



Certificate of Analysis

Certificate Number 20-09867

15-Jun-20

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 20-09867

Client Reference PSL20/2661

Order No (not supplied)

Contract Title Hoylands Common, Barnsley

Description 13 Soil samples.

Date Received 04-Jun-20

Date Started 05-Jun-20

Date Completed 15-Jun-20

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis Soil Samples

Our Ref 20-09867

Client Ref PSL20/2661

Contract Title Hoylands Common, Barnsley

Lab No	1679734	1679735	1679736	1679737	1679738	1679739	1679740	1679741	1679742	1679743	1679744
Sample ID	RC4101	RC4102	RC4102	RC4103	RC4103	RC4103	RC4105	TP1301	TP1303	TP1305	TP1306
Depth	6.00	1.30	7.00	3.40	4.90	8.00	4.80	0.80	0.50	0.60	1.50
Other ID	CM	OC	CM	OC	OC	CM	CM	OC	OC	OC	OC
Sample Type	D	D	D	D	D	D	D	D	D	D	D
Sampling Date	20/05/2020	21/05/2020	21/05/2020	19/05/2020	19/05/2020	19/05/2020	22/05/2020	27/05/2020	26/05/2020	26/05/2020	27/05/2020
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units										
Metals													
Magnesium Aqueous Extract	DETS 2076*	10	mg/l	< 10		< 10		17	13	< 10			
Inorganics													
Loss on Ignition at 440oC	DETS 2003#	0.01	%		13		4.2				10	3.2	5.6
pH	DETS 2008#		pH	7.9		6.2		8.0	5.5	8.0			
Calorific Value	DETS 5008	1	MJ/kg		2.7		< 1.0				2.0	< 1.0	< 1.0
Chloride Aqueous Extract	DETS 2055	1	mg/l	2.7		2.7		8.3	3.0	2.1			
Nitrate Aqueous Extract as NO3	DETS 2055	1	mg/l	< 1.0		< 1.0		1.1	< 1.0	< 1.0			
Sulphate Aqueous Extract as SO4	DETS 2076#	10	mg/l	47		< 10		160	120	13			
Sulphur as S, Total	DETS 2320	0.01	%	0.16		< 0.01		0.04	0.16	< 0.01			
Sulphate as SO4, Total	DETS 2321#	0.01	%	0.01		< 0.01		0.04	0.03	< 0.01			

Summary of Chemical Analysis Soil Samples

Our Ref 20-09867

Client Ref PSL20/2661

Contract Title Hoylands Common, Barnsley

Lab No	1679745	1679746
Sample ID	TP1306	TP1310
Depth	3.20	1.60
Other ID	CM	CM
Sample Type	D	D
Sampling Date	27/05/2020	26/05/2020
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Metals					
Magnesium Aqueous Extract	DETS 2076*	10	mg/l	< 10	< 10
Inorganics					
Loss on Ignition at 440oC	DETS 2003#	0.01	%		
pH	DETS 2008#		pH	5.1	5.4
Calorific Value	DETS 5008	1	MJ/kg		
Chloride Aqueous Extract	DETS 2055	1	mg/l	6.7	5.8
Nitrate Aqueous Extract as NO3	DETS 2055	1	mg/l	1.1	< 1.0
Sulphate Aqueous Extract as SO4	DETS 2076#	10	mg/l	43	36
Sulphur as S, Total	DETS 2320	0.01	%	0.02	0.01
Sulphate as SO4, Total	DETS 2321#	0.01	%	0.07	0.03

Information in Support of the Analytical Results

Our Ref 20-09867
 Client Ref PSL20/2661
 Contract Hoylands Common, Barnsley

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1679734	RC4101 6.00 SOIL	20/05/20	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
1679735	RC4102 1.30 SOIL	21/05/20	PT 1L		
1679736	RC4102 7.00 SOIL	21/05/20	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
1679737	RC4103 3.40 SOIL	19/05/20	PT 1L		
1679738	RC4103 4.90 SOIL	19/05/20	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
1679739	RC4103 8.00 SOIL	19/05/20	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
1679740	RC4105 4.80 SOIL	22/05/20	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
1679741	TP1301 0 80 SOIL	27/05/20	PT 1L		
1679742	TP1303 0.50 SOIL	26/05/20	PT 1L		
1679743	TP1305 0 60 SOIL	26/05/20	PT 1L		
1679744	TP1306 1.50 SOIL	27/05/20	PT 1L		
1679745	TP1306 3 20 SOIL	27/05/20	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
1679746	TP1310 1 60 SOIL	26/05/20	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

POINT LOAD INDEX TEST RESULTS

Date Cored/Sampled	18-22/05/2020
Date Tested	10/06/2020

Tested By	DH
Approved By	SD

BH No.	Sample No.	Depth (m bgl)	Test Type ³	Orientation ⁴	Failure Valid (Y/N)	W (mm)	D (mm)	De ² (mm ²)	De (mm)	P (kN)	Is (MPa)	F	Is(50) (MPa)
RC4105		6.40 - 6.48	D	Par	Y	84.00	87.00	7569 00	87.00	0.32	0.04	1.28	0.05
			A	Per	Y	87.00	55.00	6091 66	78.05	0.54	0.09	1.22	0.11
RC4102		6.58 - 6.70	D	Par	Y	160.00	87.00	7569 00	87.00	1.26	0.17	1.28	0.21
			A	Per	N	87.00	80.00	8860 60	94.13	0.00	0.00	1.33	0.00
RC4103		10.35 - 10.50	D	Par	Y	175.00	87.00	7569 00	87.00	0.24	0.03	1.28	0.04
			A	Per	Y	87.00	68.00	7531 51	86.78	5.68	0.75	1.28	0.97
RC4103		5.95 - 6.05	D	Par	Y	106.00	87.00	7569 00	87.00	0.83	0.11	1.28	0.14
			A	Per	Y	87.00	62.00	6866 96	82.87	0.46	0.07	1.26	0.08
RC4103		9.58 - 9.70	D	Par	Y	42.00	87.00	7569 00	87.00	2.29	0.30	1.28	0.39
			A	Per	Y	87.00	82.00	9082.11	95.30	1.34	0.15	1.34	0.20
RC4104		9.30 - 9.43	D	Par	Y	130.00	87.00	7569 00	87.00	8.64	1.14	1.28	1.46
			A	Per	Y	87.00	82.00	9082.11	95.30	14.25	1.57	1.34	2.10
RC4104		6.95 - 7.07	D	Par	N	122.00	87.00	7569 00	87.00	0.00	0.00	1.28	0.00
			A	Per	N	87.00	71.00	7863.78	88.68	0.00	0.00	1.29	0.00
RC4104		6.08 - 6.17	D	Par	Y	102.00	87.00	7569 00	87.00	2.56	0.34	1.28	0.43
			A	Per	Y	87.00	61.00	6756 21	82.20	3.20	0.47	1.25	0.59
RC4101		7.07 - 7.20	D	Par	Y	140.00	87.00	7569 00	87.00	1.94	0.26	1.28	0.33
			A	Per	Y	87.00	79.00	8749 84	93.54	0.96	0.11	1.33	0.15
RC4102		5.29 - 5.43	D	Par	Y	150.00	87.00	7569 00	87.00	0.13	0.02	1.28	0.02
			A	Per	Y	87.00	92.00	10189.69	100.94	0.44	0.04	1.37	0.06
RC4104		5.88 - 6.08	D	Par	Y	201.00	87.00	7569 00	87.00	6.38	0.84	1.28	1.08
			A	Per	Y	87.00	95.00	10521.96	102.58	5.63	0.54	1.38	0.74

Notes:

1. Testing undertaken in accordance with ISRM Suggested Methods 1985
2. All samples tested at as-received moisture content unless otherwise stated.
3. A = Axial, D = Diametral, I = Irregular Lump
4. Par = parallel, Per = perpendicular (to planes of weakness)

Comments:

Client:

Newlands Developments

Project:

Hoyland Common, Barnsley

Project No:

AG3080-19

APPLIED GEOLOGY

GEOLABS Limited
Unit D3 HRS Business Park
Granby Avenue
Birmingham
B33 0SJ

Applied Geology

Unit 23
Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

For the attention of Mr A Perks / Mr S Day

26 June 2020

Report No : GEO/31150/02

Page 1 of 1

Dear Sirs

Our ref **GEO / 31150**

Your Ref **AG3080-19**

Date samples received 03/06/2020

Date written instructions received 03/06/2020

Date testing commenced 04/06/2020

Date of sample disposal 23/07/2020

Project **HOYLAND COMMON, BARNSELY**

Further to your instructions we have pleasure in enclosing the results of the tests you requested in the attached figures.

LABORATORY TEST REPORT

Item No	Test Quantity	Description
1	~	Geotechnical Test Summary
~	3	Water Content
2	3	Liquid & Plastic Limits
3	3	Particle Size Distribution
4	1	Moisture Content / Dry Density Relationship inc Particle Density
5	3	Constant Head Permeability in a Triaxial Cell
6	1	Shear Strength by Direct Shear

Any opinions or interpretations expressed herein are outside the scope of UKAS accreditation. All results contained in this report are provisional unless signed by an approved signatory. The results contained in this report relate only to samples received in the laboratory and are tested 'as received' unless otherwise stated. This report should not be reproduced, except in full, without the written approval of the laboratory.

All the necessary data required by the documented test procedures has been recorded and will be stored for a period of not less than 6 years. This data will be issued to yourselves at your request. All samples will be disposed of after the date shown above. Written confirmation will be required to retain the samples beyond this period and a storage charge may be applied.

We trust that the above meets your requirements and should you require any further information or assistance, please do not hesitate to contact us.

Yours faithfully

on behalf of **GEOLABS Limited**

J A Reynolds
Laboratory Manager



SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC	LL	PL	PI	<425 µm	Bulk	Dry	Condition	Cell Pressure	Deviator Stress	Shear Stress	pH	2:1 W/S SO4	W/S Mg	
					%	%	%	%	%	Mg/m³	Mg/m³		kPa	kPa	kPa		g/L	mg/L	
RC4102	2.00-3.00	OC	B	Black and grey mottled sandy very clayey SILT with some fine to medium gravel.	20.5	53	22	31	84										Particle Size Distribution Constant Head Permeability
TP1304	3.00-4.00	OC	LB	Black and dark grey mottled sandy very clayey SILT with some fine to medium gravel.	20.9	51	25	26	87										Particle Size Distribution Constant Head Permeability
TP1311	0.70	CM	LB	Yellowish brown mottled grey sandy very clayey SILT with some fine to coarse gravel.	27.3	54	25	29	86										Particle Density = 2.72 Mg/m³ Particle Size Distribution Compaction Constant Head Permeability, Small Shear Box

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by J A Reynolds - Laboratory Manager 25/08/2020	Project Number: Project Name:	GEO / 31150 HOYLAND COMMON, BARNSELY AG3080-19	
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LIQUID AND PLASTIC LIMITS

Location RC4102
 Sample Ref OC
 Depth (m) 2.00
 Sample Type B

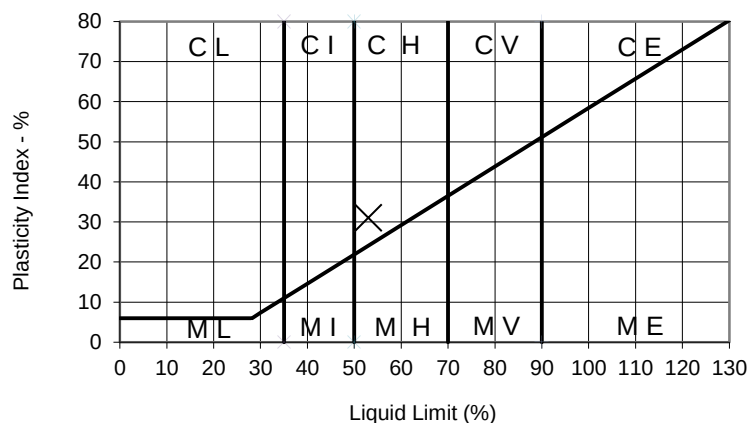
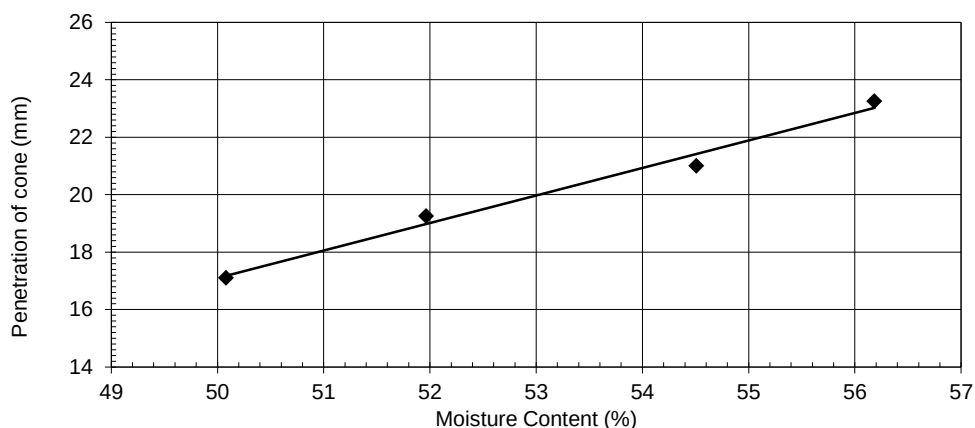
Description:

Black and grey mottled sandy very clayey SILT with some fine to medium gravel.

Preparation : Sample as received with discrete coarse particles removed by hand.

Water Content : (BS EN ISO 17892-1:2014) 20.5 %
 Estimated percentage passing 425µm sieve : 84 %
 Liquid Limit - Fall Cone 4 point Method (cone angle 30°) with increasing water content : 53 %
 Plastic Limit : 22 %
 Plasticity Index : 31 %

Equivalent Water Content of material passing 425µm sieve : 24.4 %
 Liquidity Index : 0.08



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**HOYLAND COMMON, BARNSELY
 AG3080-19**

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J A Reynolds - Laboratory Manager
 25/06/2020

LIQUID AND PLASTIC LIMITS

Location TP1304
 Sample Ref OC
 Depth (m) 3.00
 Sample Type LB

Description:

Black and dark grey mottled sandy very clayey SILT with some fine to medium gravel.

Preparation : Particles >425µm removed by wet sieving and air drying.

Water Content : (BS EN ISO 17892-1:2014) 20.9 %

Measured percentage passing 425µm sieve : 87 %

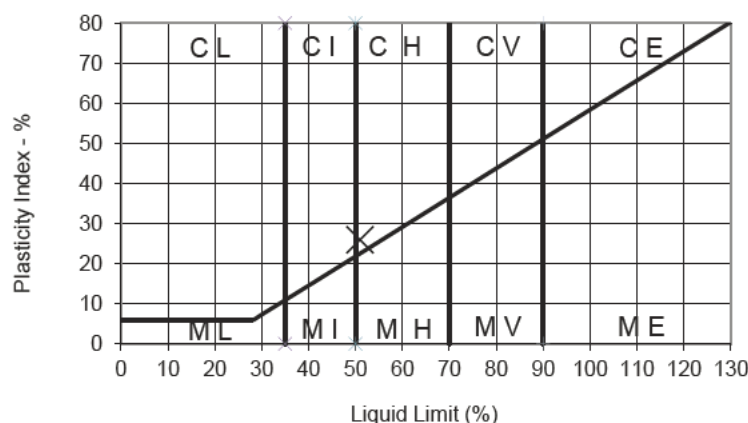
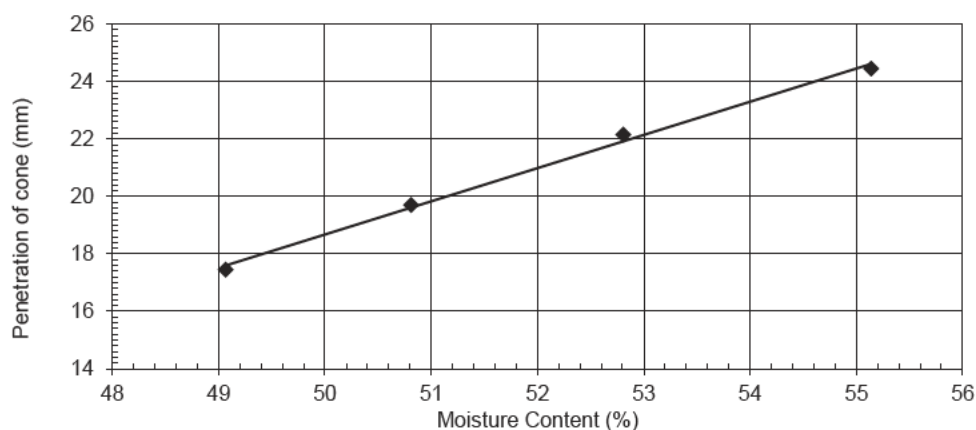
Liquid Limit - Fall Cone 4 point Method (cone angle 30°) with increasing water content : 51 %

Plastic Limit : 25 %

Plasticity Index : 26 %

Equivalent Water Content of material passing 425µm sieve : 24.1 %

Liquidity Index : -0.03



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**HOYLAND COMMON, BARNSELY
 AG3080-19**

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LIQUID AND PLASTIC LIMITS

Location TP1311
 Sample Ref CM
 Depth (m) 0.70
 Sample Type LB

Description:

Yellowish brown mottled grey sandy very clayey SILT with some fine to coarse gravel.

