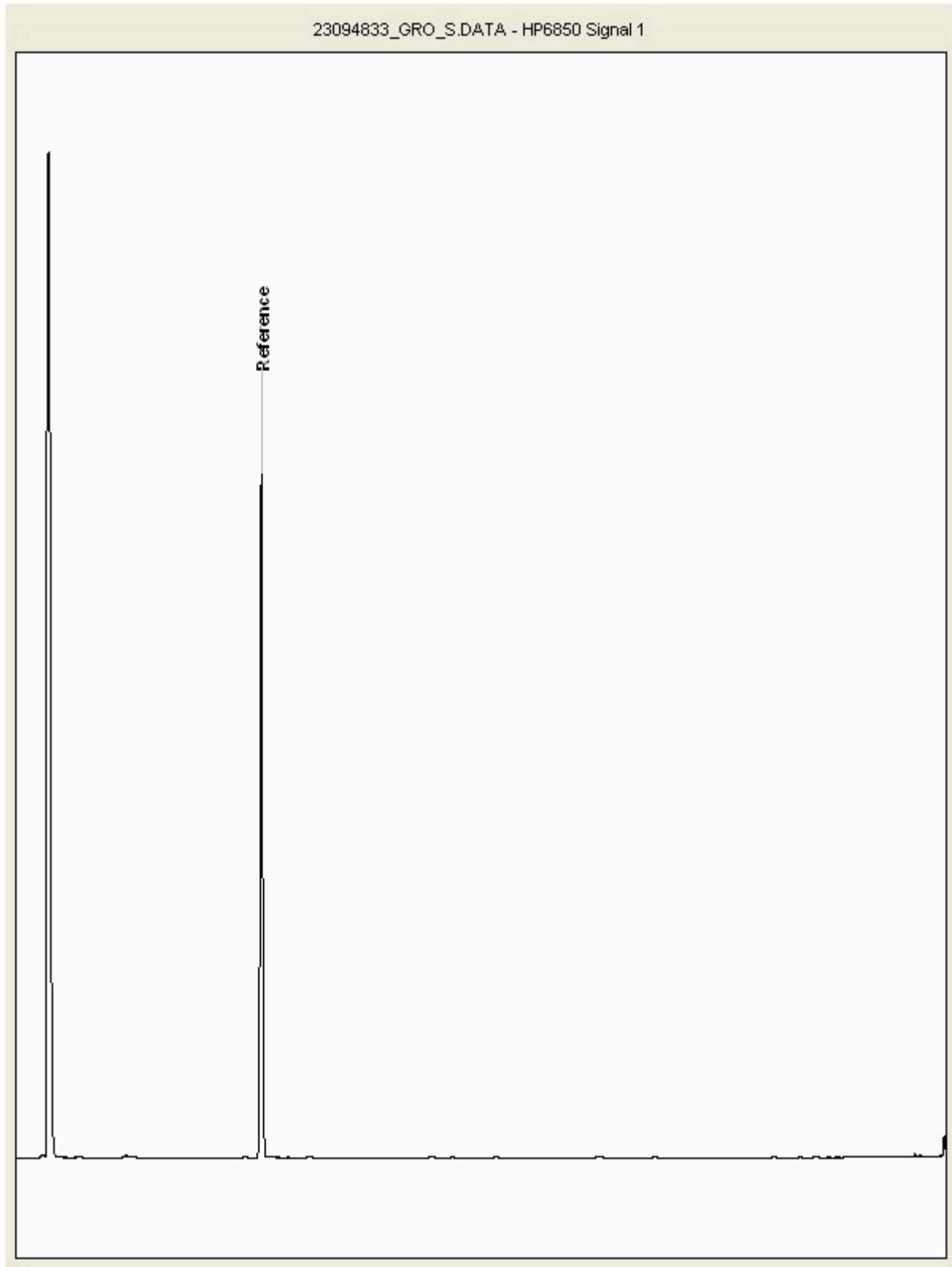
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23094833  
Sample ID : TP012

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

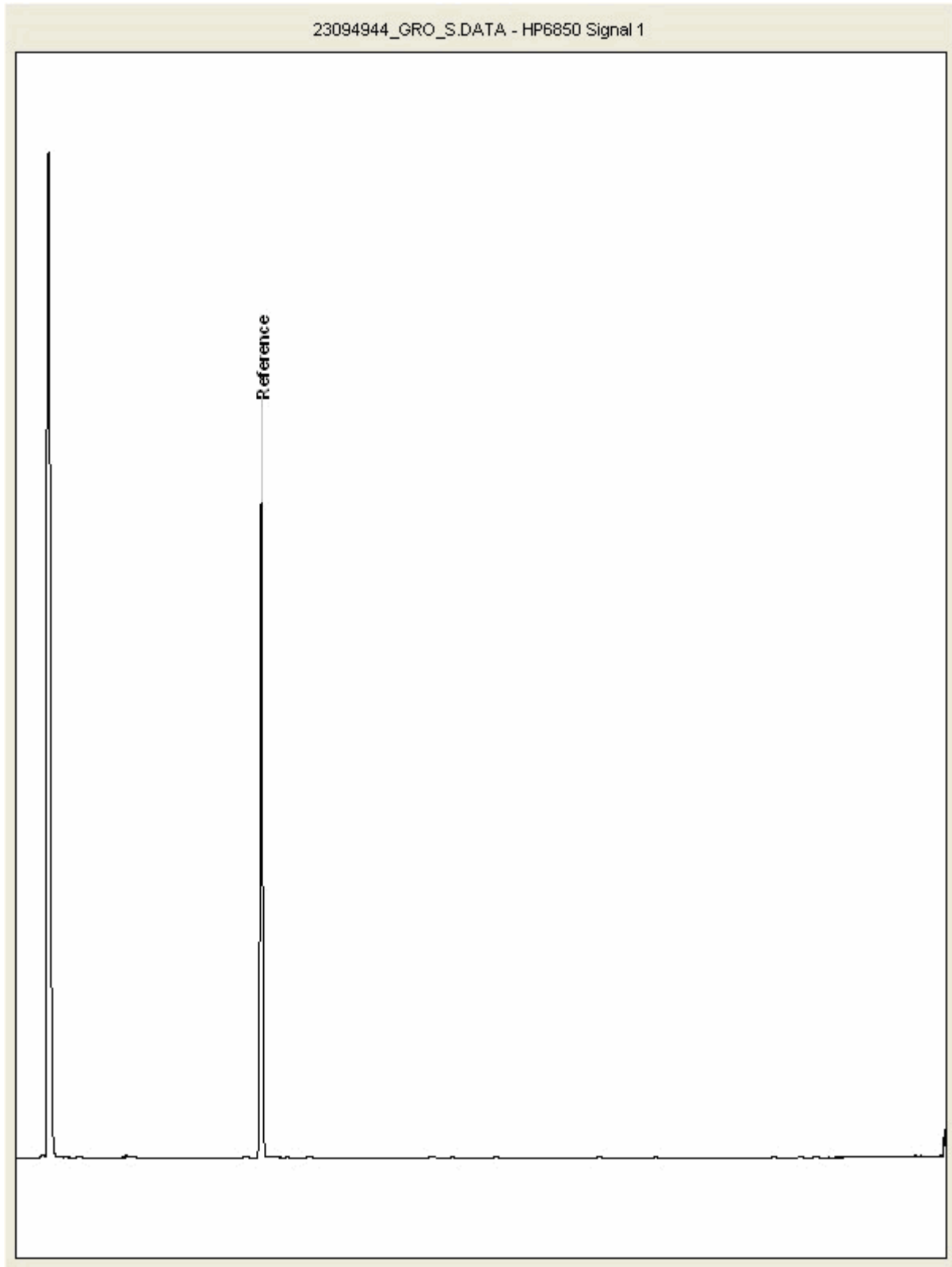
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23094944  
Sample ID : TP003

Depth : 1.50 - 1.60





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

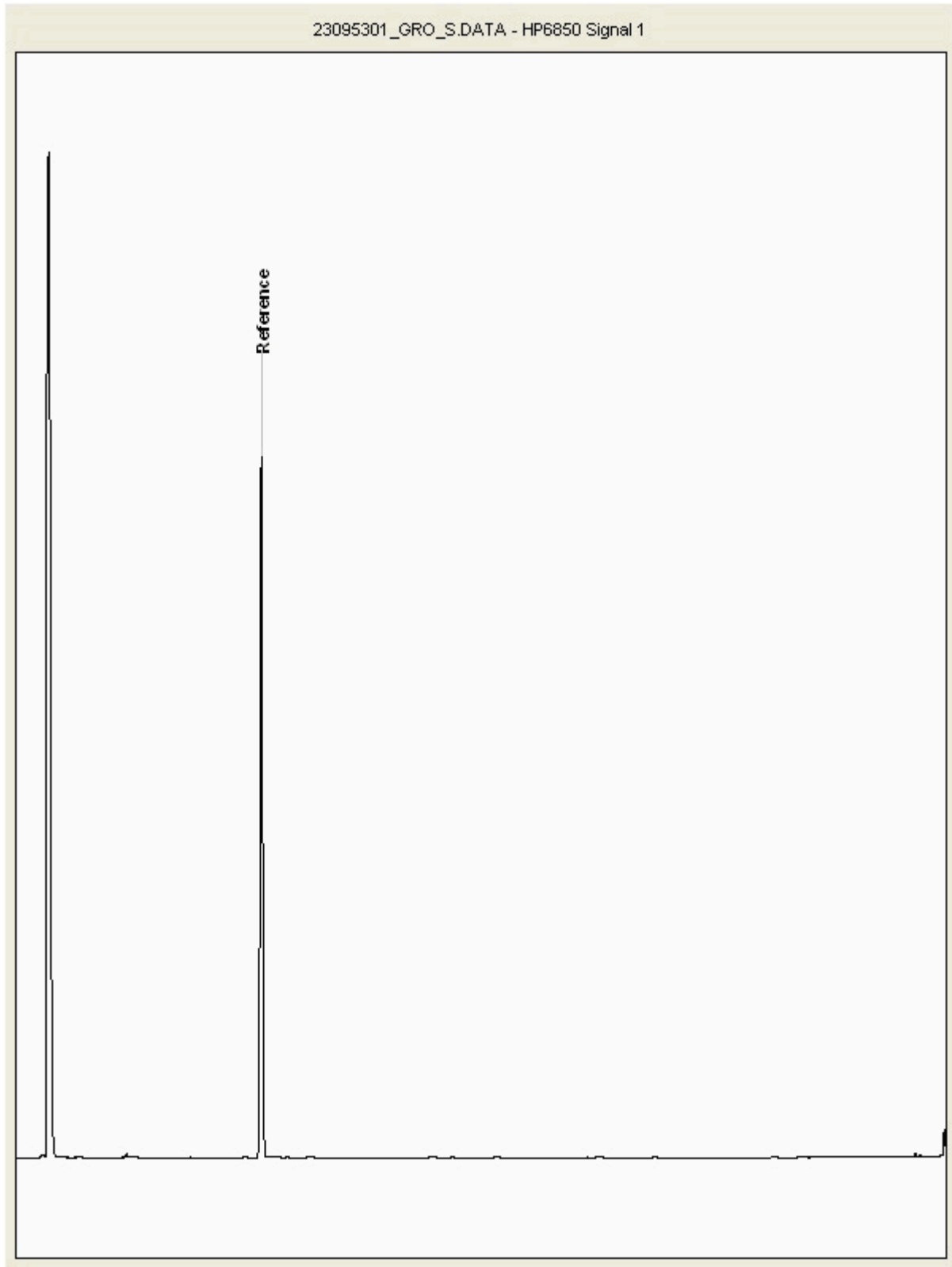
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23095301  
Sample ID : TP010

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

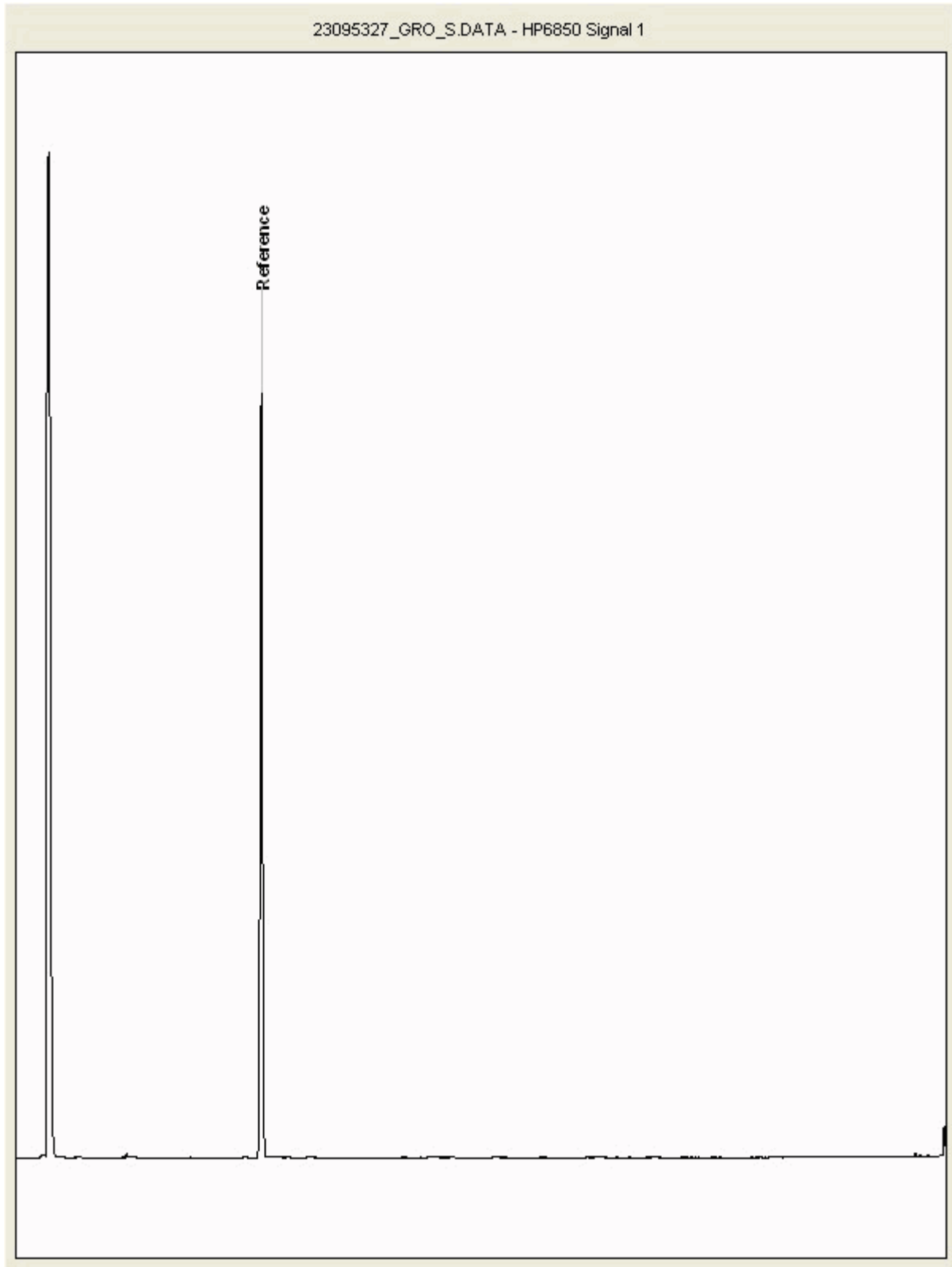
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23095327  
Sample ID : TP012

