

REF: 2211/ED/Replet/MJS

Matthew Hughes
d2 architects
Soughton House
2 Nicholas Mews
Chester CH1 2NS

11th April 2019

Dear Matthew,

RE: SOAKAWAY TESTING EATON DRIVE

The site investigation was undertaken on Monday 25th March 2019, and comprised one machine dug trial pit to a maximum depth of 3.10m, with one percolation test undertaken in the pit.

The trial pit was logged by an engineer from GSL in general accordance with BS 5930. The soakaway test was carried out by filling the pit quickly with water from a 2,000-gallon bowser, and monitoring the fall in water in accordance with BRE Digest 365. The test was undertaken in firm brown orange silty sandy dilated clay, this turning into soft brown orange silty clay at 2.80m. The clay being saturated meant the pit walls were susceptible to collapsing and a number of minor collapses did occur. A minor groundwater strike was observed at 1.70m below ground level.

The location of the trial pit is shown on Figure 1, with the supporting information in the following appendices;

- Soakaway Test Results, Appendix A,
- Trial pit log, Appendix B.

The soakaway tests revealed the ground is not suitable for soakaways as the water failed to drop over a five-hour period see appendix A.

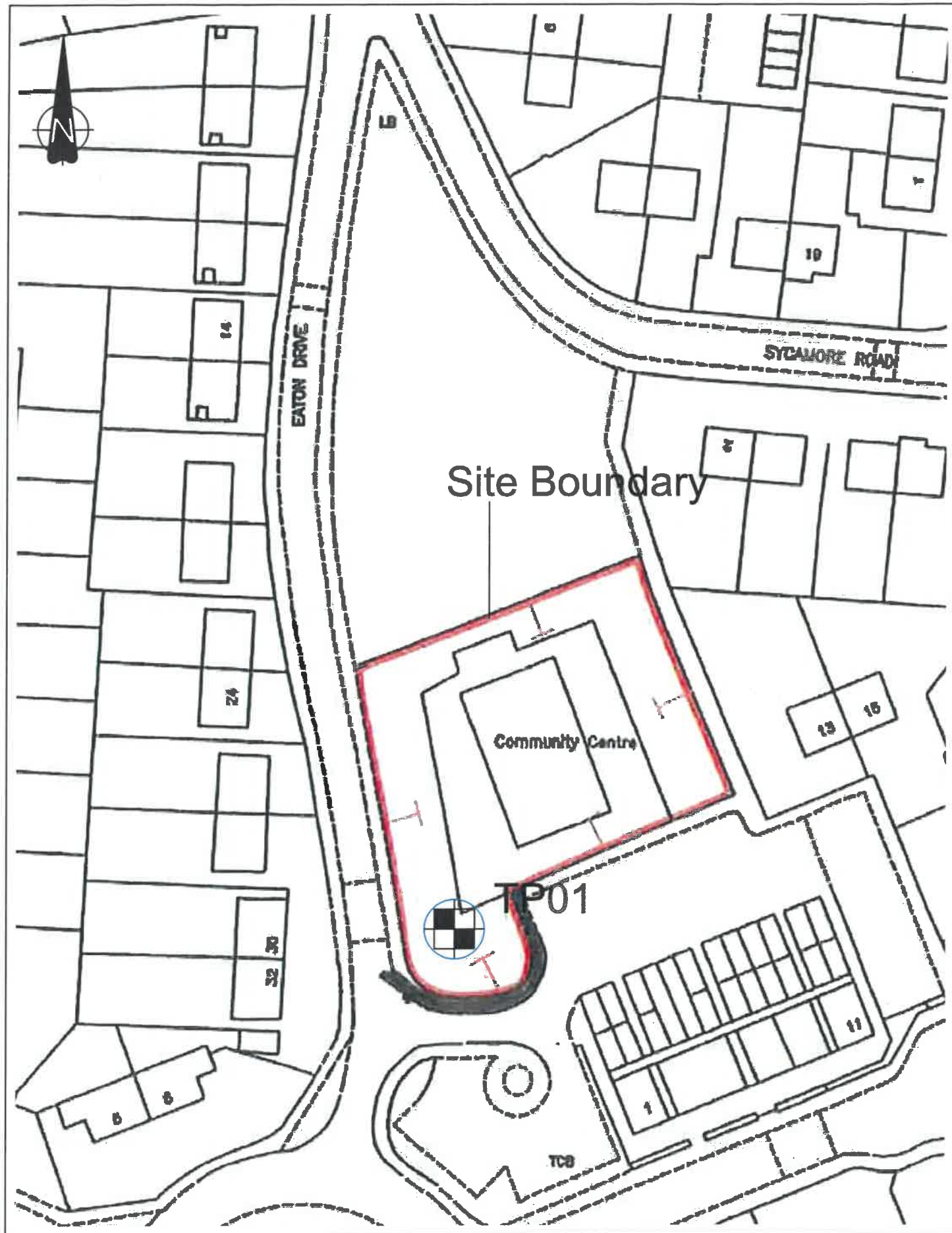
This is an interim report in lieu of a full Geoenvironmental report that will be issued once the full site investigation has taken place.

We trust this is satisfactory, should you have any queries please call Mike Scott on 01244 661361.