Preparation : Particles >425µm removed by wet sieving and air drying.

Water Content : (BS EN ISO 17892-1:2014) 27.3 %

Measured percentage passing 425µm sieve : 86 %

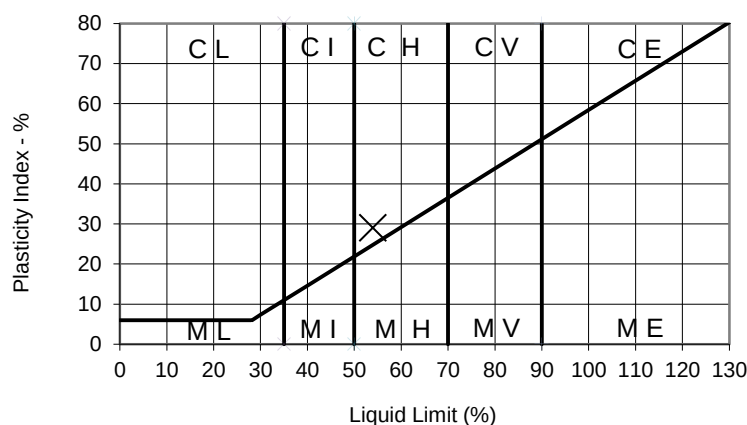
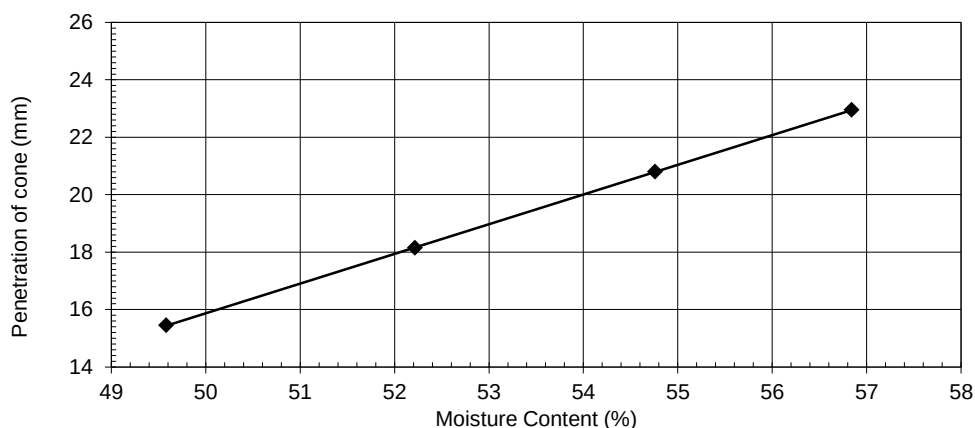
Liquid Limit - Fall Cone 4 point Method (cone angle 30°) with increasing water content : 54 %

Plastic Limit : 25 %

Plasticity Index : 29 %

Equivalent Water Content of material passing 425µm sieve : 31.7 %

Liquidity Index : 0.23



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PARTICLE SIZE DISTRIBUTION

Location	RC4102
Sample Ref	OC
Depth (m)	2.00-3.00
Sample Type	B

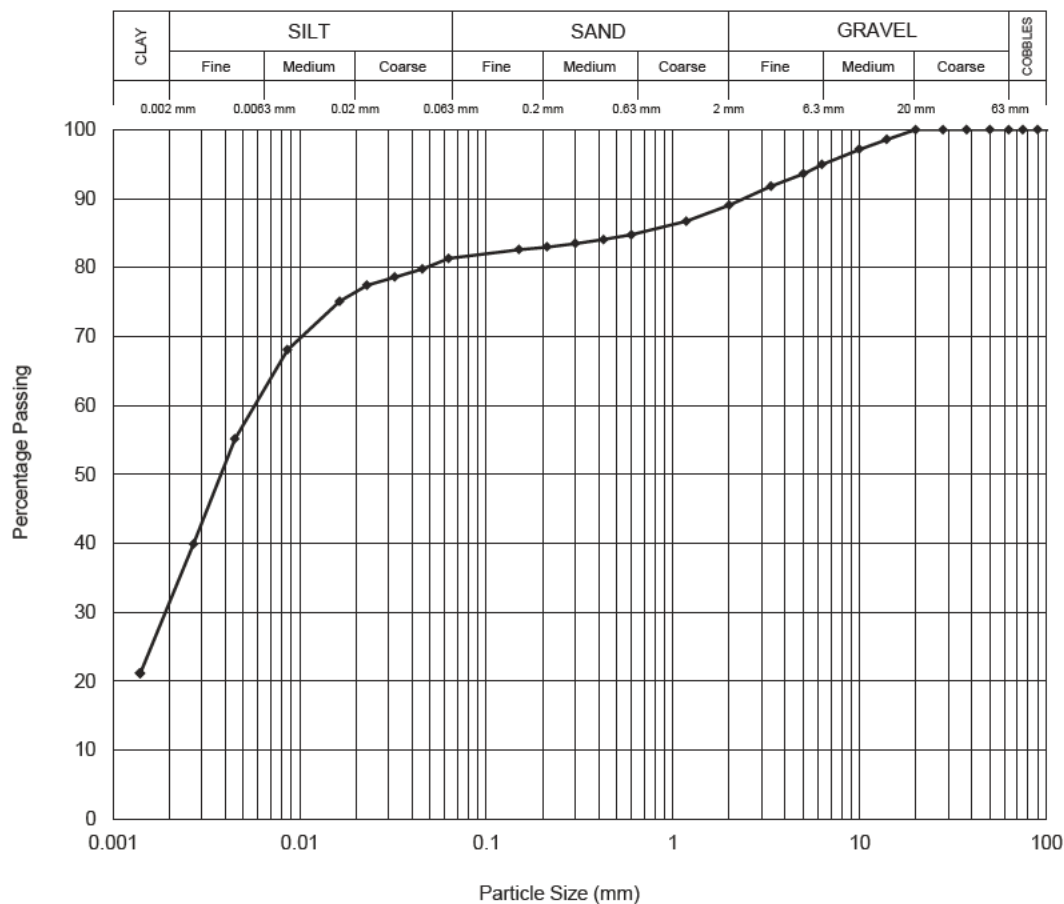
Description

Black and grey mottled sandy very clayey SILT with some fine to medium gravel.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

BS EN ISO 17892-4 : 2016 : Clause 5.3 - Sedimentation by Hydrometer

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	99
10.0 mm	97
6.30 mm	95
5.00 mm	94
3.35 mm	92
2.00 mm	89
1.18 mm	87
600 μ m	85
425 μ m	84
300 μ m	83
212 μ m	83
150 μ m	83
63 μ m	81



Sedimentation	
No Pre-treatment used	
Temp (°C)	25
Size	% Pass
46 µm	80
32 µm	79
23 µm	77
16 µm	75
8.6 µm	68
4.5 µm	55
2.7 µm	40
1.4 µm	21
Particle Density 2.70(A) Mg/m ³	

Particle Proportions	
Cobbles	0
Gravel	11
Sand	8
Silt	52
Clay	29

Processed by PK

Project Number:

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Project Name:

HOYLAND COMMON, BARNSELEY

AG3080-19

J A Reynolds - Laboratory Manager
25/06/2020

Test Report By GEOLABS Limited Unit D3 HRS Business Park, Granby Avenue, Birmingham, B33 0SJ

Client : Applied Geology, Unit 23, Abbey Park, Stareton, Kenilworth, Warwickshire, CV8 2LY

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(Ref 1593084864)

PARTICLE SIZE DISTRIBUTION

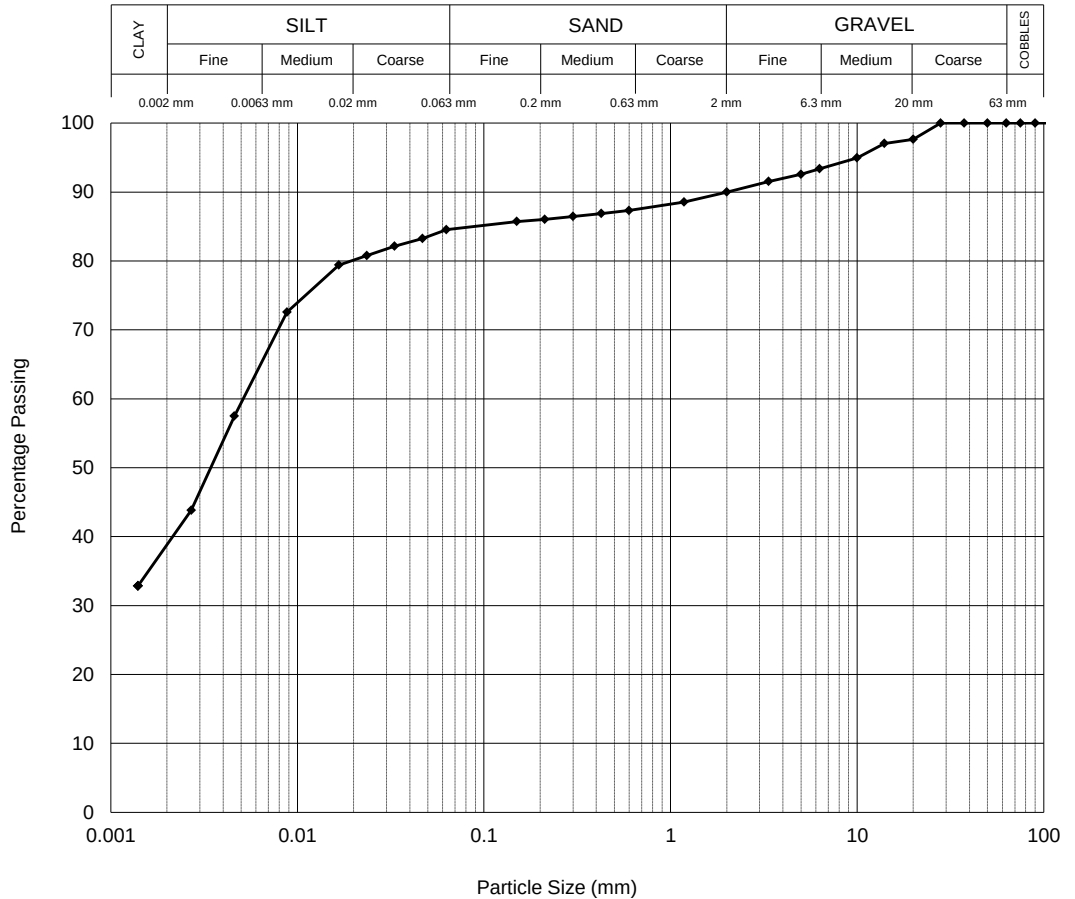
Location TP1304
 Sample Ref OC
 Depth (m) 3.00-4.00
 Sample Type LB

Description

Black and dark grey mottled sandy very clayey SILT with some fine to medium gravel.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
 BS EN ISO 17892-4 : 2016 : Clause 5.3 - Sedimentation by Hydrometer

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	98
14.0 mm	97
10.0 mm	95
6.30 mm	93
5.00 mm	93
3.35 mm	92
2.00 mm	90
1.18 mm	89
600 µm	87
425 µm	87
300 µm	86
212 µm	86
150 µm	86
63 µm	85



Sedimentation	
No Pre-treatment used	
Temp (°C)	25
Size	% Pass
47 µm	83
33 µm	82
24 µm	81
17 µm	79
8.8 µm	73
4.6 µm	58
2.7 µm	44
1.4 µm	33

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0
Gravel	10
Sand	5
Silt	47
Clay	38

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**HOYLAND COMMON, BARNSELY
 AG3080-19**

J A Reynolds - Laboratory Manager
 25/06/2020

Test Report By: GEOLABS Limited Unit D3 HRS Business Park, Granby Avenue, Birmingham, B33 0SJ

Client : Applied Geology, Unit 23, Abbey Park, Stareton, Kenilworth, Warwickshire, CV8 2LY

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(Ref 1593084875)

PARTICLE SIZE DISTRIBUTION

Location TP1311
 Sample Ref CM
 Depth (m) 0.70
 Sample Type LB

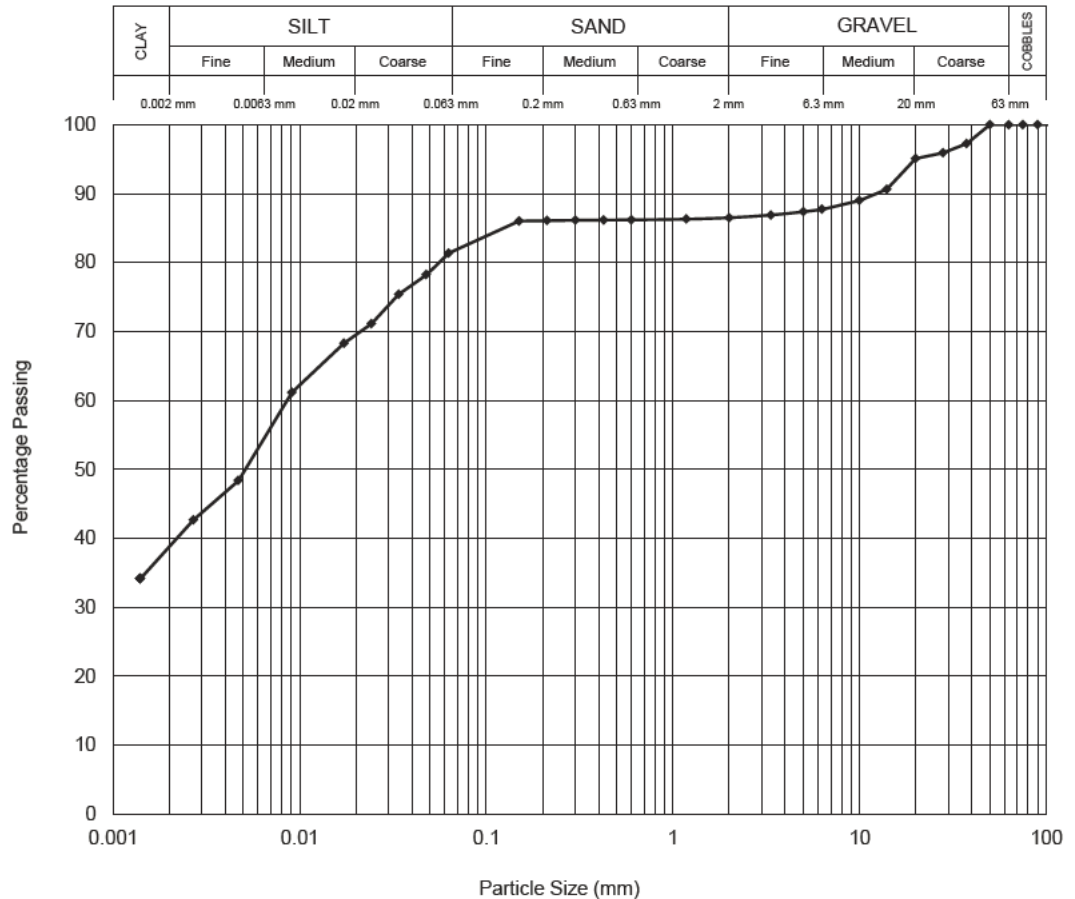
Description

Yellowish brown mottled grey sandy very clayey SILT with some fine to coarse gravel.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve

BS EN ISO 17892-4 : 2016 : Clause 5.3 - Sedimentation by Hydrometer

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	97
28.0 mm	96
20.0 mm	95
14.0 mm	91
10.0 mm	89
6.30 mm	88
5.00 mm	87
3.35 mm	87
2.00 mm	86
1.18 mm	86
600 µm	86
425 µm	86
300 µm	86
212 µm	86
150 µm	86
63 µm	81



Sedimentation	
No Pre-treatment used	
Temp (°C)	25
Size	% Pass
48 µm	78
34 µm	75
24 µm	71
17 µm	68
9.1 µm	61
4.7 µm	48
2.7 µm	43
1.4 µm	34

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0
Gravel	14
Sand	5
Silt	43
Clay	38

Processed by PK

Checked and Approved by

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HOYLAND COMMON, BARNSELY

AG3080-19

J A Reynolds - Laboratory Manager
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 (Ref 1593084890)

MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location TP1311
 Sample Ref CM
 Depth (m) 0.70
 Sample Type LB

Description:

Yellowish brown mottled grey sandy very clayey SILT with some fine to coarse gravel.