Depth : 0.50 - 0.60





CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

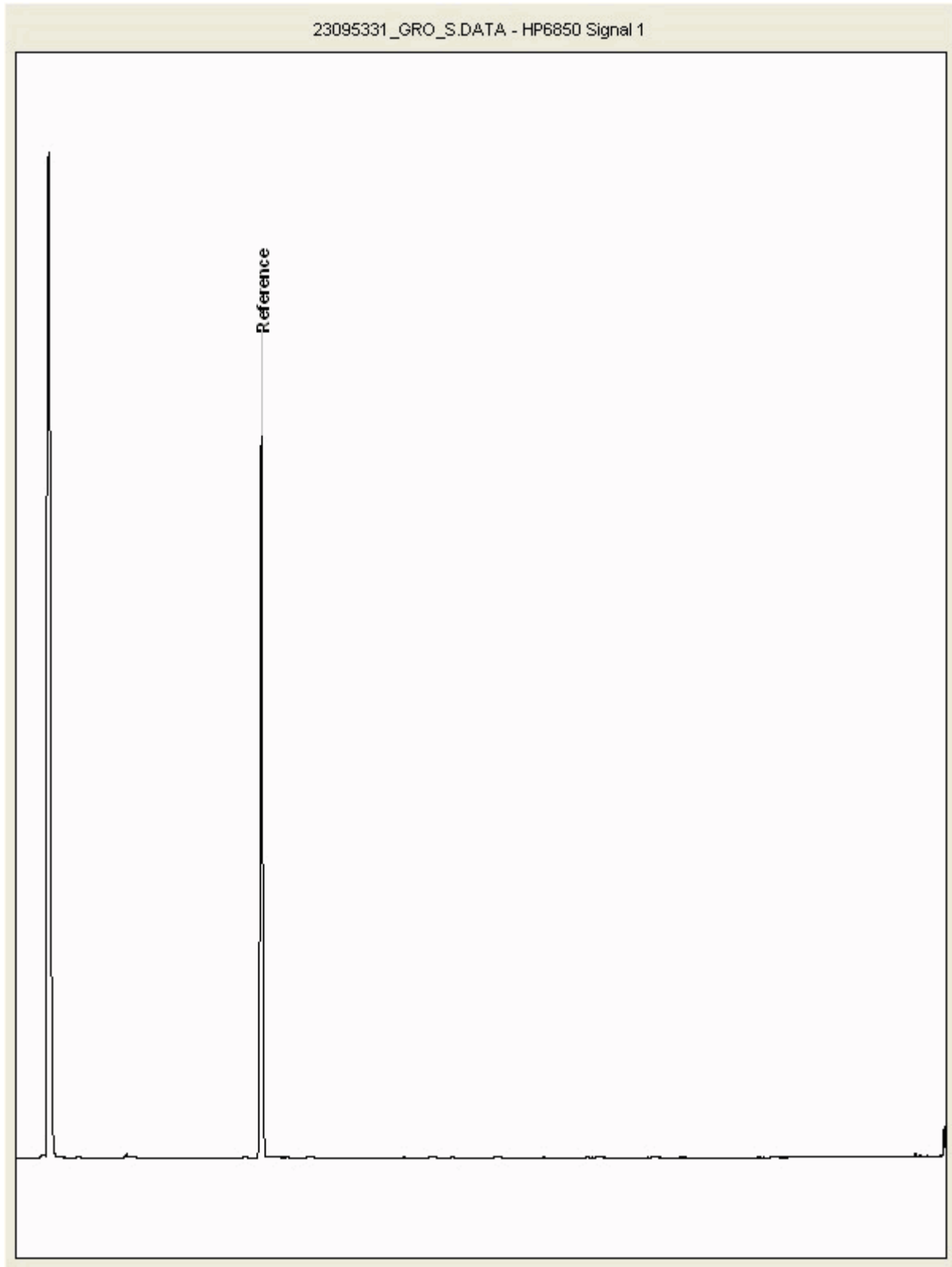
Report Number: 579754  
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23095331  
Sample ID : TP002

Depth : 0.50 - 0.60







# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

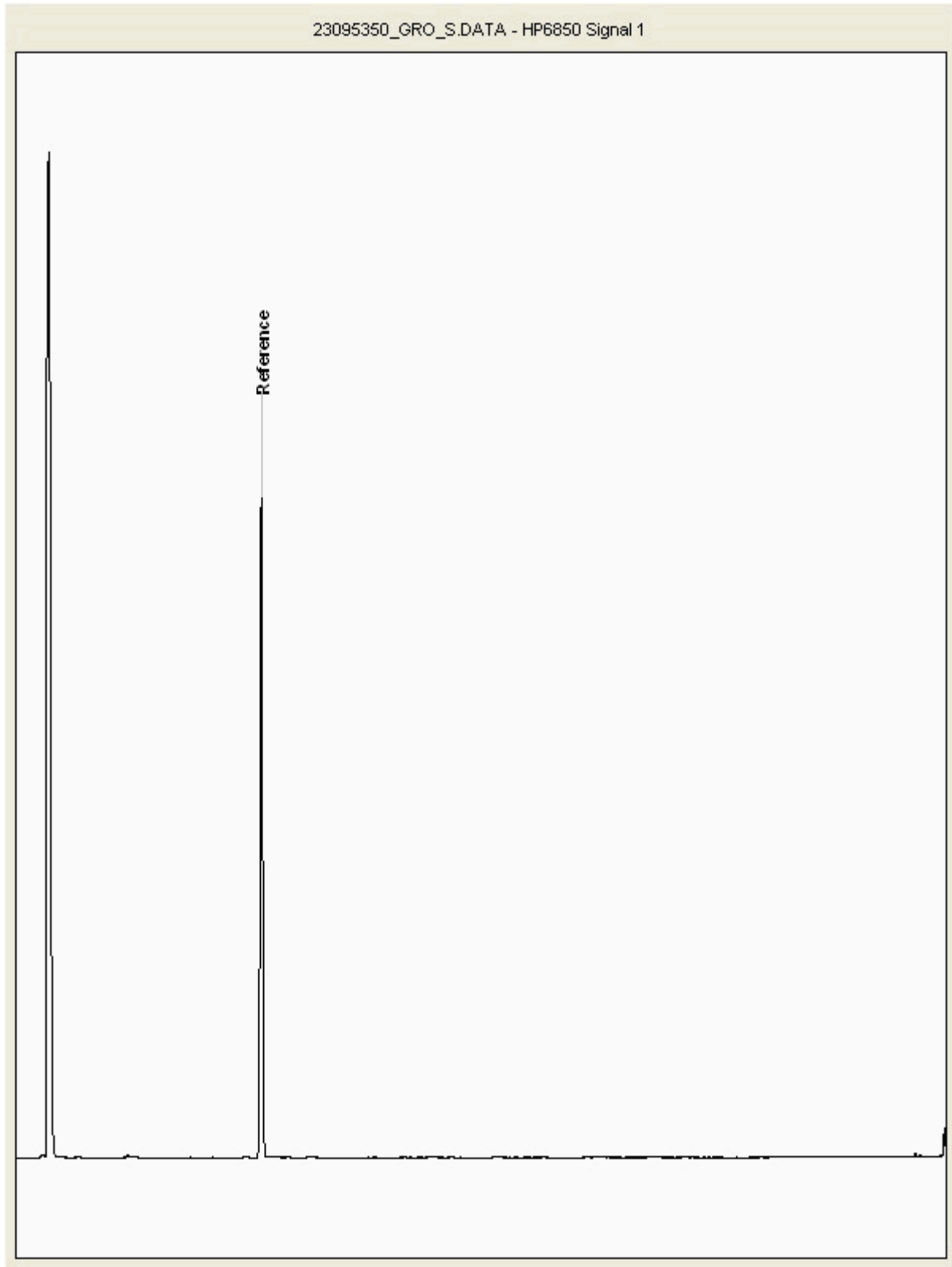
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23095350  
Sample ID : TP006

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

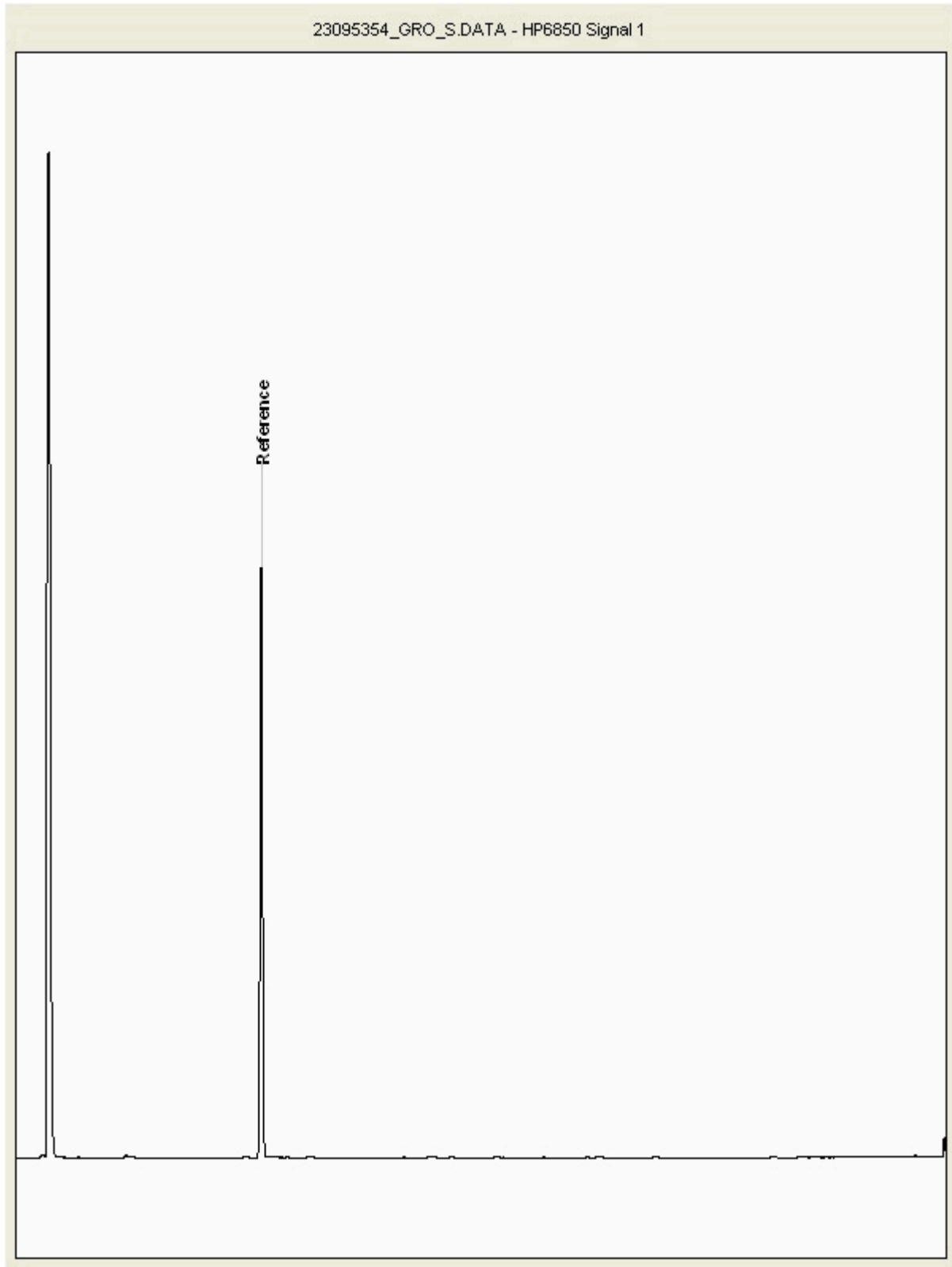
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23095354  
Sample ID : TP006

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

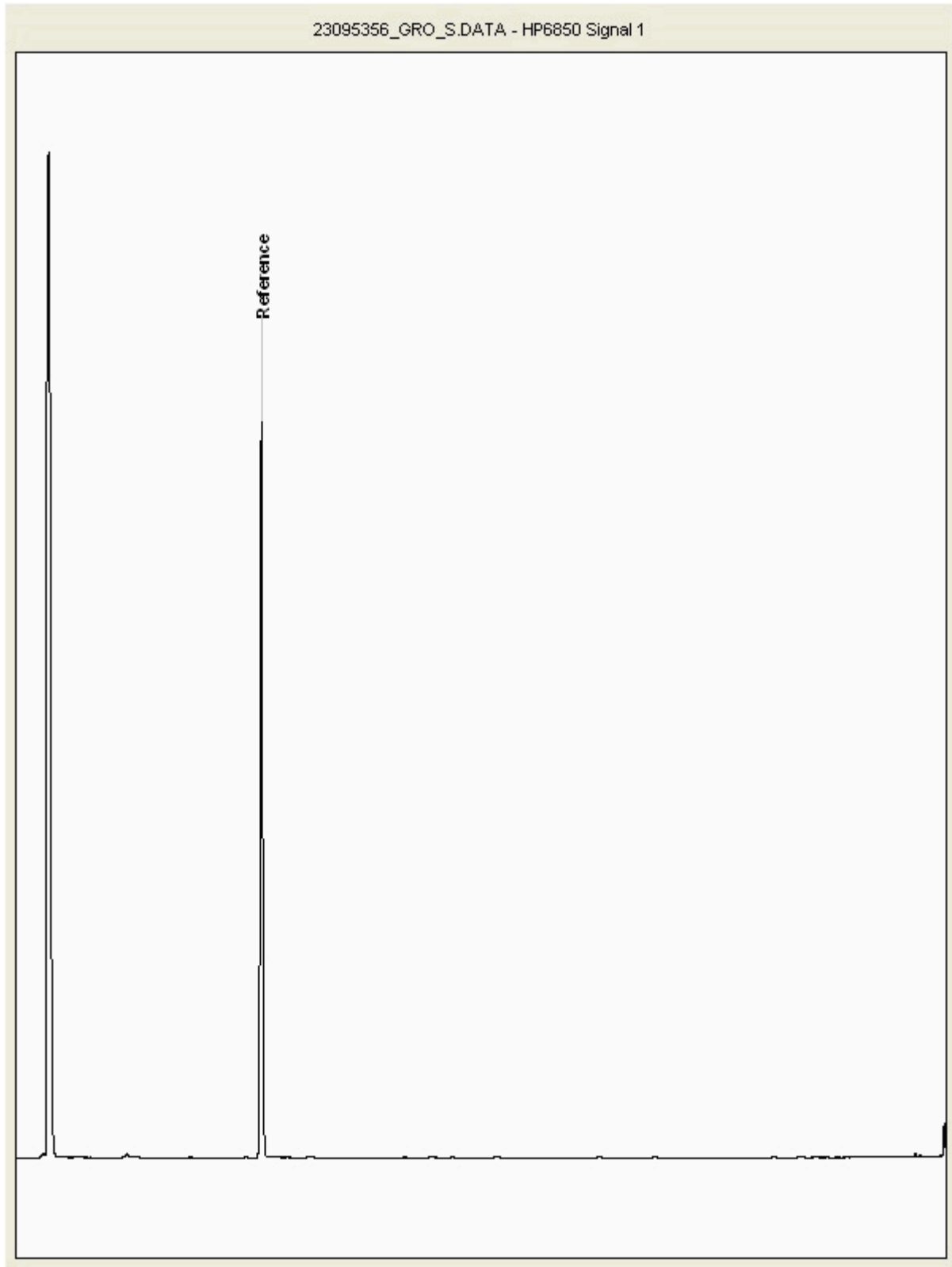
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23095356  
Sample ID : TP001