Yours sincerely

Mike Scott

FIGURES



SCALE 1:500 @ A4

Figure Title

Trial Pit Location

FIGURE 1

APPENDIX A

Soakaway Test Results

TRIAL PIT 1

Depth (m)	Strata
0.00-0.15	Grass overlying loose dark brown sandy SILT (TOPSOIL)
0.15-0.45	Loose brown orange sandy SILT with a little sub rounded coarse gravel (GLACIAL DEPOSITS)
0.45-1.00	Medium dense brown sandy clayey SILT with fragments of coal. (GLACIAL DEPOSITS)
1.00-1.70	Medium dense brown clayey sandy SILT becoming sandy with depth. (GLACIAL DEPOSITS)
1.70-2.80	Firm brown orange silty sandy CLAY (GLACIAL TILL)
2.80-3.10	Soft brown orange silt CLAY (GLACIAL TILL)

Notes

1. Groundwater strike at 1.70m
2. Pit walls unstable
3. Soakaway test failed to drop over a five-hour period



Pit walls

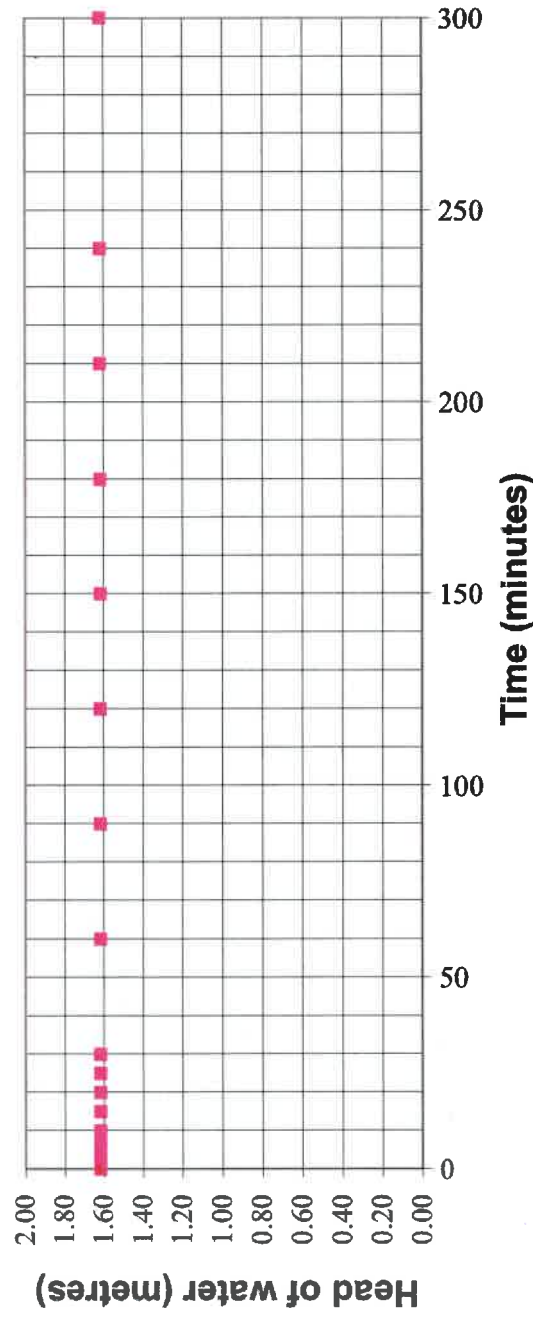


Arisings

APPENDIX B

Trial Pit Logs

2211-Eaton Drive
TP01 Test 1
 25/03/19



Time (Mins)	Depth of Water	Head of Water
0	1.48	1.62
1	1.48	1.62
2	1.48	1.62
3	1.48	1.62
4	1.48	1.62
5	1.48	1.62
6	1.48	1.62
7	1.48	1.62
8	1.48	1.62
9	1.48	1.62
10	1.48	1.62
15	1.48	1.62
20	1.48	1.62
25	1.48	1.62
30	1.48	1.62
60	1.48	1.62
90	1.48	1.62
120	1.48	1.62
150	1.48	1.62
180	1.48	1.62
210	1.48	1.62
240	1.48	1.62
300	1.48	1.62

Depth (m)	Length (m)	Width (m)	Head at 75% Vol (m)	Head at 25% Vol (m)	Water depth(t=0) (m)	Effective Area Ap50 m2	Vp75-Vp25 Volume of water m3	Adjustment Factor *	t75 (mins)	t25 (mins)	Infiltration rate m/s
3.10	2.30	0.60	1.215	0.41	1.62	6.078	1.118	1.00	-	-	N/A

* with gravel filter adjustment factor = 0.30, with no filter = 1.0

APPENDIX D

Borehole Logs

BOREHOLE LOG

Project Eaton Drive, Wrexham				BOREHOLE No BH101	
Job No 2381	Date 10-07-20 10-07-20	Ground Level (m)	Co-Ordinates ()		
Contractor					Sheet 1 of 1

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
						0.20		
						(1.70)		
1.00		N5				1.90		
						(0.60)		
2.00		N1				2.50		
						(2.30)		
3.00		N3				4.80		
						5.00		
4.00		N5				(1.50)		
						6.50		
5.00		N4						
5.50		N17						
6.00		N21						
6.50		N24						

