APPENDIX F

Laboratory Results – Concrete Core Testing

FONTMELL CLOSE AND BRIDLE CLOSE, ST. ALBANS

ADDENDUM FACTUAL REPORT ON GROUND INVESTIGATION: GEOTECHNICAL LABORATORY TEST RESULTS

Report No. G5519-15

March 2016

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Report No G5519-15

March 2016

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APPENDIX A GEOTECHNICAL LABORATORY TESTING

1 INTRODUCTION

In December 2015 ESG was commissioned by Hertfordshire County Council to carry out a ground investigation at Fontmell Close and Bridle Close in St. Albans, Hertfordshire. Opus International Consultants (Opus) were appointed as ground investigation engineers to the project. The investigation was required to obtain geotechnical information on the ground conditions in areas where subsidence or potential underground cavities may be located.

The scope of the investigation was specified by Opus and comprised concrete coring to enable dynamic probing holes, lined window sampling boreholes, cable percussive and rotary boreholes and in situ testing. The investigation was performed in accordance with the general requirements of BS 5930 (2015), BS EN 1997-2 (2007), BS EN ISO 22475-1 (2006) and other relevant related standards identified below. The fieldwork took place from 14 December 2015 to 02 February 2016.

The exploratory hole logs and results of in situ testing are presented in the ground investigation report. This addendum report presents the results of the geotechnical laboratory testing.

2 GEOTECHNICAL LABORATORY TESTING

Geotechnical laboratory testing was scheduled by Opus and was carried out in accordance with BS 1377 (1990) and BS EN ISO 17892 (2014) Part 1 unless otherwise stated. The testing is summarised below and the results are presented in Appendix A.

TABLE 1 : SUMMARY OF GEOTECHNICAL LABORATORY TESTING

TYPE	REMARKS
Moisture Content Determination	
Atterberg Limit Determination	
Particle Size Distribution Analysis	
pH, acid and Water Soluble Sulphate Content of Soils and Total Sulphur	Test methods are BS 1377 or others recognised in BRE Special Digest 1 (2005); they are indicated on the results report sheets in Appendix A.
Carbonate content of soils	
One Dimensional Consolidation	
Small Shear Box	
Large Shear Box	
Unconsolidated Undrained Triaxial Compression Testing	

TYPE	REMARKS
Concrete density and porosity	ISRM : 1981, Page 84
Concrete Compressive Strength	BS EN 12504-1 : 2009

REFERENCES

BS 1377 : 1990 : Methods of test for soils for civil engineering purposes. British Standards Institution.

BS 5930 : 2015 : Code of practice for ground investigations. British Standards Institution.

BS EN 1997-2 : 2007 : Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. British Standards Institution.

APPENDIX A

GEOTECHNICAL LABORATORY TEST RESULTS

Index Properties – Summary of Results	INDX 1 and INDX2
Particle Size Distribution Analyses	PSD 1 to PSD29
Chemical Tests – Summary of Results	CHEM1 and CHEM2
One Dimensional Consolidation Results	OED1 to OED4
Small Shear Box Results	SSB1 to SSB22
Unconsolidated Undrained Triaxial Compression Tests – Summary of Results	UUSUM 1
Concrete Density and Porosity Results	CDP1 to CDP3
Concrete Compressive Strength Results	CCS1 to CCS3

INDEX PROPERTIES - SUMMARY OF RESULTS

Project No	Project Name
G5519-15	Bridle Close & Fontmell Close, St Albans

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	ρ Mg/m³	ρ_d Mg/m³	w %	< 425 µm sieve %	W_L %	W_P %	I_P	ρ_s Mg/m³	Remarks
BH101	2	1.20		D	Dark brown slightly sandy slightly gravelly CLAY.			13	49 n	41 a	24	17		
BH101	4	2.50	3.00	B	Brown slightly sandy gravelly CLAY.			17	53 s	46 a	20	26		
BH101	7	4.00		D	Light brown slightly sandy slightly gravelly CLAY.			13	50 s	39 a	18	21		
BH101	12	6.50	7.00	B	Yellowish brown sandy gravelly CLAY.			9.2	40 s	46 a	24	22		
BH101	27	14.00		D	White CHALK composed of slightly sandy slightly gravelly silt with sand pockets.			28	97 s	35 a	24	11		
BH101	32	17.00		D	White CHALK composed of slightly sandy slightly gravelly silt.			30	100 n	36 a	23	13		
BH102	5	3.00		D	Light brown mottled grey slightly sandy slightly gravelly CLAY.			26	95 s	51 a	23	28		
BH102	7	4.00		D	Orangish brown slightly sandy CLAY.			22	98 s	67 a	22	45		
BH102	20	11.00		D	Light brown slightly gravelly slightly clayey SAND.			9.7	97 n	31 a	24	7		
BH103	3	1.00		D	Orange mottled grey slightly sandy slightly gravelly CLAY.			19	78 s	58 a	23	35		
BH103	12	6.50	7.00	B	Light brown slightly gravelly clayey SAND.			21	94 s	34 a	22	12		
BH103	15	9.50	10.00	B	White gravelly clayey SILT. Gravel is chalk.			31	94 s	34 a	26	8		
BH103	20	14.50	15.00	B	White gravelly clayey SILT. Gravel is chalk.			33	96 s	37 a	26	11		
BH103	31	23.00	23.50	B	White gravelly clayey SILT. Gravel is chalk.			28	95 s	33 a	23	10		
BH103	34	27.50	27.95	B	White slightly sandy slightly gravelly CLAY. Gravel is chalk.			26	87 s	32 a	21	11		
BH104	4	1.50	1.90	B	Brown slightly sandy slightly gravelly CLAY.			22	87 s	66 a	25	41		
BH104	8	4.00		D	Red mottled grey slightly sandy slightly gravelly CLAY.			21	93 s	58 a	28	30		
BH104	11	6.00		D	Brown slightly gravelly sandy CLAY.			19	91 s	46 a	19	27		
BH104	15	9.00		D	Brown slightly gravelly sandy silty CLAY.			20	97 s	55 a	25	30		
BH104	17	11.50	11.95	U	Very stiff orangish brown slightly sandy gravelly CLAY.			11	66 s	56 a	23	33		
BH105	3	2.00		D	Light brown slightly sandy slightly gravelly CLAY.			25	70 s	72 a	25	47		
BH105	10	5.00	5.45	D	Black slightly sandy gravelly CLAY with brick fragments.			26						
BH105	9	5.00		D					69 s	48 a	26	22		
BH105	15	8.00		D	Brown slightly sandy slightly gravelly CLAY.			24	87 s	46 a	22	24		
BH105	23	12.50		D	Orange and black slightly sandy gravelly CLAY.			6.5	24 s	43 a	25	18		
BH106	1	1.00		D	Dark brown and grey slightly sandy slightly gravelly CLAY.			15	54 s	43 a	26	17		
BH106	5	3.00		D	Dark brownish grey slightly sandy gravelly CLAY.			18	57 s	46 a	24	22		
BH106	11	6.00		D	Brown slightly sandy gravelly CLAY.			15	19 s	36 a	27	9		
BH106	18	8.00		D	Light brown and orange slightly sandy slightly gravelly CLAY.			8.6	62 s	43 a	21	22		
BH106	26	12.00	12.50	B	Brown slightly gravelly sandy CLAY.			9.9	47 s	46 a	20	26		
BH106	37	16.50	17.00	B	Brown slightly gravelly sandy CLAY.			9.1	93 s	41 a	26	15		
BH106	45	19.50	19.90	D	Light brown slightly gravelly clayey SAND.			13	72 s	30 a	21	9		

General notes: All above tests carried out to BS1377 : 1990 unless annotated otherwise. See individual test reports for further details.

Key :

ρ	bulk density, linear	W_L Liquid limit	W_P	Plastic limit	<425um preparation	ρ_s particle density
ρ_d	dry density	a 4 point cone test	NP	non - plastic	n from natural soil	-g = gas jar
w	moisture content	b 1 point cone test	I_P	Plasticity Index	s sieved specimen	-p = small pyknometer

INDEX PROPERTIES - SUMMARY OF RESULTS

Project No	Project Name
G5519-15	Bridle Close & Fontmell Close, St Albans

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	p Mg/m³	p_d Mg/m³	w %	< 425 µm sieve %	W_L %	W_P %	I_P	p_s Mg/m³	Remarks
BH106	54	25.00		D	Light brown slightly gravelly sandy CLAY.			13	73 s	38 a	24	14		
CH101	1	1.00		D	Orangish brown slightly sandy slightly gravelly CLAY.			13	43 s	76 a	32	44		
CH101	7	6.00		D	Cream CHALK composed of slightly sandy silt.			29	79 s	35 a	26	9		
CH101	13	8.50		D	White CHALK composed of slightly sandy slightly gravelly silt. Gravel is flint.			23	100 n	34 a	24	10		
CH101	21	12.50		D	Cream CHALK composed of slightly sandy slightly gravelly silt.			16	85 s	36 a	27	9		
CH101	27	15.50		D	Cream CHALk composed of slightly sandy slightly gravelly silt. Gravel is flint.			32	100 s	37 a	28	9		
CH102A	2	2.20		D	Orangish brown slightly sandy slightly gravelly CLAY.			10	39 s	65 a	30	35		
CH102A	11	22.70		D	White CHALK composed of slightly sandy gravelly silt.			32	97 n	33 a	24	9		
CH102A	15	24.80		D	White CHALK composed of slightly sandy slightly gravelly silt.			30	100 n	32 a	25	7		
CH102A	20	28.50	28.83	D	White CHALK composed of slightly sandy silt.			25	89 s	33 a	24	9		
CH102D	1	16.50		D	Cream CHALK composed of slightly sandy slightly gravelly silt.			33	94 s	36 a	24	12		
CH103A	2	1.30		D	Light brown slightly sandy slightly gravelly CLAY.			17	62 s	47 a	25	22		
CH103A	3	1.50		D	Light brown mottled red slightly sandy slightly gravelly CLAY.			23	76 s	63 a	26	37		
CH103A	12	21.00		D	White CHALK composed of slightly sandy slightly gravelly silt. Gravel is flint.			30	99 s	34 a	25	9		
CH104A	1	2.50		D	Orange slightly sandy gravelly CLAY.			10	50 s	37 a	19	18		
CH104A	8	9.50		D	Orange mottled grey slightly sandy slightly gravelly CLAY.			22	94 s	41 a	17	24		
CH104A	11	12.50		D	Orange slightly sandy slightly gravelly CLAY.			20	96 s	33 a	20	13		
CH105	2	3.30		D	Orange and black slightly sandy slightly gravelly CLAY with metal fragments.			31	74 s	42 a	27	15		
CH105	7	8.80		D	Greenish grey slightly sandy slightly gravelly CLAY.			26	84 s	46 a	25	21		
WS102	3	2.50		D	Orangish brown slightly sandy gravelly CLAY.			17	58 s	68 a	27	41		
WS102	7	4.50		D	Light brown slightly clayey SAND.			15	96 s	30 b	NP			
WS103B	2	2.00		D	Brown and orange slightly gravelly sandy CLAY.			9.2	47 s	36 a	18	18		
WS107	3	2.00		D	Light brown and black slightly gravelly sandy CLAY.			16	52 s	31 a	21	10		
WS107	8	3.50		D	Grey mottled black slightly sandy slightly gravelly CLAY.			27	81 s	45 a	24	21		
WS109	7	4.50		D	Brown and grey slightly sandy slightly gravelly CLAY.			21	71 s	48 a	20	28		
WS109	13	7.50		D	Greyish brown slightly sandy slightly gravelly CLAY with occasional chalk fragments.			27	78 s	40 a	20	20		
WS109	16	9.00		D	Brown slightly sandy slightly gravelly CLAY.			12	83 s	45 a	19	26		
WS110	2	2.00		D	Dark brown slightly sandy slightly gravelly CLAY.			19	51 s	43 a	24	19		
WS110	4	3.00		D	Orange mottled grey slightly sandy slightly gravelly CLAY.			16	72 s	52 a	21	31		