Depth : 0.40 - 0.50





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201021-100  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

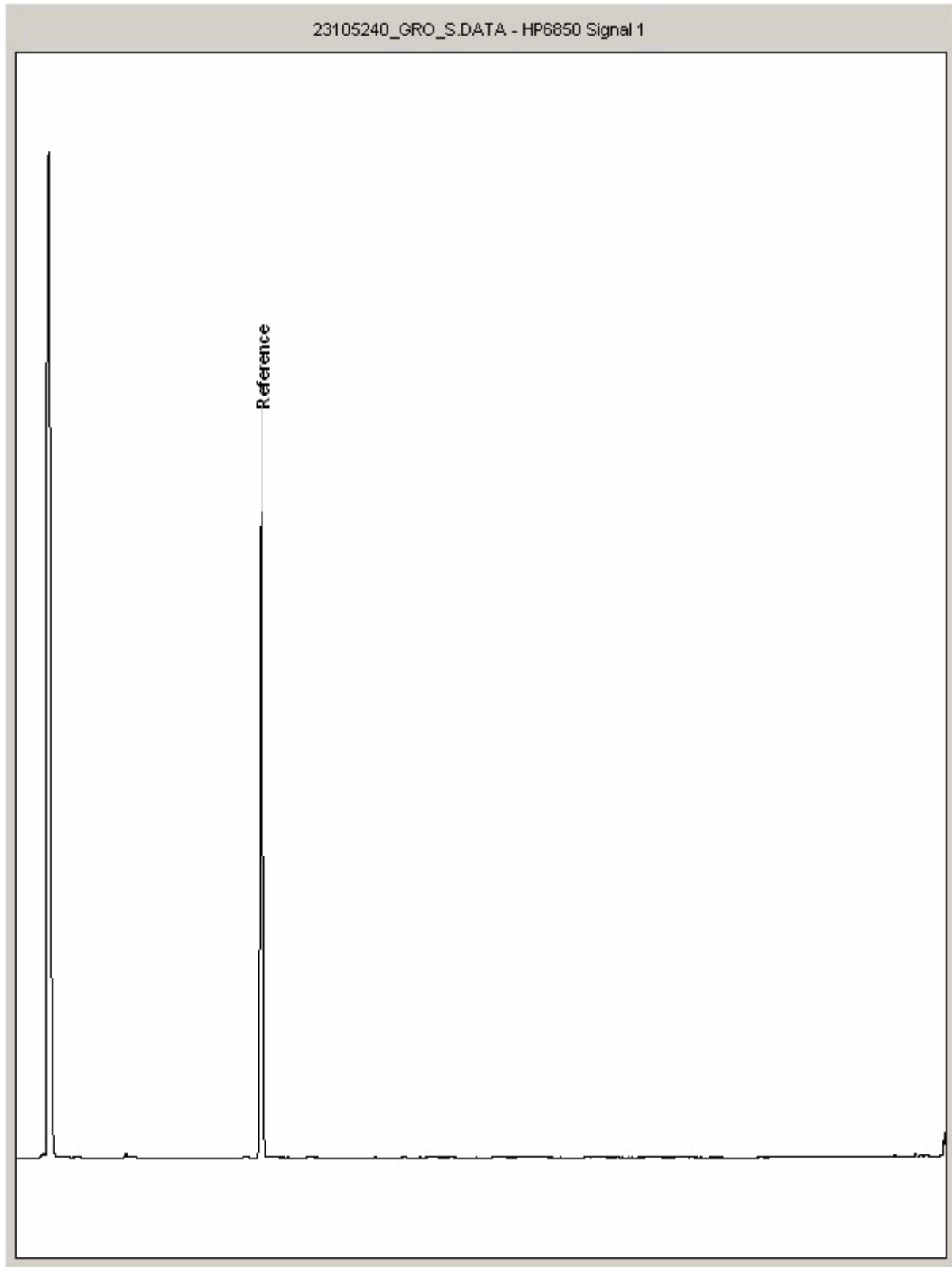
Report Number: 579754  
Superseded Report:

## Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23105240  
Sample ID : TP001

Depth : 1.40 - 1.50





# CERTIFICATE OF ANALYSIS

<b>SDG:</b>	201021-100	<b>Client Reference:</b>	2020WW102	<b>Report Number:</b>	579754
<b>Location:</b>	Arklow Bank	<b>Order Number:</b>	9028	<b>Superseded Report:</b>	

## 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 NH<sub>4</sub> by the BRE method, VOC TICs and SVOC TICs.

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

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

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

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

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

7. Results relate only to the items tested.

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

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

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

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

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

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

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

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

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

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

### 18. Sample Deviations

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

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

### 19. Asbestos

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

#### Identification of Asbestos in Bulk Materials & Soils

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

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

#### Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung. Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2017)*.

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

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



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Deeside  
CH5 3US

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Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

Irish Drilling Limited  
Old Galway Road  
Loughrea  
Co. Galway

**Attention:** Dympna Darcy

## CERTIFICATE OF ANALYSIS

**Date of report Generation:** 06 January 2021  
**Customer:** Irish Drilling Limited  
**Sample Delivery Group (SDG):** 201211-79  
**Your Reference:** 2020WW102  
**Location:** Arklow Bank  
**Report No:** 582350

**This report has been revised and directly supersedes 580858 in its entirety.**

We received 3 samples on Friday December 11, 2020 and 3 of these samples were scheduled for analysis which was completed on Wednesday January 06, 2021. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

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

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

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

Approved By:

**Sonia McWhan**

Operations Manager



1291



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201211-79      **Client Reference:** 2020WW102      **Report Number:** 582350  
**Location:** Arklow Bank      **Order Number:** 9028      **Superseded Report:** 580858

## Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23412730	BH01	EW1	0.00 - 0.00	09/12/2020
23412753	BH03	EW1	0.00 - 0.00	09/12/2020
23412768	BH04	EW1	0.00 - 0.00	09/12/2020

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



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	201211-79	<b>Client Reference:</b>	2020WW102	<b>Report Number:</b>	582350
<b>Location:</b>	Arklow Bank	<b>Order Number:</b>	9028	<b>Superseded Report:</b>	580858

<b>Results Legend</b>  <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: yellow; border: 1px solid black; margin-right: 5px;"></div> <span>Test</span> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: red; color: white; border: 1px solid black; margin-right: 5px;"></div> <span>No Determination Possible</span> </div> </div> Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	
		23412730	BH01	EW1	0.00 - 0.00	Vial (ALE297)	GW
		23412753	BH03	EW1	0.00 - 0.00	Vial (ALE297)	GW
		23412768	BH04	EW1	0.00 - 0.00	Vial (ALE297)	GW
						HNO3 Filtered (ALE204)	GW
						H2SO4 (ALE244)	GW
						500ml Plastic (ALE208)	GW
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
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# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b> 201211-79	<b>Client Reference:</b> 2020WW102	<b>Report Number:</b> 582350	<b>582350</b>
<b>Location:</b> Arklow Bank	<b>Order Number:</b> 9028	<b>Superseded Report:</b> 580858	

<b>Results Legend</b> <div style="margin-top: 5px;"> <span style="background-color: yellow; border: 1px solid black; padding: 2px;">X</span> Test              <span style="background-color: red; color: white; border: 1px solid black; padding: 2px;">N</span> No Determination Possible         </div> <b>Sample Types -</b> S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	
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					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	
					250ml Amber Gl. PTFE/PE	GW	
					Vial (ALE297)	GW	
					HNO3 Filtered (ALE204)	GW	
					H2SO4 (ALE244)	GW	
					500ml Plastic (ALE208)	GW	
					250ml BOD (ALE212)	GW	



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201211-79  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 582350  
**Superseded Report:** 580858

Results Legend		Customer Sample Ref.	BH01	BH03	BH04			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
M	mCERTS accredited.		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
aq	Aqueous / settled sample.		09/12/2020	09/12/2020	09/12/2020			
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.		11/12/2020	11/12/2020	11/12/2020			
*	Subcontracted - refer to subcontractor report for accreditation status.		201211-79	201211-79	201211-79			
**	% 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		23412730	23412753	23412768			
(F)	Trigger breach confirmed		EW1	EW1	EW1			
1-4*§@	Sample deviation (see appendix)							
Component	LOD/Units		Method					
Suspended solids, Total	<2 mg/l	TM022	14600 #	25.9 #	3170 #			
Alkalinity, Total as CaCO3	<2 mg/l	TM043	349 #	178 #	431 #			
BOD, unfiltered	<1 mg/l	TM045	4.06 #	2.9 #	<10 #			
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2 #	0.337 #	0.37 #			
COD, unfiltered	<7 mg/l	TM107	1050 #	14.5 #	252 #			
Dissolved solids, Total (meter)	<5 mg/l	TM123	661 #	451 #	369 #			
Chromium, Trivalent (Low)	<0.003 mg/l	TM152	<0.003 #	<0.003 #	<0.003 #			
Antimony (diss.filt)	<1 µg/l	TM152	<1 #	<1 #	<1 #			
Arsenic (diss.filt)	<0.5 µg/l	TM152	<0.5 #	1.58 #	1.61 #			
Barium (diss.filt)	<0.2 µg/l	TM152	136 #	46.1 #	45.5 #			
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08 #	<0.08 #	<0.08 #			
Chromium (diss.filt)	<1 µg/l	TM152	<1 #	<1 #	<1 #			
Copper (diss.filt)	<0.3 µg/l	TM152	<0.3 #	0.508 #	0.462 #			
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2 #	<0.2 #	<0.2 #			
Manganese (diss.filt)	<3 µg/l	TM152	3590 #	11.6 #	11.2 #			
Molybdenum (diss.filt)	<3 µg/l	TM152	<3 #	22.5 #	22.6 #			
Nickel (diss.filt)	<0.4 µg/l	TM152	1.44 #	3.29 #	3.33 #			
Selenium (diss.filt)	<1 µg/l	TM152	<1 #	1.28 #	1.13 #			
Zinc (diss.filt)	<1 µg/l	TM152	3.13 #	<1 #	<1 #			
Sodium (Dis.Filt)	<0.076 mg/l	TM152	71.2 #	122 #	124 #			
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	17.1 #	5.12 #	5.23 #			
Potassium (Dis.Filt)	<0.2 mg/l	TM152	1.63 #	2.81 #	2.86 #			
Calcium (Dis.Filt)	<0.2 mg/l	TM152	77.9 #	6.19 #	6.16 #			
Iron (Dis.Filt)	<0.019 mg/l	TM152	<0.019 #	<0.019 #	<0.019 #			
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172	162 @	168 @	354 @			
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01 #	<0.01 #	<0.01 #			
Sulphate	<2 mg/l	TM184	27.9 #	18.7 #	42.5 #			
Phosphate (Ortho as P)	<0.02 mg/l	TM184	<0.02 #	<0.02 #	<0.02 #			
Nitrate as NO3	<0.3 mg/l	TM184	0.768 #	<0.3 #	0.337 #			
PCB congener 28	<0.015 µg/l	TM197	<0.015 #	<0.015 #	<0.015 #			
PCB congener 52	<0.015 µg/l	TM197	<0.015 #	<0.015 #	<0.015 #			
PCB congener 101	<0.015 µg/l	TM197	<0.015 #	<0.015 #	<0.015 #			





# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b> 201211-79	<b>Client Reference:</b> 2020WW102	<b>Report Number:</b> 582350
<b>Location:</b> Arklow Bank	<b>Order Number:</b> 9028	<b>Superseded Report:</b> 580858

## SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	BH01	BH03	BH04			
# ISO17025 accredited.			Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW)	0.00 - 0.00 Ground Water (GW)	0.00 - 0.00 Ground Water (GW)			
M mCERTS accredited.				09/12/2020	09/12/2020	09/12/2020			
aq Aqueous / settled sample.				11/12/2020	11/12/2020	11/12/2020			
diss.fit Dissolved / filtered sample.				201211-79	201211-79	201211-79			
tot.unfilt Total / unfiltered sample.				23412730	23412753	23412768			
* Subcontracted - refer to subcontractor report for accreditation status.				EW1	EW1	EW1			
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F) Trigger breach confirmed									
1-4*§@ Sample deviation (see appendix)									
Component	LOD/Units	Method							
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2-Chlorophenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2-Methylphenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2-Nitroaniline (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
2-Nitrophenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
3-Nitroaniline (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
4-Chloroaniline (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
4-Methylphenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
4-Nitroaniline (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
4-Nitrophenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Azobenzene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Acenaphthylene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Acenaphthene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Anthracene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<8 #	<2 #	<40 #				
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201211-79  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 582350  
**Superseded Report:** 580858

## SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	BH01	BH03	BH04			
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / filtered sample. dis.fit Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1.4.4.6@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 09/12/2020 11/12/2020 201211-79 23412730 EW1	0.00 - 0.00 Ground Water (GW) 09/12/2020 11/12/2020 201211-79 23412753 EW1	0.00 - 0.00 Ground Water (GW) 09/12/2020 11/12/2020 201211-79 23412768 EW1			
Component	LOD/Units	Method							
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Carbazole (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Chrysene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Dibenzofuran (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Diethyl phthalate (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Dimethyl phthalate (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<20 #	<5 #	<100 #				
Fluoranthene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Fluorene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Hexachlorobenzene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Pentachlorophenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Phenol (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Hexachloroethane (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Nitrobenzene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Naphthalene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Isophorone (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Phenanthrene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				
Pyrene (aq)	<1 µg/l	TM176	<4 #	<1 #	<20 #				



# CERTIFICATE OF ANALYSIS

Validated

<b>SDG:</b>	201211-79	<b>Client Reference:</b>	2020WW102	<b>Report Number:</b>	582350
<b>Location:</b>	Arklow Bank	<b>Order Number:</b>	9028	<b>Superseded Report:</b>	580858