Preparation**Test Method****Samples Used**

Mass Retained on 37.5 mm Sieve

%

Mass Retained on 20.0 mm Sieve

%

Particle Density - Measured

Mg/m³

Natural Moisture Content

%

Maximum Dry Density

Mg/m³

Optimum Moisture Content

%

Air dried

2.5kg Rammer for soils with particles up to medium-gravel size

Single

0

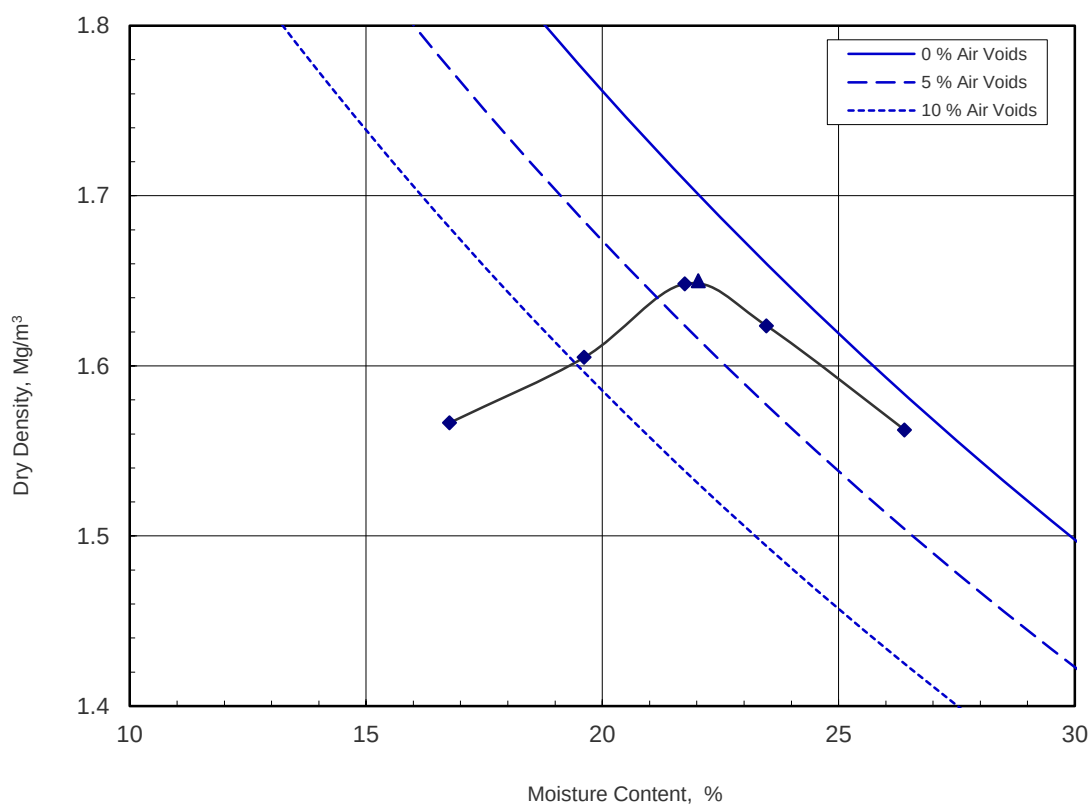
1

2.72

31.0

1.65

22.0



Determination		1	2	3	4	5
Moisture Content	%	16.8	19.6	21.7	23.5	26.4
Dry Density	Mg/m ³	1.57	1.61	1.65	1.62	1.56
Hand Vane	kPa			>188		

Processed by AC
 Checked and Approved by

Project Number:

GEO / 31150

Project Name:

HOYLAND COMMON, BARNSELY
AG3080-19

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Determination of Permeability in a Triaxial Cell

Borehole Ref.: RC4102
 Sample Ref.: OC
 Depth (m): 2.00-3.00
 Sample Type: B

Description:
 Black and grey mottled sandy very clayey SILT with some fine to medium gravel.

SPECIMEN DETAILS

Depth within original sample n/a
 Orientation within original n/a
 Specimen preparation Remoulded at the as-received moisture using 2.5 kg compactive effort.

TEST DETAILS

Cell Preparation Performed in accordance with Clause 3.5

		INITIAL	FINAL
Diameter	mm	104.77	104.08
Height	mm	100.36	99.69
Water Content	%	17.5	22.3
Bulk Density	Mg/m ³	1.96	2.08
Dry Density	Mg/m ³	1.67	1.70

SATURATION STAGE

Saturation initially by constant moisture content, followed by back-pressure assistance.

Pore pressure coefficient ('B' value) 0.00 0.95

CONSOLIDATION STAGE

Effective pressure kPa 50
 Volume change mL 17.2

PERMEABILITY STAGE

Measured under constant head conditions in a triaxial cell

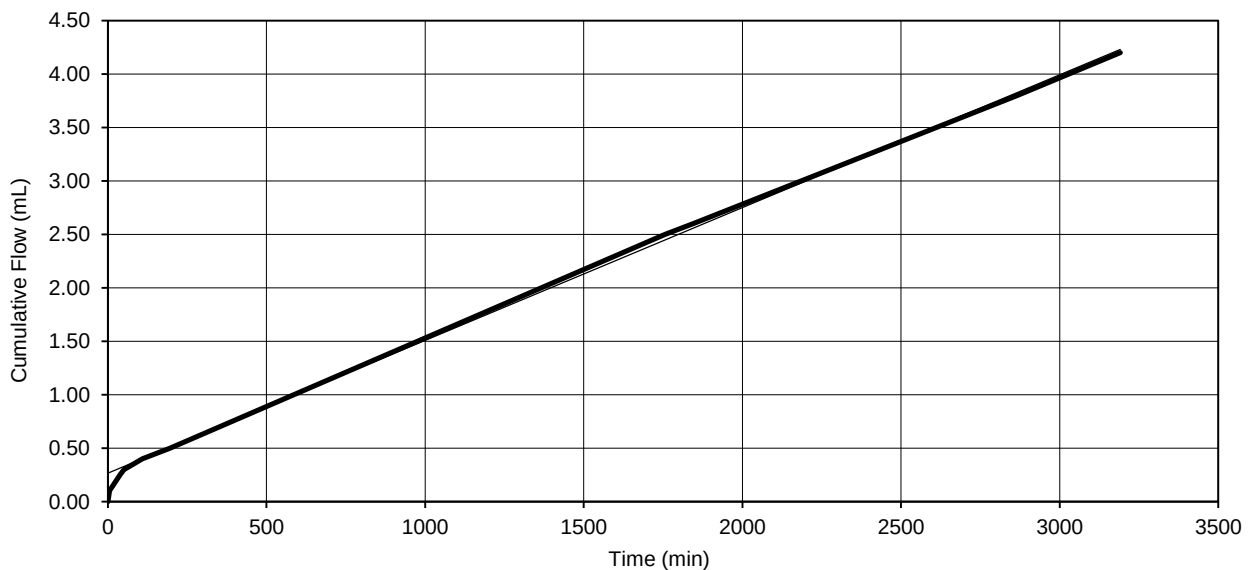
Pressure difference across specimen kPa 5
 Hydraulic gradient 5.0
 Mean effective stress kPa 47.55

TEST DURATIONS

Saturation days 3
 Consolidation days 1
 Flow days 2

Coefficient of Permeability

k_v at 20 °C = 4.9×10^{-10} m/s



Checked and Approved by

Project Number:

GEO / 31150

Project Name:

HOYLAND COMMON, BARNSELY
 AG3080-19

J A Reynolds - Laboratory Manager
 25/06/2020

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Determination of Permeability in a Triaxial Cell

Borehole Ref.: TP1304
 Sample Ref.: OC
 Depth (m): 3.00-4.00
 Sample Type: LB

Description:
 Black and dark grey mottled sandy very clayey SILT with some fine to medium gravel.

SPECIMEN DETAILS

Depth within original sample n/a
 Orientation within original n/a
 Specimen preparation Remoulded at the as-received moisture using 2.5 kg compactive effort.

TEST DETAILS

Cell Preparation Performed in accordance with Clause 3.5

		INITIAL	FINAL
Diameter	mm	105.22	104.90
Height	mm	100.66	100.36
Water Content	%	20.4	23.2
Bulk Density	Mg/m ³	1.92	1.98
Dry Density	Mg/m ³	1.59	1.61

SATURATION STAGE

Saturation initially by constant moisture content, followed by back-pressure assistance.

Pore pressure coefficient ('B' value) 0.21 0.95

CONSOLIDATION STAGE

Effective pressure kPa 60
 Volume change mL 7.9

PERMEABILITY STAGE

Measured under constant head conditions in a triaxial cell

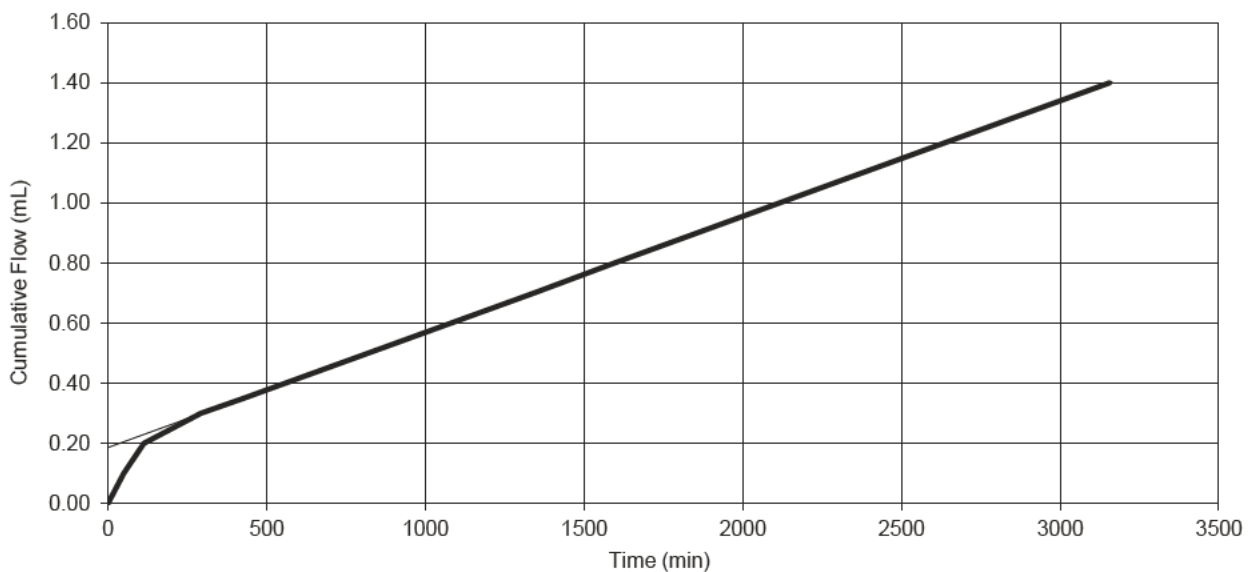
Pressure difference across specimen kPa 5
 Hydraulic gradient 5.0
 Mean effective stress kPa 57.55

TEST DURATIONS

Saturation days 3
 Consolidation days 1
 Flow days 2

Coefficient of Permeability

k_v at 20 °C = 1.5×10^{-10} m/s



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Project Number:

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ct Name:

**HOYLAND COMMON, BARNSELY
 AG3080-19**

J A Reynolds - Laboratory Manager
 25/06/2020

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Determination of Permeability in a Triaxial Cell

Borehole Ref.: TP1311
 Sample Ref.: CM
 Depth (m): 0.70
 Sample Type: LB

Description:
 Yellowish brown mottled grey sandy very clayey SILT with some fine to coarse gravel.

SPECIMEN DETAILS

Depth within original sample n/a
 Orientation within original n/a
 Specimen preparation Remoulded at the as-received moisture using 2.5 kg compactive effort.

TEST DETAILS

Cell Preparation Performed in accordance with Clause 3.5

		INITIAL	FINAL
Diameter	mm	105.01	104.94
Height	mm	100.31	100.24
Water Content	%	27.3	30.1
Bulk Density	Mg/m ³	1.94	1.98
Dry Density	Mg/m ³	1.52	1.53

SATURATION STAGE

Saturation initially by constant moisture content, followed by back-pressure assistance.

Pore pressure coefficient ('B' value) 0.42 1.00

CONSOLIDATION STAGE

Effective pressure kPa 20
 Volume change mL 1.7

PERMEABILITY STAGE

Measured under constant head conditions in a triaxial cell

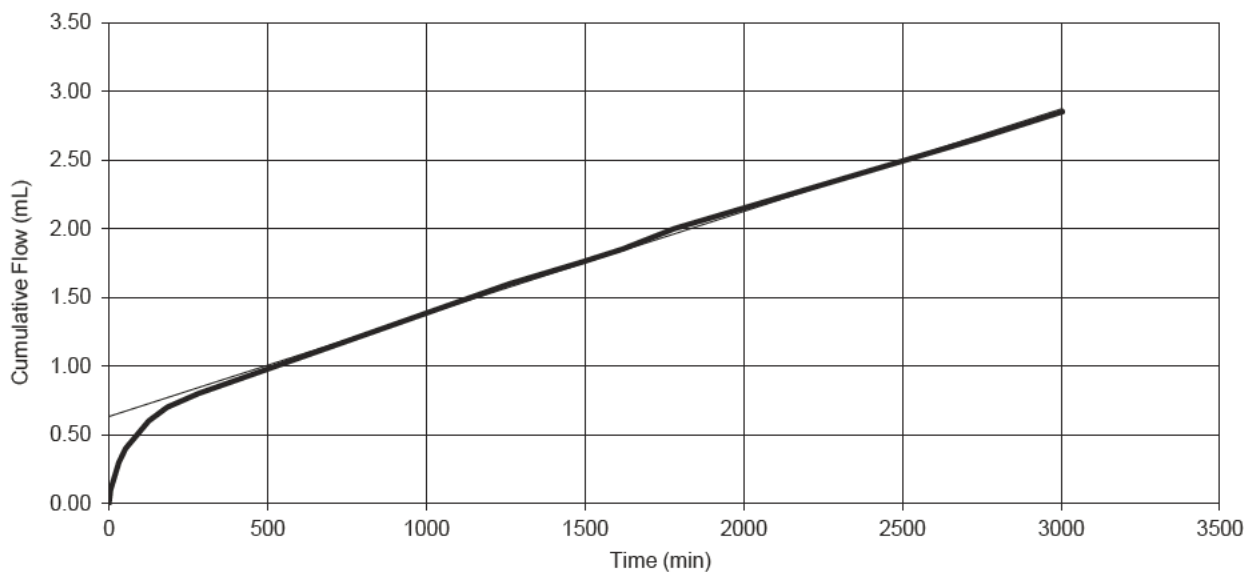
Pressure difference across specimen kPa 5
 Hydraulic gradient 5.0
 Mean effective stress kPa 17.55

TEST DURATIONS

Saturation days 5
 Consolidation days 1
 Flow days 2

Coefficient of Permeability

k_v at 20 °C = 2.9×10^{-10} m/s



Number:

GEO / 31150

Name:

**HOYLAND COMMON, BARNSELY
 AG3080-19**

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SHEAR STRENGTH BY DIRECT SHEAR

(small shearbox apparatus)

Borehole No TP1311
 Sample No CM
 Depth (m) 0.70
 Sample Type LB

Description:

Yellowish brown mottled grey sandy very clayey SILT with some fine to coarse gravel.

Specimen Details

Depth within original sample *mm* n/a
 Orientation within original sample n/a
 Test condition Submerged
 Preparation < 2 mm material remoulded at optimum water content using a 2.5 kg compactive effort

Particle density *Mg/m³* 2.72 (measured)

Specimen Number		1	2	3
Length	<i>mm</i>	59.94	60.79	61.18
Width	<i>mm</i>	60.04	60.85	61.07
Height	<i>mm</i>	22.76	22.06	21.69
Initial water content	%	21.7	21.7	21.7
Initial wet density	<i>Mg/m³</i>	2.08	2.08	2.10
Initial dry density	<i>Mg/m³</i>	1.71	1.71	1.72
Initial voids ratio		0.595	0.589	0.578

Consolidation Stage

	<i>kPa</i>	50	100	200
Normal stress				
Duration	<i>day(s)</i>	1	1	1

Shearing Stage

	<i>kPa</i>	50	100	200
Normal stress				

Peak Conditions:

	<i>mm/min</i>	0.00144	0.00144	0.00144
Rate of horizontal displacement				
Maximum shear stress	<i>kPa</i>	39.0	63.1	107.9
Horizontal displacement at MSS	<i>mm</i>	1.8	1.7	3.6
Vertical Displacement at Peak	<i>mm</i>	-0.04	0.19	0.19

Residual Conditions:

	<i>mm/min</i>	0.0072	0.0072	0.0072
Rate of horizontal displacement				
Residual shear stress	<i>kPa</i>	30.3	45.1	82.4
Final cumulative displacement	<i>mm</i>	22.8	24.7	23.2
Vertical Displacement at Residual	<i>mm</i>	0.71	3.15	2.90
Total traverses		13	13	13

Method of reversal Rapid multi-reversals by hand (5 traverses), to Clause 4.5.5.5(c)

	%	28.9	32.1	29.2
Final water content				
Duration	<i>day(s)</i>	5	5	5

Shear Strength Parameters

		Peak Condition	Residual Condition
Apparent Cohesion	<i>kPa</i>	17	12
Angle of Shearing Resistance	<i>degrees</i>	24.5	19.5

Notes:

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Project Number:

GEO / 31150

Project Name:

HOYLAND COMMON, BARNSELY
 AG3080-19

S Allen - Senior Technician
 26/06/2020

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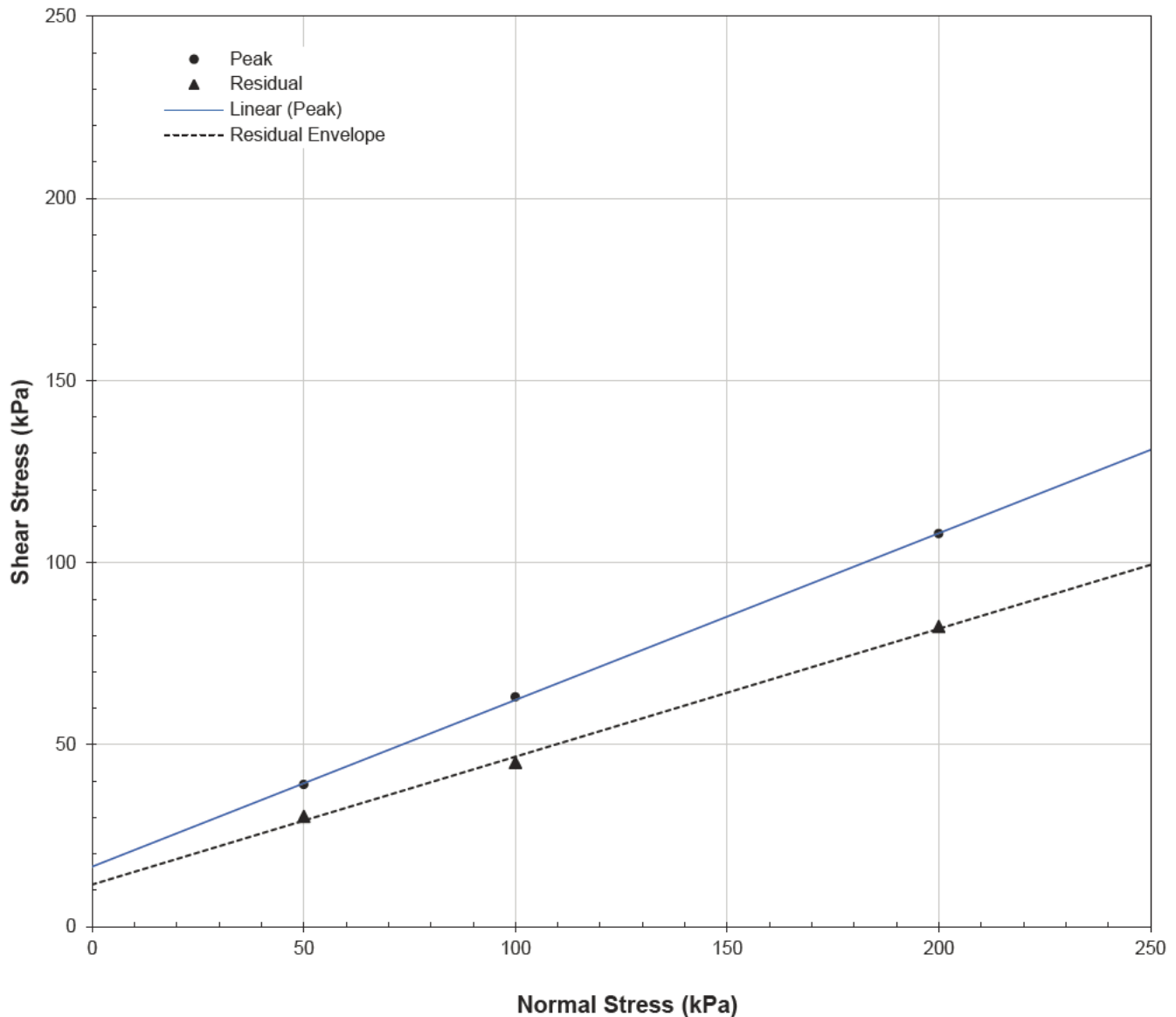
SHEAR STRENGTH BY DIRECT SHEAR

(small shearbox apparatus)

Borehole No TP1311
 Sample No CM
 Depth (m) 0.70
 Sample Type LB

Description:

Yellowish brown mottled grey sandy very clayey SILT with some fine to coarse gravel.

Shear Stress v Normal Stress

Peak: $c' = 17$
 $\Phi' = 24.5$

Residual: $c'_r = 12$
 $\Phi'_r = 19.5$

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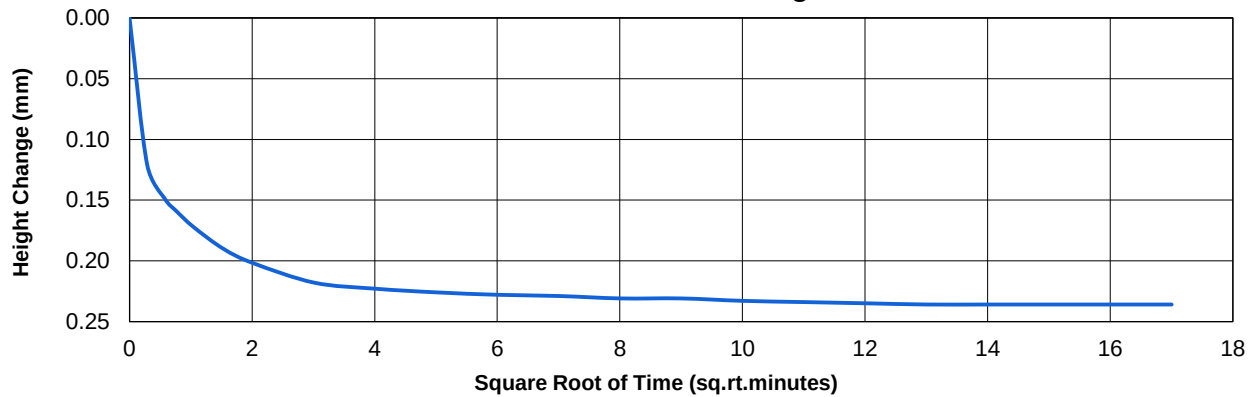
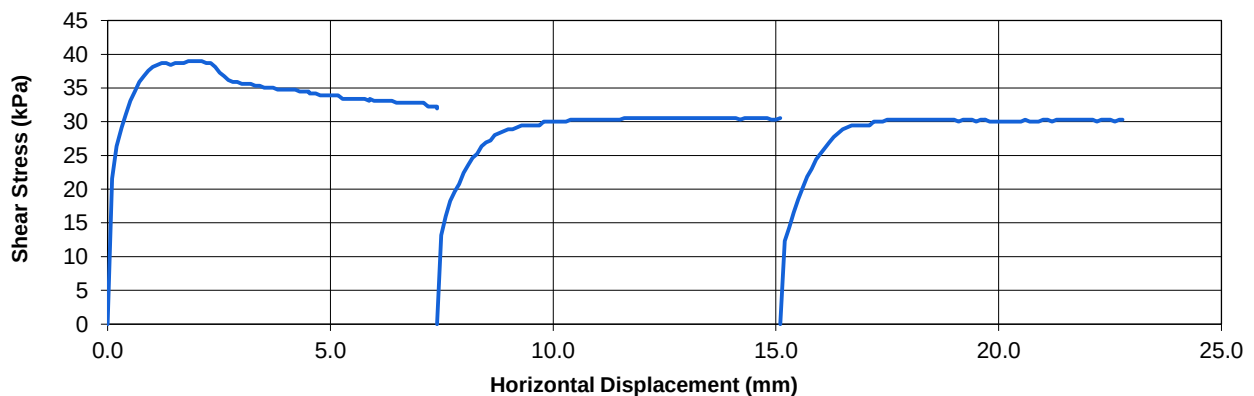
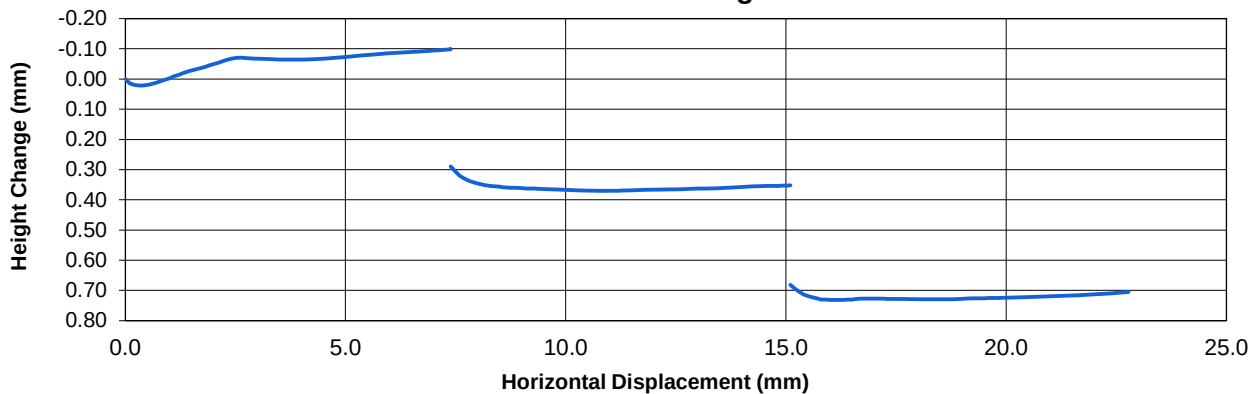
SHEAR STRENGTH BY DIRECT SHEAR

(small shearbox apparatus)

Borehole No TP1311
 Sample No CM
 Depth (m) 0.70
 Sample Type LB

Description:

Yellowish brown mottled grey sandy very clayey SILT with some fine to coarse gravel.

Specimen: 1**Consolidation Stage****Shear Stage**

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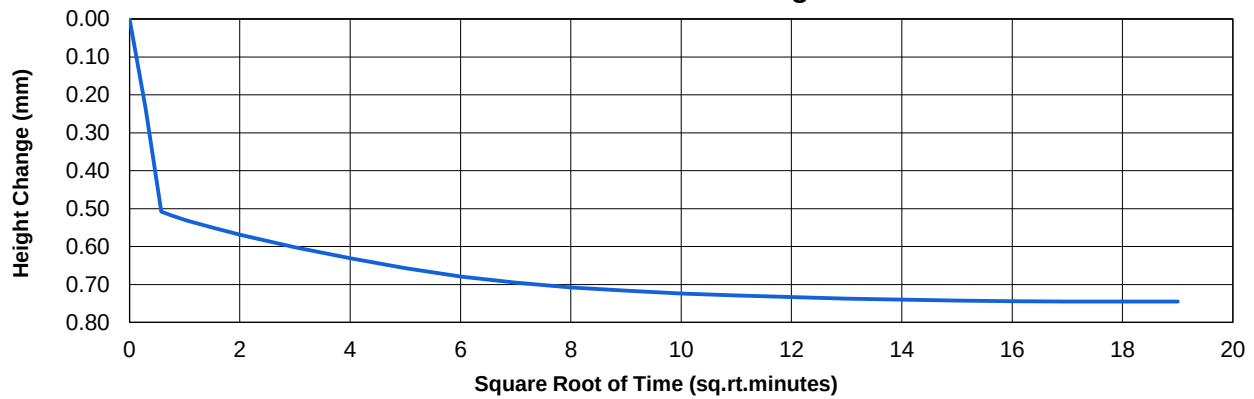
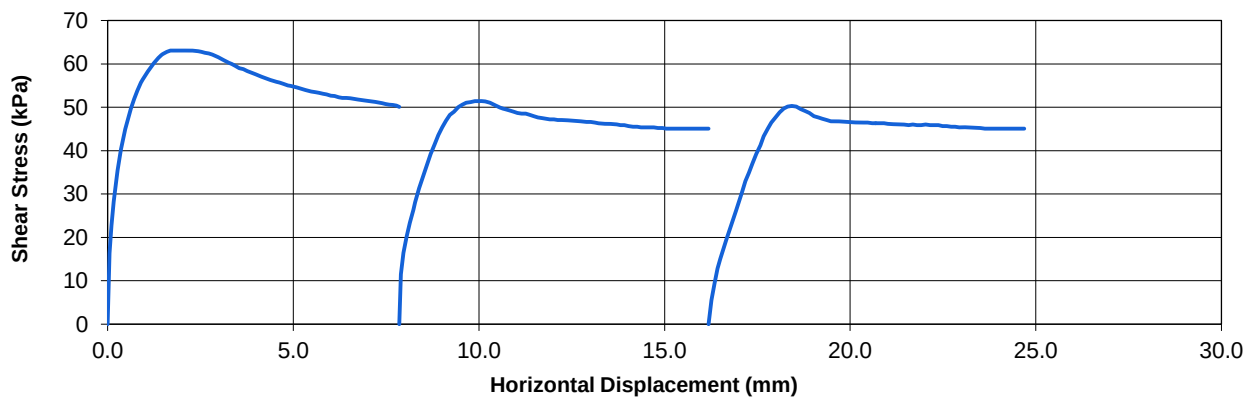
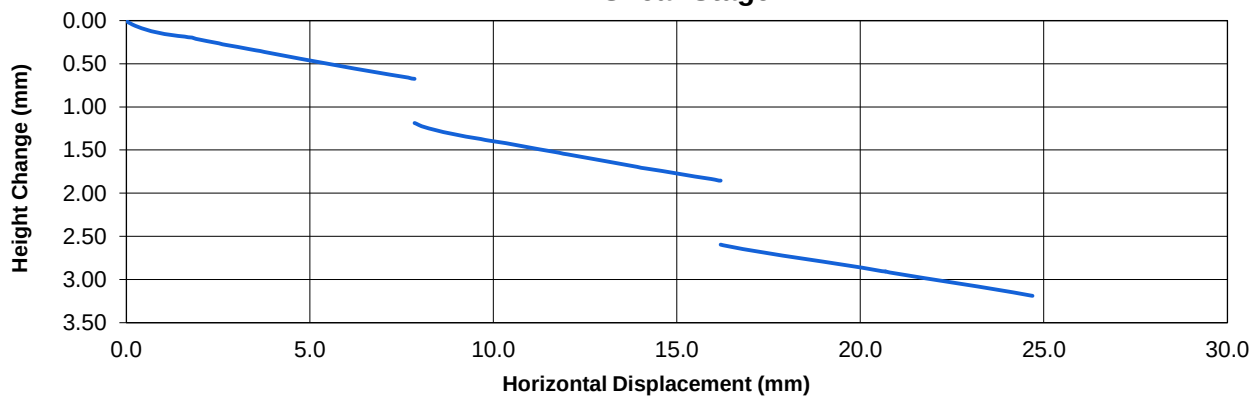
SHEAR STRENGTH BY DIRECT SHEAR

(small shearbox apparatus)

Borehole No TP1311
 Sample No CM
 Depth (m) 0.70
 Sample Type LB

Description:

Yellowish brown mottled grey sandy very clayey SILT with some fine to coarse gravel.

Specimen: 2**Consolidation Stage****Shear Stage**

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Project Number:

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Project Name:

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AG3080-19

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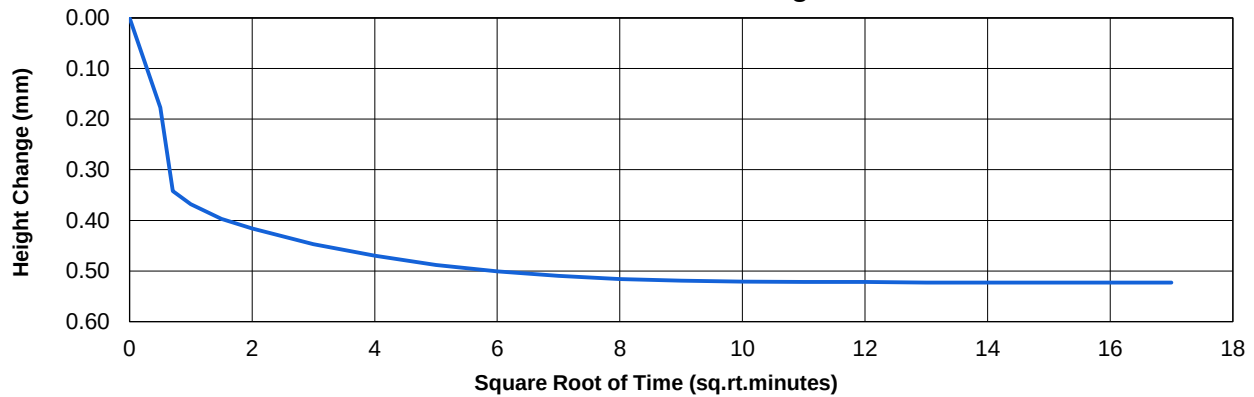
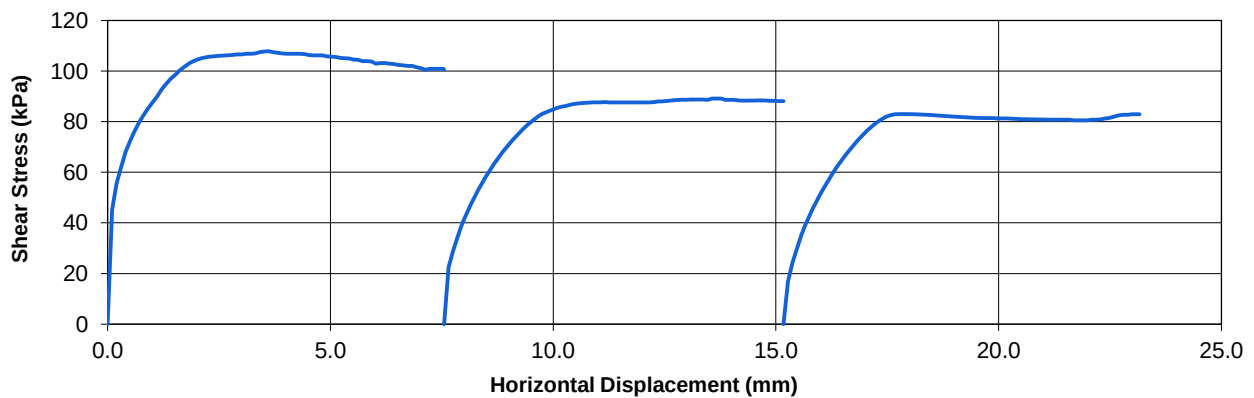
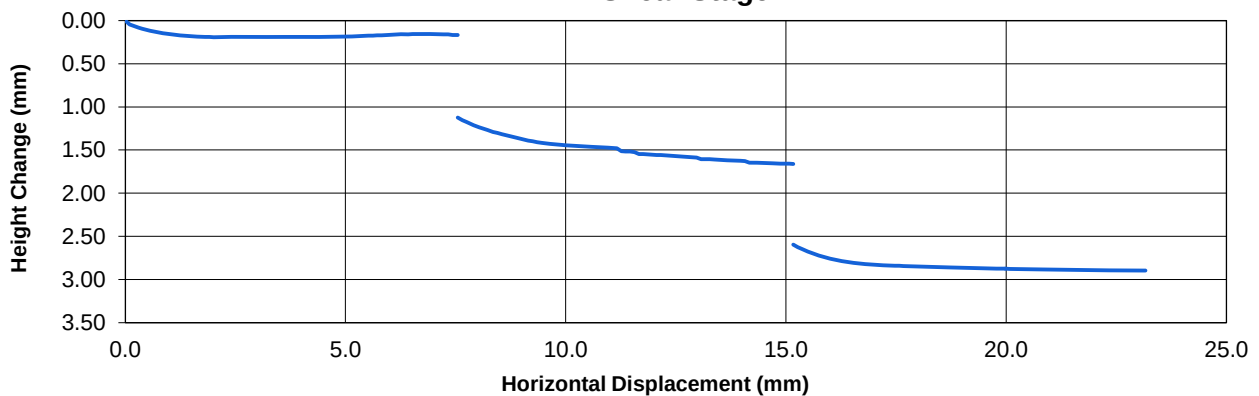
SHEAR STRENGTH BY DIRECT SHEAR

(small shearbox apparatus)

Borehole No TP1311
 Sample No CM
 Depth (m) 0.70
 Sample Type LB

Description:

Yellowish brown mottled grey sandy very clayey SILT with some fine to coarse gravel.