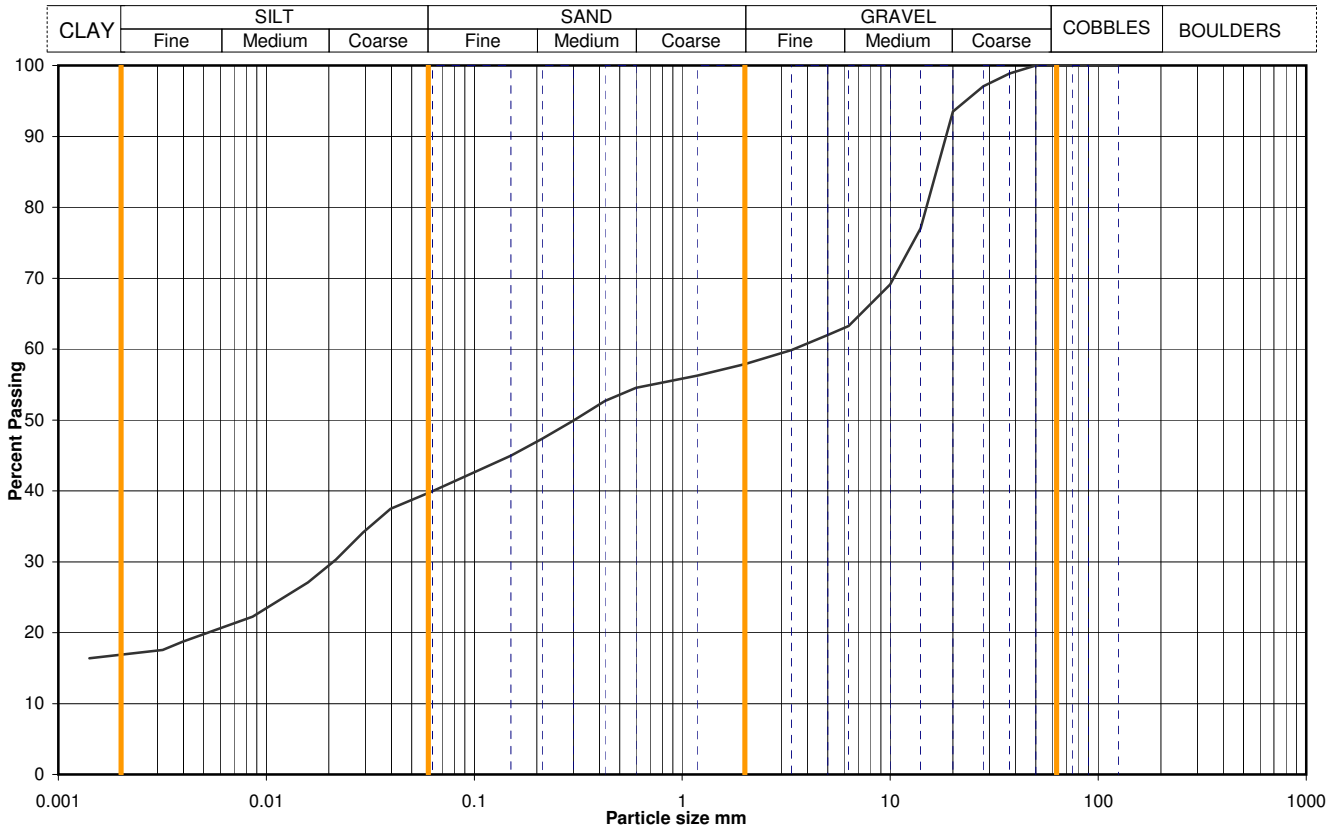
General notes: All above tests carried out to BS1377 : 1990 unless annotated otherwise. See individual test reports for further details.

Key :

p	bulk density, linear	W_L Liquid limit	W_P	Plastic limit	<425um preparation	p_s particle density
p_d	dry density	a 4 point cone test	NP	non - plastic	n from natural soil	-g = gas jar
w	moisture content	b 1 point cone test	I_P	Plasticity Index	s sieved specimen	-p = small pyknometer

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	2.50		
			Samp No	4	Type	B
			ID	G5519-1520160203023534		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	40
90	100	0.0395	37
75	100	0.0292	34
63	100	0.0216	30
50	100	0.0158	27
37.5	99	0.0086	22
28	97	0.0040	19
20	93	0.0032	18
14	77	0.0014	16
10	69		
6.3	63		
5.0	62		
3.35	60		
2.00	58		
1.18	56	Particle density, Mg/m3	
0.600	55		
0.425	53	2.65	assumed
0.300	50	Dry mass of sample, kg	
0.212	47		
0.150	45	8.2	
0.063	40		

Soil description	Brown slightly sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	42	42
	Sand	18	18
	Silt	23	23
	Clay	17	17

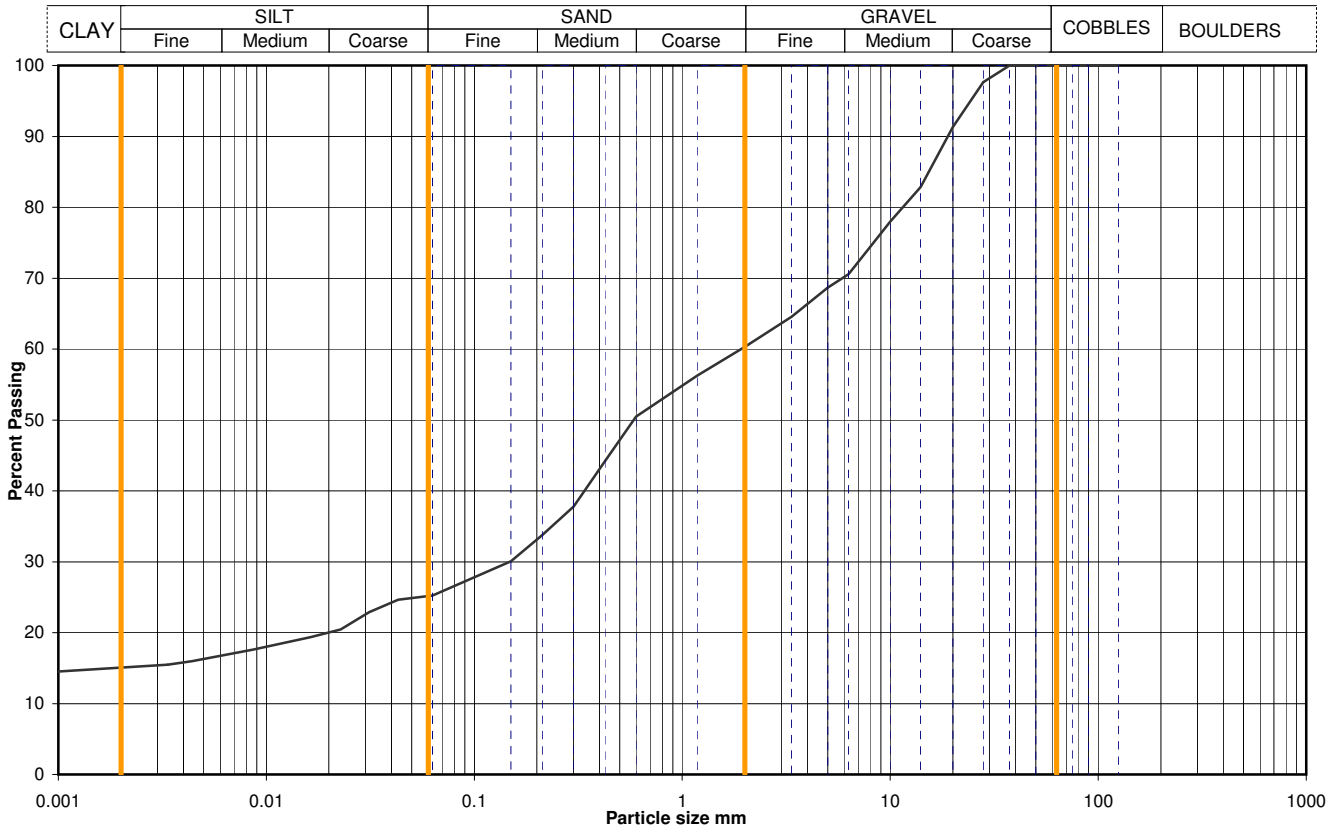
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:53	**Figure** **PSD 1**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	5.50		
			Samp No	9	Type	B
			ID	G5519-1520160203023643		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	25
90	100	0.0430	25
75	100	0.0312	23
63	100	0.0228	20
50	100	0.0163	19
37.5	100	0.0086	18
28	98	0.0044	16
20	91	0.0034	15
14	83	0.0008	14
10	78		
6.3	71		
5.0	69		
3.35	65		
2.00	60		
1.18	56	Particle density, Mg/m3	
0.600	50		
0.425	44	2.65	assumed
0.300	38	Dry mass of sample, kg	
0.212	34		
0.150	30	14.1	
0.063	25		