## TPH CWG (W)

Results Legend			Customer Sample Ref.	BH01	BH03	BH04			
# ISO17025 accredited.			Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW)	0.00 - 0.00 Ground Water (GW)	0.00 - 0.00 Ground Water (GW)			
M mCERTS accredited.				09/12/2020	09/12/2020	09/12/2020			
aq Aqueous / settled sample.				11/12/2020	11/12/2020	11/12/2020			
diss.fit Dissolved / filtered sample.				201211-79	201211-79	201211-79			
tot.unfit Total / unfiltered sample.				23412730	23412753	23412768			
* Subcontracted - refer to subcontractor report for accreditation status.				EW1	EW1	EW1			
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F) Trigger breach confirmed									
1-4*\$@ Sample deviation (see appendix)									
Component	LOD/Units	Method							
GRO Surrogate % recovery**	%	TM245	109	101	117				
GRO >C5-C12	<50 µg/l	TM245	<50 #	<50 #	<50 #				
Methyl tertiary butyl ether (MTBE)	<3 µg/l	TM245	<3 #	<3 #	<3 #				
Benzene	<7 µg/l	TM245	<7 #	<7 #	<7 #				
Toluene	<4 µg/l	TM245	<4 #	<4 #	<4 #				
Ethylbenzene	<5 µg/l	TM245	<5 #	<5 #	<5 #				
m,p-Xylene	<8 µg/l	TM245	<8 #	<8 #	<8 #				
o-Xylene	<3 µg/l	TM245	<3 #	<3 #	<3 #				
Sum of detected Xylenes	<11 µg/l	TM245	<11	<11	<11				
Sum of detected BTEX	<28 µg/l	TM245	<28	<28	<28				
Aliphatics >C5-C6	<10 µg/l	TM245	<10	<10	<10				
Aliphatics >C6-C8	<10 µg/l	TM245	<10	<10	<10				
Aliphatics >C8-C10	<10 µg/l	TM245	<10	<10	<10				
Aliphatics >C10-C12	<10 µg/l	TM245	<10	<10	<10				
Aliphatics >C12-C16 (aq)	<10 µg/l	TM174	65	<10	28				
Aliphatics >C16-C21 (aq)	<10 µg/l	TM174	42	<10	36				
Aliphatics >C21-C35 (aq)	<10 µg/l	TM174	250	<10	173				
Total Aliphatics >C12-C35 (aq)	<10 µg/l	TM174	357	<10	237				
Aromatics >EC5-EC7	<10 µg/l	TM245	<10	<10	<10				
Aromatics >EC7-EC8	<10 µg/l	TM245	<10	<10	<10				
Aromatics >EC8-EC10	<10 µg/l	TM245	<10	<10	<10				
Aromatics >EC10-EC12	<10 µg/l	TM245	<10	<10	<10				
Aromatics >EC12-EC16 (aq)	<10 µg/l	TM174	<10	<10	<10				
Aromatics >EC16-EC21 (aq)	<10 µg/l	TM174	<10	<10	<10				
Aromatics >EC21-EC35 (aq)	<10 µg/l	TM174	<10	<10	<10				
Total Aromatics >EC12-EC35 (aq)	<10 µg/l	TM174	<10	<10	<10				
Total Aliphatics & Aromatics >C5-35 (aq)	<10 µg/l	TM174	357	<10	237				
Aliphatics >C16-C35 Aqueous	<10 µg/l	TM174	292	<10	209				



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201211-79  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 582350  
**Superseded Report:** 580858

## VOC MS (W)

Results Legend			Customer Sample Ref.	BH01	BH03	BH04			
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted - refer to subcontractor report for accreditation status.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
1-4*§@	Sample deviation (see appendix)								
Component	LOD/Units	Method	Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00			
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)			
			Date Sampled	09/12/2020	09/12/2020	09/12/2020			
			Sampled Time						
			Date Received	11/12/2020	11/12/2020	11/12/2020			
			SDG Ref	201211-79	201211-79	201211-79			
			Lab Sample No.(s)	23412730	23412753	23412768			
			AGS Reference	EW1	EW1	EW1			
Dibromofluoromethane**	%	TM208		109	105	108			
Toluene-d8**	%	TM208		98.5	103	98.4			
4-Bromofluorobenzene**	%	TM208		98.9	100	97.7			
Dichlorodifluoromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Chloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Vinyl chloride	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Bromomethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Chloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Trichlorofluoromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,1-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Carbon disulphide	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Dichloromethane	<3 µg/l	TM208		<3 #	<3 #	<3 #			
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208		<1 #	<1 #	<1 #			
trans-1,2-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,1-Dichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
cis-1,2-Dichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
2,2-Dichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Bromochloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Chloroform	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,1,1-Trichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,1-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Carbontetrachloride	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,2-Dichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Benzene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Trichloroethene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,2-Dichloropropane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Dibromomethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Bromodichloromethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			
cis-1,3-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
Toluene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
trans-1,3-Dichloropropene	<1 µg/l	TM208		<1 #	<1 #	<1 #			
1,1,2-Trichloroethane	<1 µg/l	TM208		<1 #	<1 #	<1 #			



# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201211-79  
**Location:** Arklow Bank

**Client Reference:** 2020WW102  
**Order Number:** 9028

**Report Number:** 582350  
**Superseded Report:** 580858

## VOC MS (W)

Results Legend			Customer Sample Ref.	BH01	BH03	BH04			
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. dis.fit Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1.4.4.6@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 09/12/2020 11/12/2020 201211-79 23412730 EW1	0.00 - 0.00 Ground Water (GW) 09/12/2020 11/12/2020 201211-79 23412753 EW1	0.00 - 0.00 Ground Water (GW) 09/12/2020 11/12/2020 201211-79 23412768 EW1			
Component	LOD/Units	Method							
1,3-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
Tetrachloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
Dibromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
1,2-Dibromoethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
Chlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
Ethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
m,p-Xylene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
o-Xylene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
Styrene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
Bromoform	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
Isopropylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
1,2,3-Trichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
Bromobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
Propylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
2-Chlorotoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
4-Chlorotoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
tert-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
sec-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
4-iso-Propyltoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
1,3-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
1,4-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
n-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
1,2-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
Hexachlorobutadiene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			
Naphthalene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #			







# CERTIFICATE OF ANALYSIS

Validated

**SDG:** 201211-79      **Client Reference:** 2020WW102      **Report Number:** 582350  
**Location:** Arklow Bank      **Order Number:** 9028      **Superseded Report:** 580858

## Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
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
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM226	In-House Method	Determination of Anions in Waters using Ion Chromatography
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM331		Low Level Hexavalent Chromium

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



**CERTIFICATE OF ANALYSIS**

Validated

<b>SDG:</b> 201211-79	<b>Client Reference:</b> 2020WW102	<b>Report Number:</b> 582350	
<b>Location:</b> Arklow Bank	<b>Order Number:</b> 9028	<b>Superseded Report:</b> 580858	

**Test Completion Dates**

	23412730	23412753	23412768
<b>Lab Sample No(s)</b>	23412730	23412753	23412768
<b>Customer Sample Ref.</b>	BH01	BH03	BH04
<b>AGS Ref.</b>	EW1	EW1	EW1
<b>Depth</b>	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
<b>Type</b>	Ground Water	Ground Water	Ground Water
Alkalinity as CaCO3	18-Dec-2020	18-Dec-2020	18-Dec-2020
Ammoniacal Nitrogen	18-Dec-2020	18-Dec-2020	18-Dec-2020
Anions by ion Chromatography	17-Dec-2020	17-Dec-2020	17-Dec-2020
Anions by Kone (w)	17-Dec-2020	17-Dec-2020	17-Dec-2020
BOD True Total	16-Dec-2020	17-Dec-2020	17-Dec-2020
Chromium III	17-Dec-2020	17-Dec-2020	17-Dec-2020
COD Unfiltered	18-Dec-2020	18-Dec-2020	18-Dec-2020
Dissolved Metals by ICP-MS	18-Dec-2020	18-Dec-2020	18-Dec-2020
EPH CWG (Aliphatic) Aqueous GC (W)	17-Dec-2020	16-Dec-2020	16-Dec-2020
EPH CWG (Aromatic) Aqueous GC (W)	17-Dec-2020	16-Dec-2020	16-Dec-2020
GRO by GC-FID (W)	15-Dec-2020	17-Dec-2020	15-Dec-2020
Low Level Hexavalent Chromium (w)	14-Dec-2020	14-Dec-2020	14-Dec-2020
Mercury Dissolved	14-Dec-2020	14-Dec-2020	14-Dec-2020
Mineral Oil C10-40 Aqueous (W)	06-Jan-2021	06-Jan-2021	06-Jan-2021
Nitrite by Kone (w)	16-Dec-2020	16-Dec-2020	16-Dec-2020
PCB Congeners - Aqueous (W)	17-Dec-2020	17-Dec-2020	17-Dec-2020
Phosphate by Kone (w)	14-Dec-2020	14-Dec-2020	14-Dec-2020
Suspended Solids	14-Dec-2020	14-Dec-2020	12-Dec-2020
SVOC MS (W) - Aqueous	18-Dec-2020	17-Dec-2020	18-Dec-2020
Total Dissolved Solids	11-Dec-2020	11-Dec-2020	11-Dec-2020
TPH CWG (W)	17-Dec-2020	17-Dec-2020	17-Dec-2020
VOC MS (W)	16-Dec-2020	16-Dec-2020	16-Dec-2020



# CERTIFICATE OF ANALYSIS

Validated

SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 582350  
Superseded Report: 580858

## Chromatogram

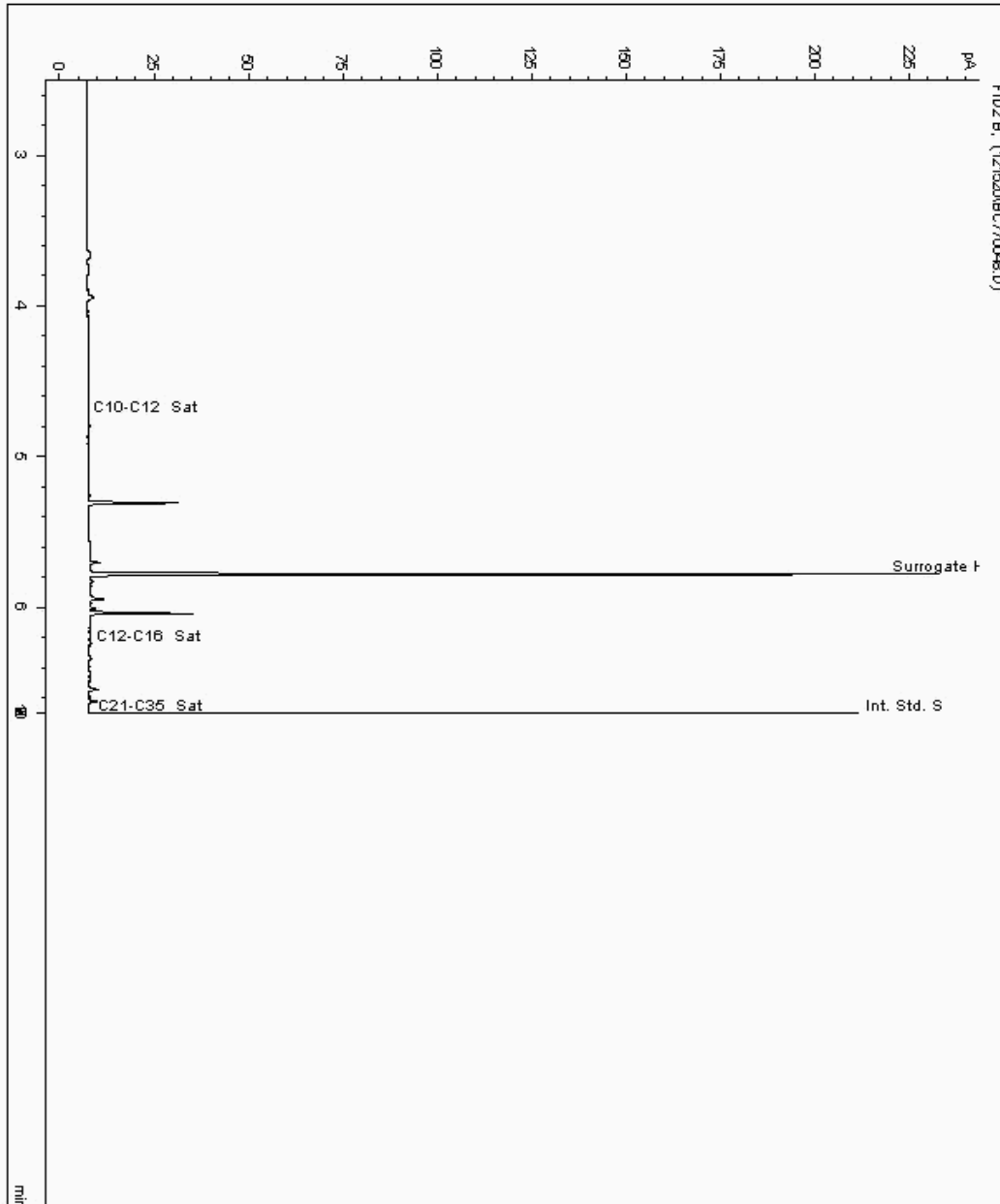
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 23413362  
Sample ID : BH04

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 21965233-  
Date Acquired : 12/16/2020 3:55:18 PM  
Units : ppb  
Dilution :  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 582350  
Superseded Report: 580858