AGS3 UK BH 2381 EATON DRIVE.GPJ GINT STD AGS 3 1.GDT 11/12/20

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1.) Hand pit to 1.20m, 2.) Continuous SPT from 5.00m. 3.) Groundwater encountered at 2.50m.
All dimensions in metres Scale 1:50			Client			Method/ Plant Used			Logged By TG		

BOREHOLE LOG

Project Eaton Drive, Wrexham				BOREHOLE No BH102	
Job No 2381	Date 10-07-20 10-07-20	Ground Level (m)	Co-Ordinates ()		Sheet 1 of 1
Contractor					

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
1.00		N4				0.20 0.30	Scrub over loose dark brown slightly gravelly sandy SILT with rootlets. Gravel is angular coarse of glass. (TOPSOIL)	
							Concrete.	
						(1.10)	Loose brown becoming dark brown slightly clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone and limestone.	
						1.40		
2.00		N5					Loose orangish brown slightly gravelly slightly clayey fine to coarse SAND. Gravel is subrounded to rounded fine to coarse of sandstone. (GLACIOFLUVIAL DEPOSITS)	
3.00		N4				(3.60)		
4.00		N6						
5.00		N10				5.00		
5.50		N26				(0.50) 5.50	End of sample hole. No recovery with continuous SPT.	

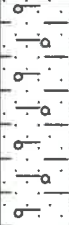
Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1.) Hand pit to 1.20m, 2.) Continuous SPT from 5.00m. 3.) Groundwater encountered at 4.00m.

All dimensions in metres Scale 1:50	Client	Method/ Plant Used	Logged By TG
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AGS3 UK BH 2381 EATON DRIVE.GPJ GINT STD AGS 3.1.GDT 11/12/20

BOREHOLE LOG

Project Eaton Drive, Wrexham				BOREHOLE No BH103	
Job No 2381	Date 10-07-20 10-07-20	Ground Level (m)	Co-Ordinates ()		
Contractor					Sheet 1 of 1

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
1.00		N9				0.20	Scrub over loose dark brown slightly gravelly sandy SILT. Gravel is angular coarse of glass. (TOPSOIL)		
						(1.60)	Loose dark brown to brown slightly gravelly clayey fine to coarse SAND. Gravel is angular to subangular fine to coarse. (GLACIOFLUVIAL DEPOSITS)		
						1.80			
2.00		N6				(0.50)	Loose dark brown mottled orangish brown clayey fine to coarse SAND. (GLACIOFLUVIAL DEPOSITS)		
						2.30			
3.00		N4				(0.70)	Soft light greyish brown mottled bluish grey sandy CLAY. (GLACIOFLUVIAL DEPOSITS)		
						3.00			
						(2.00)	Very soft to soft reddish brown to grey very sandy CLAY. (GLACIOFLUVIAL DEPOSITS)		
4.00		N3				5.00			
5.00		N4				(1.00)	End of sample hole. No recovery with continuous SPT.		
6.00		N23				6.00			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Dia. mm	Water Dpt	From	To	Hours	From	To	
											1.) Hand pit to 1.20m, 2.) Continuous SPT from 5.00m, 3.) No groundwater encountered.
All dimensions in metres Scale 1:50			Client			Method/ Plant Used			Logged By TG		

BOREHOLE LOG

Project Eaton Drive, Wrexham				BOREHOLE No BH104	
Job No 2381	Date 10-07-20 10-07-20	Ground Level (m)	Co-Ordinates ()		Sheet 1 of 1
Contractor					

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
1.00		N8				(1.00) 1.00	Scrub over loose dark brown slightly gravelly silty fine to coarse SAND. Gravel is angular to subangular fine to coarse of brick. (TOPSOIL)	
						(0.50) 1.50	Loose brown mottled orangish brown fine to coarse SAND. (GLACIOFLUVIAL DEPOSITS)	
2.00		N6				(1.50) 3.00	Very loose brown fine to coarse SAND. (GLACIOFLUVIAL DEPOSITS)	
3.00		N2				(2.00) 5.00	Loose brown clayey fine to coarse SAND. (GLACIOFLUVIAL DEPOSITS)	
4.00		N5						
5.00		N4						

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1.) Hand pit to 1.20m, 2.) Hole collapsed to 1.70m. 3.) Groundwater encountered at 3.00m.
All dimensions in metres Scale 1:50			Client			Method/ Plant Used			Logged By TG		

BOREHOLE LOG

Project Eaton Drive, Wrexham				BOREHOLE No BH105	
Job No 2381	Date 10-07-20 10-07-20	Ground Level (m)	Co-Ordinates ()		Sheet 1 of 1
Contractor					

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
						(0.40) 0.40		
1.00		N10				(1.60) 2.00		
2.00		N2				(3.00) 5.00		
3.00		N2				(1.50) 6.50		
4.00		N2						
5.00		N3						
6.50		N21						

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1.) Hand pit to 1.20m, 2.) Continuous SPT from 5.00m. 3.) Groundwater encountered at 2.50m.
All dimensions in metres Scale 1:50			Client			Method/ Plant Used			Logged By TG		