Soil description	Brown sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	40	40
	Sand	35	35
	Silt	10	10
	Clay	15	15

Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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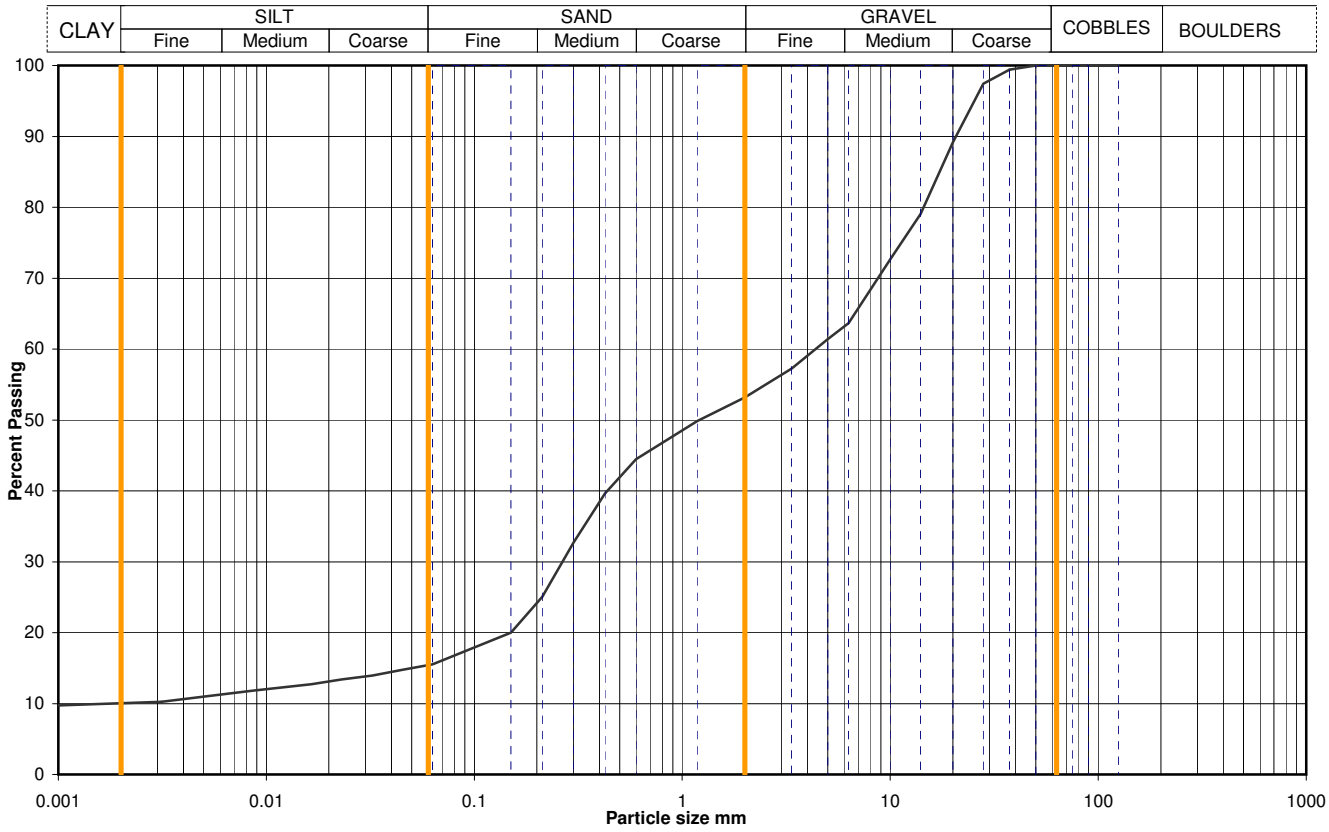
Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	6.50		
			Samp No	12	Type	B
			ID	G5519-1520160203023800		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	16
90	100	0.0452	15
75	100	0.0324	14
63	100	0.0231	13
50	100	0.0165	13
37.5	99	0.0086	12
28	97	0.0039	11
20	89	0.0031	10
14	79	0.0008	10
10	73		
6.3	64		
5.0	61		
3.35	57		
2.00	53		
1.18	50	Particle density, Mg/m3	
0.600	44		
0.425	40	2.65	assumed
0.300	33	Dry mass of sample, kg	
0.212	25		
0.150	20	14.6	
0.063	16		

Soil description	Yellowish brown sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	47	47
	Sand	38	38
	Silt	5	5
	Clay	10	10

Uniformity Coefficient	D_{60} / D_{10}	2411

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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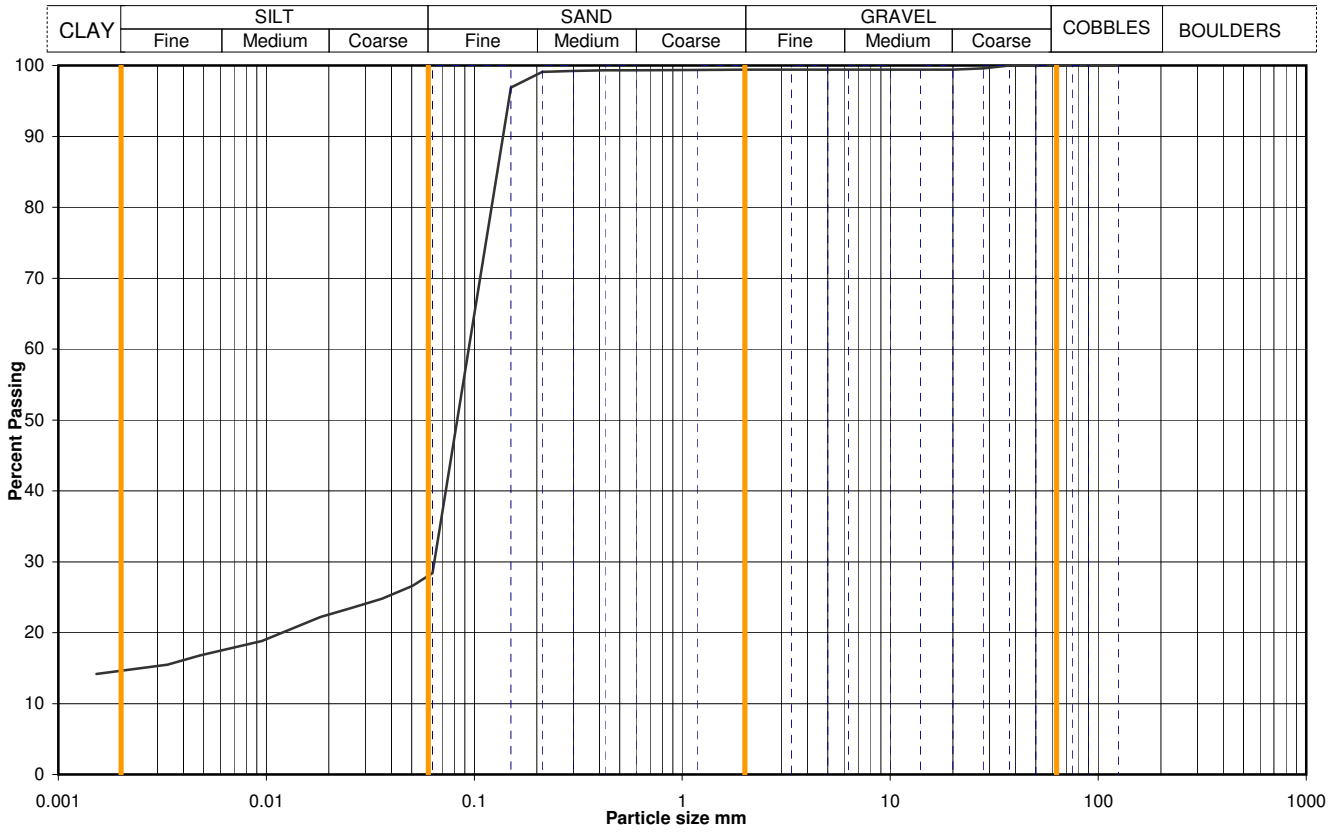
Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	9.50		
			Samp No	19	Type	B
			ID	G5519-1520160203023916		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	28
90	100	0.0504	27
75	100	0.0359	25
63	100	0.0256	23
50	100	0.0182	22
37.5	100	0.0095	19
28	100	0.0048	17
20	99	0.0034	15
14	99	0.0015	14
10	99		
6.3	99		
5.0	99		
3.35	99		
2.00	99		
1.18	99	Particle density, Mg/m3	
0.600	99		
0.425	99	2.65	assumed
0.300	99	Dry mass of sample, kg	
0.212	99		
0.150	97	12.0	
0.063	28		

Soil description	Light brown slightly gravelly very sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	1	1
	Sand	71	71
	Silt	13	13
	Clay	15	15

Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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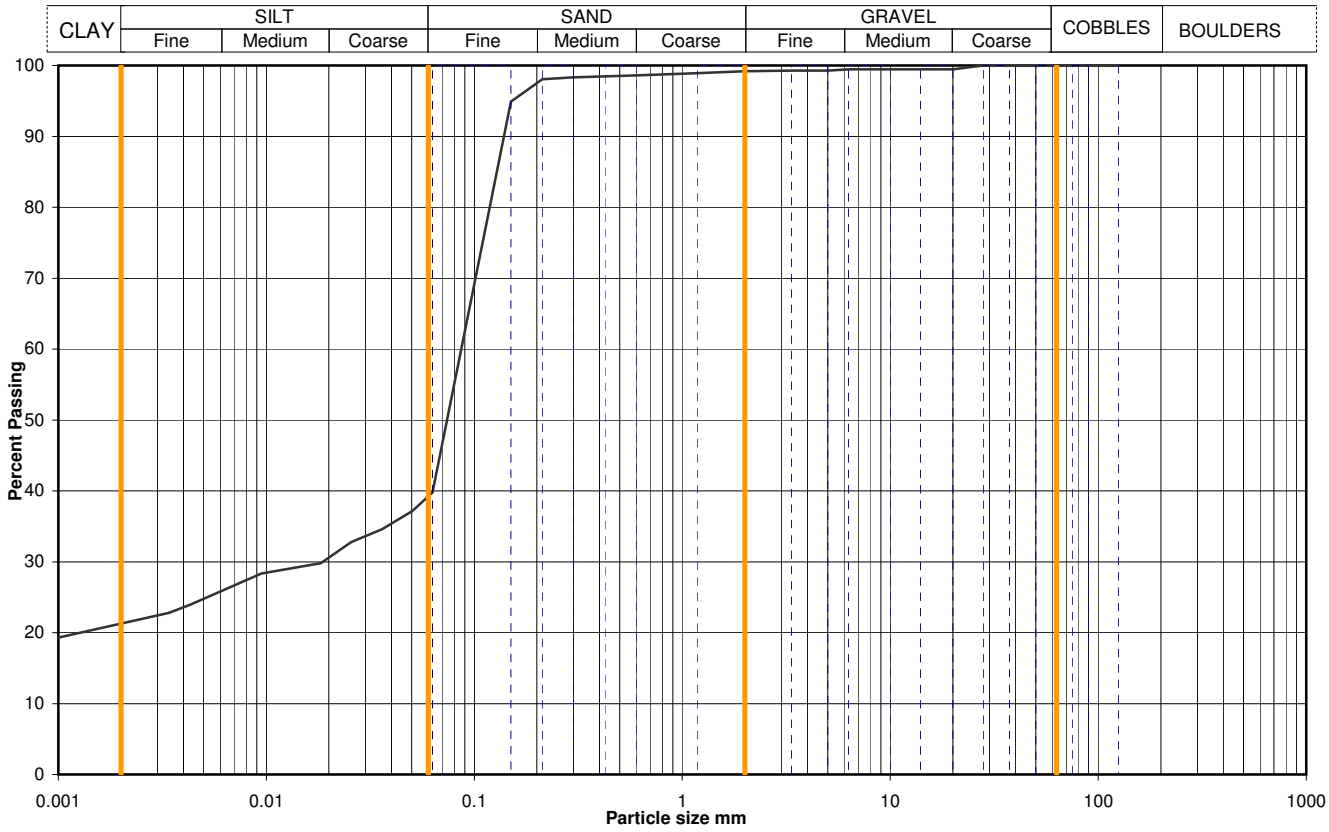
Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	11.50		
			Samp No	22	Type	B
			ID	G5519-1520160203023950		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	40
90	100	0.0504	37
75	100	0.0360	35
63	100	0.0256	33
50	100	0.0183	30
37.5	100	0.0095	28
28	100	0.0043	24
20	99	0.0034	23
14	99	0.0008	19
10	99		
6.3	99		
5.0	99		
3.35	99		
2.00	99		
1.18	99	Particle density, Mg/m3	
0.600	99		
0.425	98	2.65	assumed
0.300	98	Dry mass of sample, kg	
0.212	98		
0.150	95	10.0	
0.063	40		

Soil description	Yellowish brown slightly gravelly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	1	1
	Sand	60	60
	Silt	18	18
	Clay	21	21

Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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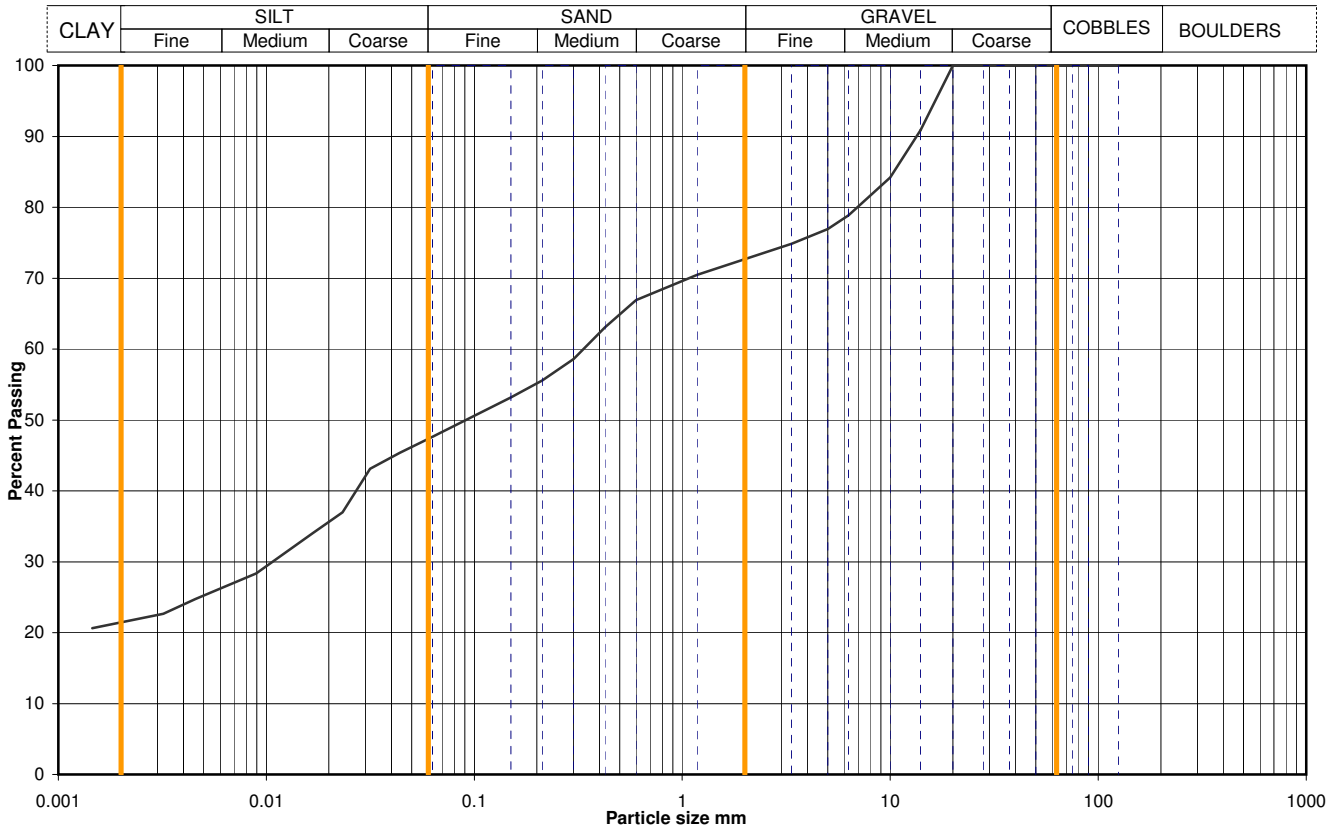
Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH102		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	1.20		
			Samp No	2	Type	D
			ID	G5519-1520151222045820		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	48
90	100	0.0439	45
75	100	0.0315	43
63	100	0.0232	37
50	100	0.0167	34
37.5	100	0.0089	28
28	100	0.0046	25
20	100	0.0032	23
14	91	0.0015	21
10	84		
6.3	79		
5.0	77		
3.35	75		
2.00	73		
1.18	70	Particle density, Mg/m3	
0.600	67		
0.425	63	2.65	assumed
0.300	59	Dry mass of sample, kg	
0.212	56		
0.150	53	0.2	
0.063	48		

Soil description	Brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	27	27
	Sand	25	25
	Silt	26	26
	Clay	22	22

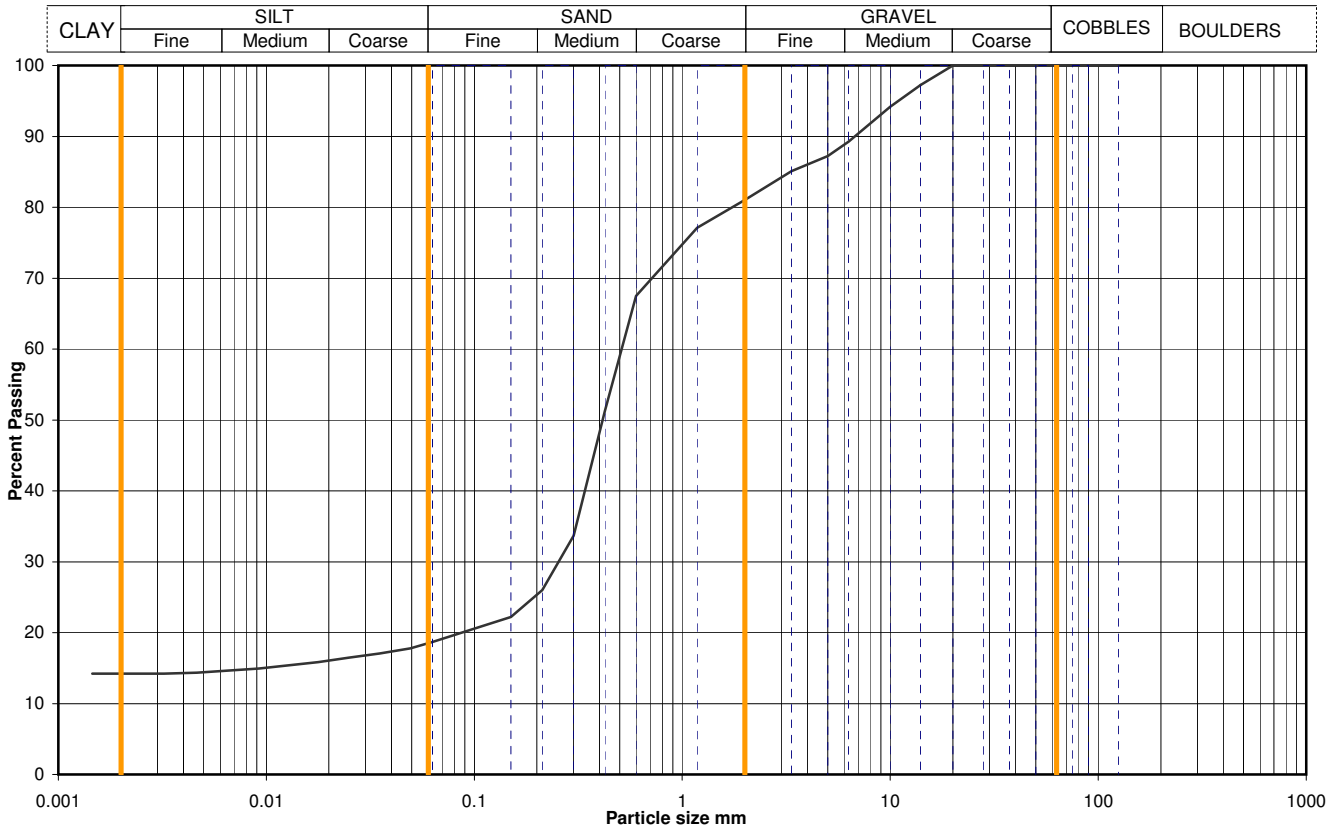
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.3 dry sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD6**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH102		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	5.00		
			Samp No	10	Type	D
			ID	G5519-1520151223090614		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	19
90	100	0.0494	18
75	100	0.0351	17
63	100	0.0250	16
50	100	0.0177	16
37.5	100	0.0092	15
28	100	0.0046	14
20	100	0.0032	14
14	97	0.0015	14
10	94		
6.3	89		
5.0	87		
3.35	85		
2.00	81		
1.18	77	Particle density, Mg/m3	
0.600	67		
0.425	51	2.65	assumed
0.300	34	Dry mass of sample, kg	
0.212	26		
0.150	22	0.7	
0.063	19		