## Chromatogram

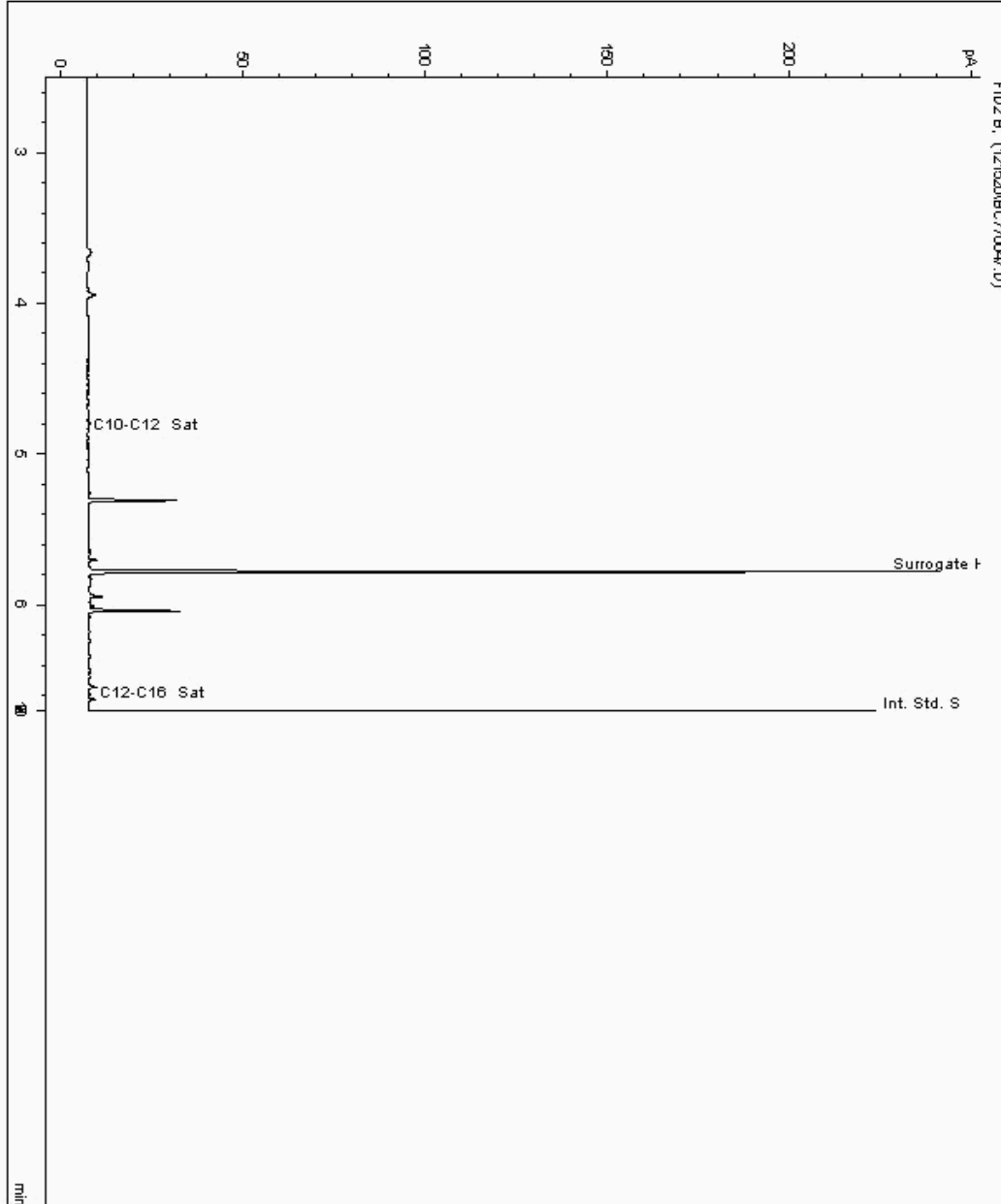
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 23413419  
Sample ID : BH03

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 21965202-  
Date Acquired : 12/16/2020 3:31:32 PM  
Units : ppb  
Dilution :  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 582350  
Superseded Report: 580858

## Chromatogram

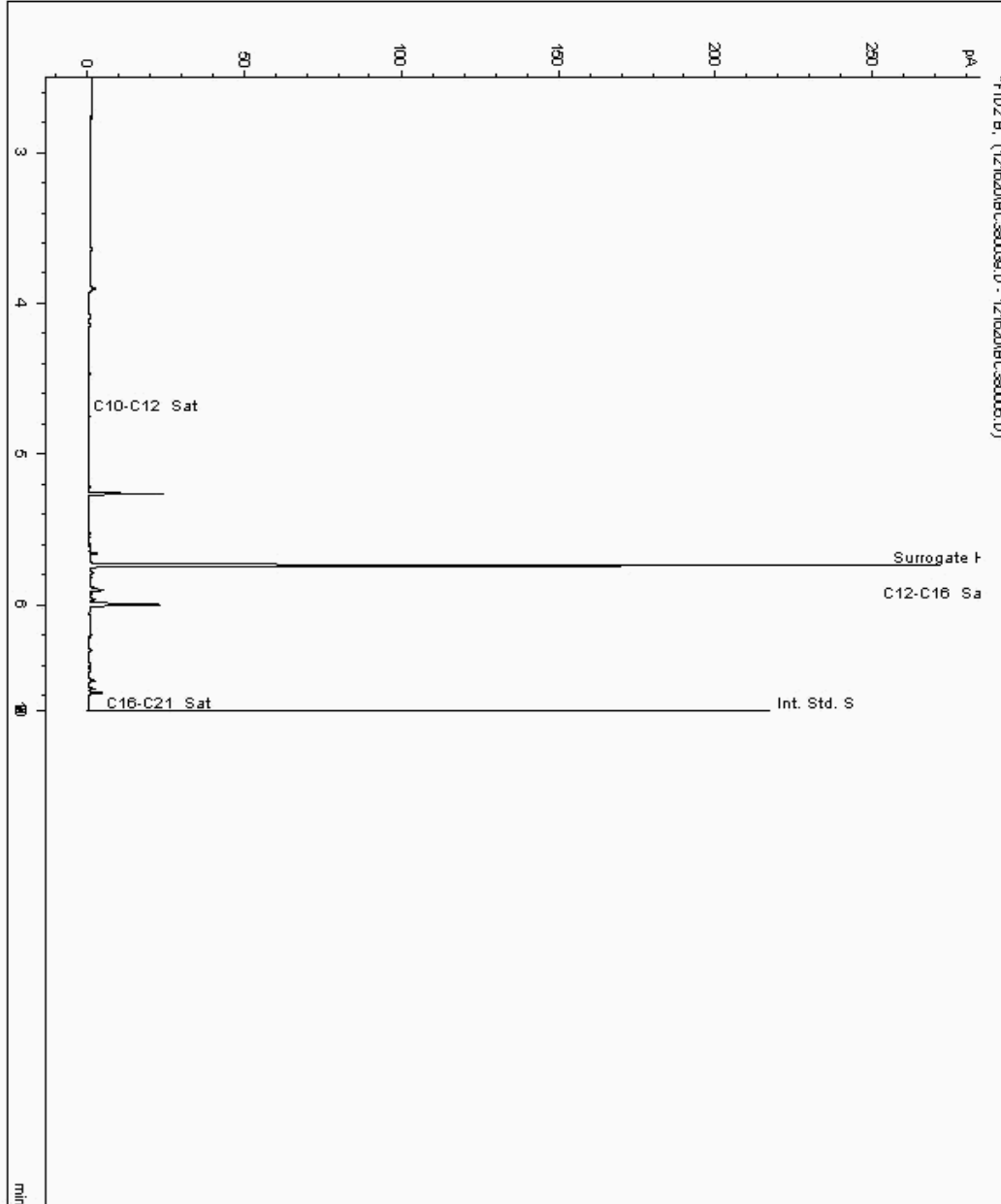
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 23413431  
Sample ID : BH01

Depth : 0.00 - 0.00

Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 21965174-  
Date Acquired : 17/12/20 10:44:45 PM  
Units : ppb  
Dilution :  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 582350  
Superseded Report: 580858

## Chromatogram

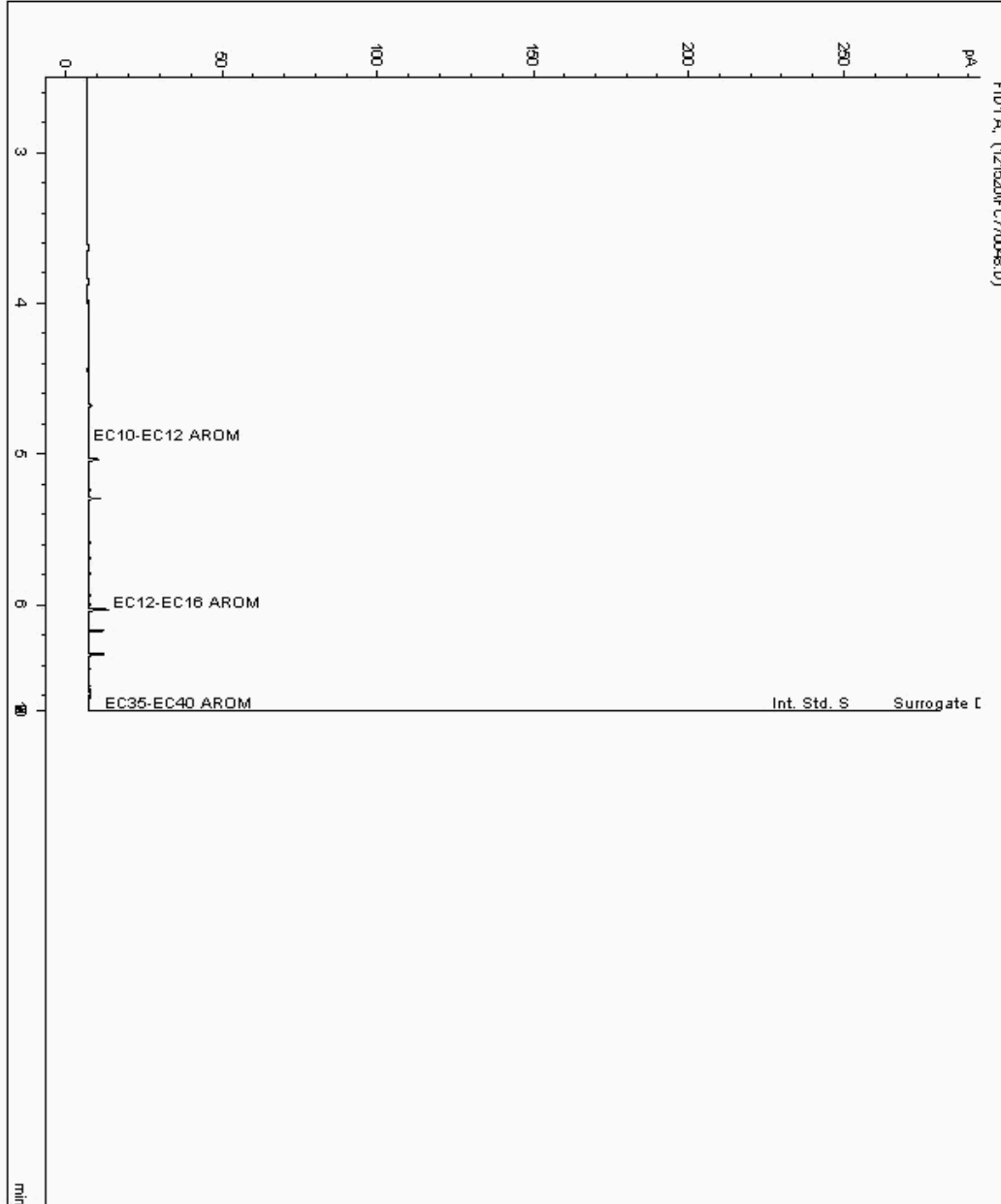
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 23413362  
Sample ID : BH04

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 21965234-  
Date Acquired : 12/16/2020 3:55:18 PM  
Units : ppb  
Dilution :  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 582350  
Superseded Report: 580858

## Chromatogram

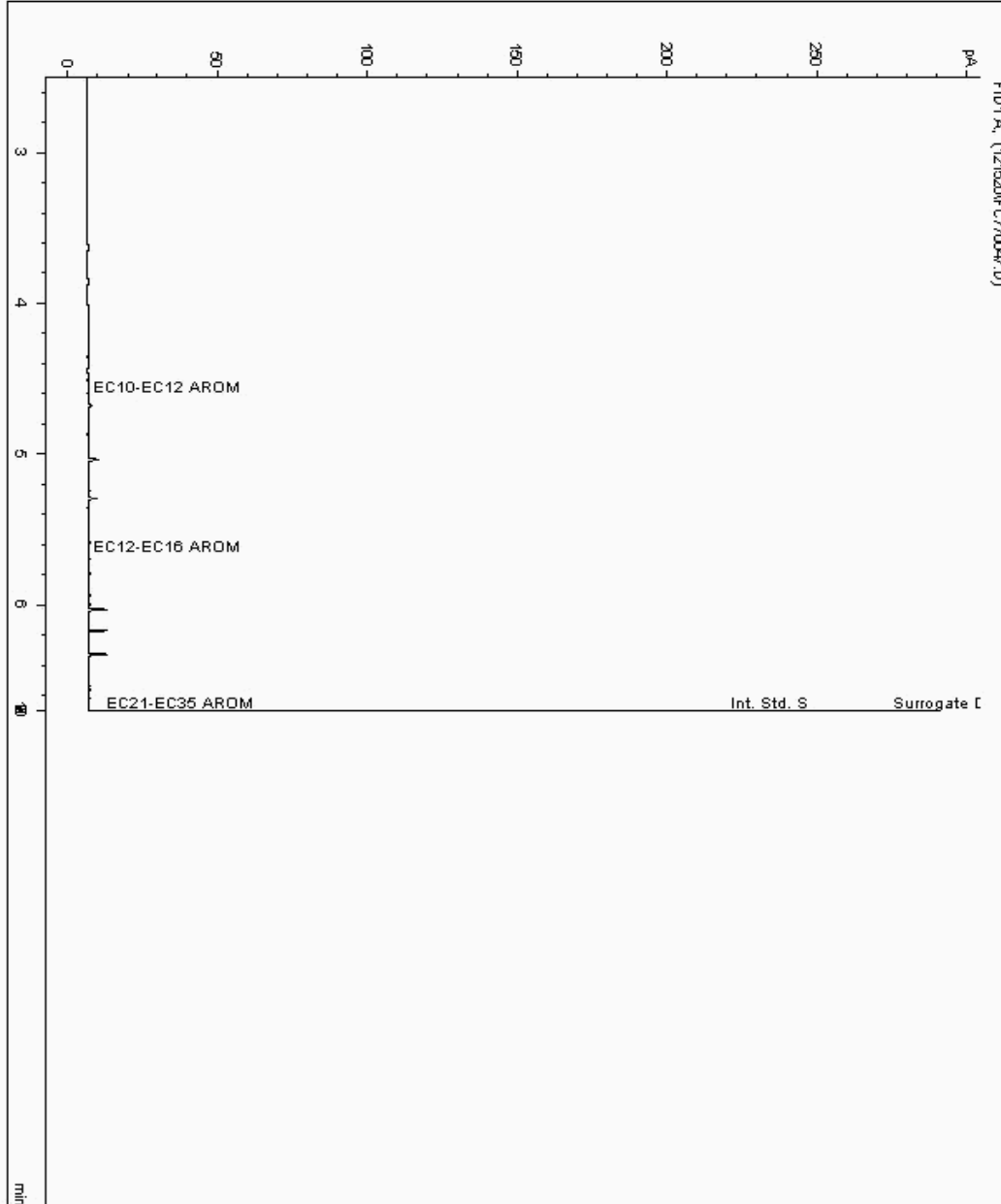
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 23413419  
Sample ID : BH03

Depth : 0.00 - 0.00

Alcontrol/Geochem Analytical Services  
Speciated TPH - SATS ( C12 - C40 )

Sample Identity: 21965203-  
Date Acquired : 12/16/2020 3:31:32 PM  
Units : ppb  
Dilution :  
CF : 1  
Multiplier : 0.025







# CERTIFICATE OF ANALYSIS

Validated

SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 582350  
Superseded Report: 580858

