

APPENDIX D - GEOTECHNICAL IN SITU FIELDWORK AND LABORATORY RESULTS



TEST REPORT

Client Tier Environmental Ltd

Address Suite 513, Chadwick House
Warrington Road
Birchwood Park
WA3 6AE

Contract TE1456 –
Net World Sports, Wrexham

Job Number MRN 4144/19
Date of Issue 28 April 2021
Page 1 of 14

Approved Signatories

S J Hutchings, O P Davies

Notes

- 1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
- 2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
- 3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation
- 4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted. This does not, however, guarantee the balance of the materials from which the tested samples have been taken to be of equal quality.



Andrew House, Hadfield Street, Dukinfield, Cheshire SK16 4QX Tel: 0161 475 0870
Email: enquiries@murrayrix.com Website: www.murrayrix.com

Also at: London: 020 8523 1999

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MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

**TEST CERTIFICATE**

**MOISTURE CONTENT DETERMINATION
BS 1377 : PART 2 : 1990 (OVEN DRY)**

CLIENT	Tier Environmental Ltd
SITE	TE1456 – Net World Sports, Wrexham
JOB NUMBER	MRN 4144/19

DATE SAMPLED	Not advised	SAMPLED BY	Client
DATE TESTED	22 April 2021	DATE RECEIVED	23 March 2021

Sample No	Site Reference	Material	Sample Location	Moisture Content %
97925	WS3 SPT 2	Stiff brown silty sandy CLAY	As site reference	20
97932	WS6 SPT 4	Stiff brown silty sandy CLAY	As site reference	21
97919	WS1 SPT 3	Stiff brown silty sandy CLAY	As site reference	18
97888	CP1 D 0.4	Firm to stiff brown silty sandy CLAY with rare gravel	As site reference	27
97900	CP2 1.5	Stiff brown silty sandy CLAY	As site reference	20
97913	CP3 SPT 4.3	Stiff brown silty sandy CLAY	As site reference	18
97924	WS3 SPT 1.2	Stiff brown silty sandy CLAY	As site reference	18
97927	WS4 SPT 2	Stiff brown silty sandy CLAY	As site reference	19
97922	WS2 SPT 2	Stiff brown silty sandy CLAY	As site reference	14

REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 28 April 2021

MURRAY RIX

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TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

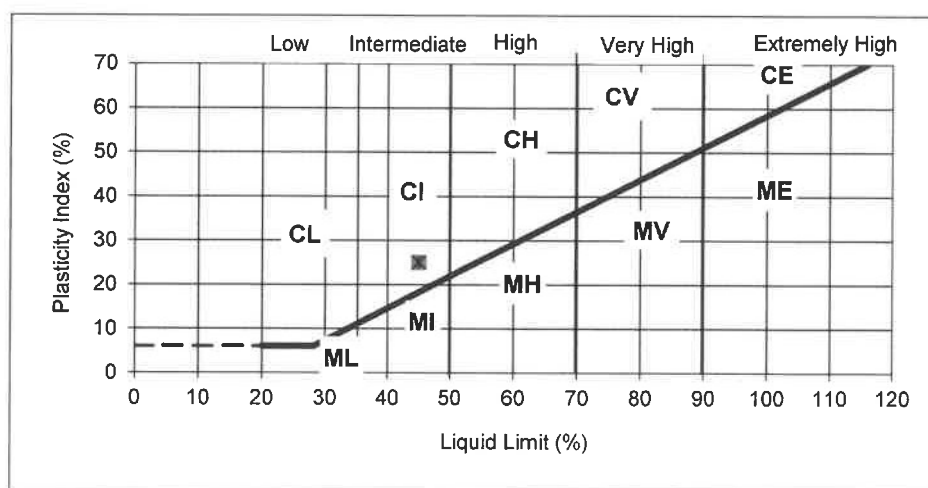
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net world Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	WS3 SPT 2	DATE SAMPLED	Not advised
SAMPLE No.	97925	DATE RECEIVED	14-Apr-21
DATE TESTED	16-Apr-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
20	45	20	25	100



REMARKS

Sample tested after wet sieving

SIGNED

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 28-Apr-21

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LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