APPENDIX E
Physical Test Results

Laboratory Test Certificate

Form REP008 Rev 3

Issued To	Tyler Goodrick Groundsolve Ltd Unit 1 Charter Court, Well House Barns Chester Road, Bretton Flintshire, CH4 0DH	Date of issue	27/07/2020
		Issue No.	1
		Client Ref. No.	2381/ED/TG
		Samples / Material Source	
Testing Start Date	21/07/2020	Samples Recv'd	21/07/2020
Testing Complete	27/07/2020	Sample State	As received
Comments			
Project No	PC207917		
Project Name	2381 - EATON DRIVE, WREXHAM		

Summary of Tests

Standard	Test Description	Test Quantity	UKAS
BS EN ISO 17892-4:2016 Cl. 5.2	Particle Size Distribution by Sieving Method	2	Yes

Note: Any descriptions, opinions or interpretations are outside the scope of UKAS accreditation.
The results within this report relate only to the samples tested and received from the client.



Test Results checked and approved for issue.
Signed for and on behalf of Geotechnics Limited

Stephane Schiano (Laboratory Testing Manager)

GEOTECHNICS
geotechnical and geoenvironmental specialists

203 Torrington Avenue, Tile Hill,
Coventry, CV4 9UT

LABORATORY RESULTS - Particle Size Distribution

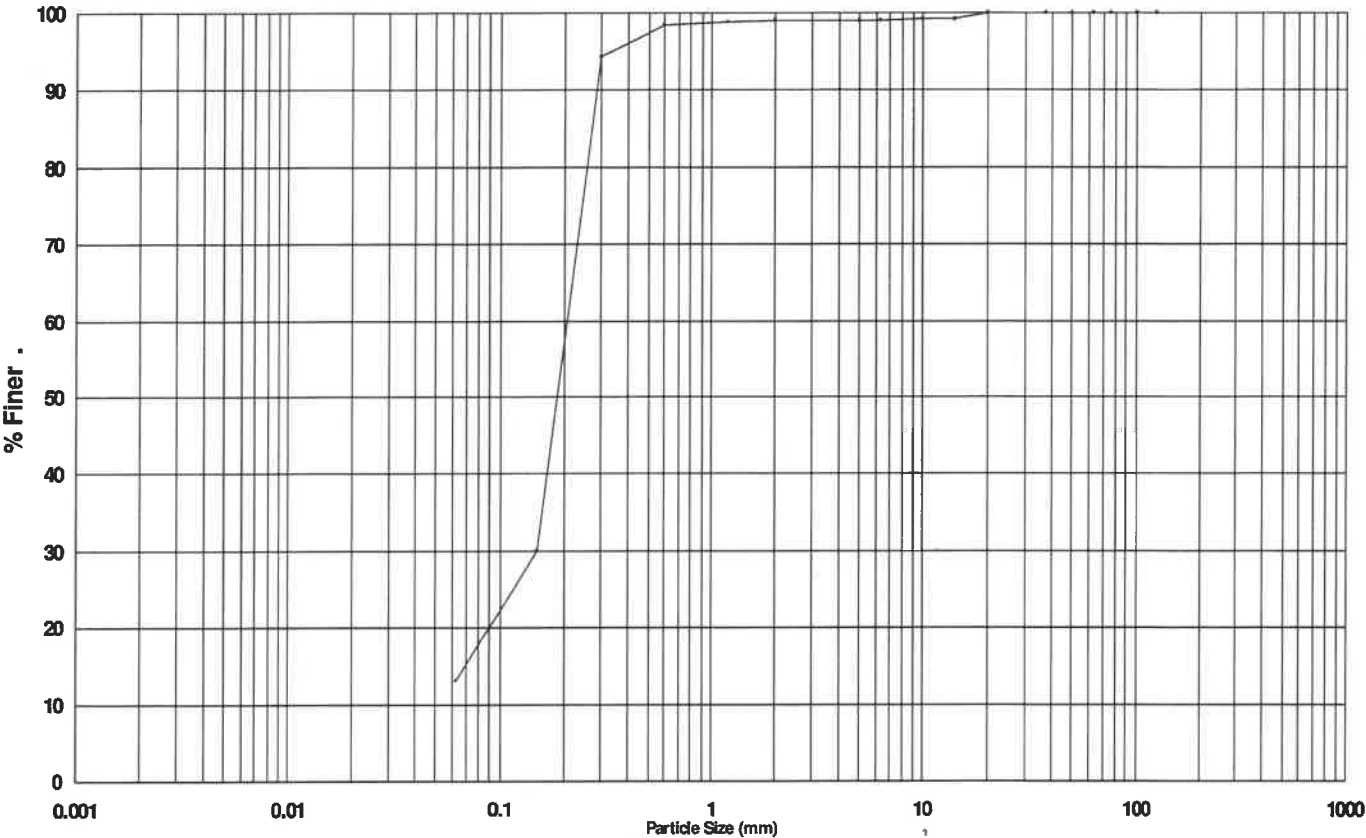
Project: 2381 - EATON DRIVE, WREXHAM

Project No: PC207917

Hole BH101
Sample Depth 0.20-1.90m
Sample Type B
Sample Ref C42716

Sample Description

Brown slightly gravelly clayey SAND with occasional pockets of clay.