Specimen: 3**Consolidation Stage****Shear Stage**

Processed by CO
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20/06/2020

Project Number:

GEO / 31150

Project Name:

HOYLAND COMMON, BARNSELY
AG3080-19

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APPENDIX F

CONTAMINATION ASSESSMENT PROCEDURES

Human Health

Applied Geology Limited has followed the guidance given in the CLR 11 publication and other available guidance to assess the contaminant concentrations. Details of the methodology followed are briefly outlined below.

The available chemical data is sorted into appropriate datasets depending on sampling regime and ground conditions. An initial generic quantitative risk assessment is undertaken on this data using statistical tests, where appropriate, and relevant screening values. Risk to human health has been initially assessed by comparing soil results against various published screening criteria. These have been sourced from the following, in order of preference:

- DEFRA. Category 4 Screening Levels (C4SL), March 2014;
- LQM/CIEH S4UL for Human Health Risk Assessment (S4UL), 2015*;
- Environment Agency/DEFRA, Soil Guideline Values (SGV) published in 2009;
- EIC/AGS/CL:AIRE Soil Generic Assessment Criteria (GAC), 2010.

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Except for lead and benzo(a)pyrene, the assessments will be carried out by comparing results against the LQM/CIEH S4UL in the first instance, where these values are exceeded, then reference will be made to the C4SLs where such exist. Lead will only be compared to the C4SL because no S4UL exists for lead. For Benzo(a)pyrene, Applied Geology has chosen to adopt the approach presented by the C4SL committee rather than the approach proposed by LQM/CIEH. Further discussion on this is presented below.

It is our view, and the view of others in the industry, that the C4SL were derived for use in both the Part IIA system and through the planning system, as they allow identification of those sites that fall within Category 4 (not contaminated) and are therefore able to be developed with no further remedial action. The C4SLs are considered to represent a contamination level that is 'low' from a toxicological view point, which we therefore consider to be 'acceptable' under planning.

Historically, the level of contamination has been assessed with reference to SGV values which were derived to represent a 'minimal' level of contamination. The SGVs are still valid and can be used alongside C4SL, however both screening values are only intended to provide guidance as to the level of contamination and, where concentrations fall below these screening values, the site is not contaminated (and is within Category 4). Exceedance of a SGV/S4UL/C4SL does not automatically indicate that an 'unacceptable' risk exists at a site; simply that further consideration of that particular contaminant is required.

At this time, there are two toxicological methodologies that can be used in the derivation of screening criteria for PAHs; Relative Potency Factor (RPFs) or the Surrogate Marker approach. Applied Geology has chosen (based on the latest guidance from the Health Protection Agency (HPA) to use the surrogate marker approach proposed in the C4SL methodology, whereby benzo(a)pyrene can be used as a surrogate marker for all 'genotoxic' (gene damaging) PAHs. The surrogate marker approach estimates the toxicity of a mixture of PAHs in an environmental matrix by using data from toxicity studies in which a PAH mixture of known composition was tested. Exposure to the surrogate marker benzo(a)pyrene is assumed to represent exposure to all the PAHs in the environmental matrix. Thus, the level of toxicity ascribed to the surrogate represents the toxicity of the PAH mixture. This allows an assessment of the combined carcinogenic risk associated with genotoxic PAHs using only benzo(a)pyrene. In order to confirm that the mixture of genotoxic PAH in the soil is similar to the coal tar mixture used in the toxicological study, various PAH ratios are plotted and checked to see that they fall within the limits set in HPA, 2010.

Water Quality

Risks to water quality has been assessed by following the Environment Agency guidance on groundwater protection (previously known as GP3), updated on their website in March 2017, see <https://www.gov.uk/government/policies/water-quality> and 'The Environment Agency's approach to groundwater protection' (March 2017 Version 1.0).

For hazardous substances, which should be prevented from entering groundwater, the screening criteria are initially set as the limit of detection, however, if groundwater has already been impacted, an appropriate environmental standard will then be used. For hazardous substances, background quality may also be taken into account.

For non-hazardous compounds, their release should not result in any pollution or significant risk of pollution in the future, as such comparison with UK DWS or EQS standards will allow determination of whether pollution could occur. Typically screening criteria will be sourced from the following:

- Environmental Standards (ES), which are defined in European legislation such as the Water Framework Directive (WFD) (2000/60/EC) and the Priority Substances Directive (PSD) (2008/105/EC) a daughter directive of the WFD.
- The River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Direction, 2010.
- UK Water Supply (Water Quality) Regulations, 2010.
- UK quality standards for water to be used for direct abstraction to potable supply e.g. Surface Water (Abstraction for Drinking Water) (Classification) Regulations, 1996.
- World Health Organisation (WHO) Guidelines for Drinking Water Quality.

Re-use of Soils and Waste Soil Disposal

It is noted that if any excavated material is to be reused on site, a Waste Management Plan (WMP) and / or a Materials Management Plan (MMP) will probably be required. Any such materials must be suitable for re-use without further treatment, and only the quantity necessary for the specified works should be used. Any materials not within these definitions may need to be considered as waste whereby a Waste Management Licence Exemption may also be required.

A specific categorisation and assessment of potential waste soils arising from the proposed development has not been undertaken as part of the investigation, unless otherwise detailed in the report text. However, generic comments and advice are made below for the reader.

All waste soils should be sorted to prevent mixtures of waste types. Where possible, any waste soil should be recycled and the volume of soil to be disposed of should be minimised. Any excavated soil material and excess spoil disposed of off-site should be treated as Waste and classified as Inert, Non-hazardous or Hazardous, prior to removal from site, as required by the "Duty of Care" (Environmental Protection Act, 1990) legislation together with Annex II of Directive 1999/31/EC ("Landfill Directive"). Initially, Basic Characterisation of the waste is required whereby the material should be described and its source of origin recorded (a site plan, exploratory hole records and the certificates of chemical analysis in this report should be included). This should also include data on its composition and leaching behaviour, its European Waste Catalogue (EWC) code, and where relevant any hazardous properties according to Annex III of Directive 91/689/EEC. This information should be provided to the licensed waste contractor.

Soils excavated on many sites would generally fall under the EWC description "Soil and Stones", EWC code 17 05 04. Waste Acceptance Criteria (WAC) testing is required for many Inert wastes and generally for all Hazardous Waste but not for non-hazardous waste. There are certain restrictions for inert wastes regarding topsoil and peat. Any asbestos must be disposed of by suitably licensed contractors to a suitably licensed facility.

**Fiona Connor**

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CV8 2LY

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

Analytical Report Number : 20-12453

Replaces Analytical Report Number : 20-12453, issue no. 2

Report format change.

Project / Site name:	Hoyland Common, Barnsley	Samples received on:	02/06/2020
Your job number:	AG3080-19	Sample instructed/ Analysis started on:	02/06/2020
Your order number:	15691	Analysis completed by:	16/06/2020
Report Issue Number:	3	Report issued on:	08/07/2020
Samples Analysed:	18 soil samples		

Karolina Marek
PL Head of Reporting Team

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 20-12453-3 Hoyland Common, Barnsley AG3080-19

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report relate only to the sample(s) submitted for testing.

Page 1 of 19



Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524736	1524737	1524738	1524739	1524740
Sample Reference				RC4101	RC4101	RC4102	RC4102	RC4103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	4.00	1.30	3.40	1.80
Date Sampled				20/05/2020	20/05/2020	21/05/2020	21/05/2020	19/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	6.3	8.0	4.4	11	11
Total mass of sample received	kg	0.001	NONE	2.0	2.0	2.0	2.0	2.0

Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.0	7.0	6.7	6.7	7.0
Total Sulphate as SO ₄	%	0.005	MCERTS	0.081	-	-	0.023	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	610	320	360	38	380
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.31	0.16	0.18	0.019	0.19
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	306	158	180	19.1	189
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	6.0	-	-	5.1	-
Total Sulphur	%	0.005	MCERTS	0.053	-	-	0.029	-
Organic Matter	%	0.1	MCERTS	-	3.3	2.6	4.0	0.7
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	2	NONE	8.0	-	-	9.8	-
Water Soluble Nitrate (2:1) as NO ₃ (leachate equivalent)	mg/l	5	NONE	< 5.0	-	-	< 5.0	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1 2 3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	< 0.80	< 0.80	< 0.80	< 0.80
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Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524736	1524737	1524738	1524739	1524740
Sample Reference				RC4101	RC4101	RC4102	RC4102	RC4103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	4.00	1.30	3.40	1.80
Date Sampled				20/05/2020	20/05/2020	21/05/2020	21/05/2020	19/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	4.6	2.9	4.1	4.3
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	1.2	1.2	1.4	1.1
Boron (total)	mg/kg	1	MCERTS	-	4.6	5.2	5.6	3.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	22	25	26	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	35	41	40	29
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	19	18	26	15
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	43	42	44	41
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	20	19	22	17
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	98	110	110	100
Magnesium (water soluble)	mg/kg	5	NONE	53	38	54	5.6	50
Magnesium (leachate equivalent)	mg/l	2.5	NONE	26	-	-	2.8	-



Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524736	1524737	1524738	1524739	1524740
Sample Reference				RC4101	RC4101	RC4102	RC4102	RC4103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	4.00	1.30	3.40	1.80
Date Sampled				20/05/2020	20/05/2020	21/05/2020	21/05/2020	19/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

SVOCs

Aniline	mg/kg	0.1	NONE	-	-	-	-	-
Phenol	mg/kg	0.2	ISO 17025	-	-	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
1 2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	-	-	-
1 4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
2 4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
2 4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	-
2 4 6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
2 4 5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	-
2 6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
2 4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1 2 3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-



Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524736	1524737	1524738	1524739	1524740
Sample Reference				RC4101	RC4101	RC4102	RC4102	RC4103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	4.00	1.30	3.40	1.80
Date Sampled				20/05/2020	20/05/2020	21/05/2020	21/05/2020	19/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

SVOCs TICs

Pesticide		N/A	NONE	-	-	-	-	-
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Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524741	1524742	1524743	1524744	1524745
Sample Reference				RC4103	RC4104	RC4105	TP1301	TP1301
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				4.90	2.30	0.30	0.30	0.80
Date Sampled				19/05/2020	18/05/2020	22/05/2020	27/05/2020	27/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	8.3	16	14	6.6
Total mass of sample received	kg	0.001	NONE	2.0	2.0	2.0	2.0	2.0

Asbestos in Soil	Type	N/A	ISO 17025	-	-	Not-detected	-	-
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.9	7.7	-	-	8.0
Total Sulphate as SO ₄	%	0.005	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	320	52	-	-	250
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.16	0.026	-	-	0.12
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	161	25.8	-	-	123
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	-	-
Total Sulphur	%	0.005	MCERTS	-	-	-	-	-
Organic Matter	%	0.1	MCERTS	1.1	1.7	-	-	4.0
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	2	NONE	-	-	-	-	-
Water Soluble Nitrate (2:1) as NO ₃ (leachate equivalent)	mg/l	5	NONE	-	-	-	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Indeno(1 2 3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Dibenz(a h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	-	-	< 0.80
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Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524741	1524742	1524743	1524744	1524745
Sample Reference				RC4103	RC4104	RC4105	TP1301	TP1301
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				4.90	2.30	0.30	0.30	0.80
Date Sampled				19/05/2020	18/05/2020	22/05/2020	27/05/2020	27/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.3	6.2	-	-	5.1
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	1.2	-	-	1.2
Boron (total)	mg/kg	1	MCERTS	4.0	3.7	-	-	5.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	-	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	5.6	26	-	-	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	51	31	-	-	45
Lead (aqua regia extractable)	mg/kg	1	MCERTS	19	21	-	-	21
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	29	45	-	-	41
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.4	1.9	-	-	2.1
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	6.4	22	-	-	20
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	37	110	-	-	91
Magnesium (water soluble)	mg/kg	5	NONE	45	22	-	-	25
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	-	-



Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524741	1524742	1524743	1524744	1524745
Sample Reference				RC4103	RC4104	RC4105	TP1301	TP1301
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				4.90	2.30	0.30	0.30	0.80
Date Sampled				19/05/2020	18/05/2020	22/05/2020	27/05/2020	27/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	< 0.1	< 0.1	-
Phenol	mg/kg	0.2	ISO 17025	-	-	< 0.2	< 0.2	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	< 0.1	< 0.1	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	< 0.2	< 0.2	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	< 0.2	< 0.2	-
1 2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	< 0.1	< 0.1	-
1 4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	< 0.2	< 0.2	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	< 0.1	< 0.1	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	< 0.3	< 0.3	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	< 0.3	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	< 0.2	< 0.2	-
Isophorone	mg/kg	0.2	MCERTS	-	-	< 0.2	< 0.2	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	< 0.3	< 0.3	-
2 4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	< 0.3	< 0.3	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	< 0.3	< 0.3	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	< 0.3	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	-
2 4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	< 0.3	< 0.3	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	< 0.1	< 0.1	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	< 0.1	< 0.1	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	< 0.1	< 0.1	-
2 4 6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	< 0.1	< 0.1	-
2 4 5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	< 0.2	< 0.2	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	< 0.1	< 0.1	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	< 0.1	< 0.1	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	< 0.1	< 0.1	-
2 6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	< 0.1	< 0.1	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	-
2 4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	< 0.2	< 0.2	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	< 0.2	< 0.2	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	< 0.3	< 0.3	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	< 0.2	< 0.2	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	< 0.2	< 0.2	-
Fluorene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	-
Azobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	< 0.3	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	< 0.2	< 0.2	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	< 0.3	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	-
Anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	-
Carbazole	mg/kg	0.3	MCERTS	-	-	< 0.3	< 0.3	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	< 0.2	< 0.2	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	< 0.3	< 0.3	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	0.35	< 0.05	-
Pyrene	mg/kg	0.05	MCERTS	-	-	0.35	< 0.05	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	< 0.3	< 0.3	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	0.28	< 0.05	-
Chrysene	mg/kg	0.05	MCERTS	-	-	0.31	< 0.05	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	0.31	< 0.05	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	0.15	< 0.05	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	0.22	< 0.05	-
Indeno(1 2 3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	-



Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524741	1524742	1524743	1524744	1524745
Sample Reference				RC4103	RC4104	RC4105	TP1301	TP1301
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				4.90	2.30	0.30	0.30	0.80
Date Sampled				19/05/2020	18/05/2020	22/05/2020	27/05/2020	27/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

SVOCs TICs

Pesticide		N/A	NONE	-	-	ND	ND	-
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Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524746	1524747	1524748	1524749	1524750
Sample Reference				TP1302	TP1303	TP1304	TP1305	TP1306
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.30	0.30	0.20	0.80
Date Sampled				27/05/2020	26/05/2020	27/05/2020	26/05/2020	27/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
Moisture Content	%	N/A	NONE	8.8	8.9	11	-	5.7
Total mass of sample received	kg	0.001	NONE	2.0	2.0	2.0	-	2.0