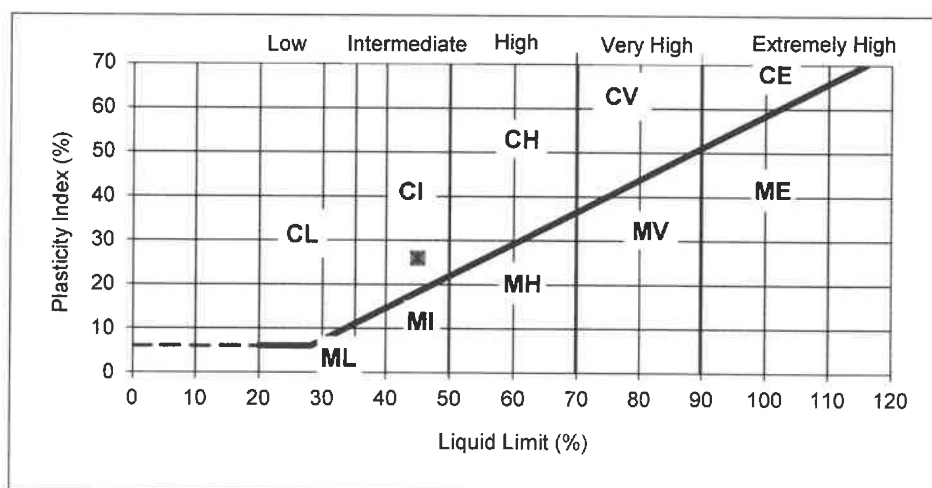
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net world Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	WS6 SPT 4	DATE SAMPLED	Not advised
SAMPLE No.	97932	DATE RECEIVED	14-Apr-21
DATE TESTED	16-Apr-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
21	45	19	26	100



REMARKS

Sample tested after wet sieving

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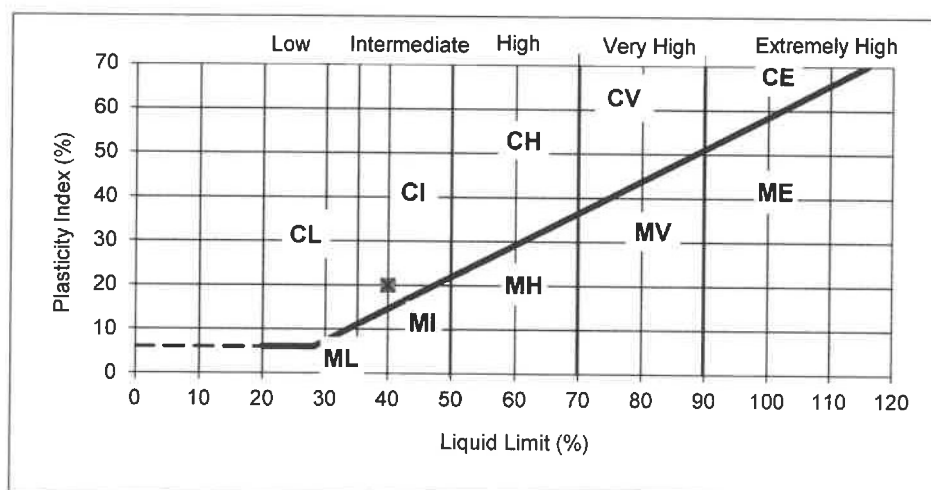
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net world Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	CP1 D 0.4	DATE SAMPLED	Not advised
SAMPLE No.	97888	DATE RECEIVED	14-Apr-21
DATE TESTED	16-Apr-21	SAMPLED BY	Client

MATERIAL	Firm to stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
27	40	20	20	92



REMARKS

Sample tested after wet sieving

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BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