Classification	CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
		SILT			SAND			Gravel				

Classification	% of each	Size	% Finer	Size	% Finer	Uniformity Coefficient	
		125 mm	100	63 μm	13	Not Available	
		100 mm	100			Sieving Method	
		75 mm	100			Wet sieve	
		63 mm	100			Fine Particle Analysis	
SILT (including CLAY)	13	50 mm	100			Method	
		37.5 mm	100			Pre-treated with	
SAND	86	20 mm	100			% loss on Pre-treatment	
		14 mm	99			Particle Density	
GRAVEL	1	10 mm	99				
		6.3 mm	99				
		5 mm	99				
		2 mm	99				
COBBLES	0	1.18 mm	99				
		600 μm	99				
		300 μm	94				
BOULDERS	0	150 μm	30				

Remarks AGS Sieve-Test performed in accordance with BS EN ISO 17892-4:2016

27/07/2020

LABORATORY RESULTS - Particle Size Distribution

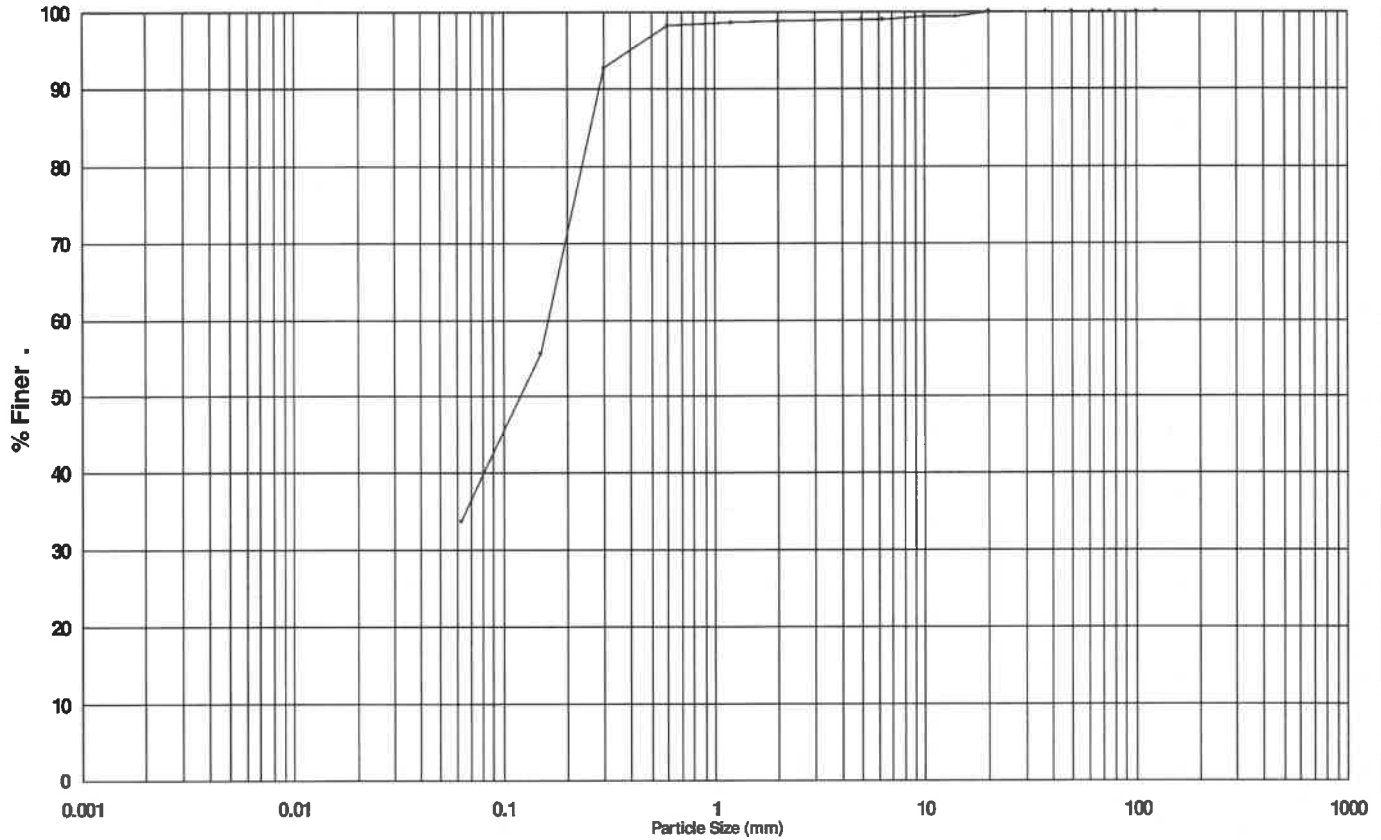
Project: 2381 - EATON DRIVE, WREXHAM

Hole BH103
Sample Depth 2.30-3.00m
Sample Type B
Sample Ref C42717

Project No: PC207917

Sample Description

Brown mottled light grey slightly gravelly clayey SAND with roots.