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	-
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.1	7.0	-	-	7.2
Total Sulphate as SO ₄	%	0.005	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	34	83	-	-	170
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.017	0.042	-	-	0.086
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	16.9	41.5	-	-	85.8
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	-	-
Total Sulphur	%	0.005	MCERTS	-	-	-	-	-
Organic Matter	%	0.1	MCERTS	4.4	4.2	-	-	0.6
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	2	NONE	-	-	-	-	-
Water Soluble Nitrate (2:1) as NO ₃ (leachate equivalent)	mg/l	5	NONE	-	-	-	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.39	0.33	-	-	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.12	0.11	-	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.24	0.30	-	-	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.31	0.37	-	-	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Indeno(1 2 3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Dibenz(a h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1.06	1.11	-	-	< 0.80
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Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524746	1524747	1524748	1524749	1524750
Sample Reference				TP1302	TP1303	TP1304	TP1305	TP1306
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.30	0.30	0.20	0.80
Date Sampled				27/05/2020	26/05/2020	27/05/2020	26/05/2020	27/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.9	9.2	-	-	4.0
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	1.6	-	-	1.1
Boron (total)	mg/kg	1	MCERTS	3.2	2.9	-	-	2.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.2	< 0.2	-	-	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	23	-	-	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	25	23	-	-	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	36	36	-	-	16
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	27	38	-	-	44
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	2.5	3.3	-	-	2.3
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	28	32	-	-	25
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	86	100	-	-	96
Magnesium (water soluble)	mg/kg	5	NONE	18	15	-	-	37
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	-	-



Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524746	1524747	1524748	1524749	1524750
Sample Reference				TP1302	TP1303	TP1304	TP1305	TP1306
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.30	0.30	0.20	0.80
Date Sampled				27/05/2020	26/05/2020	27/05/2020	26/05/2020	27/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	< 0.1	-	-
Phenol	mg/kg	0.2	ISO 17025	-	-	< 0.2	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
1 2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
1 4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	< 0.2	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
2 4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
2 4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	< 0.1	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	< 0.1	-	-
2 4 6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
2 4 5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	< 0.1	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
2 6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	< 0.1	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
2 4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	< 0.3	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	0.30	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	0.11	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	0.22	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	0.33	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	< 0.3	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Indeno(1 2 3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	-



Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524746	1524747	1524748	1524749	1524750
Sample Reference				TP1302	TP1303	TP1304	TP1305	TP1306
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.30	0.30	0.20	0.80
Date Sampled				27/05/2020	26/05/2020	27/05/2020	26/05/2020	27/05/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

SVOCs TICs

Pesticide		N/A	NONE	-	-	Present	-	-
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Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524751	1524752	1524753		
Sample Reference				TP1306	TP1308	TP1310		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.50	0.30	0.30		
Date Sampled				27/05/2020	26/05/2020	26/05/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	7.8	11	12		
Total mass of sample received	kg	0.001	NONE	2.0	2.0	2.0		

Asbestos in Soil	Type	N/A	ISO 17025	-	-	Not-detected		
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.2	7.1	7.8		
Total Sulphate as SO ₄	%	0.005	MCERTS	0.037	-	-		
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	170	42	45		
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.088	0.021	0.023		
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	87.5	21.2	22.7		
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	4.0	-	-		
Total Sulphur	%	0.005	MCERTS	0.017	-	-		
Organic Matter	%	0.1	MCERTS	1.3	5.0	2.6		
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	2	NONE	2.5	-	-		
Water Soluble Nitrate (2:1) as NO ₃ (leachate equivalent)	mg/l	5	NONE	< 5.0	-	-		

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.28	< 0.05		
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.32	< 0.05		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.24	< 0.05		
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.17	< 0.05		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Indeno(1 2 3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Dibenz(a h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	1.01	< 0.80		
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Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524751	1524752	1524753		
Sample Reference				TP1306	TP1308	TP1310		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.50	0.30	0.30		
Date Sampled				27/05/2020	26/05/2020	26/05/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.1	13	7.7		
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	1.1	1.1		
Boron (total)	mg/kg	1	MCERTS	2.8	2.8	2.9		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.2	< 0.2		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	21	18		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	28	23	13		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	18	43	33		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	39	20	16		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.7	2.7	2.7		
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	20	30	28		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	89	84	69		
Magnesium (water soluble)								
Magnesium (water soluble)	mg/kg	5	NONE	38	16	18		
Magnesium (leachate equivalent)								
Magnesium (leachate equivalent)	mg/l	2.5	NONE	19	-	-		



Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524751	1524752	1524753		
Sample Reference				TP1306	TP1308	TP1310		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.50	0.30	0.30		
Date Sampled				27/05/2020	26/05/2020	26/05/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	-		
Phenol	mg/kg	0.2	ISO 17025	-	-	-		
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	-		
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	-		
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-		
1 2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	-		
1 4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-		
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-		
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-		
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-		
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-		
4-Methylphenol	mg/kg	0.2	NONE	-	-	-		
Isophorone	mg/kg	0.2	MCERTS	-	-	-		
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-		
2 4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-		
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-		
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-		
Naphthalene	mg/kg	0.05	MCERTS	-	-	-		
2 4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-		
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-		
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-		
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-		
2 4 6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-		
2 4 5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-		
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-		
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-		
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-		
2 6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-		
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-		
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-		
2 4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-		
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-		
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	-		
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-		
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-		
Fluorene	mg/kg	0.05	MCERTS	-	-	-		
Azobenzene	mg/kg	0.3	MCERTS	-	-	-		
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-		
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-		
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-		
Anthracene	mg/kg	0.05	MCERTS	-	-	-		
Carbazole	mg/kg	0.3	MCERTS	-	-	-		
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-		
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-		
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-		
Pyrene	mg/kg	0.05	MCERTS	-	-	-		
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-		
Chrysene	mg/kg	0.05	MCERTS	-	-	-		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-		
Indeno(1 2 3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-		



Analytical Report Number: 20-12453

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15691

Lab Sample Number				1524751	1524752	1524753		
Sample Reference				TP1306	TP1308	TP1310		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.50	0.30	0.30		
Date Sampled				27/05/2020	26/05/2020	26/05/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

SVOCs TICs

Pesticide		N/A	NONE	-	-	-		
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Analytical Report Number : 20-12453

Project / Site name: Hoyland Common, Barnsley

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1524736	RC4101	None Supplied	1.50	Grey clay and sand with gravel.
1524737	RC4101	None Supplied	4.00	Grey clay and sand with coal.
1524738	RC4102	None Supplied	1.30	Grey clay.
1524739	RC4102	None Supplied	3.40	Grey clay.
1524740	RC4103	None Supplied	1.80	Brown clay.
1524741	RC4103	None Supplied	4.90	Light grey clay.
1524742	RC4104	None Supplied	2.30	Brown clay and sand with gravel.
1524743	RC4105	None Supplied	0.30	Brown clay and sand with vegetation.
1524744	TP1301	None Supplied	0.30	Brown clay and sand with rubble and vegetation.
1524745	TP1301	None Supplied	0.80	Grey clay and sand.
1524746	TP1302	None Supplied	0.30	Brown clay and loam with vegetation.
1524747	TP1303	None Supplied	0.30	Brown clay and loam with vegetation and gravel.
1524748	TP1304	None Supplied	0.30	Brown clay and loam with gravel and vegetation.
1524749	TP1305	None Supplied	0.20	-
1524750	TP1306	None Supplied	0.80	Brown clay.
1524751	TP1306	None Supplied	1.50	Brown clay and sand.
1524752	TP1308	None Supplied	0.30	Brown clay and sand.
1524753	TP1310	None Supplied	0.30	Brown clay and sand with vegetation.

Analytical Report Number : 20-12453

Project / Site name: Hoyland Common, Barnsley

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Nitrate, water soluble, in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	D	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Tentatively identified compounds (SVOC) in soil	Determination of semi-volatile organic compounds total ion count in soil by extraction with dichloromethane and hexane followed by GC-MS followed by a full library scan.	In-house method based on USEPA 8270	L064-PL	D	NONE
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Iss No 20-12453-3 Hoyland Common, Barnsley AG3080-19

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The results included within the report relate only to the sample(s) submitted for testing.

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**Fiona Connor**

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CV8 2LY

i2 Analytical Ltd.
7 Woodshots Meadow,
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WD18 8YS

Analytical Report Number : 20-13629

Project / Site name:	Hoyland Common, Barnsley	Samples received on:	10/06/2020
Your job number:	AG3080-19	Sample instructed/ Analysis started on:	11/06/2020
Your order number:	15713	Analysis completed by:	18/06/2020
Report Issue Number:	1	Report issued on:	18/06/2020
Samples Analysed:	3 water samples		

Karolina Marek
PL Head of Reporting Team

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 20-13629-1 Hoyland Common, Barnsley AG3080-19

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Analytical Report Number: 20-13629

Project / Site name: Hoyland Common, Barnsley

Your Order No: 15713

Lab Sample Number				1530985	1530986	1530987		
Sample Reference				RC4101	RC4102	RC4103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				5.50-5.95	3.10-3.45	10.70-11.15		
Date Sampled				09/06/2020	09/06/2020	09/06/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	6.8	6.5	7.0		
Sulphate as SO ₄	mg/l	0.045	ISO 17025	471	269	311		
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0		
Chloride	mg/l	0.15	ISO 17025	30	38	44		
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	3.74	10.7	2.52		
Nitrate as N	mg/l	0.01	ISO 17025	0.34	0.29	3.10		
Nitrate as NO ₃	mg/l	0.05	ISO 17025	1.52	1.27	13.7		
Nitrite as N	µg/l	1	ISO 17025	15	45	340		
Nitrite as NO ₂	µg/l	5	ISO 17025	48	150	1100		
Alkalinity	mgCaCO ₃ /l	3	ISO 17025	460	400	420		
Hardness - Total	mgCaCO ₃ /l	1	ISO 17025	750	461	483		

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16	< 0.16		
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Heavy Metals / Metalloids

Chromium (total)	µg/l	0.2	ISO 17025	< 0.2	0.6	< 0.2		
Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.29	0.55	0.41		
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1		
Boron (dissolved)	µg/l	10	ISO 17025	110	100	51		
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.32	0.52	0.25		
Calcium (dissolved)	mg/l	0.012	ISO 17025	140	100	97		
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2		
Copper (dissolved)	µg/l	0.5	ISO 17025	1.2	2.5	0.7		
Iron (dissolved)	mg/l	0.004	ISO 17025	0.012	0.070	0.010		
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2		
Magnesium (dissolved)	mg/l	0.005	ISO 17025	95	51	59		
Manganese (dissolved)	µg/l	0.05	ISO 17025	3800	3400	600		
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05		
Nickel (dissolved)	µg/l	0.5	ISO 17025	6.1	10	30		
Potassium (dissolved)	mg/l	0.025	ISO 17025	10	7.9	13		
Selenium (dissolved)	µg/l	0.6	ISO 17025	2.0	3.8	27		
Sodium (dissolved)	mg/l	0.01	ISO 17025	91	35	78		
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2		
Zinc (dissolved)	µg/l	0.5	ISO 17025	7.5	19	2.5		

U/S = Unsuitable Sample I/S = Insufficient Sample

Iss No 20-13629-1 Hoyland Common, Barnsley AG3080-19

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Analytical Report Number : 20-13629

Project / Site name: Hoyland Common, Barnsley

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Alkalinity in Water (by discrete analyser)	Determination of Alkalinity by discrete analyser (colorimetry). Accredited matrices: SW, PW, GW.	In house method based on MEWAM & USEPA Method 310.2.	L082-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Chloride in water	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025
Metals in water by ICP-MS (total)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Nitrate in water	Determination of nitrate by reaction with sodium salicylate and colorimetry. Accredited matrices SW, GW, PW	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	ISO 17025
Nitrite as N in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by discrete analyser (colorimetry). Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Nitrite in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by discrete analyser (colorimetry). Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

SOIL CHEMICAL RESULTS COMPARED AGAINST SCREENING VALUES FOR HUMAN HEALTH

Site: Hoyland Common, Barnsley
Job No: AG3080-19

Land Use: Residential with Plant Uptake
Dataset: Topsoil / Made Ground
Soil Organic Matter (%): 6.0 %

Exploratory Hole Reference		RC4105	TP1301	TP1302	TP1303	TP1304	TP1305	TP1308	TP1310	No. of samples (n)	Residential with Plant Uptake	Commercial / Industrial	Source/Justification
Depth (m)		0.30	0.30	0.30	0.30	0.30	0.20	0.30	0.30				
Strata		TS/MG	TS/MG	TS/MG	TS/MG	TS/MG	TS/MG	TS/MG	TS/MG				
	Units												
Organic Matter (%)	%			4.4	4.2			5	2.6	4			
pH	pH Units			7.1	7			7.1	7.8	4			
Arsenic	mg/kg			9.9	9.2			13	7.7	4	37	640	LQM/CIEH S4UL (2015)
Beryllium	mg/kg			1.1	1.6			1.1	1.1	4	1.7	12	LQM/CIEH S4UL (2015)
Boron - Total	mg/kg			3.2	2.9			2.8	2.9	4	290	240000	LQM/CIEH S4UL (2015)
Cadmium	mg/kg			0.2	0.2			0.2	0.2	4	11	190	LQM/CIEH S4UL (2015)
Chromium (total)	mg/kg			23	23			21	18	4	910	8600	LQM/CIEH S4UL (2015)
Copper	mg/kg			25	23			23	13	4	2400	68000	LQM/CIEH S4UL (2015)
Lead	mg/kg			36	36			43	33	4	200	2330	C4SL (2014)
Magnesium	mg/kg			18	15			16	18	4			
Mercury (Total)	mg/kg			0.3	0.3			0.3	0.3	4	40	1100	LQM/CIEH S4UL (2015)
Nickel	mg/kg			27	38			20	16	4	130	980	LQM/CIEH S4UL (2015)
Selenium	mg/kg			2.5	3.3			2.7	2.7	4	250	12000	LQM/CIEH S4UL (2015)
Vanadium	mg/kg			28	32			30	28	4	410	9000	LQM/CIEH S4UL (2015)
Zinc	mg/kg			86	100			84	69	4	3700	730000	LQM/CIEH S4UL (2015)
Naphthalene	mg/kg			0.05	0.05			0.05	0.05	4	13	1100	LQM/CIEH S4UL (2015)
Acenaphthylene	mg/kg			0.05	0.05			0.05	0.05	4	1100	100000	LQM/CIEH S4UL (2015)
Acenaphthene	mg/kg			0.05	0.05			0.05	0.05	4	920	100000	LQM/CIEH S4UL (2015)
Fluorene	mg/kg			0.05	0.05			0.05	0.05	4	860	71000	LQM/CIEH S4UL (2015)
Phenanthrene	mg/kg			0.39	0.33			0.05	0.05	4	440	23000	LQM/CIEH S4UL (2015)
Anthracene	mg/kg			0.12	0.11			0.05	0.05	4	11000	540000	LQM/CIEH S4UL (2015)
Fluoranthene	mg/kg			0.24	0.3			0.28	0.05	4	890	23000	LQM/CIEH S4UL (2015)
Pyrene	mg/kg			0.31	0.37			0.32	0.05	4	2000	54000	LQM/CIEH S4UL (2015)
Benzo[a]anthracene	mg/kg			0.05	0.05			0.24	0.05	4	13	180	LQM/CIEH S4UL (2015)
Chrysene	mg/kg			0.05	0.05			0.17	0.05	4	27	350	LQM/CIEH S4UL (2015)
Benzo[b]fluoranthene	mg/kg			0.05	0.05			0.05	0.05	4	3.7	45	LQM/CIEH S4UL (2015)
Benzo[k]fluoranthene	mg/kg			0.05	0.05			0.05	0.05	4	100	1200	LQM/CIEH S4UL (2015)
Benzo[a]pyrene	mg/kg			0.05	0.05			0.05	0.05	4	3	36	LQM/CIEH S4UL (2015)
Dibenzo[a,h]anthracene	mg/kg			0.05	0.05			0.05	0.05	4	0.3	3.6	LQM/CIEH S4UL (2015)
Indeno[1,2,3-cd]pyrene	mg/kg			0.05	0.05			0.05	0.05	4	41	510	LQM/CIEH S4UL (2015)
Benzo[g,h,i]perylene	mg/kg			0.05	0.05			0.05	0.05	4	350	4000	LQM/CIEH S4UL (2015)
Total of 16 PAHs	mg/kg			1.06	1.11			1 01	0.8	4			
										0			
Asbestos ID	Detection	ND		ND			ND		ND	4			Detection Limit
Asbestos ID	Description	-		-			-		-	-			Detection Limit
Asbestos Quantity	%	-		-			-		-	-			Detection Limit

Key -
Value within sample set exceeds screening value
TS/MG - Topsoil/Made Ground

LQM/CIEH S4UL Reference No. S4UL3159 (2015)
Values in **bold** are reported at the laboratory limit of detection

SOIL CHEMICAL RESULTS COMPARED AGAINST SCREENING VALUES FOR HUMAN HEALTH

Site: Hoyland Common, Barnsley
Job No: AG3080-19

Land Use: Commercial / Industrial
Dataset: Made Ground
Soil Organic Matter (%): 2.5 %