Soil description	Orangish brown slightly gravelly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	19	19
	Sand	63	63
	Silt	4	4
	Clay	14	14

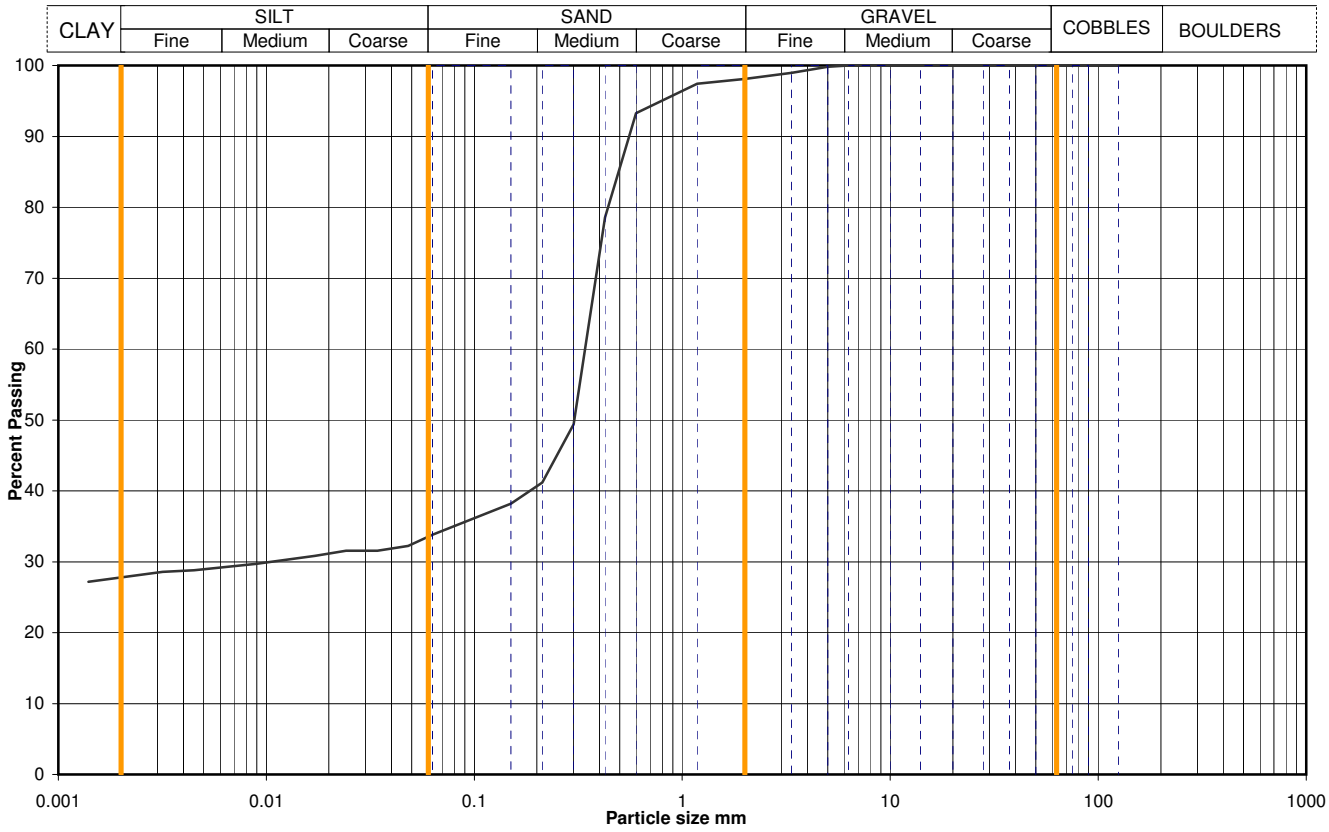
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD7**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH102		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	6.00		
			Samp No	11	Type	D
			ID	G5519-1520151223085956		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	34
90	100	0.0482	32
75	100	0.0342	32
63	100	0.0242	32
50	100	0.0172	31
37.5	100	0.0089	30
28	100	0.0045	29
20	100	0.0032	29
14	100	0.0014	27
10	100		
6.3	100		
5.0	100		
3.35	99		
2.00	98		
1.18	97	Particle density, Mg/m3	
0.600	93		
0.425	79	2.65	assumed
0.300	49	Dry mass of sample, kg	
0.212	41		
0.150	38	0.7	
0.063	34		

Soil description	Orangish brown slightly gravelly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	2	2
	Sand	65	65
	Silt	5	5
	Clay	28	28

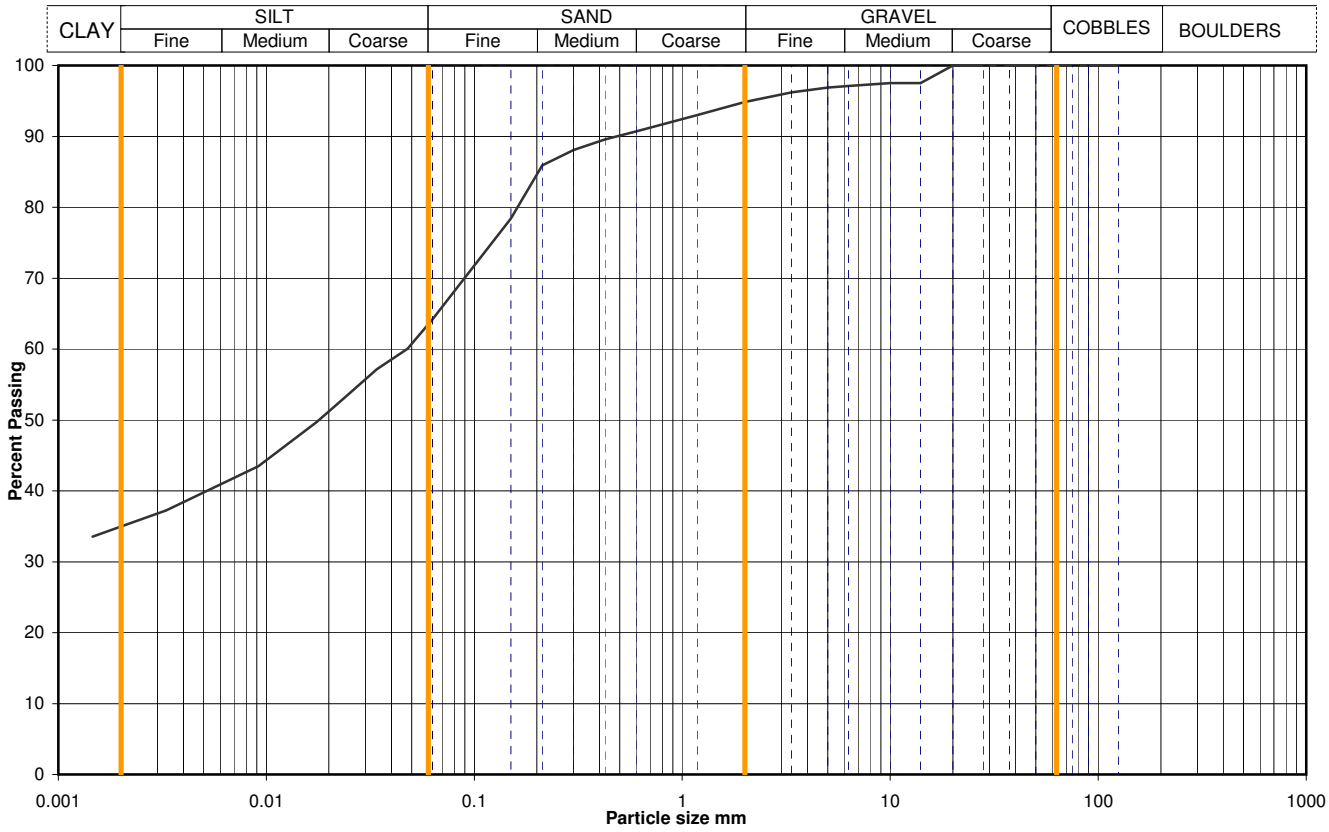
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD8**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH102		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	13.00		
			Samp No	23	Type	D
			ID	G5519-1520151223085913		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	64
90	100	0.0477	60
75	100	0.0340	57
63	100	0.0244	53
50	100	0.0174	50
37.5	100	0.0092	43
28	100	0.0046	39
20	100	0.0033	37
14	98	0.0015	34
10	98		
6.3	97		
5.0	97		
3.35	96		
2.00	95		
1.18	93	Particle density, Mg/m3	
0.600	91		
0.425	90	2.65	assumed
0.300	88	Dry mass of sample, kg	
0.212	86		
0.150	78	0.7	
0.063	64		