## Chromatogram

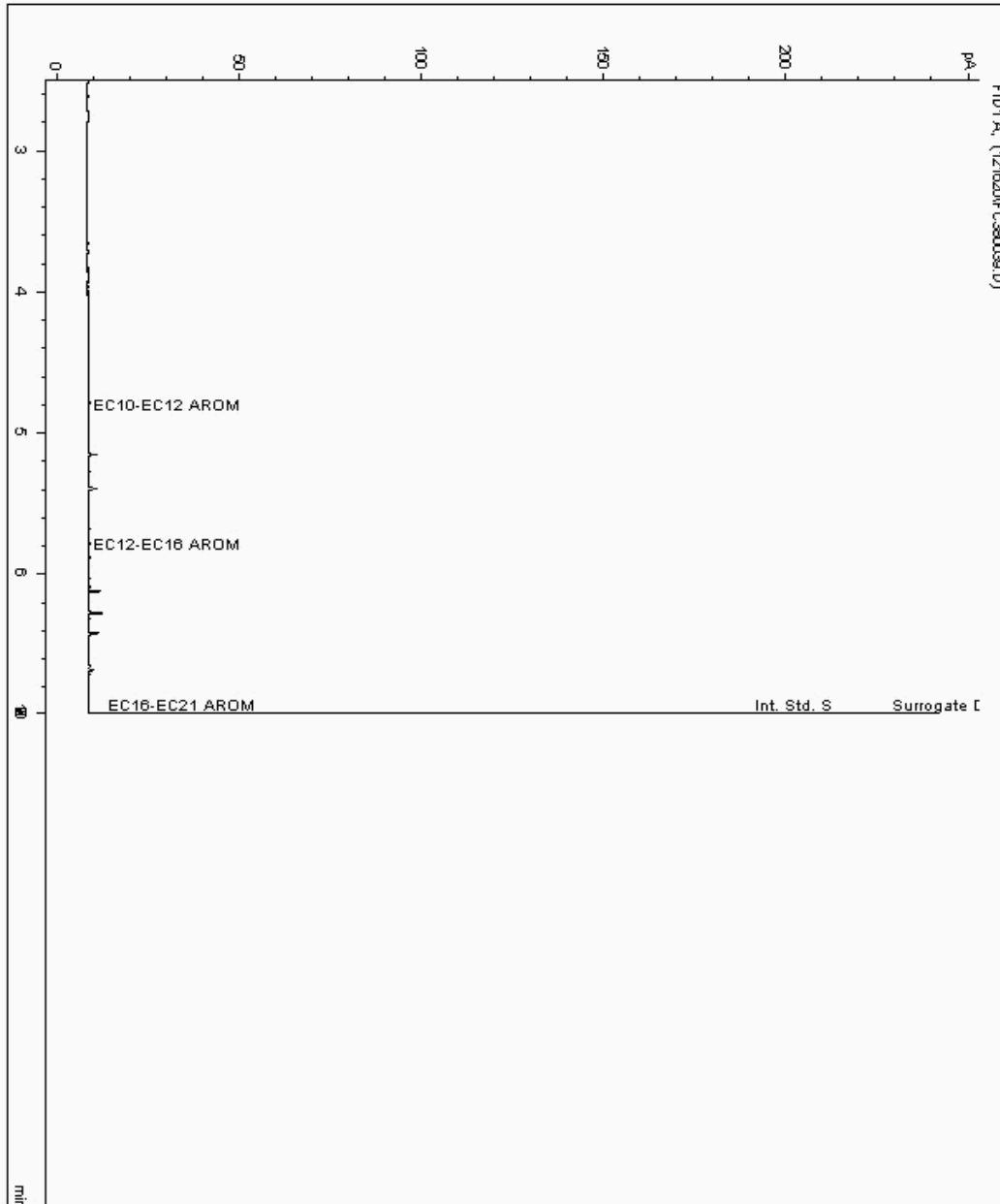
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 23413431  
Sample ID : BH01

Depth : 0.00 - 0.00

Speciated TPH - AROM ( C12 - C40 )

Sample Identity: 21965175-  
Date Acquired : 17/12/20 10:44:45 PM  
Units : ppb  
Dilution :  
CF : 1  
Multiplier : 0.025





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 582350  
Superseded Report: 580858

## Chromatogram

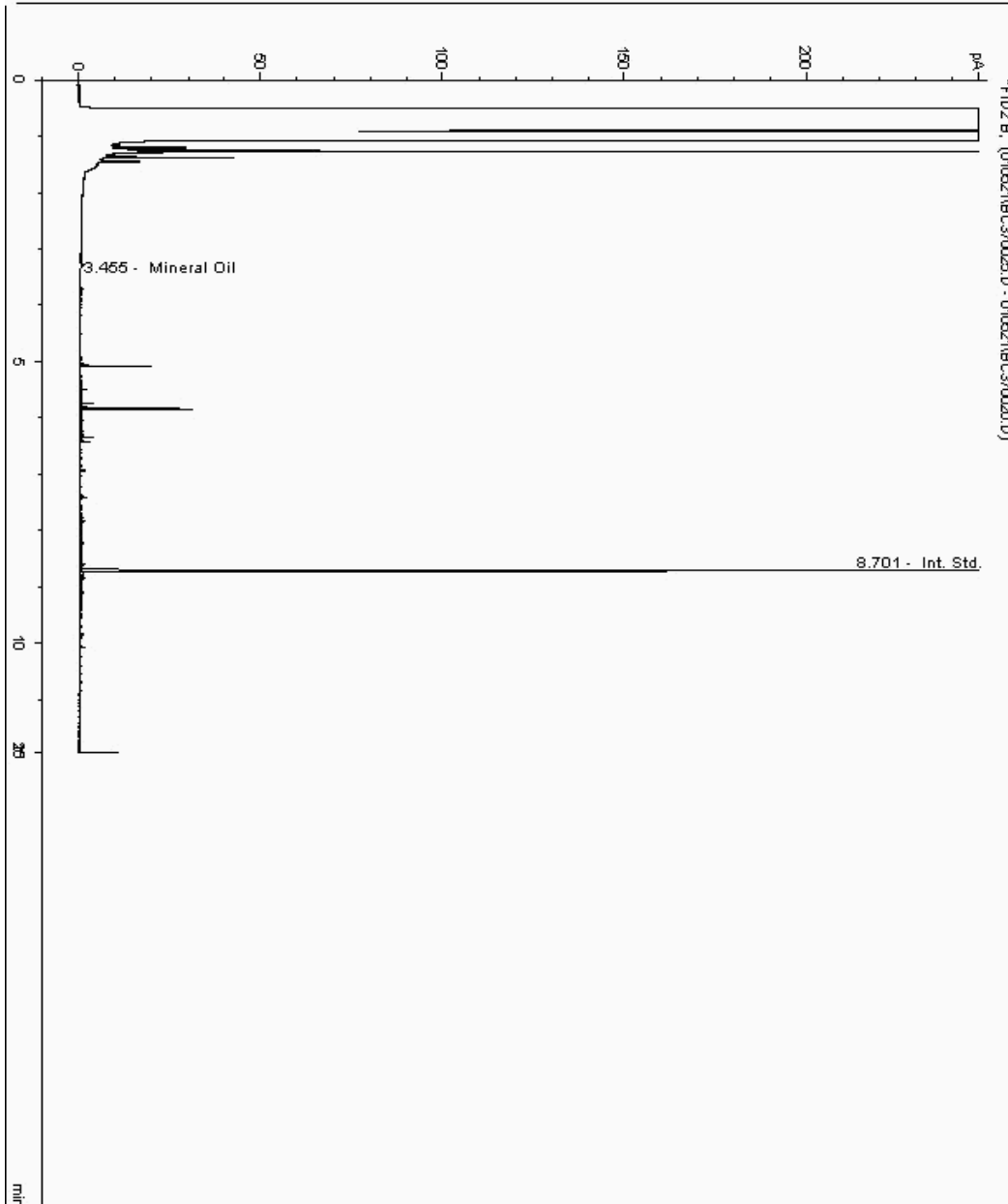
Analysis: Mineral Oil C10-40 Aqueous (W)

Sample No : 23498911  
Sample ID : BH03

Depth : 0.00 - 0.00

EPH Range Organics ( C10 - C40 )

Sample Identity: 22042550-  
Date Acquired : 05/01/2021 23:11:32 PM  
Units : mg/l





# CERTIFICATE OF ANALYSIS

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SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 582350  
Superseded Report: 580858

## Chromatogram

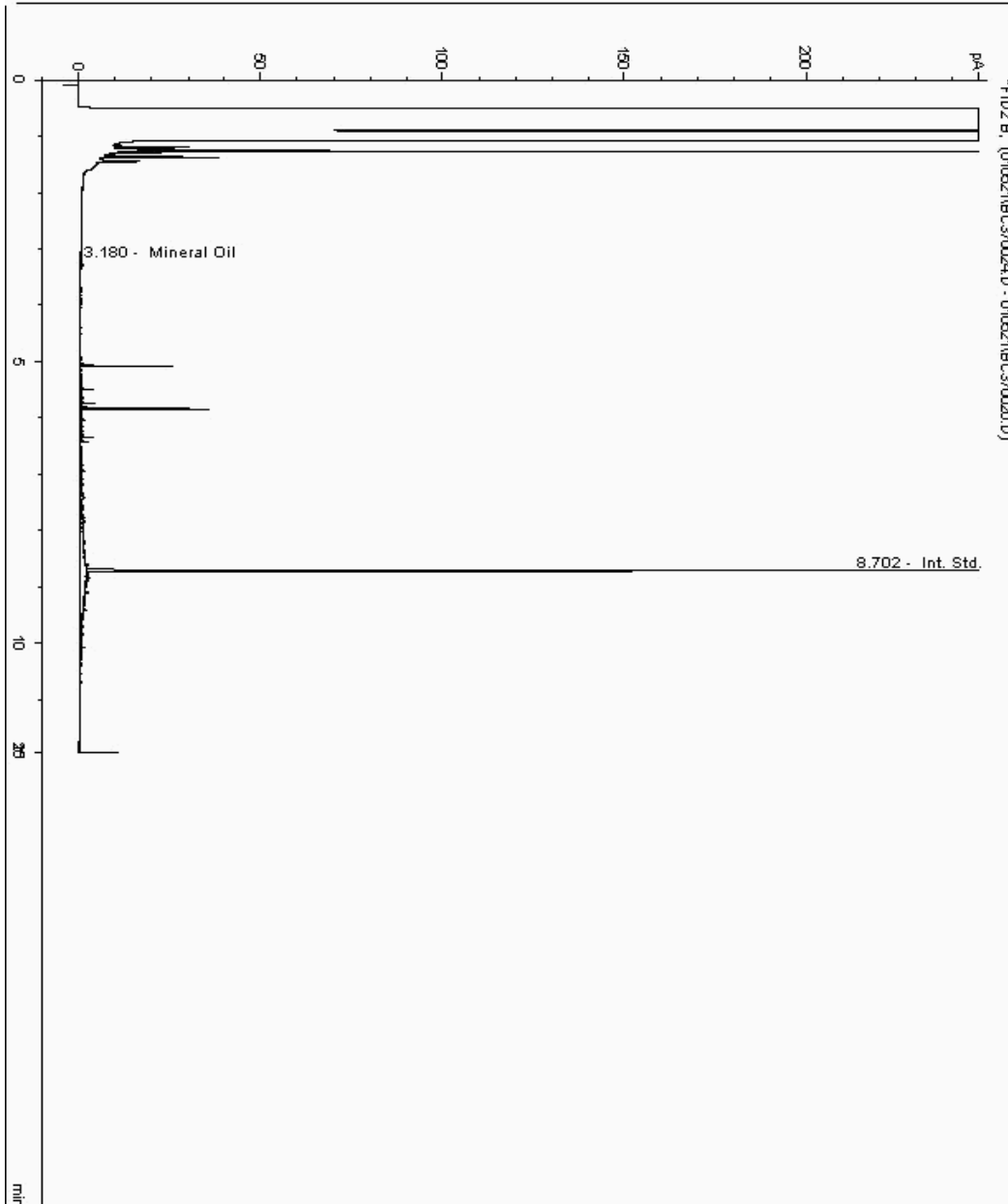
Analysis: Mineral Oil C10-40 Aqueous (W)

Sample No : 23498912  
Sample ID : BH04

Depth : 0.00 - 0.00

EPH Range Organics ( C10 - C40 )

Sample Identity: 22042552-  
Date Acquired : 05/01/2021 22:47:33 PM  
Units : mg/l





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

Report Number: 582350  
Superseded Report: 580858

## Chromatogram

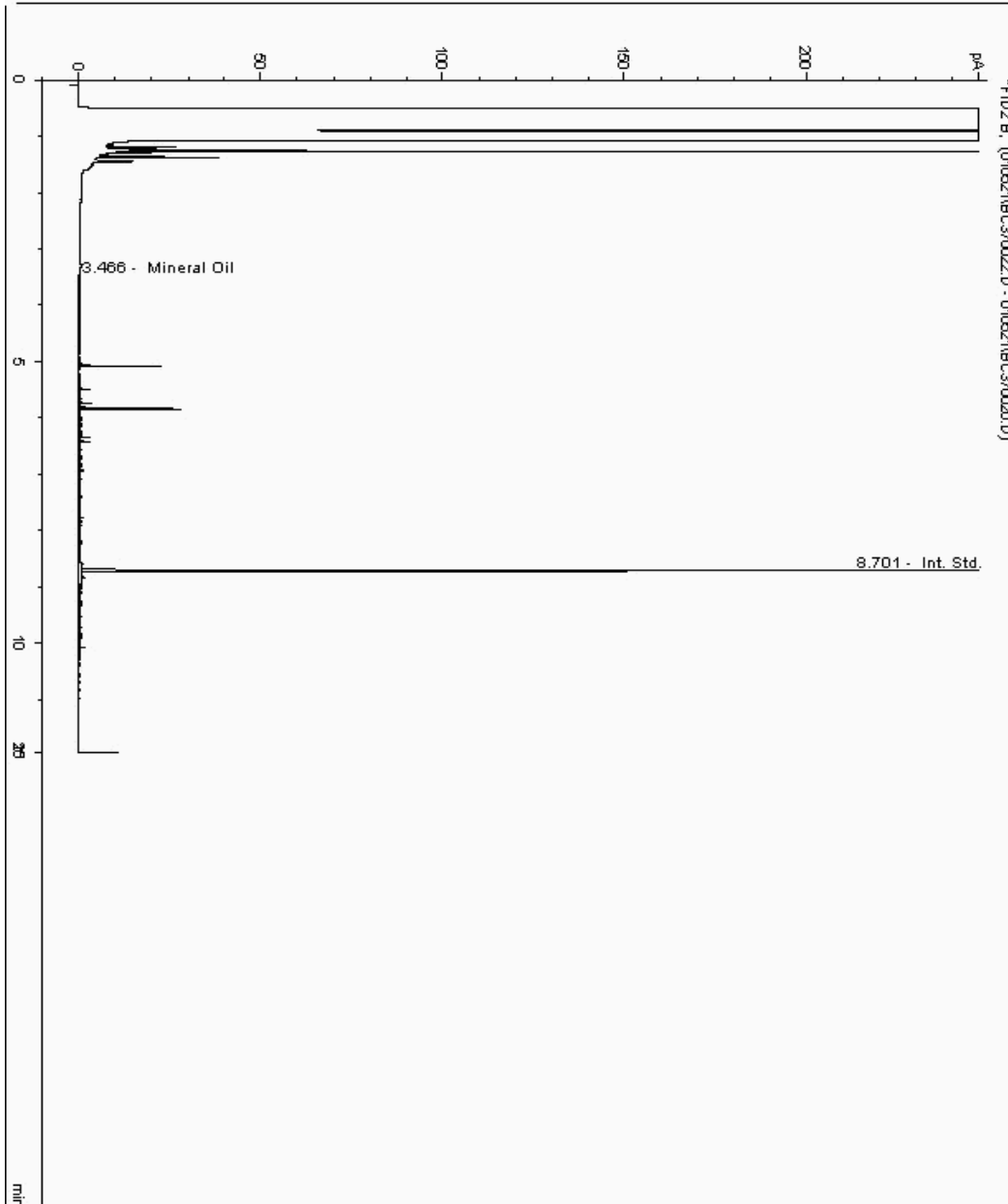
Analysis: Mineral Oil C10-40 Aqueous (W)