Exploratory Hole Reference		RC4101	RC4102	RC4102	RC4103	RC4103	RC4104	TP1301	TP1306	TP1306	No. of samples (n)	Commercial / Industrial	Source/Justification
Depth (m)		4.00	1.30	3.40	1.80	4.90	2.30	0.80	0.80	1.50			
Strata		MG-OC	MG-OC	MG-OC	MG-OC	MG-OC	MG-OC	MG-OC	MG-OC	MG-OC			
	Units												
Organic Matter (%)	%	3.3	2.6	4	0.7	1.1	1.7	4	0.6	1.3	9		
pH	pH Units	7	6.7	6.7	7	7.9	7.7	8	7.2	7.2	9		
Arsenic	mg/kg	4.6	2.9	4.1	4.3	4.3	6 2	5.1	4	6.1	9	640	LQM/CIEH S4UL (2015)
Beryllium	mg/kg	1.2	1.2	1.4	1.1	1.1	1.2	1.2	1.1	1.1	9	12	LQM/CIEH S4UL (2015)
Boron - Total	mg/kg	4.6	5.2	5.6	3.2	4	3.7	5.6	2.8	2.8	9	240000	LQM/CIEH S4UL (2015)
Cadmium	mg/kg	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	9	190	LQM/CIEH S4UL (2015)
Chromium (total)	mg/kg	22	25	26	23	5.6	26	22	23	21	9	8600	LQM/CIEH S4UL (2015)
Copper	mg/kg	35	41	40	29	51	31	45	27	28	9	68000	LQM/CIEH S4UL (2015)
Lead	mg/kg	19	18	26	15	19	21	21	16	18	9	2330	C4SL (2014)
Magnesium	mg/kg	38	54	5.6	50	45	22	25	37	38			
Mercury (Total)	mg/kg	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	9	1100	LQM/CIEH S4UL (2015)
Nickel	mg/kg	43	42	44	41	29	45	41	44	39	9	980	LQM/CIEH S4UL (2015)
Selenium	mg/kg	1	1	1	1	1.4	1.9	2.1	2.3	1.7	9	12000	LQM/CIEH S4UL (2015)
Vanadium	mg/kg	20	19	22	17	6.4	22	20	25	20	9	9000	LQM/CIEH S4UL (2015)
Zinc	mg/kg	98	110	110	100	37	110	91	96	89	9	730000	LQM/CIEH S4UL (2015)
Naphthalene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	460	LQM/CIEH S4UL (2015)
Acenaphthylene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	97000	LQM/CIEH S4UL (2015)
Acenaphthene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	97000	LQM/CIEH S4UL (2015)
Fluorene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	68000	LQM/CIEH S4UL (2015)
Phenanthrene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	22000	LQM/CIEH S4UL (2015)
Anthracene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	540000	LQM/CIEH S4UL (2015)
Fluoranthene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	23000	LQM/CIEH S4UL (2015)
Pyrene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	54000	LQM/CIEH S4UL (2015)
Benzo[a]anthracene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	170	LQM/CIEH S4UL (2015)
Chrysene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	350	LQM/CIEH S4UL (2015)
Benzo[b]fluoranthene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	44	LQM/CIEH S4UL (2015)
Benzo[k]fluoranthene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	1200	LQM/CIEH S4UL (2015)
Benzo[a]pyrene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	35	LQM/CIEH S4UL (2015)
Dibenzo[a,h]anthracene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	3.6	LQM/CIEH S4UL (2015)
Indeno[1,2,3-cd]pyrene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	510	LQM/CIEH S4UL (2015)
Benzo[g,h,i]perylene	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	9	4000	LQM/CIEH S4UL (2015)
Total of 16 PAHs	mg/kg	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	9		

Key -
Value within sample set exceeds screening value
MG-OC - Made Ground Opencast fill

LQM/CIEH S4UL Reference No. S4UL3159 (2015)
Values in **bold** are reported at the laboratory limit of detection

SUMMARY OF GROUNDWATER RESULTS

Site Hoyland Common, Barnsley
Job Number AG3080-19
Type of Water Groundwater

Determinand	Limit of Detection	Hazardous or Non-Hazardous [^]	Sample Identity Depth Sampled Date	RC4101 5.50-5.95 09/06/2020	RC4102 3.10-3.45 09/06/2020	RC4103 10.70-11.15 09/06/2020	No. of samples (n)	Waters Screening Value	Source & Justification
Hardness		-	mg l ⁻¹	750	461	483	3	-	-
pH		-	-	6.8	6.5	7	3	-	-
TOC		-	mg l ⁻¹	3.74	10.7	2.52	3	-	-
Arsenic		Haz	µg l ⁻¹	0.29	0.55	0.41	3	50	WFD Environmental Standard, 2010
Cadmium		Non Haz	µg l ⁻¹	0.32	0.52	0.25	3	1.5	WFD Environmental Standard, 2010
Chromium (Total)		Non Haz	µg l ⁻¹	0.2	0.6	0.2	3	50	UK Drinking Water Standards (2010)
Chromium (III)		Non Haz	µg l ⁻¹	0.2	0.2	0.2	3	32	WFD Environmental Standard, 2010
Copper		Non Haz	µg l ⁻¹	1.2	2.5	0.7	3	28	WFD Environmental Standard, 2010
Lead		Haz	µg l ⁻¹	0.2	0.2	0.2	3	7.2	WFD Environmental Standard, 2010
Mercury		Haz	µg l ⁻¹	0.05	0.05	0.05	3	0.07	WFD Environmental Standard, 2010
Nickel		Non Haz	µg l ⁻¹	6.1	10	30	3	20	WFD Environmental Standard, 2010
Selenium		Non Haz	µg l ⁻¹	2	3.8	27	3	10	UK Drinking Water Standards (2010)
Zinc		Non Haz	µg l ⁻¹	7.5	19	2.5	3	125	WFD Environmental Standard, 2010
Boron		Non Haz	µg l ⁻¹	110	100	51	3	1000	UK Drinking Water Standards (2010)
Beryllium		Non Haz	µg l ⁻¹	0.1	0.1	0.1	3	12	UK Drinking Water Standards (2010)
Vanadium		Non Haz	µg l ⁻¹	0.2	0.2	0.2	3	60	EQS
Sodium		Non Haz	mg l ⁻¹	91	35	78	3		
Calcium		Non Haz	mg l ⁻¹	140	100	97	3		
Iron		Non Haz	mg l ⁻¹	0.012	0.07	0.01	3		
Manganese		Non Haz	µg l ⁻¹	3800	3400	600	3		
Potassium		Non Haz	mg l ⁻¹	10	7.9	13	3		
Magnesium		Non Haz	mg l ⁻¹	95	51	59	3		
Sulphate		Non Haz	mg l ⁻¹	471	269	311	3	250	UK Drinking Water Standards (2010)
Sulphide		Non Haz	µg l ⁻¹	5	5	5	3	0.25	UK Drinking Water Standards (2010)
Naphthalene		Non Haz	µg l ⁻¹	0.01	0.01	0.01	3	2.4	WFD Environmental Standard, 2010
Acenaphthylene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Acenaphthene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Fluorene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Phenanthrene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Anthracene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.4	WFD Environmental Standard, 2010
Fluoranthene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	1	WFD Environmental Standard, 2010
Pyrene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Benzo[a]anthracene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Chrysene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Benzo[b]fluoranthene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.03	WFD Environmental Standard, 2010
Benzo[k]fluoranthene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.03	WFD Environmental Standard, 2010
Benzo[a]pyrene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.1	WFD Environmental Standard, 2010
Dibenz(a,h)Anthracene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.5	Detection limit
Indeno(1,2,3-c,d)Pyrene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.002	WFD Environmental Standard, 2010
Benzo[g,h,i]perylene		Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.002	WFD Environmental Standard, 2010

Key-

Result exceeds test Detection Limit (for Haz determinands)

Result exceeds Screening Value (for Non Haz determinands)

Values in bold at the limit of detection

[^] Note:

Hazardous and non-hazardous substances determined by JAGDAG (Jan 2017) and published at <http://www.wfduk.org/sites/default/files/Media/170116%20Substance%20Determinationsfinal.pdf>. These are marked in bold.

For substances not assessed by JAGDAG, Applied Geology has assumed a determination based on our understanding of the behaviour of the chemical. These determinations are highlighted in yellow.

Analysis Report

Report Number: 20/JUN/COA/798273

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: TP 1035 - 3.5M-4.0M 03/02/20

Quote Ref:

Date Sampled: 3 February 2020

Date Received: 16 June 2020

Test Date: 16 June 2020 to 7 July 2020

Date Reported: 7 July 2020

Laboratory References

Sample Matrix: COAL

Sample Number: 798273

6m Bottle:

72m Bottle: 1249

Bio Bottle: -

Samples prepared using UKAS accredited methods in accordance with UKAS schedule No.0001

The results relate only to the sample tested

Analysis was undertaken at the following location(s):

SOCOTEC UK Limited, Bretby Business Park, Ashby Road, Burton upon Trent, DE15 0YZ

* Denotes calculated values.

** Non accredited method for this matrix.

*** Sub contracted test, UKAS accredited.

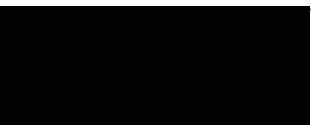
**** Sub contracted test, non-UKAS accredited.

Customer Supplied Result.

I/S Insufficient sample to test.

U/S unsuitable sample to test.

This sample was taken by a 3rd party and submitted to SOCOTEC UK Limited for analysis



Stephen Winfield

Head of Reporting

For and on behalf of SOCOTEC UK Limited

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Analysis Report

Report Number: 20/JUN/COA/798273

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: TP 1035 - 3.5M-4.0M 03/02/20

Laboratory References

Date Sampled: 3 February 2020

Sample Number: 798273

Date Received: 16 June 2020

6m Bottle:

Test Date: 16 June 2020 to 7 July 2020

72m Bottle: 1249

Date Reported: 7 July 2020

Bio Bottle: -

			Results Basis			
Test	Method Reference	Units	As Received *	As Analysed	Dry *	Dry Ash Free *
Analysis Moisture	CA2	%	-	4.8	-	-
Ash	CA3	%	-	15.8	-	-

Analysis Report Floats and Sinks

Report Number: 20/JUN/COA/798273

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: TP 1035 - 3.5M-4.0M 03/02/20

Laboratory References

Date Sampled: 3 February 2020

Sample Number: 798273

Date Received: 16 June 2020

6m Bottle:

Test Date: 16 June 2020 to 7 July 2020

72m Bottle: 1249

Date Reported: 7 July 2020

Bio Bottle: -

Method	Gravity	% Weight
**	Flt 1.60	0.5
**	Snk 1.60	99.5

Not UKAS accredited for gravity above 1.60

--END OF REPORT--

Analysis Report

Report Number: 20/JUN/COA/798274

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: TP1052 - 2M 03/02/20

Quote Ref:

Date Sampled: 3 February 2020

Date Received: 16 June 2020

Test Date: 16 June 2020 to 7 July 2020

Date Reported: 7 July 2020

Laboratory References

Sample Matrix: COAL

Sample Number: 798274

6m Bottle:

72m Bottle: 2831

Bio Bottle: -

Samples prepared using UKAS accredited methods in accordance with UKAS schedule No.0001

The results relate only to the sample tested

Analysis was undertaken at the following location(s):

SOCOTEC UK Limited, Bretby Business Park, Ashby Road, Burton upon Trent, DE15 0YZ

* Denotes calculated values.

** Non accredited method for this matrix.

*** Sub contracted test, UKAS accredited.

**** Sub contracted test, non-UKAS accredited.

Customer Supplied Result.

I/S Insufficient sample to test.

U/S unsuitable sample to test.

This sample was taken by a 3rd party and submitted to SOCOTEC UK Limited for analysis

Report Authorised By:

Stephen Winfield

Head of Reporting

For and on behalf of SOCOTEC UK Limited

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Analysis Report

Report Number: 20/JUN/COA/798274

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: TP1052 - 2M 03/02/20

Laboratory References

Date Sampled: 3 February 2020

Sample Number: 798274

Date Received: 16 June 2020

6m Bottle:

Test Date: 16 June 2020 to 7 July 2020

72m Bottle: 2831

Date Reported: 7 July 2020

Bio Bottle: -

			Results Basis			
Test	Method Reference	Units	As Received *	As Analysed	Dry *	Dry Ash Free *
Analysis Moisture	CA2	%	-	4.3	-	-
Ash	CA3	%	-	20.3	-	-

Analysis Report Floats and Sinks

Report Number: 20/JUN/COA/798274

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: TP1052 - 2M 03/02/20

Laboratory References

Date Sampled: 3 February 2020

Sample Number: 798274

Date Received: 16 June 2020

6m Bottle:

Test Date: 16 June 2020 to 7 July 2020

72m Bottle: 2831

Date Reported: 7 July 2020

Bio Bottle: -

Method	Gravity	% Weight
**	Flt 1.60	3.4
**	Snk 1.60	96.6

Not UKAS accredited for gravity above 1.60

--END OF REPORT--

Analysis Report

Report Number: 20/JUN/COA/798275

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: RC4006 - RC4006 - 3M-5M 04/02/20

Quote Ref:

Date Sampled: 4 February 2020

Date Received: 16 June 2020

Test Date: 16 June 2020 to 7 July 2020

Date Reported: 7 July 2020

Laboratory References

Sample Matrix: COAL

Sample Number: 798275

6m Bottle:

72m Bottle: 1909

Bio Bottle: -

Samples prepared using UKAS accredited methods in accordance with UKAS schedule No.0001

The results relate only to the sample tested

Analysis was undertaken at the following location(s):

SOCOTEC UK Limited, Bretby Business Park, Ashby Road, Burton upon Trent, DE15 0YZ

* Denotes calculated values.

** Non accredited method for this matrix.

*** Sub contracted test, UKAS accredited.

**** Sub contracted test, non-UKAS accredited.

Customer Supplied Result.

I/S Insufficient sample to test.

U/S unsuitable sample to test.

This sample was taken by a 3rd party and submitted to SOCOTEC UK Limited for analysis

Report Authorised By:

Stephen Winfield

Head of Reporting

For and on behalf of SOCOTEC UK Limited

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Analysis Report

Report Number: 20/JUN/COA/798275

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: RC4006 - RC4006 - 3M-5M 04/02/20

Laboratory References

Date Sampled: 4 February 2020

Sample Number: 798275

Date Received: 16 June 2020

6m Bottle:

Test Date: 16 June 2020 to 7 July 2020

72m Bottle: 1909

Date Reported: 7 July 2020

Bio Bottle: -

			Results Basis			
Test	Method Reference	Units	As Received *	As Analysed	Dry *	Dry Ash Free *
Analysis Moisture	CA2	%	-	6.6	-	-
Ash	CA3	%	-	10.5	-	-

Analysis Report Floats and Sinks

Report Number: 20/JUN/COA/798275

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: RC4006 - RC4006 - 3M-5M 04/02/20

Laboratory References

Date Sampled: 4 February 2020

Sample Number: 798275

Date Received: 16 June 2020

6m Bottle:

Test Date: 16 June 2020 to 7 July 2020

72m Bottle: 1909

Date Reported: 7 July 2020

Bio Bottle: -

Method	Gravity	% Weight
**	Flt 1.60	2.9
**	Snk 1.60	97.1

Not UKAS accredited for gravity above 1.60

--END OF REPORT--

Analysis Report

Report Number: 20/JUN/COA/798276

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: TP1312 - 1M-2M 01/06/20

Quote Ref:

Date Sampled: 1 June 2020

Date Received: 16 June 2020

Test Date: 16 June 2020 to 7 July 2020

Date Reported: 7 July 2020

Laboratory References

Sample Matrix: COAL

Sample Number: 798276

6m Bottle:

72m Bottle: 4618

Bio Bottle: -

Samples prepared using UKAS accredited methods in accordance with UKAS schedule No.0001

The results relate only to the sample tested

Analysis was undertaken at the following location(s):

SOCOTEC UK Limited, Bretby Business Park, Ashby Road, Burton upon Trent, DE15 0YZ

* Denotes calculated values.

** Non accredited method for this matrix.

*** Sub contracted test, UKAS accredited.

**** Sub contracted test, non-UKAS accredited.

Customer Supplied Result.

I/S Insufficient sample to test.

U/S unsuitable sample to test.

This sample was taken by a 3rd party and submitted to SOCOTEC UK Limited for analysis

Report Authorised By:

Stephen Winfield

Head of Reporting

For and on behalf of SOCOTEC UK Limited

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Analysis Report

Report Number: 20/JUN/COA/798276

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: TP1312 - 1M-2M 01/06/20

Laboratory References

Date Sampled: 1 June 2020

Sample Number: 798276

Date Received: 16 June 2020

6m Bottle:

Test Date: 16 June 2020 to 7 July 2020

72m Bottle: 4618

Date Reported: 7 July 2020

Bio Bottle: -

			Results Basis			
Test	Method Reference	Units	As Received *	As Analysed	Dry *	Dry Ash Free *
Analysis Moisture	CA2	%	-	8.8	-	-
Ash	CA3	%	-	12.7	-	-

Analysis Report Floats and Sinks

Report Number: 20/JUN/COA/798276

Supplier: Applied Geology
Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Site: Hoyland Common

Grade: 42109

Our Ref: Coal

Customer Ref: TP1312 - 1M-2M 01/06/20

Laboratory References

Date Sampled: 1 June 2020

Sample Number: 798276

Date Received: 16 June 2020

6m Bottle:

Test Date: 16 June 2020 to 7 July 2020

72m Bottle: 4618

Date Reported: 7 July 2020

Bio Bottle: -

Method	Gravity	% Weight
**	Flt 1.60	2.9
**	Snk 1.60	97.1

Not UKAS accredited for gravity above 1.60

--END OF REPORT--

APPENDIX G



TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Mr Stuart Day
Applied Geology Limited
Unit 23 Abbey Park
Stareton
Kenilworth
Warwickshire CV8 2LY

4th June 2020
Our Ref: TOHA/20/9497/SS
Your Ref: PO 15683

Dear Sirs

Topsoil Analysis Report: Hoyland Common (AG3080-19)

We have completed the analysis of the soil samples recently submitted, referenced *TP1303* and *TP1310*, and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the samples for general landscape purposes (trees, shrubs, amenity grass). In addition, these samples have been assessed to determine their compliance with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

This report presents the results of analysis for the samples submitted to our office, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification testing, validation testing or waste designation purposes.