Classification	CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
		SILT			SAND			Gravel				

Classification	% of each
SILT (including CLAY)	34
SAND	65
GRAVEL	1
COBBLES	0
BOULDERS	0

Size	% Finer
125 mm	100
100 mm	100
75 mm	100
63 mm	100
50 mm	100
37.5 mm	100
20 mm	100
14 mm	99
10 mm	99
6.3 mm	99
5 mm	99
2 mm	99
1.18 mm	99
600 µ m	98
300 µ m	93
150 µ m	56

Size	% Finer
63 µ m	34

Uniformity Coefficient	
Not Available	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	
Pre-treated with	
% loss on Pre-treatment	
Particle Density	

Remarks AGS Sieve:-Test performed in accordance with BS EN ISO 17892-4:2016

27/07/2020

United Kingdom Accreditation Service

ACCREDITATION CERTIFICATE



TESTING LABORATORY
No. 1365

Geotechnics Limited

is accredited in accordance with the recognised International Standard ISO/IEC 17025:2017 - General Requirements for the competence of testing and calibration laboratories.

This accreditation demonstrates technical competence for a defined scope as detailed in and at the locations specified in the schedule to this certificate, and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated April 2017).

The schedule to this certificate is an essential accreditation document and from time to time may be revised and reissued by the United Kingdom Accreditation Service. The most recent issue of the schedule of accreditation, which bears the same accreditation number as this certificate, is available from the UKAS website www.ukas.com.

This accreditation is subject to continuing conformity with United Kingdom Accreditation Service requirements. The absence of a schedule on the UKAS website indicates that the accreditation is no longer in force.

Section Head, United Kingdom Accreditation Service

Initial Accreditation date
01 September 1993

This certificate issued on
07 August 2019

UKAS is appointed as the sole national accreditation body for the UK by The Accreditation Regulations 2009 (SI No 3155/2009) and operates under a Memorandum of Understanding (MoU) with the Department for Business, Energy & Industrial Strategy (BEIS)

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-Upon-Thames, Middlesex TW18 3HR



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Accredited to
ISO/IEC 17025:2017

Geotechnics Limited

Issue No: 020 Issue date: 06 August 2019

The Geotechnical Centre
203 Torrington Avenue
Tile Hill
Coventry
CV4 9AP

Contact: Mr Stephane Schiano
Tel: +44 (0)24 7662 9024
E-Mail: sschiano@geotechnics.co.uk
Website: www.geotechnics.co.uk

Testing performed at the above address only

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
AGGREGATES	Particle size distribution - sieving method	BS EN 933-1:2012
	Water content	BS EN 1097-5:2008
ROCK	Point load strength and anisotropy indices	ISRM Commission on Testing Methods. Suggested Method for Determining Point Load Strength 1985
	Water content – method 1	International Society for Rock Mechanics – suggested methods, Part 1 Test 1: 1981
GEOTECHNICAL INVESTIGATION and TESTING - Laboratory testing of soil	Water content	BS EN ISO 17892-1:2014
	Bulk density - linear measurement method	BS EN ISO 17892-2:2014
	Determination of particle density – fluid pycnometer method,	BS EN ISO 17892-3:2015
	Determination of particle size distribution - Sieving method	BS EN ISO 17892-4:2016
	Determination of particle size distribution - Pipette method	BS EN ISO 17892-4:2016
	Incremental loading odometer test	BS EN ISO 17892-5:2017
	Unconsolidated undrained triaxial test	BS EN 17892-8:2018
	Determination of liquid limit (fall cone method)	BS EN 17892-12:2018



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Accredited to
ISO/IEC 17025:2017**Schedule of Accreditation**

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-Upon-Thames, Middlesex TW18 3HR

Geotechnics Limited

Issue No: 020 Issue date: 06 August 2019

Testing performed at main address only

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
GEOTECHNICAL INVESTIGATION and TESTING - Laboratory testing of soil (cont'd) SOILS for civil engineering purposes	Determination of liquid limit (one-point fall cone method)	BS EN 17892-12:2018
	Determination of plastic limit	BS EN 17892-12:2018
	Determination of plasticity limits	BS EN 17892-12:2018
	Sulphate content of soil and ground water gravimetric method	BS 1377-3:1990 (withdrawn)
	pH value	BS 1377-3:1990 (withdrawn)
	California Bearing Ratio (CBR)	BS 1377-4:1990
	Unconfined compressive strength - load frame method	BS 1377-7:1990
	Undrained shear strength - triaxial compression without measurement of pore pressure	BS 1377-7:1990
	Undrained shear strength - triaxial compression with multistage loading and without measurement of pore pressure	BS 1377-7:1990
	Moisture content - oven drying method	BS 1377-2:1990
	Saturation moisture content of chalk	BS 1377-2:1990
	Liquid limit - cone penetrometer	BS 1377-2:1990
	Liquid limit - cone penetrometer - one point	BS 1377-2:1990
	Plastic limit	BS 1377-2:1990
	Plasticity index	BS 1377-2:1990
	Linear shrinkage	BS 1377-2:1990
	Density - linear measurement	BS 1377-2:1990