Sample No : 23498913  
Sample ID : BH01

Depth : 0.00 - 0.00

EPH Range Organics ( C10 - C40 )

Sample Identity: 22042548-  
Date Acquired : 05/01/2021 21:59:24 PM  
Units : mg/l





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

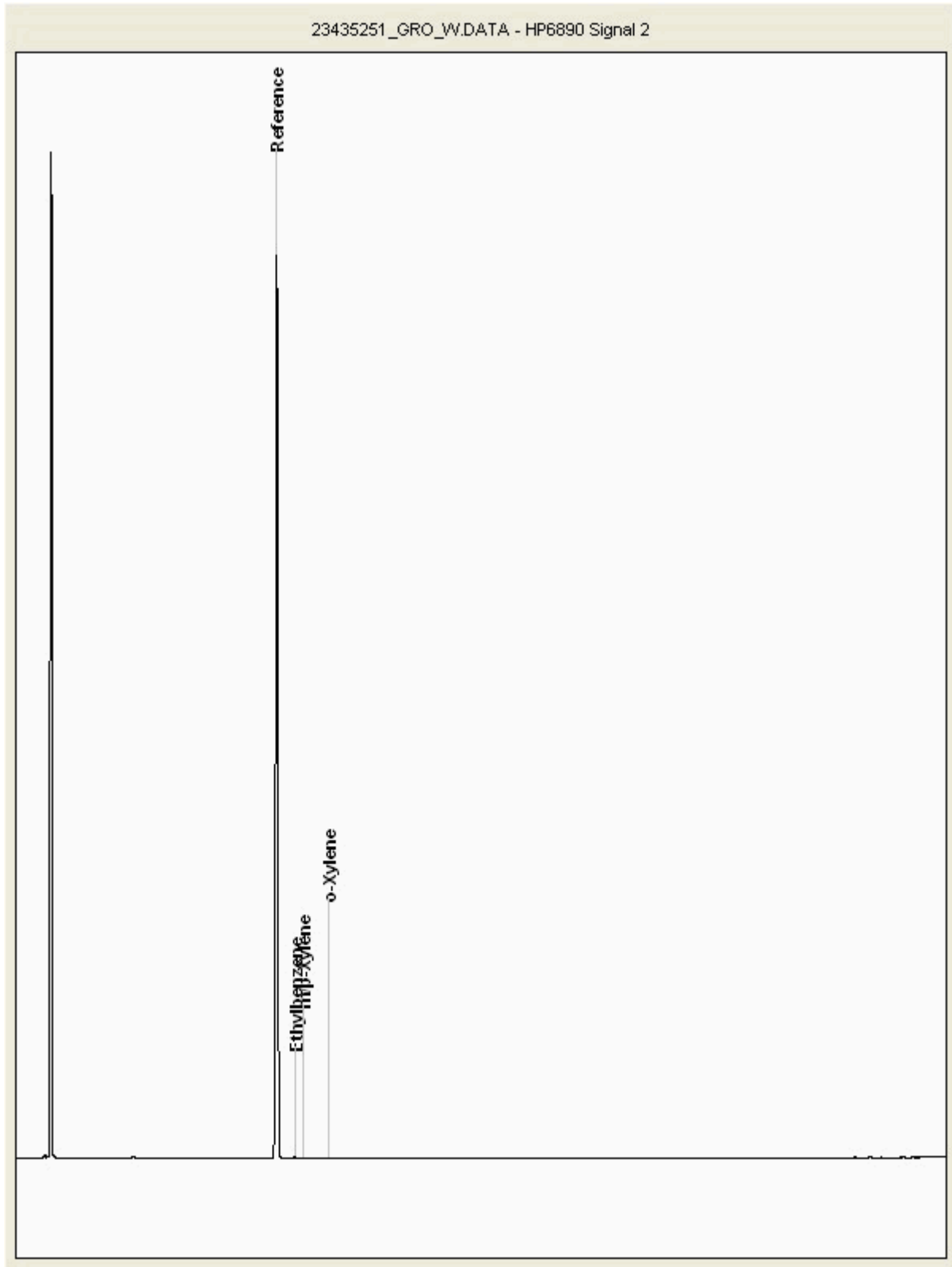
Report Number: 582350  
Superseded Report: 580858

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 23435251  
Sample ID : BH04

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

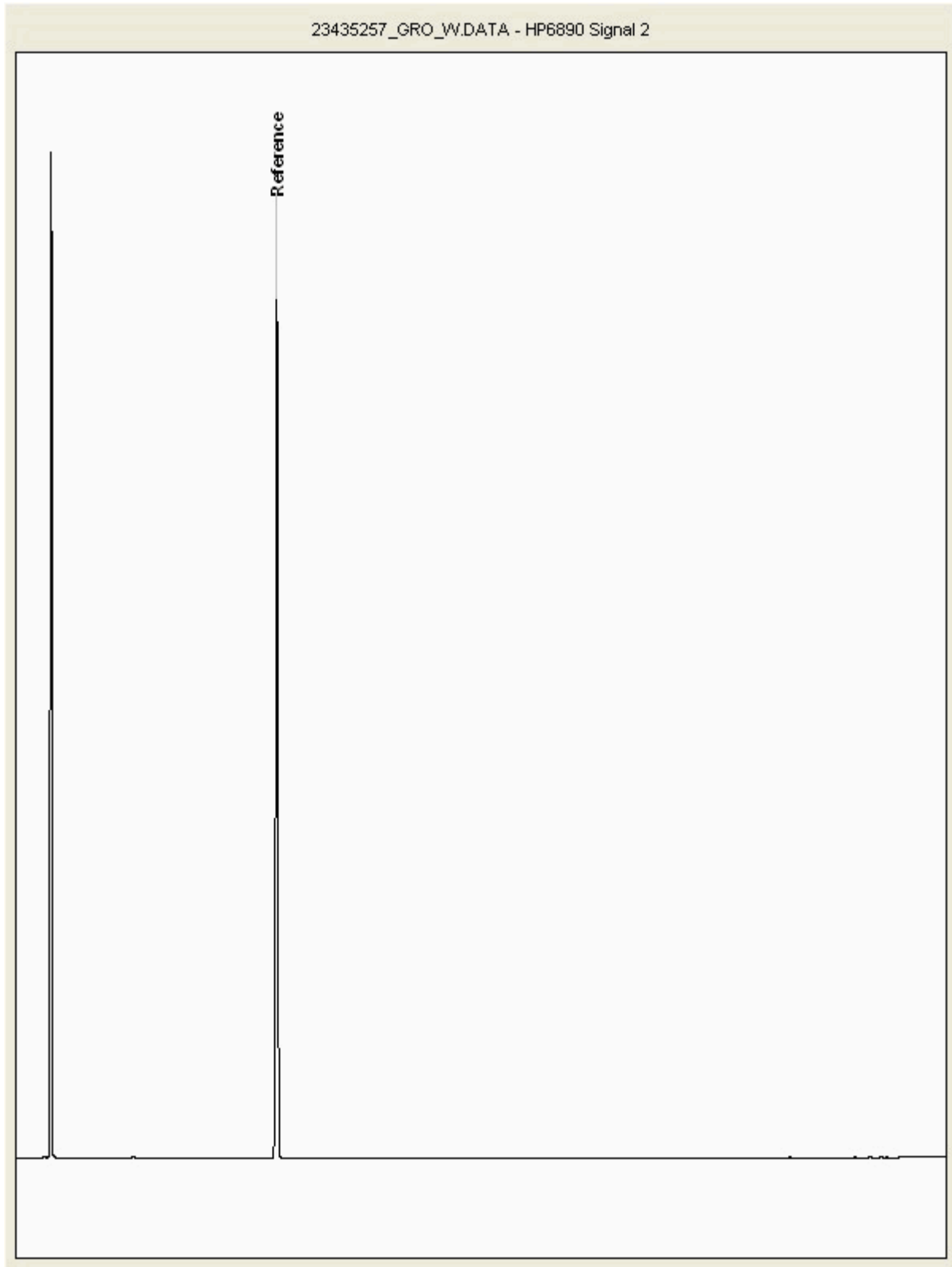
Report Number: 582350  
Superseded Report: 580858

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 23435257  
Sample ID : BH01

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201211-79  
Location: Arklow Bank

Client Reference: 2020WW102  
Order Number: 9028

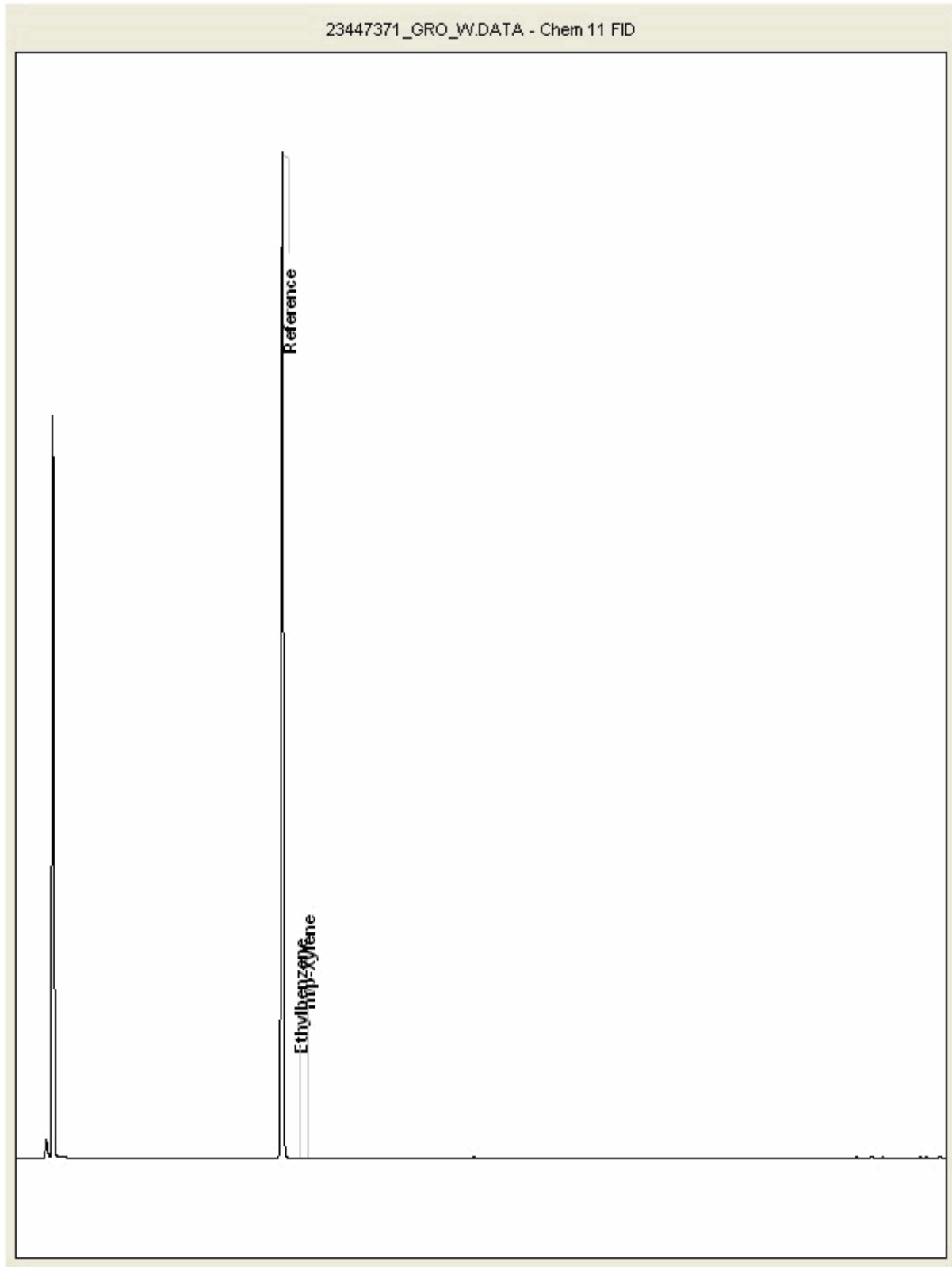
Report Number: 582350  
Superseded Report: 580858

## Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 23447371  
Sample ID : BH03

Depth : 0.00 - 0.00





# CERTIFICATE OF ANALYSIS

<b>SDG:</b>	201211-79	<b>Client Reference:</b>	2020WW102	<b>Report Number:</b>	582350
<b>Location:</b>	Arklow Bank	<b>Order Number:</b>	9028	<b>Superseded Report:</b>	580858

## 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 NH<sub>4</sub> by the BRE method, VOC TICs and SVOC TICs.

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

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

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

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

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

7. Results relate only to the items tested.

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

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

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

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

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

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

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

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

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

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

### 18. Sample Deviations

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

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

### 19. Asbestos

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

#### Identification of Asbestos in Bulk Materials & Soils

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

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

#### Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung. Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2017)*.