Soil description	Orangish brown mottled cream slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	5	5
	Sand	31	31
	Silt	29	29
	Clay	35	35

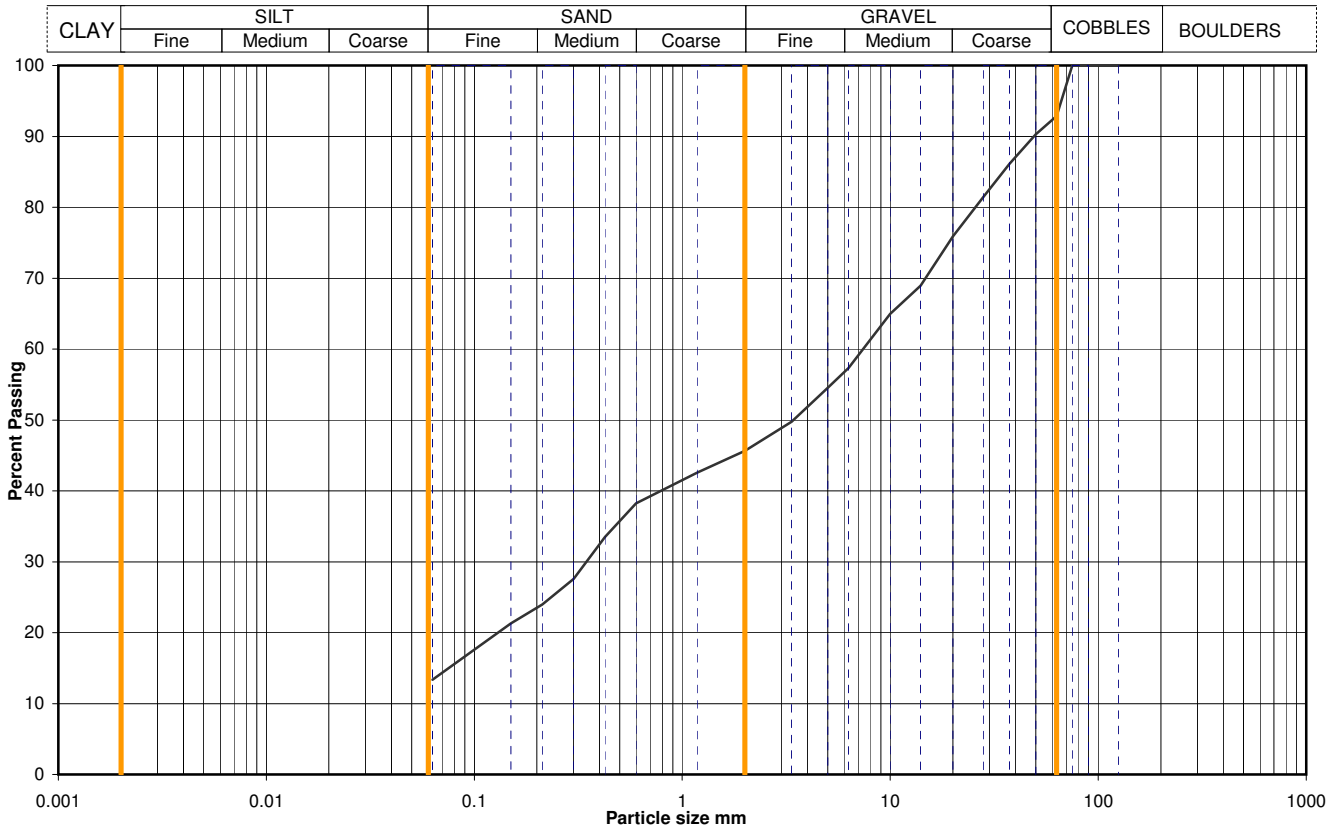
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD9**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH103		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	4.50		
			Samp No	9	Type	B
			ID	G5519-1520160107090542		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	93		
50	90		
37.5	86		
28	81		
20	76		
14	69		
10	65		
6.3	57		
5.0	55		
3.35	50		
2.00	46		
1.18	43		
0.600	38		
0.425	34		
0.300	28	Dry mass of sample, kg	
0.212	24		
0.150	21	10.6	
0.063	13		

Soil description	Brown slightly sandy gravelly CLAY with one cobble.		
Preparation / Pretreatment	Sieve: natural material		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	7	0
	Gravel	47	51
	Sand	32	34
	Silt	silt+clay =	
	Clay	14	15

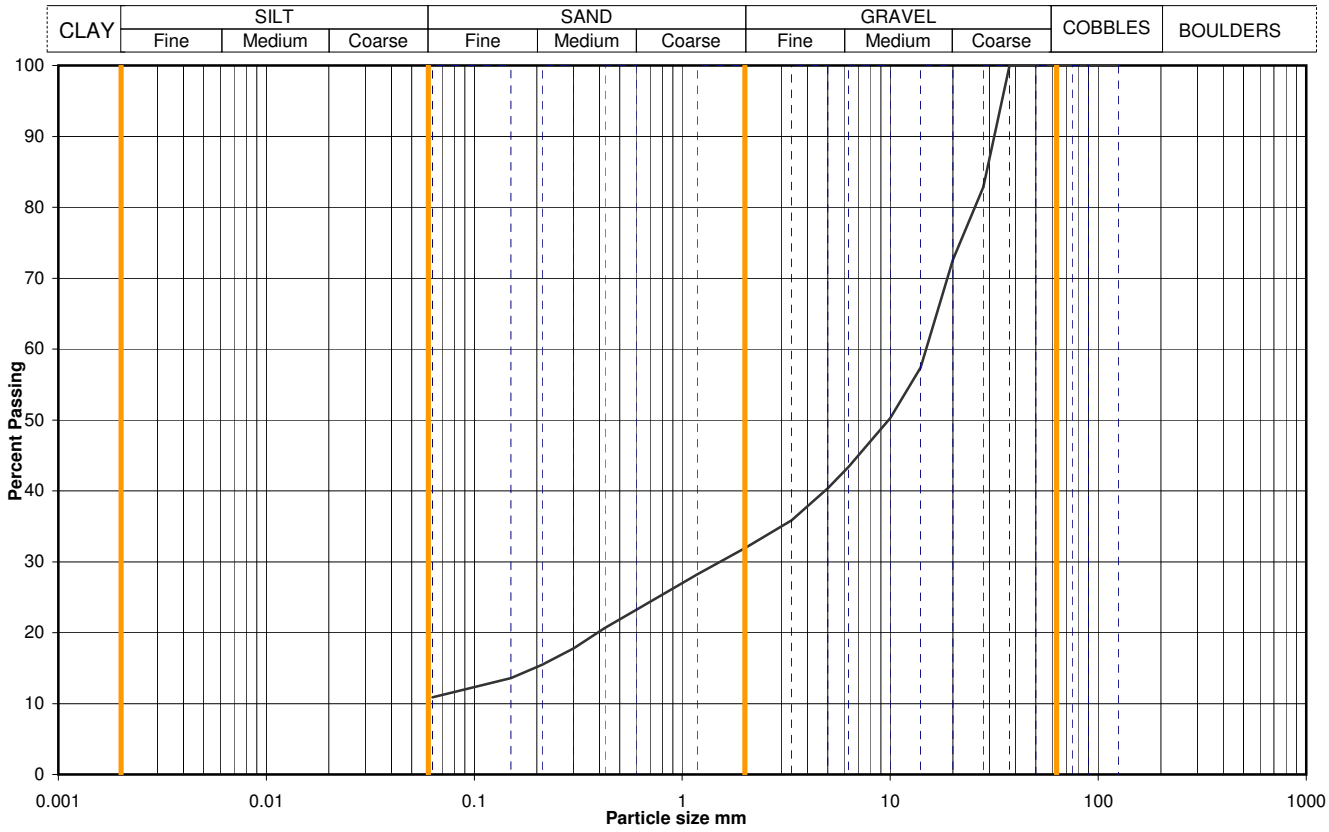
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD10**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH104		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	0.50		
			Samp No	1	Type	D
			ID	G5519-1520160111093909		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	83		
20	73		
14	57		
10	50		
6.3	43		
5.0	40		
3.35	36		
2.00	32		
1.18	28		
0.600	23		
0.425	21		
0.300	18	Dry mass of sample, kg	
0.212	15		
0.150	14	1.3	
0.063	11		

Soil description	Dark brown very sandy clayey GRAVEL.		
Preparation / Pretreatment	Sieve: natural material		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	68	68
	Sand	21	21
	Silt	silt+clay =	
	Clay	11	11