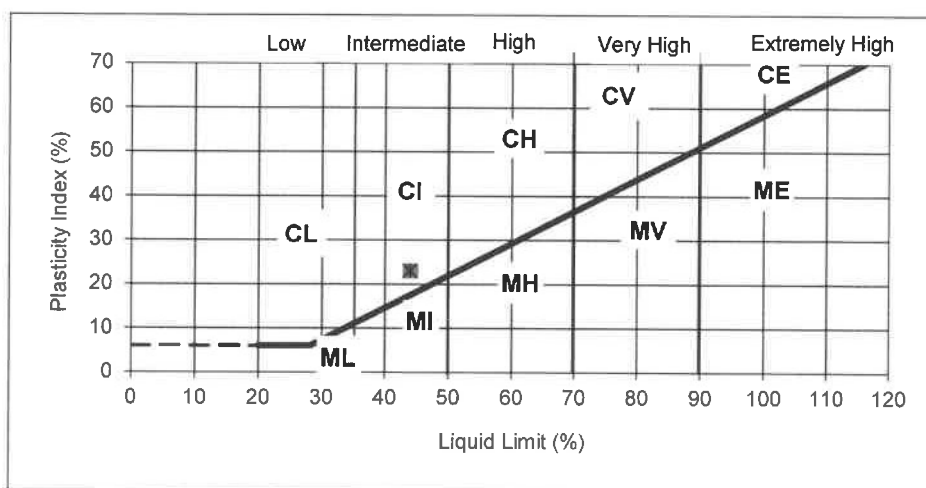
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net world Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	CP2 B 5	DATE SAMPLED	Not advised
SAMPLE No.	97936	DATE RECEIVED	14-Apr-21
DATE TESTED	16-Apr-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
20	44	21	23	100



REMARKS

Sample tested after wet sieving

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DATE 28-Apr-21

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BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

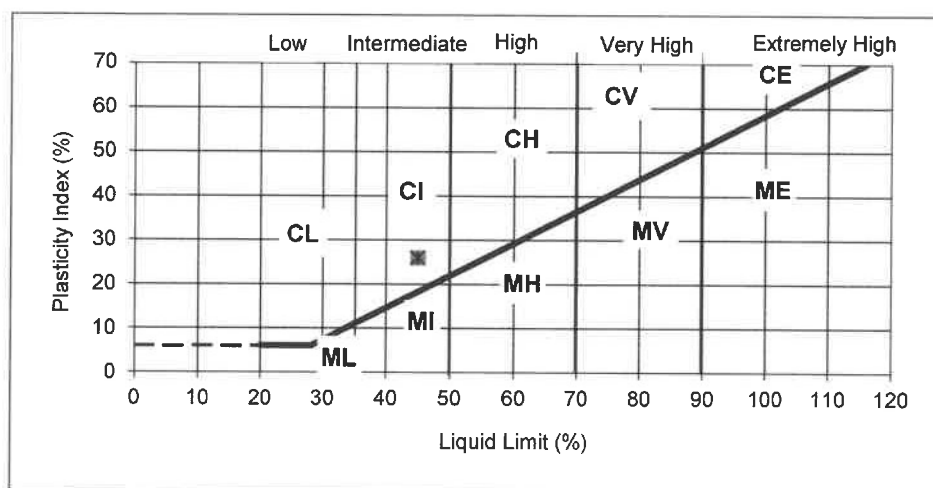
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net world Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	WS3 SPT 1.2	DATE SAMPLED	Not advised
SAMPLE No.	97924	DATE RECEIVED	14-Apr-21
DATE TESTED	16-Apr-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
18	45	19	26	100



REMARKS

Sample tested after wet sieving

SIGNED

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 28-Apr-21

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TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