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Geotechnics Limited

Issue No: 020 Issue date: 06 August 2019

Testing performed at main address only

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
SOILS for civil engineering purposes (cont'd)	Particle density - gas jar	BS 1377-2:1990
	Particle density - small pyknometer	BS 1377-2:1990
	Particle density - large pyknometer	BS 1377-2:1990
	Particle size distribution - wet sieving	BS 1377-2:1990
	Particle size distribution - dry sieving	BS 1377-2:1990
	Particle size distribution - sedimentation - pipette method	BS 1377-2:1990
	Dry density/moisture content relationship (2.5 kg rammer)	BS 1377-4:1990
	Dry density/moisture content relationship (4.5 kg rammer)	BS 1377-4:1990
	Dry density/moisture content relationship (vibrating hammer)	BS 1377-4:1990
	Maximum and minimum dry densities for granular soils	BS 1377-4:1990
	Moisture condition value (MCV)	BS 1377-4:1990
	MCV/moisture content relation	BS 1377-4:1990
	Chalk crushing value	BS 1377-4:1990
	One-dimensional consolidation properties	BS 1377-5:1990
	Shear strength - small shear box	BS1377-7:1990
	Residual strength - small ring shear apparatus	BS1377-7:1990



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Geotechnics Limited

Issue No: 020 Issue date: 06 August 2019

Testing performed at main address only

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
Hydraulically bound and stabilized materials for civil engineering purposes	Initial consumption of lime	BS 1924-2:2018
	California bearing ratio/immediate bearing index	BS EN 13286-47:2012
	Moisture content - oven drying method (definitive)	BS EN 17892-1:2014
	Plastic limit	BS 1924-2:2018
	Liquid limit	BS 1924-2:2018
	Plasticity index	BS 1924-2:2018
	Dry density/moisture content relationship (2.5 kg rammer)	BS 1924-2:2018 and BS EN 13826-2:2010
	Dry density/moisture content relationship (4.5 kg rammer)	BS 1924-2:2018 and BS EN 13826-2:2010
	Dry density/moisture content relationship (vibrating hammer - subsidiary method)	BS 1924-2:2018 and BS EN 13826-4:2003
	Moisture condition value (MCV)	BS EN 13826-46:2003
END		

Classification and Strength

Symbol	C - Clay (0 - containing organic matter) Plasticity	M - Silt L - Low I - Intermediate H - High V - Very High E - Extremely High
I _p	Plasticity Index	
%	% retained on 425 µm sieve, shown under I _p value	
w _L	Liquid Limit	
w _p	Plastic Limit	
NP	Non-Plastic	
NAT	Sample tested in natural state	
w	Water Content	
p _d	Particle Density	
Test	Quick undrained triaxial tests	
	SS	Single stage - 102mm diameter.
	S3	Single stage - set of 3 38mm diameter.
	MS	Multistage - 102mm diameter.
	D	Drained Test
	HV	Hand Vane
	PP	Pocket Penetrometer (kg/cm ²)
	NST	Not suitable for test
γ _b	Bulk Density	
σ ₃	Triaxial Cell Pressure	
σ ₁ - σ ₃	Deviator Stress	
##	Excessive Strain	
c _u	Undrained Cohesion	
c	Cohesion Intercept	
φ	Angle of Shearing Resistance	
Linear Shrink	Linear Shrinkage	
Stab add-	Stabiliser which is added	

Consolidation

m _v	Coefficient of Volume Compressibility
c _{v50}	Coefficient of Consolidation - Log t
c _{v90}	Coefficient of Consolidation - √t

Rock

UF	Unacceptable Failure
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Chemical Analysis

Acid Soluble	Total sulphate in specimen, expressed as SO ₃ %, value in brackets expressed as SO ₄ %
Water Soluble	Soluble sulphate in 2:1 water : soil extract, expressed as SO ₃ g/l, value in brackets expressed as SO ₄ g/l
In Water	Sulphate content of groundwater, expressed as SO ₃ g/l, value in brackets expressed as SO ₄ g/l
pH	pH value
Organic content	Organic content expressed as a percentage of dry weight
Chloride	Chloride Ion content expressed as a percentage of dry weight

MCV, Compaction, CBR

MCV	Moisture Condition Value at natural water content
MCC	Moisture Condition Calibration
CCV	Chalk Crushing Value

Compaction

Type	2.5	= 2.5 kg Rammer
	4.5	= 4.5 kg Rammer
	V	= Vibrating Hammer

γ_b Bulk Density

γ_d Dry Density

CBR California Bearing Ratio

Type	2.5	= Test on Specimen Recompacted using 2.5 kg Rammer
	4.5	= As above but using 4.5 kg Rammer
	V	= As above but using Vibrating Hammer
	M	= Test on open drive mould specimen cut in field
	S	= Soaked Specimen

Top CBR at top of mould

Bottom CBR at bottom of mould

ND None Detected

* In the Sample Description denotes a laboratory only description

APPENDIX F
Chemical Test Results



Certificate of Analysis

Certificate Number 20-12852

24-Jul-20

Client GroundSolve Limited
Unit 1
Well House Barns
Bretton
Flintshire
FAO Adam Fenwick
CH4 0DH

Our Reference 20-12852

Client Reference 2381

Order No (not supplied)

Contract Title Eaton Drive, Wrexham

Description 5 Soil samples.

Date Received 17-Jul-20

Date Started 17-Jul-20

Date Completed 24-Jul-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

A handwritten signature in black ink, appearing to read "A Fenwick", is written over a light blue horizontal line.