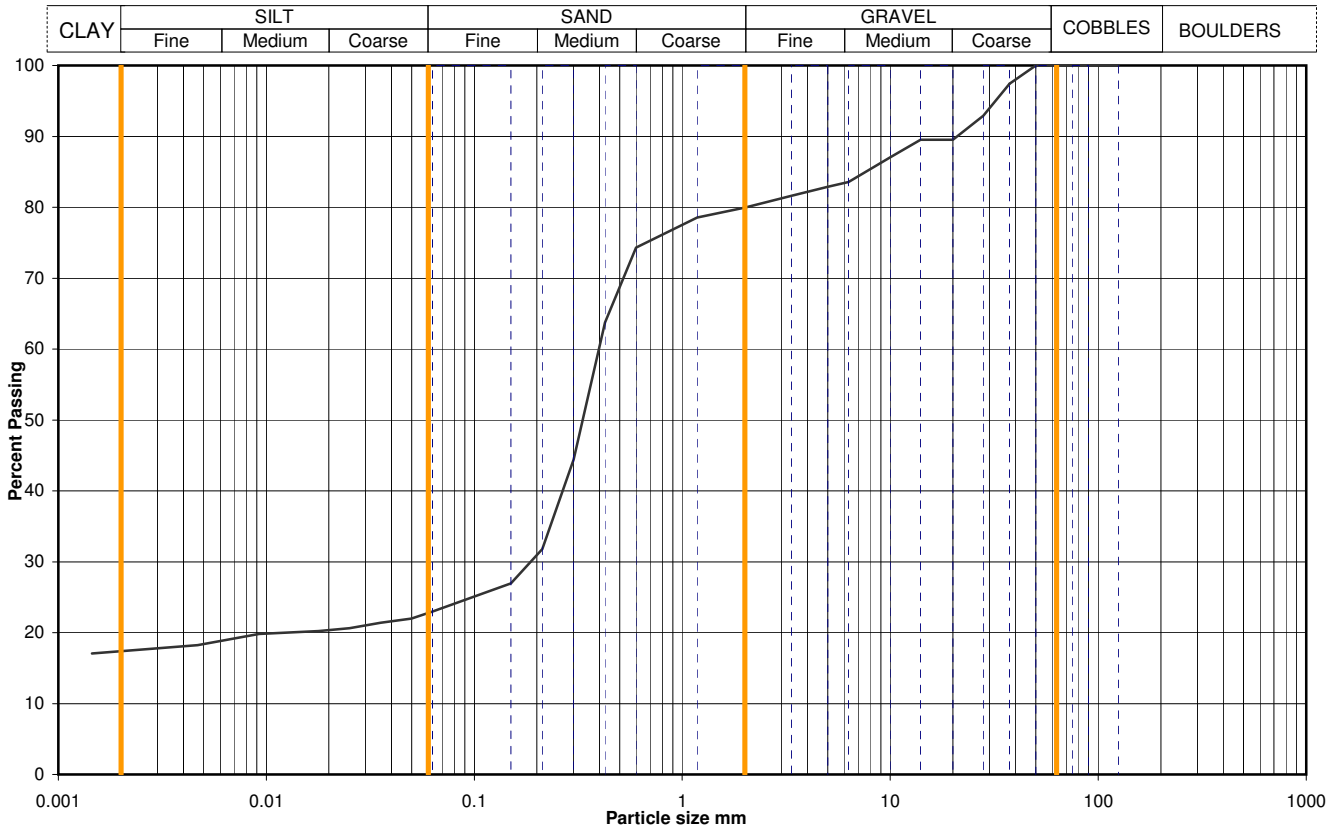
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD11**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH104		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	14.50		
			Samp No	21	Type	B
			ID	G5519-1520160111094334		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	23
90	100	0.0499	22
75	100	0.0354	21
63	100	0.0252	21
50	100	0.0178	20
37.5	97	0.0092	20
28	93	0.0047	18
20	90	0.0015	17
14	90		17
10	87		
6.3	84		
5.0	83		
3.35	82		
2.00	80		
1.18	79	Particle density, Mg/m3	
0.600	74		
0.425	64	2.65	assumed
0.300	44	Dry mass of sample, kg	
0.212	32		
0.150	27	8.3	
0.063	23		

Soil description	Brown slightly gravelly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	20	20
	Sand	57	57
	Silt	6	6
	Clay	17	17

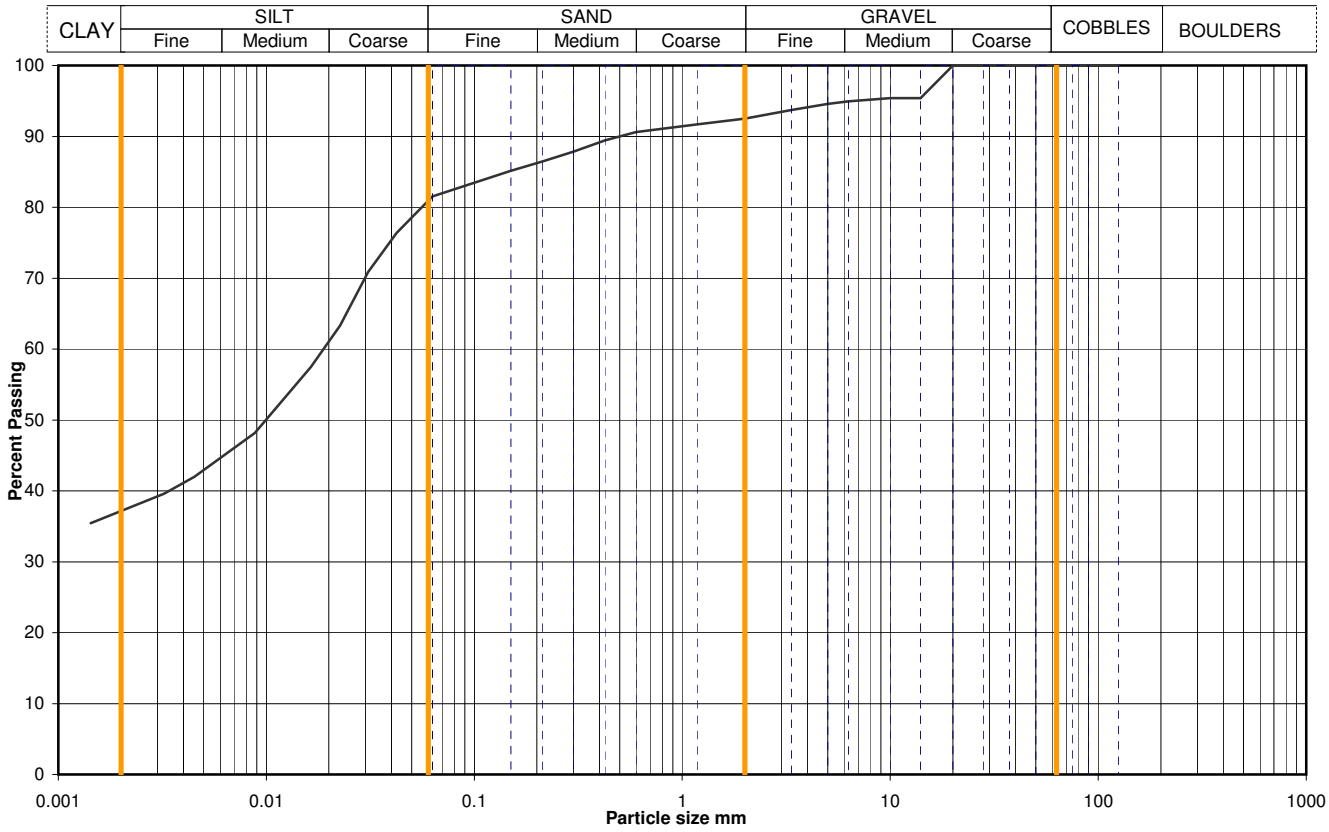
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD 12**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH105		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	9.00		
			Samp No	16	Type	D
			ID	G5519-1520151221085311		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	82
90	100	0.0424	76
75	100	0.0308	71
63	100	0.0226	63
50	100	0.0164	57
37.5	100	0.0088	48
28	100	0.0045	42
20	100	0.0032	40
14	95	0.0014	35
10	95		
6.3	95		
5.0	95		
3.35	94		
2.00	92		
1.18	92	Particle density, Mg/m3	
0.600	91		
0.425	89	2.65	assumed
0.300	88	Dry mass of sample, kg	
0.212	86		
0.150	85	0.9	
0.063	82		

Soil description	Brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	8	8
	Sand	12	12
	Silt	43	43
	Clay	37	37

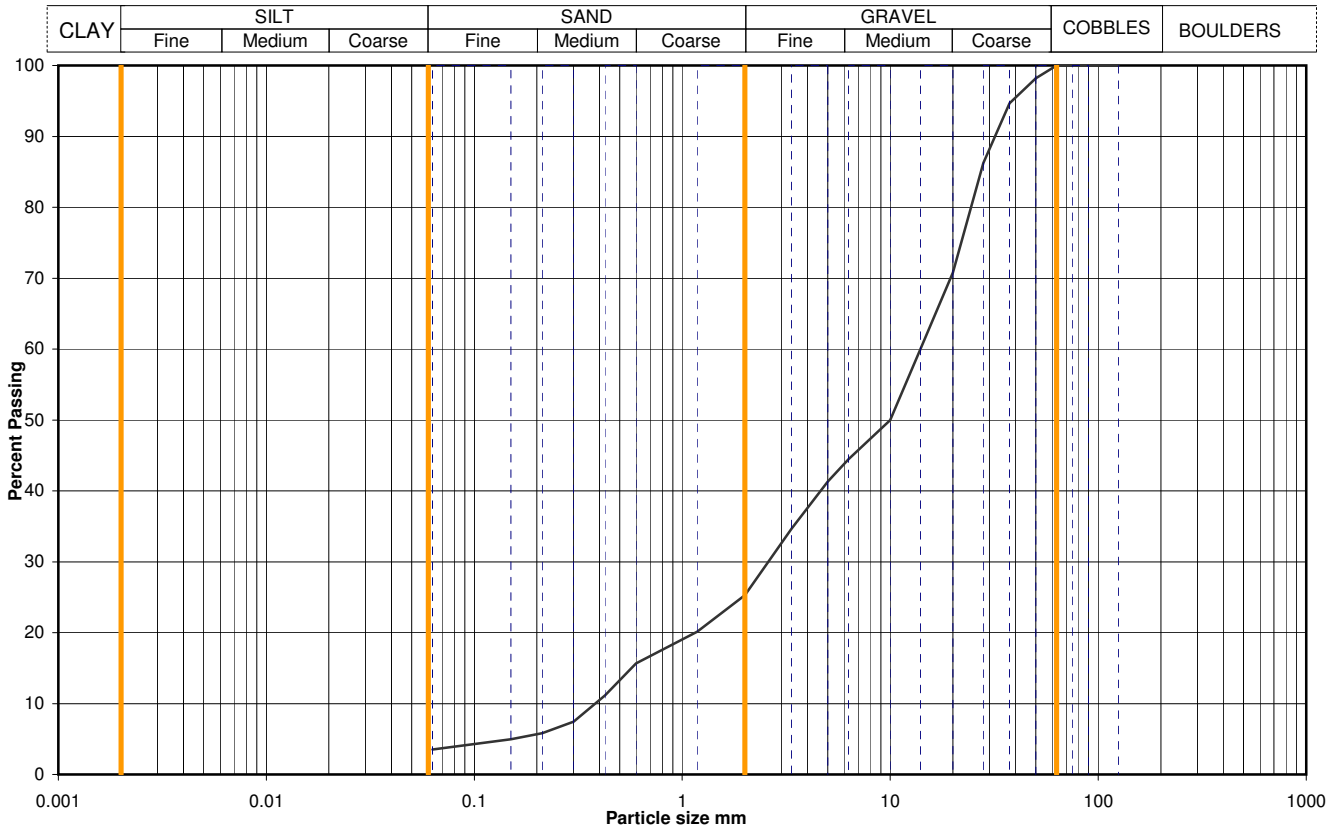
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD13**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH105		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	15.00		
			Samp No	28	Type	B
			ID	G5519-1520151223083040		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	98		
37.5	95		
28	86		
20	71		
14	60		
10	50		
6.3	44		
5.0	41		
3.35	35		
2.00	25		
1.18	20		
0.600	16		
0.425	11		
0.300	7	Dry mass of sample, kg	
0.212	6		
0.150	5	14.1	
0.063	4		