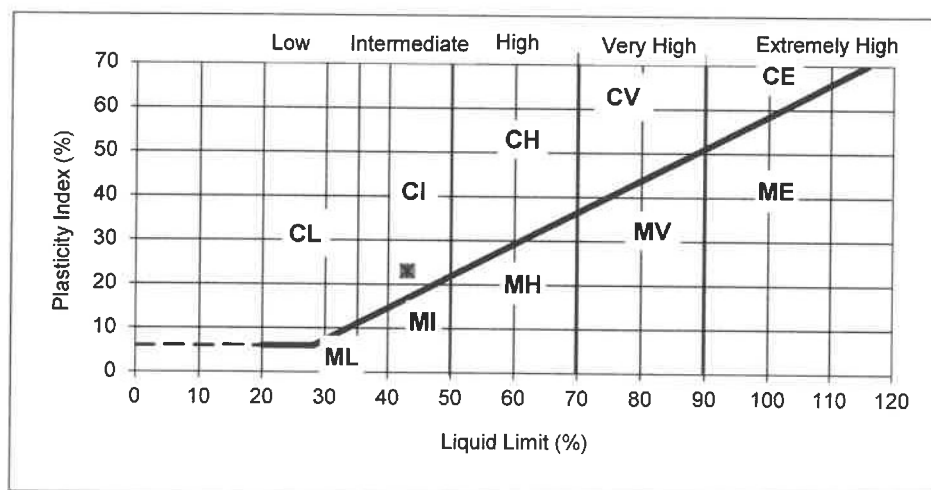
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net world Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	CP2 D 1.5	DATE SAMPLED	Not advised
SAMPLE No.	97900	DATE RECEIVED	14-Apr-21
DATE TESTED	16-Apr-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
20	43	20	23	100



REMARKS

Sample tested after wet sieving

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DATE 28-Apr-21

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TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

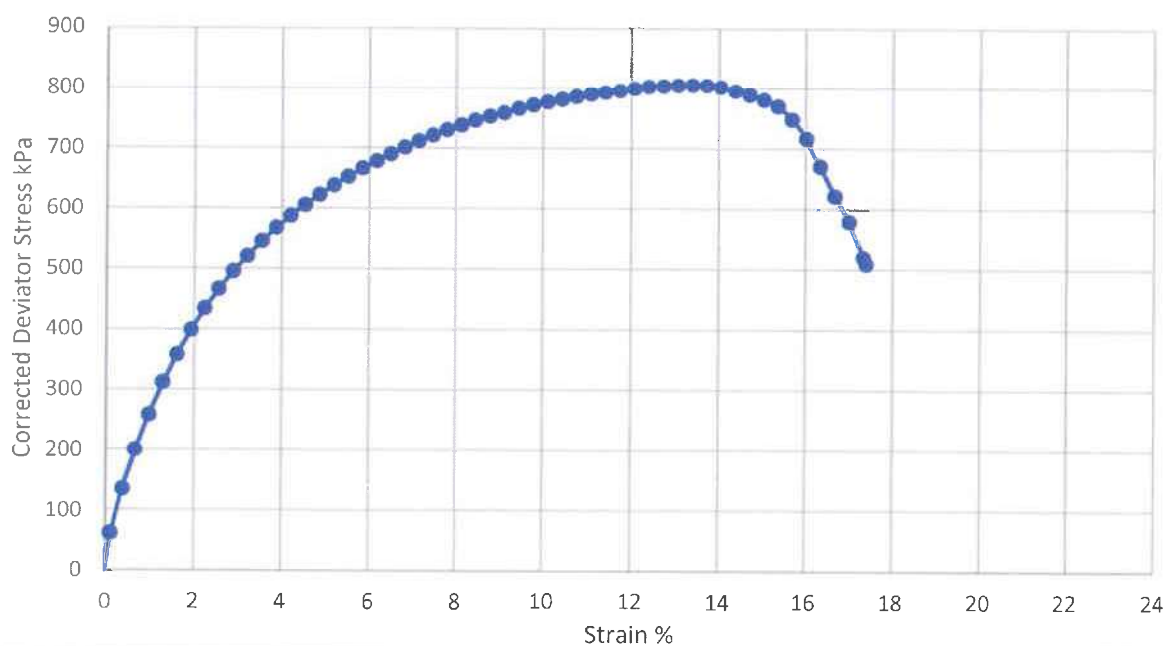
BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net World Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	WS01 2	DATE SAMPLED	Not advised
LAB SAMPLE No.	97919	DATE RECEIVED	14-Apr-21
DATE TESTED	27-Apr-21	SAMPLED BY	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

Specimen Location		Sample Length (mm)	70	Specimen depth from top of Sample (mm)	5
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	61	Specimen Moisture Content (%)	18
		Specimen Diameter (mm)	34	Specimen Bulk Density (Mg/m3)	2.17
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.83
		Membrane Correction	4.03		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN

TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength c_u (kPa)
40	13	2	806	403

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed 

Date 28 April 2021

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TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

BS 1377 : PART 7: Clause 8 Single Stage

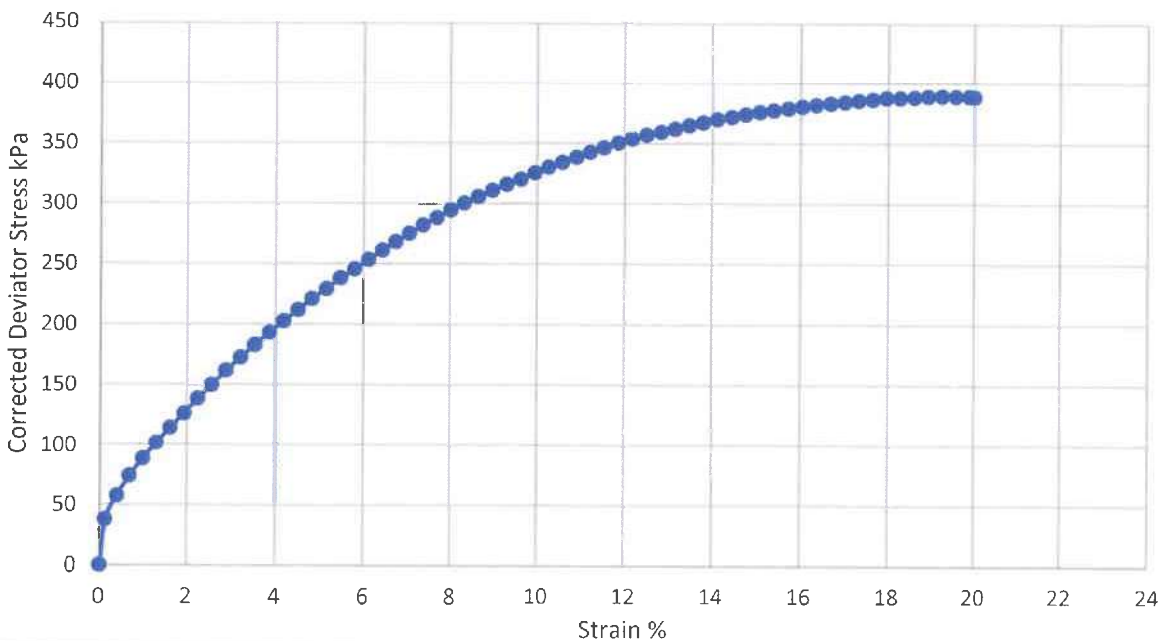
CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net World Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	CP2 1.5	DATE SAMPLED	Not advised
LAB SAMPLE No.	97900	DATE RECEIVED	14-Apr-21
DATE TESTED	27-Apr-21	SAMPLED BY	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

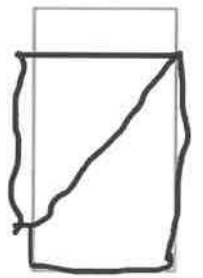
Specimen Location		Sample Length (mm)	75	Specimen depth from top of Sample (mm)	5
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	62	Specimen Moisture Content (%)	20
		Specimen Diameter (mm)	34	Specimen Bulk Density (Mg/m3)	2.22
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.85
		Membrane Correction	4.52		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength c_u (kPa)
30	20	2	389	195

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed 

Date 28 April 2021

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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