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 20-12852

Client Ref 2381

Contract Title Eaton Drive, Wrexham

Lab No	1699067	1699068	1699069	1699070	1699071
Sample ID	BH101	BH102	BH103	BH104	BH105
Depth	0.50	0.50	1.50	1.00	0.50
Other ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	10/07/2020	10/07/2020	10/07/2020	10/07/2020	10/07/2020
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Metals								
Arsenic	DETSC 2301#	0.2	mg/kg	11		11		4.4
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	< 0.2		0.3		< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.2		0.2		< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	11		8.4		5.8
Chromium III	DETSC 2301*	0.15	mg/kg	11		8.4		5.8
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0		< 1.0		< 1.0
Copper	DETSC 2301#	0.2	mg/kg	26		22		11
Lead	DETSC 2301#	0.3	mg/kg	27		60		21
Mercury	DETSC 2325#	0.05	mg/kg	0.05		0.06		< 0.05
Nickel	DETSC 2301#	1	mg/kg	13		6.6		3.5
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5		< 0.5		< 0.5
Zinc	DETSC 2301#	1	mg/kg	42		30		34
Inorganics								
pH	DETSC 2008#		pH	9.4	7.6	7.2	7.6	7.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.2		0.3		0.3
Organic matter	DETSC 2002#	0.1	%	0.8		5.0		1.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	13	< 10	17	11	15
Sulphide	DETSC 2024*	10	mg/kg	16		16		12
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75		< 0.75		< 0.75
Sulphur as S, Total	DETSC 2320	0.01	%		< 0.01		< 0.01	
Sulphate as SO4, Total	DETSC 2321#	0.01	%		0.02		0.02	

Summary of Chemical Analysis

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Other ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	10/07/2020	10/07/2020	10/07/2020	10/07/2020	10/07/2020
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aliphatic C6-C8	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aliphatic C8-C10	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aliphatic C10-C12	DETS 3072#	1.5	mg/kg	< 1.5		< 1.5		< 1.5
Aliphatic C12-C16	DETS 3072#	1.2	mg/kg	< 1.2		< 1.2		< 1.2
Aliphatic C16-C21	DETS 3072#	1.5	mg/kg	< 1.5		< 1.5		< 1.5
Aliphatic C21-C35	DETS 3072#	3.4	mg/kg	< 3.4		< 3.4		< 3.4
Aliphatic C35-C40	DETS 3072*	3.4	mg/kg	< 3.4		< 3.4		< 3.4
Aliphatic C5-C35	DETS 3072*	10	mg/kg	< 10		< 10		< 10
Aromatic C5-C7	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aromatic C7-C8	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aromatic C8-C10	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01		< 0.01
Aromatic C10-C12	DETS 3072#	0.9	mg/kg	< 0.9		< 0.9		< 0.9
Aromatic C12-C16	DETS 3072#	0.5	mg/kg	< 0.5		< 0.5		< 0.5
Aromatic C16-C21	DETS 3072#	0.6	mg/kg	< 0.6		< 0.6		< 0.6
Aromatic C21-C35	DETS 3072#	1.4	mg/kg	< 1.4		< 1.4		< 1.4
Aromatic C35-C40	DETS 3072*	1.4	mg/kg	< 1.4		< 1.4		< 1.4
Aromatic C5-C35	DETS 3072*	10	mg/kg	< 10		< 10		< 10
TPH Ali/Aro Total	DETS 3072*	10	mg/kg	< 10		< 10		< 10
PAHs								
Naphthalene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Acenaphthylene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Acenaphthene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Fluorene	DETS 3303	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Phenanthrene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Anthracene	DETS 3303	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Fluoranthene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Pyrene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Benzo(a)anthracene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Chrysene	DETS 3303	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Benzo(b)fluoranthene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Benzo(k)fluoranthene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Benzo(a)pyrene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Indeno(1,2,3-c,d)pyrene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Dibenzo(a,h)anthracene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
Benzo(g,h,i)perylene	DETS 3303#	0.03	mg/kg	< 0.03		< 0.03		< 0.03
PAH - USEPA 16, Total	DETS 3303	0.1	mg/kg	< 0.10		< 0.10		< 0.10
Phenols								
Phenol - Monohydric	DETS 2130#	0.3	mg/kg	< 0.3		< 0.3		< 0.3

Summary of Asbestos Analysis

Soil Samples

Our Ref 20-12852

Client Ref 2381

Contract Title Eaton Drive, Wrexham

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1699067	BH101 0.50	SOIL	NAD	none	Joanne Luscombe
1699069	BH103 1.50	SOIL	NAD	none	Joanne Luscombe
1699071	BH105 0.50	SOIL	NAD	none	Joanne Luscombe

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 20-12852
 Client Ref 2381
 Contract Eaton Drive, Wrexham

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1699067	BH101 0.50 SOIL	10/07/20	GJ 250ml, GJ 60ml x2, PT 1L		
1699068	BH102 0.50 SOIL	10/07/20	GJ 250ml, GJ 60ml x2, PT 1L		
1699069	BH103 1.50 SOIL	10/07/20	PT 1L		Aliphatics/Aromatics, BTEX, Naphthalene, PAH MS
1699070	BH104 1.00 SOIL	10/07/20	PT 1L		
1699071	BH105 0.50 SOIL	10/07/20	PT 1L		Aliphatics/Aromatics, BTEX, Naphthalene, PAH MS

Key: G-Glass P-Plastic J-Jar 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