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

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





## Appendix 7      Photographs    (Trial Pits)

# Irish Drilling Ltd: Trial Pit Photos:



Figure 1 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP01(1).JPG



Figure 4 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP02(1).JPG



Figure 2 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP01(2).JPG



Figure 5 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP02(2).JPG



Figure 3 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP01(3).JPG



Figure 6 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP02(3).JPG

# Irish Drilling Ltd: Trial Pit Photos:



Figure 7 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP03(1).JPG



Figure 10 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP04(2).JPG

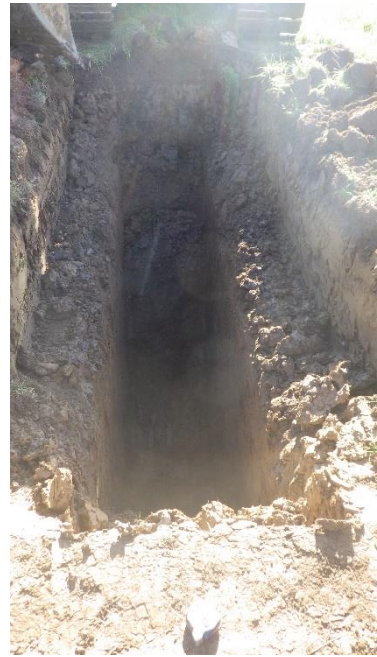


Figure 11 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP05(1).JPG



Figure 8 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP03(2).JPG



Figure 9 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP04(1).JPG



Figure 12 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP05(2).JPG

# Irish Drilling Ltd: Trial Pit Photos:



Figure 13 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP06(1).JPG



Figure 16 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP07(1).JPG



Figure 14 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP06(2).JPG



Figure 17 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP07(2).JPG



Figure 15 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP06(3).JPG



Figure 18 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP07(3).JPG

# Irish Drilling Ltd: Trial Pit Photos:



Figure 19 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP08(1).JPG



Figure 22 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP09(2).JPG



Figure 23 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP10(1).JPG



Figure 20 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP08(2).JPG



Figure 21 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP09(1).JPG



Figure 24 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP10(2).JPG

# Irish Drilling Ltd: Trial Pit Photos:



Figure 25 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP10(3).JPG



Figure 28 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP11(3).JPG



Figure 26 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP11(1).JPG



Figure 29 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP12(1).JPG



Figure 27 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP11(2).JPG



Figure 30 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp Photos\TP12(2).JPG

# Irish Drilling Ltd: Trial Pit Photos:

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Figure 31 H:\2020-WW-102 Arklow Bank\Arklow Bank Tp  
Photos\TP12(3).JPG



## Appendix 8      Photographs (Rotary Core)



# Irish Drilling Ltd: Core Photos:



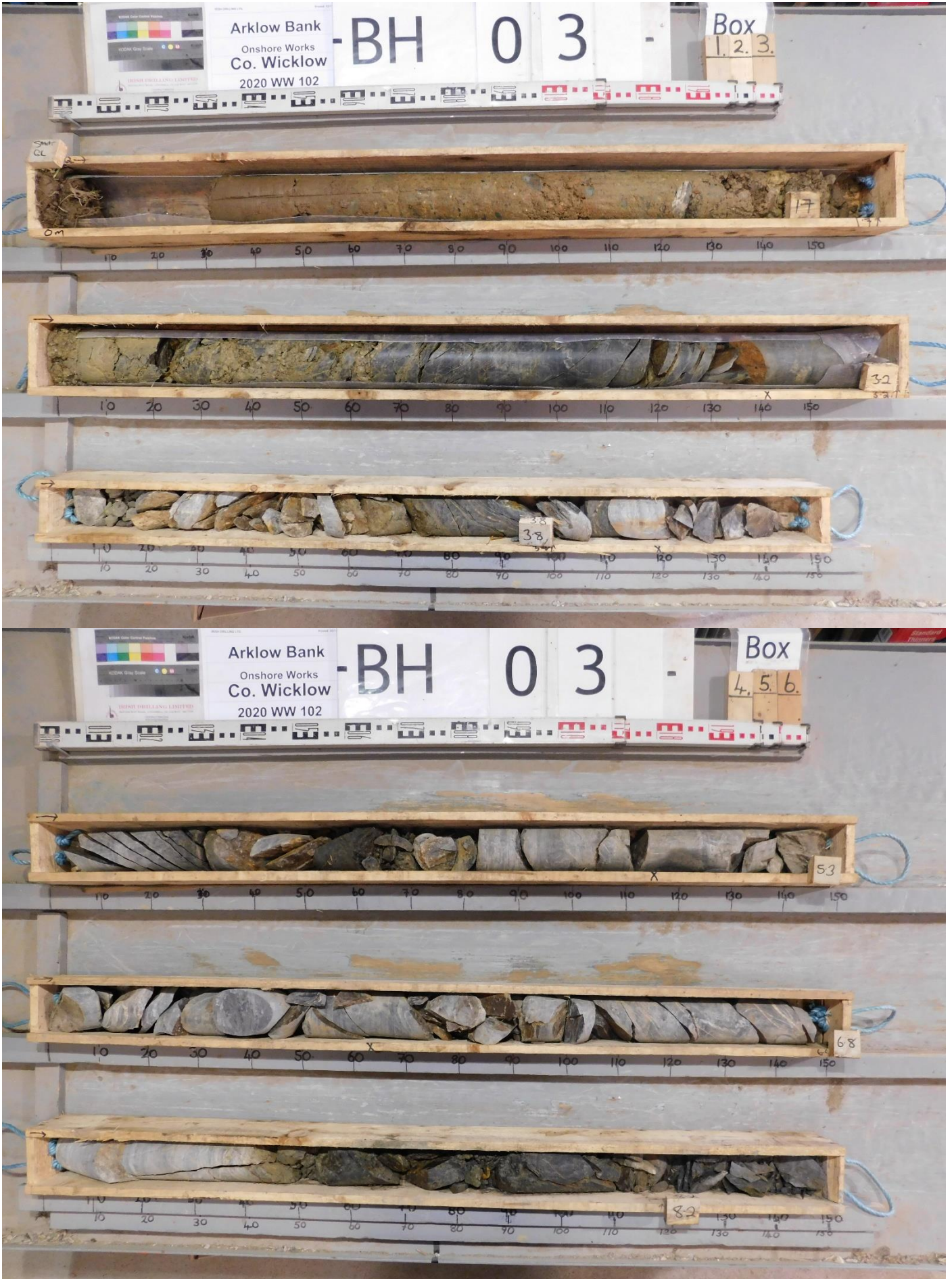
# Irish Drilling Ltd: Core Photos:



# Irish Drilling Ltd: Core Photos:



# Irish Drilling Ltd: Core Photos:



# Irish Drilling Ltd: Core Photos:



# Irish Drilling Ltd: Core Photos:



# Irish Drilling Ltd: Core Photos:



# Irish Drilling Ltd: Core Photos:



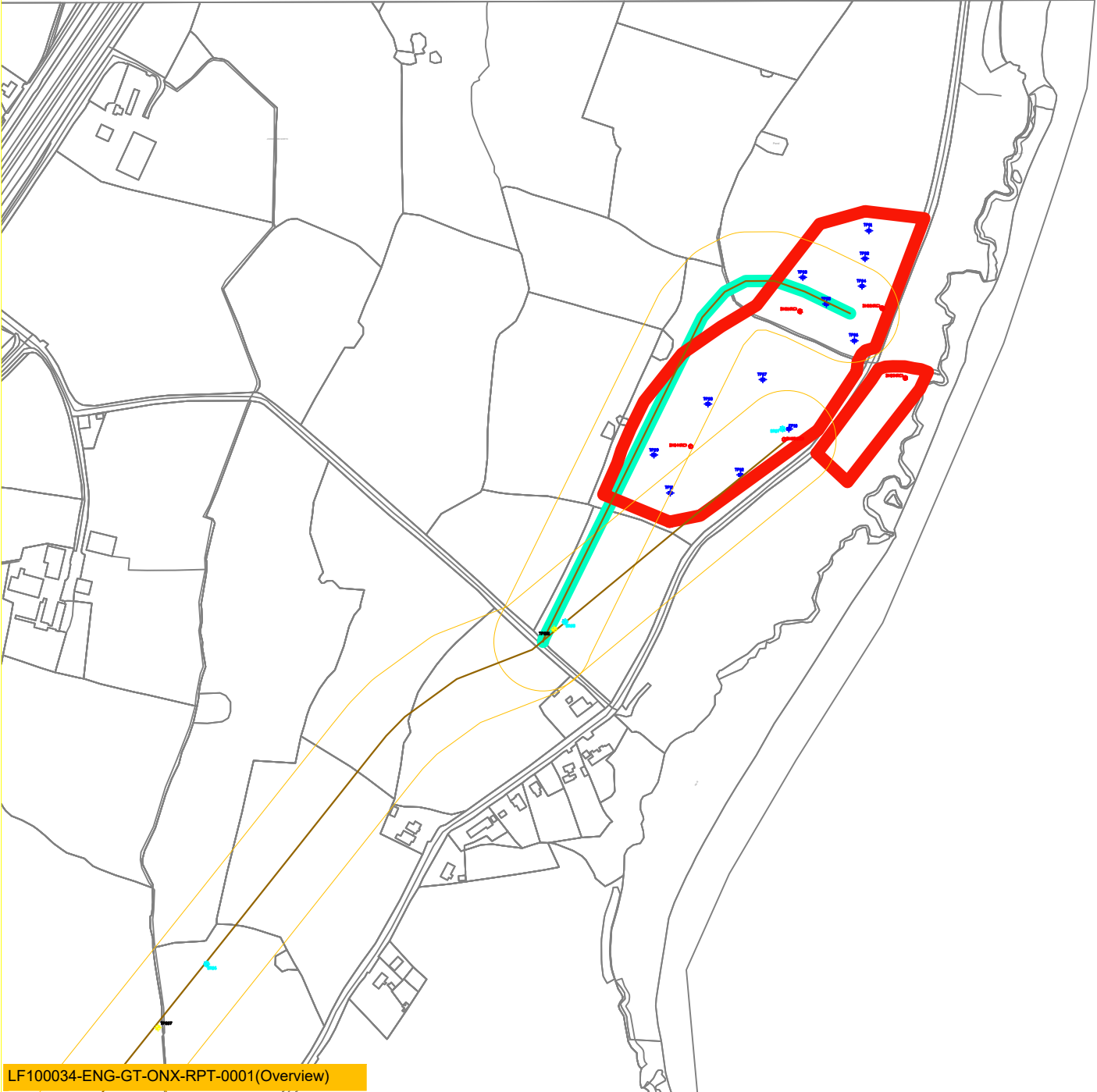


# Irish Drilling Ltd: Core Photos:



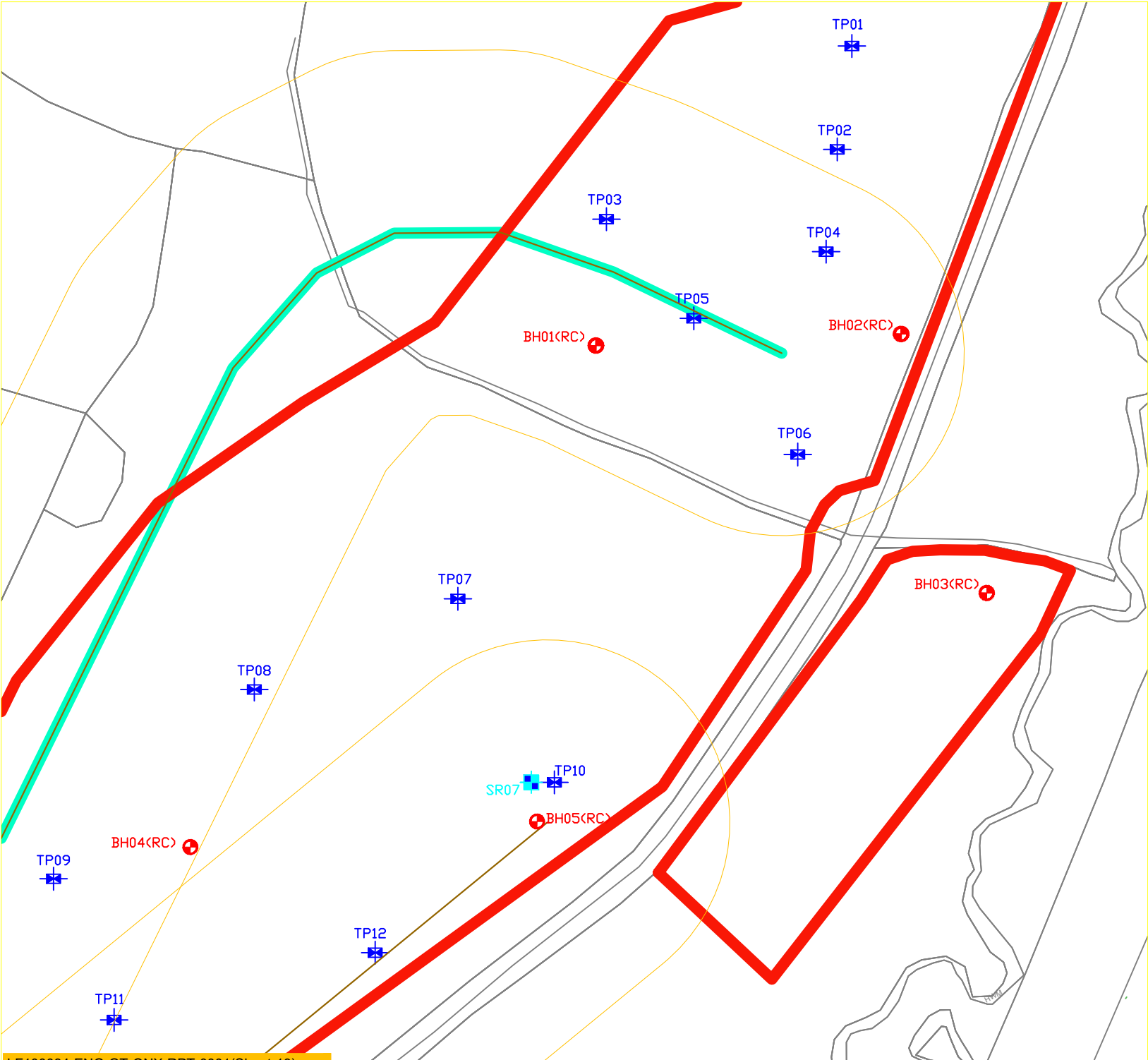


## Appendix 9 'As-Built' Drawings



LF100034-ENG-GT-ONX-RPT-0001(Overview)

<b>Client :</b> SURE PARTNERS LIMITED (SPL)	
<b>Project :</b> ARKLOW BANK WIND PARK (LAND-FALL)	
<b>Date :</b> 23-11-2020	<b>Scale :</b> not to scale
<b>Description :</b> I.D.L (AS BUILT)	
<b>Drawing Number :</b> LF100034-ENG-GT-ONX-RPT-0001(Overview)	



**LEGEND**

- TRIAL PIT
- BOREHOLE (CP+RC)  
CP- CABLE PERCUSSIVE  
RC- ROTARY CORE
- SOIL RESISTIVITY

<b>Client :</b> SURE PARTNERS LIMITED (SPL)	
<b>Project :</b> ARKLOW BANK WIND PARK (LAND-FALL)	
<b>Date :</b> 23-11-2020	<b>Scale :</b> not to scale
<b>Description :</b> I.D.L (AS BUILT)	
<b>Drawing Number :</b> LF100034-ENG-GT-ONX-RPT-0001(Sheet-13)	



## Appendix 10 Digital Data