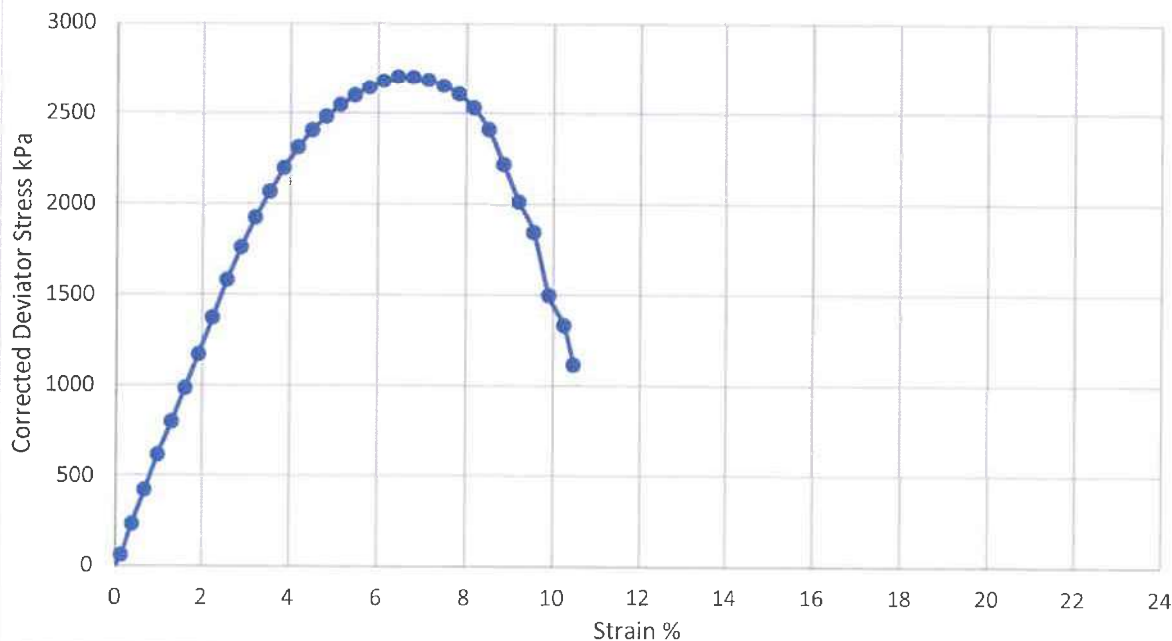
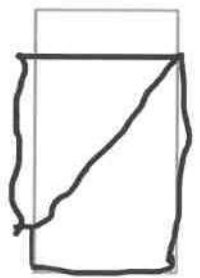
BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net World Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	WS2 SPT 2	DATE SAMPLED	Not advised
LAB SAMPLE No.	97922	DATE RECEIVED	14-Apr-21
DATE TESTED	26-Apr-21	SAMPLED BY	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

Specimen Location		Sample Length (mm)	70	Specimen depth from top of Sample (mm)	5
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	62	Specimen Moisture Content (%)	14
		Specimen Diameter (mm)	33	Specimen Bulk Density (Mg/m ³)	2.23
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m ³)	1.96
		Membrane Correction	2.85		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN**TEST TYPE**
SINGLE STAGE**SKETCH OF SPECIMEN AT FAILURE**

SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength C_u (kPa)
40	6	2	2706	1353

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)Signed 

Date 28 April 2021

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TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

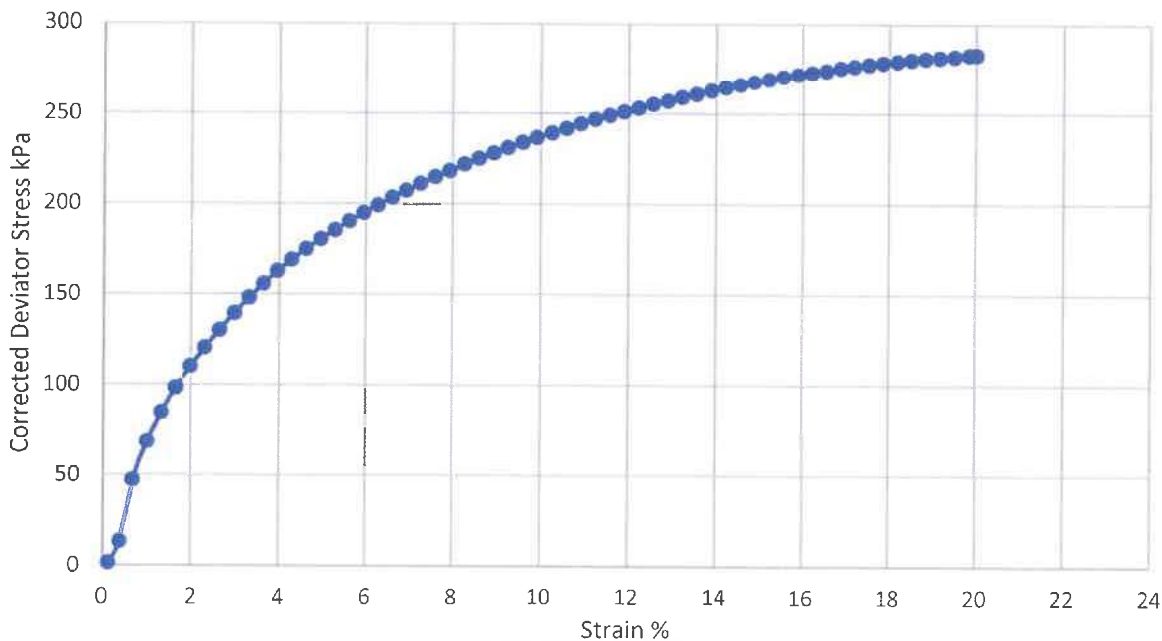
BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net World Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	CP3 B 5.1	DATE SAMPLED	Not advised
LAB SAMPLE No.	97938	DATE RECEIVED	14-Apr-21
DATE TESTED	27-Apr-21	SAMPLED BY	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