SAMPLE EXAMINATION

The samples were similar in appearance and were described as dark grey (Munsell Colour 7.5YR 4/1) to very dark grey (Munsell Colour 7.5YR 3/1), slightly moist, friable, non-calcareous CLAYS with well developed, medium to very coarse, sub-angular blocky to angular blocky ('cloddy') structures*. The samples were virtually stone free and no unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

*This appraisal of soil structure was made from examination of a disturbed samples. Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

Tim O'Hare Associates LLP
Howbery Park Wallingford Oxfordshire OX10 8BA
T:01491 822653 E:info@toha.co.uk
www.toha.co.uk

ANALYTICAL SCHEDULE

The samples were submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- particle size analysis (sand, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn);
- total cyanide and total (mono) phenols;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX).

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

RESULTS OF ANALYSIS

Particle Size Analysis

The samples fell into the *clay* texture class and the soil would be described as very heavy in texture. Such soils have physical limitations for use in general landscaping. The high clay content of these soils is likely to make them, at best, only very slowly permeable. The soils would also be prone to structural degradation and compaction during handling, and especially when plastic in consistency. Any damage to the structural condition of the soils is likely to further reduce their drainage and aeration properties.

This texture class may be considered suitable for more robust landscape applications, including hardy trees and shrubs and amenity grass (low foot traffic only), provided the physical condition of the soil is satisfactory and provided species tolerant of moisture retentive, heavy soil are selected. The soils would not be suited to more demanding planting environments or plant species that require or prefer light or free-draining soil.

In addition, smaller plant stock, such as whips and transplants, would be more suited than containerised or rootballed stock, as they tend to be more tolerant of adverse soil conditions. The soils would probably not be suitable for use as a backfill material for tree pits.

Stone Content

The samples were stoneless to virtually stone free and, as such, stones should not restrict the use of the soils for general landscape purposes.

pH and Electrical Conductivity Values

The samples were slightly acid to slightly alkaline in reaction (pH 6.8 - 7.1), with a pH range that would be considered ideal for general landscape purposes.

The electrical conductivity (salinity) values (water extract) were low to very low. The very low salinity itself would not present any growth restrictions on plants; however, the low levels of salts in solution may suggest possible deficiencies in available plant nutrients (as demonstrated within the nutrient analysis discussed below).

The electrical conductivity values by CaSO₄ extract (BS3882 requirement) fell below the maximum specified value (3300 µS/cm) given in BS3882:2015 – Table 1.

Organic Matter and Fertility Status

The samples were adequately supplied with organic matter, total nitrogen and extractable magnesium, but were very deficient in extractable phosphorus and extractable potassium. These deficiencies could be remedied by routine fertiliser application.

The C:N ratio of the samples were acceptable for general landscape purposes.

Potential Contaminants

With reference to BS3882:2015 - Table 1: Notes 3 and 4, there is a requirement to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with homegrown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels (C4SLs) for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

Phytotoxic Contaminants

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in BS3882:2015 – Table 1.

CONCLUSION

The purpose of the analysis was to determine the suitability of the samples for general landscape purposes (trees, shrubs, amenity grass). In addition, these samples have been assessed to determine its compliance with the requirements of the British Standard for Topsoil (BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil).

Summary of Findings

From the soil examination and subsequent laboratory analysis, the samples were described as slightly acid to slightly alkaline, non-saline, non-calcareous clays with low stone contents. The samples contained sufficient reserves of organic matter, total nitrogen and extractable magnesium but were deficient in extractable phosphorus and extractable potassium. Of the potential contaminants determined, none exceeded their respective guideline values.

Suitability for Re-Use

To conclude, based on our findings, the topsoil represented by these samples would only be considered suitable for use in more robust landscape applications (e.g. hardy bareroot stock and amenity grass – low footfall areas). This is provided the following conditions are met:

- the physical condition of the soil is at its optimum;
- species tolerant of heavy, moisture retentive soils are selected;
- the nutrient deficiencies are addressed by fertiliser application;

In order to prepare the topsoils for planting, turfing or seeding, they will need to be cultivated to improve their soil structure and create a fine tilth.

If this topsoil is to be stripped and then respread on site, to minimise the risk of self-compaction and anaerobism, we recommend that the topsoil is not replaced any deeper than **300mm**.

Compliance with BS3882:2015 Multipurpose Topsoil

The samples were not compliant with the requirements of the British Standard for Topsoil (BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil) due to the following parameters:

- particle size distribution (high clay content and low sand content);
- extractable phosphorus and potassium deficiencies;

RECOMMENDATIONS

Fertiliser for Planting

To address the nutrient deficiencies and to help promote effective plant establishment, we recommend applying and incorporating the compound, slow release fertiliser *ICL Enmag CRF* (11%N:21%P₂O₅:9%K₂O:6%MgO) at a rate of 100 g/m² and to a depth of 200mm.

Fertiliser for Amenity Grass Establishment

To address the nutrient deficiencies and to help promote effective grass establishment, we recommend applying and incorporating the pre-seeding grass fertiliser *ICL Sportsmaster Pre-seeder* (8%N:12%P₂O₅:8%K₂O+3%MgO) prior to seeding or turfing at a rate of 50 g/m² and to a depth of 100mm.

Soil Handling Recommendations

The heavy texture of this topsoil will make it particularly vulnerable to physical degradation (compaction) during all phases of soiling and landscape works. It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking, and soil handling should be stopped during and after heavy rainfall, and not continued until the soil has returned to a friable state. If this soil is damaged its potential for re-use will be limited. Therefore, to maintain the physical condition of the soil and avoid structural damage, all phases of soil handling operations (e.g. stockpiling, resspreading, cultivating, and planting, seeding or turfing) should only be carried out when the soil is reasonably dry and non-plastic (friable) in consistency.

If the soil is structurally damaged and compacted at any stage during the course of soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

Further details on soil handling are provided in Annex A of BS3882:2015.

Further guidance on the management, preparation and handling of soils is provided in the DEFRA publication *Construction code of practice for the sustainable use of soils on construction sites*, 2009

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully

Matthew Lowry
BSc MSc
Graduate Soil Scientist

Tim White
BSc MSc MSoilSci CSci
Senior Associate

For & on behalf of Tim O'Hare Associates LLP



TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client:	Applied Geology Limited
Project:	Hoyland Common (AG-3080-19)
Job:	Topsoil Analysis (BS3882:2015)
Date:	04/06/2020
Job Ref No:	TOHA/20/9497/SS

Sample Reference		Accreditation
Clay (<0.002mm)	%	UKAS
Silt (0.002-0.063mm)	%	UKAS
Sand (0.063-2.0mm)	%	UKAS
Texture Class (UK Classification)	--	UKAS
Stones (2-20mm)	% DW	GLP
Stones (20-50mm)	% DW	GLP
Stones (>50mm)	% DW	GLP

TP1303
58
36
6
C
1
1
0

TP1310
40
41
19
C
0
0
0

pH Value (1:2.5 water extract)	units	UKAS
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS
Electrical Conductivity (1:2 CaSO ₄ extract)	uS/cm	UKAS
Exchangeable Sodium Percentage	%	UKAS
Organic Matter (LOI)	%	UKAS
Total Nitrogen (Dumas)	%	UKAS
C : N Ratio	ratio	UKAS
Extractable Phosphorus	mg/l	UKAS
Extractable Potassium	mg/l	UKAS
Extractable Magnesium	mg/l	UKAS

6.8
97
2090
1.0
5.9
0.21
17
6
86
397

7.1
59
2016
0.7
5.7
0.18
18
6
50
143

Total Arsenic (As)	mg/kg	MCERTS
Total Cadmium (Cd)	mg/kg	MCERTS
Total Chromium (Cr)	mg/kg	MCERTS
Hexavalent Chromium (Cr VI)	mg/kg	MCERTS
Total Copper (Cu)	mg/kg	MCERTS
Total Lead (Pb)	mg/kg	MCERTS
Total Mercury (Hg)	mg/kg	MCERTS
Total Nickel (Ni)	mg/kg	MCERTS
Total Selenium (Se)	mg/kg	MCERTS
Total Zinc (Zn)	mg/kg	MCERTS
Water Soluble Boron (B)	mg/kg	MCERTS
Total Cyanide (CN)	mg/kg	MCERTS
Total (mono) Phenols	mg/kg	MCERTS

12
< 0.2
25
< 4.0
23
40
< 0.3
29
< 1.0
99
1.3
< 1
< 1.0

12
< 0.2
20
< 4.0
18
49
< 0.3
19
< 1.0
89
1.5
< 1
< 1.0

Naphthalene	mg/kg	MCERTS
Acenaphthylene	mg/kg	MCERTS
Acenaphthene	mg/kg	MCERTS
Fluorene	mg/kg	MCERTS
Phenanthrene	mg/kg	MCERTS
Anthracene	mg/kg	MCERTS
Fluoranthene	mg/kg	MCERTS
Pyrene	mg/kg	MCERTS
Benz(a)anthracene	mg/kg	MCERTS
Chrysene	mg/kg	MCERTS
Benzo(b)fluoranthene	mg/kg	MCERTS
Benzo(k)fluoranthene	mg/kg	MCERTS
Benzo(a)pyrene	mg/kg	MCERTS
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS
Dibenzo(a,h)anthracene	mg/kg	MCERTS
Benzo(g,h,i)perylene	mg/kg	MCERTS
Total PAHs (sum USEPA16)	mg/kg	MCERTS

< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.80

< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
< 0.05
0.34
0.29
0.3
0.26
0.43
0.17
0.24
0.24
< 0.05
0.22
2.5

Aliphatic TPH >C5 - C6	mg/kg	MCERTS
Aliphatic TPH >C6 - C8	mg/kg	MCERTS
Aliphatic TPH >C8 - C10	mg/kg	MCERTS
Aliphatic TPH >C10 - C12	mg/kg	MCERTS
Aliphatic TPH >C12 - C16	mg/kg	MCERTS
Aliphatic TPH >C16 - C21	mg/kg	MCERTS
Aliphatic TPH >C21 - C35	mg/kg	MCERTS
Aliphatic TPH (C5 - C35)	mg/kg	MCERTS
Aromatic TPH >C5 - C7	mg/kg	MCERTS
Aromatic TPH >C7 - C8	mg/kg	MCERTS
Aromatic TPH >C8 - C10	mg/kg	MCERTS
Aromatic TPH >C10 - C12	mg/kg	MCERTS
Aromatic TPH >C12 - C16	mg/kg	MCERTS
Aromatic TPH >C16 - C21	mg/kg	MCERTS
Aromatic TPH >C21 - C35	mg/kg	MCERTS
Aromatic TPH (C5 - C35)	mg/kg	MCERTS

< 0.001
< 0.001
< 0.001
< 1.0
< 2.0
< 8.0
< 8.0
< 10
< 0.001
< 0.001
< 0.001
< 1.0
< 2.0
< 10
< 10
< 10

< 0.001
< 0.001
< 0.001
< 1.0
< 2.0
< 8.0
< 8.0
< 10
< 0.001
< 0.001
< 0.001
< 1.0
< 2.0
< 10
< 10
< 10

Benzene	mg/kg	MCERTS
Toluene	mg/kg	MCERTS
Ethylbenzene	mg/kg	MCERTS
p & m-xylene	mg/kg	MCERTS
o-xylene	mg/kg	MCERTS
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	MCERTS

< 0.001
< 0.001
< 0.001
< 0.001
< 0.001
< 0.001

< 0.001
< 0.001
< 0.001
< 0.001
< 0.001
< 0.001

C = CLAY

Visual Examination

The samples were similar in appearance and were described as dark grey (Munsell Colour 7.5YR 4/1) to very dark grey (Munsell Colour 7.5YR 3/1), slightly moist, non-calcareous CLAYS with well developed, medium to very coarse, sub-angular blocky to angular blocky ('cloddy') structures. The samples were virtually stone free and no unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

Results of analysis should be read in conjunction with the report they were issued with

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Matthew Lowry
BSc MSc
Graduate Soil Scientist

APPENDIX H

Risk ID	Hazard	Consequences	Qualitative Risk Level (High /Medium/Low/ Negligible)	Comments & Possible Mitigation Measures
P1	Inability for balancing pond to retain sufficient water - water drains out of pond through permeable materials, voids within material or through features associated with historic coal/ironstone mining activities (i.e. old shafts).	- Increased construction costs - Programme delays - Construction difficulties Water not retained leading to ingress of water into backfill materials causes inundation settlement and collapse of materials/excessive settlement. Ingress of water into neighbouring historic mine workings/shafts, which are being monitored by the Coal Authority.	High	Ground investigation identified some backfill materials to be relatively permeable. Mitigate this hazard by designing the balancing pond to include a suitably impermeable liner.
P2	Slope instability – cut slopes of balancing pond.	- Increased construction costs - Programme delays - Construction difficulties Collapse of pond sides leading to lack of function of pond and water loss.	Medium/High	Ground investigation identified opencast materials as likely to be unstable on cut slopes at steep angles. Ensure safe slope angle for cut faces, consider re-engineering of cut slope where composed of opencast materials. Consider suitable engineered fill placement so as not to create artificial slip surfaces between re-engineered layers. Ensure impermeable liner functions to prevent weakening of materials from saturation.
P3	High existing ground water levels within opencast materials and/or sub-artesian groundwater pressures within Pennine Middle Coal Measures Formation.	- Increased construction costs - Programme delays - Construction difficulties Lack of capacity in the pond. Groundwater ingress into cutting during construction and issues with designing impermeable liner (buoyancy?)	Medium	Some high water levels recorded during post-fieldwork monitoring. Design pond accordingly. Possible dewatering needed during construction or further consideration of groundwater levels needed in designing pond geometry.
P4	Untreated and unrecorded mineshafts.	- Increased construction costs - Programme delays - Construction difficulties Would require Coal Authority consultation and prior agreement for any treatment/capping works. Could impact pond location/geometry.	Low	None identified during site works in locations indicated on abandonment plans. Ensure during excavation of materials a suitability qualified person present to check for ground anomalies and evidence of unrecorded shafts during construction of pond.

P5	Contamination within opencast backfill materials	Increased construction costs and programme delays due to materials being unsuitable for re-use on site and need to either dispose off-site, undertake on-site remediation and need for double handling.	Low	SI suggests no contamination present. Include procedures on measures to deal with unexpected contamination in earthworks specification and/or contract documents.
P6	Sulphate-rich, potentially pyritic ground and acidic conditions	- Increased costs for buried concrete - Increased costs and construction difficulties (earthworks) if strata unsuitable for lime modification (for materials to be used on main site)	High	SI suggests DS-2 and AC-3z conditions. Buried concrete to be specified for these conditions. Sulphate test results suggest modification with lime should be possible.
P7	Intact coal within cut materials.	Increased construction costs and programme delays due to: - Additional excavation, careful segregation and possible double handling or temporary stockpiling; - Disposal costs.	Low/Medium	Coal has been proven in a localised area of cut within the natural materials. Due to the limited quantity and weathered condition it is considered unlikely to be suitable for re-sale and thus require placement elsewhere on site or disposal. Cannot be used as engineered fill.
P8	Unsuitable soils for re-use as engineered fill (for geotechnical reasons)	Increased construction costs and programme delays due to: - Additional measures needed to render cut materials suitable for use as engineered fill - Disposal costs if unsuitable (e.g. too organic, coal) - Possible double handling of materials.	High/Medium	Oversize materials are present in the opencast backfill and areas of excavation in bedrock will generate significant quantities of further over size materials. As this will include siltstones, sandstones and mudstones, some crushing and screening will be required to render the materials suitable for use as engineered fill.
P9	Difficult excavation of rock strength materials in areas of cut	Increased construction costs, construction difficulties and programme delays due to: - Reduced rate of excavation - Additional plant needed - Increase in oversize materials for re-use	High/Medium	SI indicates excavation of rock strength material will be required. Crusher and screen will probably be needed on site to process materials.

Risk categories:

- Negligible: Geohazards that might have unacceptable impact on the development, are unlikely to be present, or, have been proven to be too far from or too deep beneath the site to have a significant influence.
- Low Risk: Geohazards may be present but are unlikely to have an unacceptable impact on the development.

- Medium Risk: Geohazards are probably present and might have an unacceptable impact on the development. Therefore, remedial measures or appropriate design may be necessary to reduce the risks.
- High Risk: Geohazards probably or certainly present and likely to have an unacceptable impact on the development. Remedial measures or appropriate design are likely to be necessary to reduce the risks to acceptable levels.