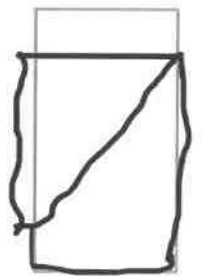
INITIAL CONDITIONS

Specimen Location		Sample Length (mm)	245	Specimen depth from top of Sample (mm)	20
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	191	Specimen Moisture Content (%)	19
		Specimen Diameter (mm)	101	Specimen Bulk Density (Mg/m3)	2.12
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.79
		Membrane Correction	1.49		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN

TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength c_u (kPa)
100	20	2	283	141

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed 

Date 28 April 2021

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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

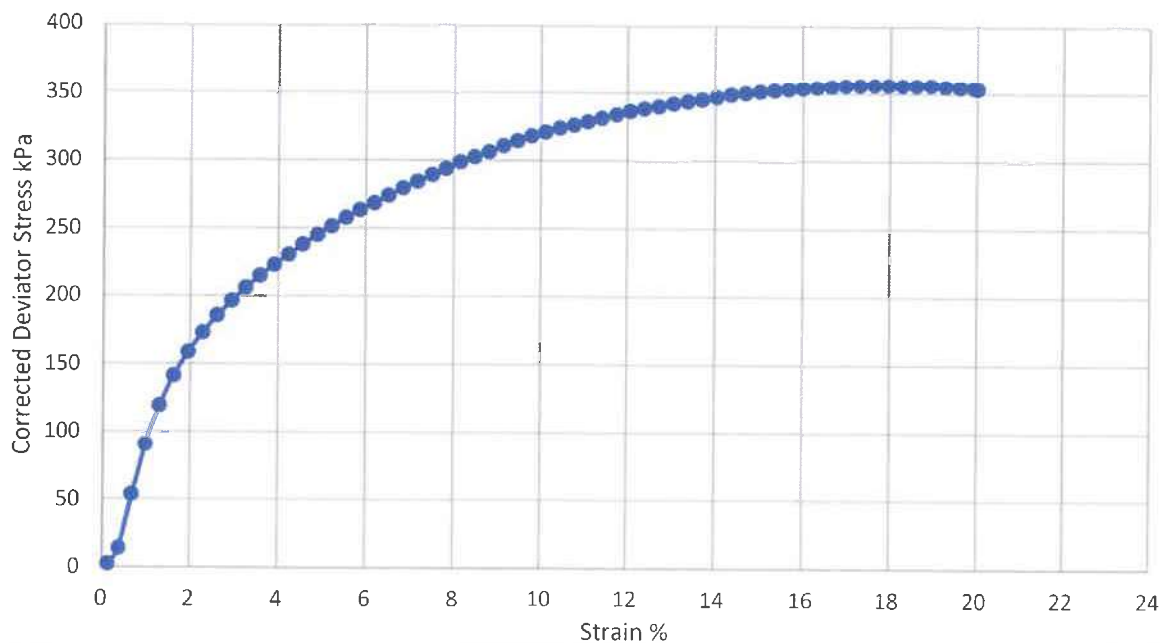
BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net World Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	CP1 B 1.7	DATE SAMPLED	Not advised
LAB SAMPLE No.	97933	DATE RECEIVED	14-Apr-21
DATE TESTED	26-Apr-21	SAMPLED BY	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

Specimen Location		Sample Length (mm)	240	Specimen depth from top of Sample (mm)	10
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	204	Specimen Moisture Content (%)	18
		Specimen Diameter (mm)	99	Specimen Bulk Density (Mg/m3)	2.07
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.75
		Membrane Correction	1.53		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN

TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength c_u (kPa)
40	18	2	356	178

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed 

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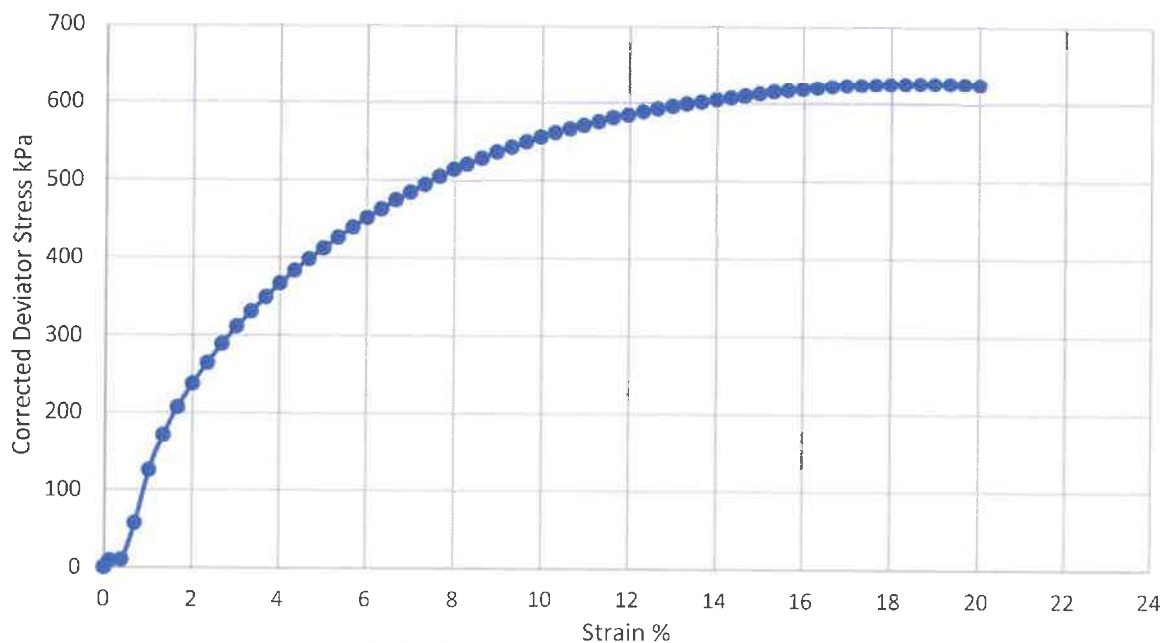
BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	Tier Environmental Ltd
SITE	TE1456 - Net World Sports, Wrexham
JOB NUMBER	MRN 4144/19

SAMPLE LABEL	CP2 SPT 2.1	DATE SAMPLED	Not advised
LAB SAMPLE No.	97901	DATE RECEIVED	14-Apr-21
DATE TESTED	26-Apr-21	SAMPLED BY	Client
MATERIAL	Stiff brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

Specimen Location		Sample Length (mm)	80	Specimen depth from top of Sample (mm)	5
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	60	Specimen Moisture Content (%)	19
		Specimen Diameter (mm)	34	Specimen Bulk Density (Mg/m3)	2.17
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.83
		Membrane Correction	4.43		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN

TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
45	19	2	627	313

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed 

Date 28 April 2021

APPENDIX E - GROUNDWATER AND GAS MONITORING RESULTS