Soil description	Brown very sandy slightly clayey GRAVEL.		
Preparation / Pretreatment	Sieve: natural material		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	75	75
	Sand	22	22
	Silt	silt+clay =	
	Clay	3	3

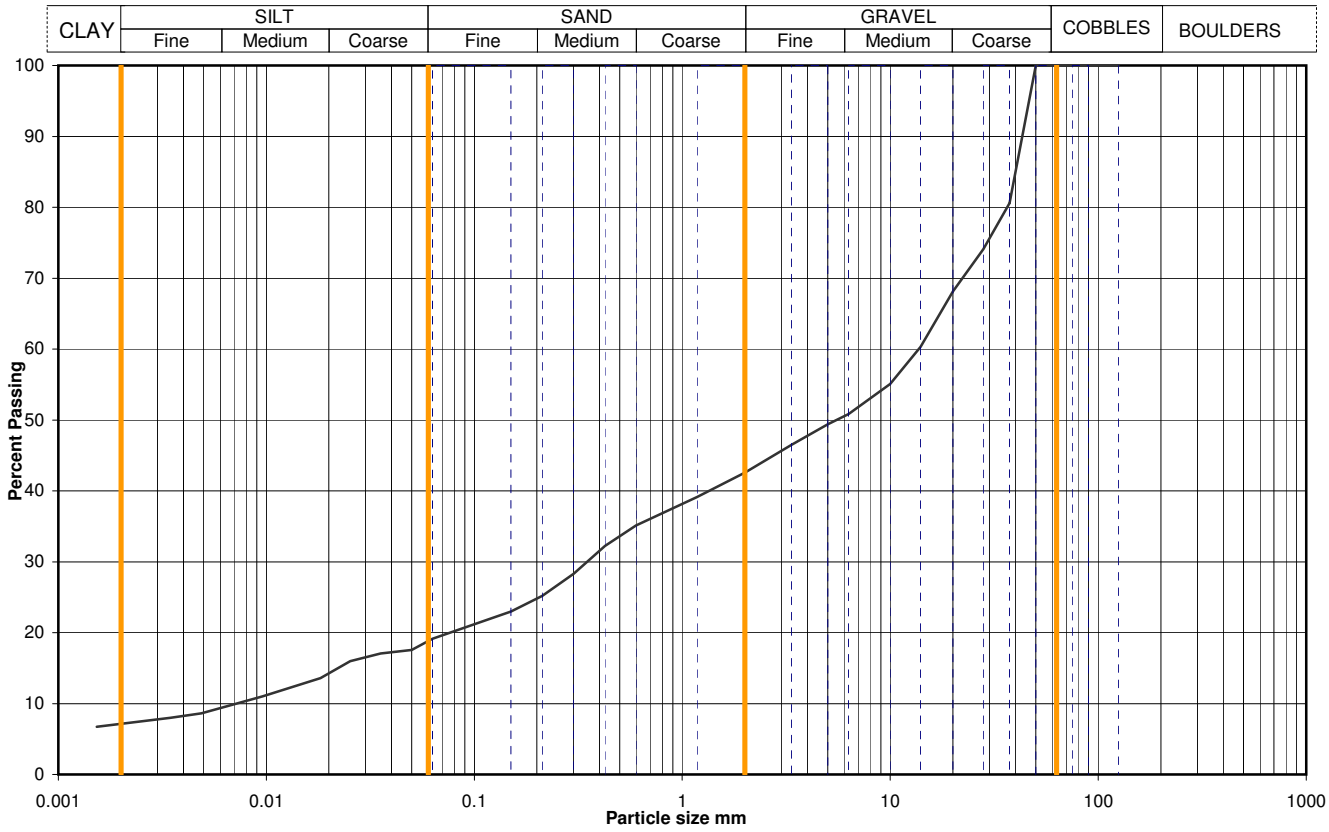
Uniformity Coefficient	D_{60} / D_{10}	37

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD 14**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	2.00		
			Samp No	3	Type	D
			ID	G5519-1520151217095833		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	19
90	100	0.0499	18
75	100	0.0354	17
63	100	0.0253	16
50	100	0.0182	14
37.5	81	0.0096	11
28	74	0.0049	9
20	68	0.0035	8
14	60	0.0015	7
10	55		
6.3	51		
5.0	49		
3.35	47		
2.00	43		
1.18	39	Particle density, Mg/m3	
0.600	35		
0.425	32	2.65	assumed
0.300	28	Dry mass of sample, kg	
0.212	25		
0.150	23	0.9	
0.063	19		

Soil description	Brownish red slightly sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: pre dried, Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	57	57
	Sand	24	24
	Silt	12	12
	Clay	7	7

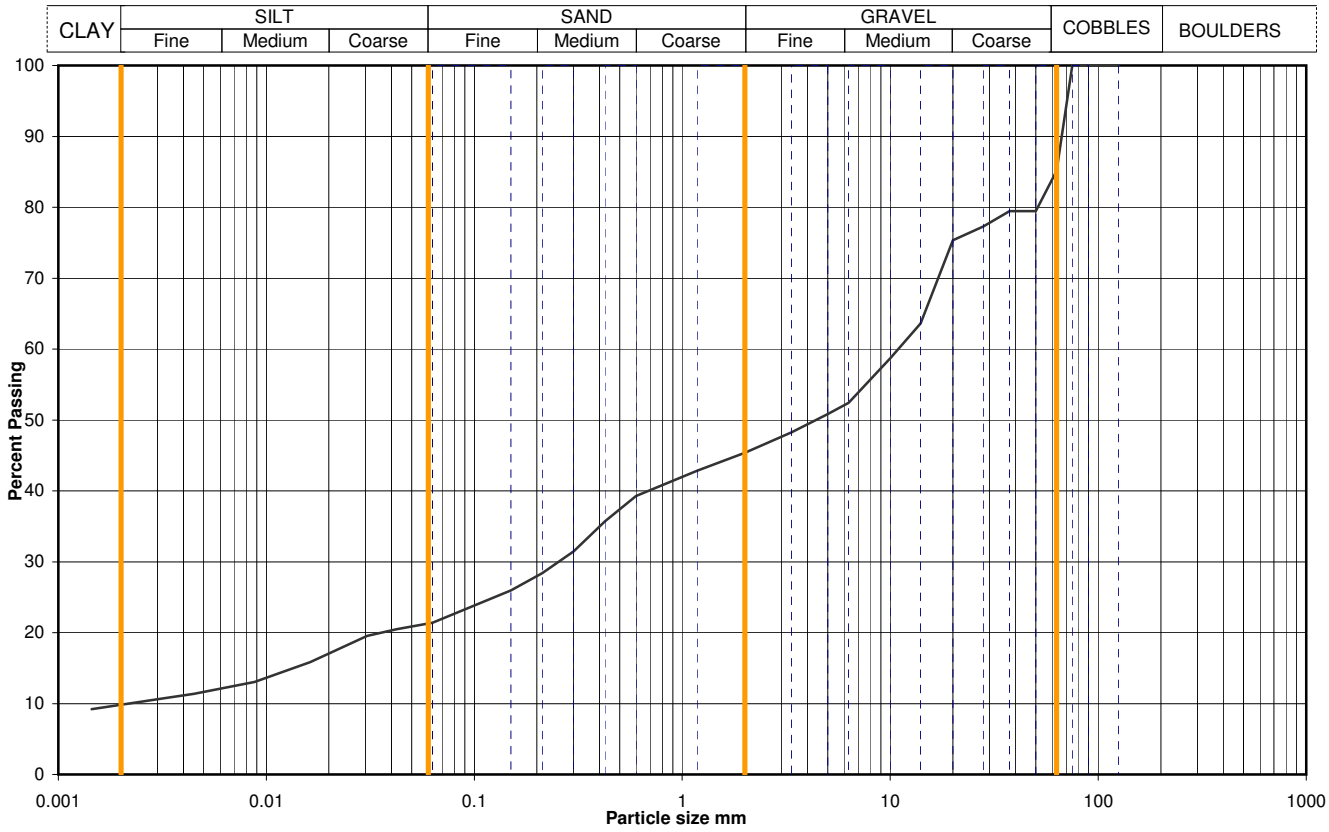
Uniformity Coefficient	D_{60} / D_{10}	1909

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.3 dry sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD15**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	4.00		
			Samp No	7	Type	D
			ID	G5519-1520151217095946		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	21
90	100	0.0424	20
75	100	0.0305	20
63	85	0.0223	18
50	79	0.0163	16
37.5	79	0.0088	13
28	77	0.0045	11
20	75	0.0031	11
14	64	0.0014	9
10	59		
6.3	52		
5.0	51		
3.35	48		
2.00	45		
1.18	43	Particle density, Mg/m3	
0.600	39		
0.425	36	2.65	assumed
0.300	31	Dry mass of sample, kg	
0.212	28		
0.150	26	3.7	
0.063	21		

Soil description	Dark brownish grey slightly sandy gravelly CLAY with one cobble.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	15	0
	Gravel	40	47
	Sand	24	28
	Silt	11	13
	Clay	10	12

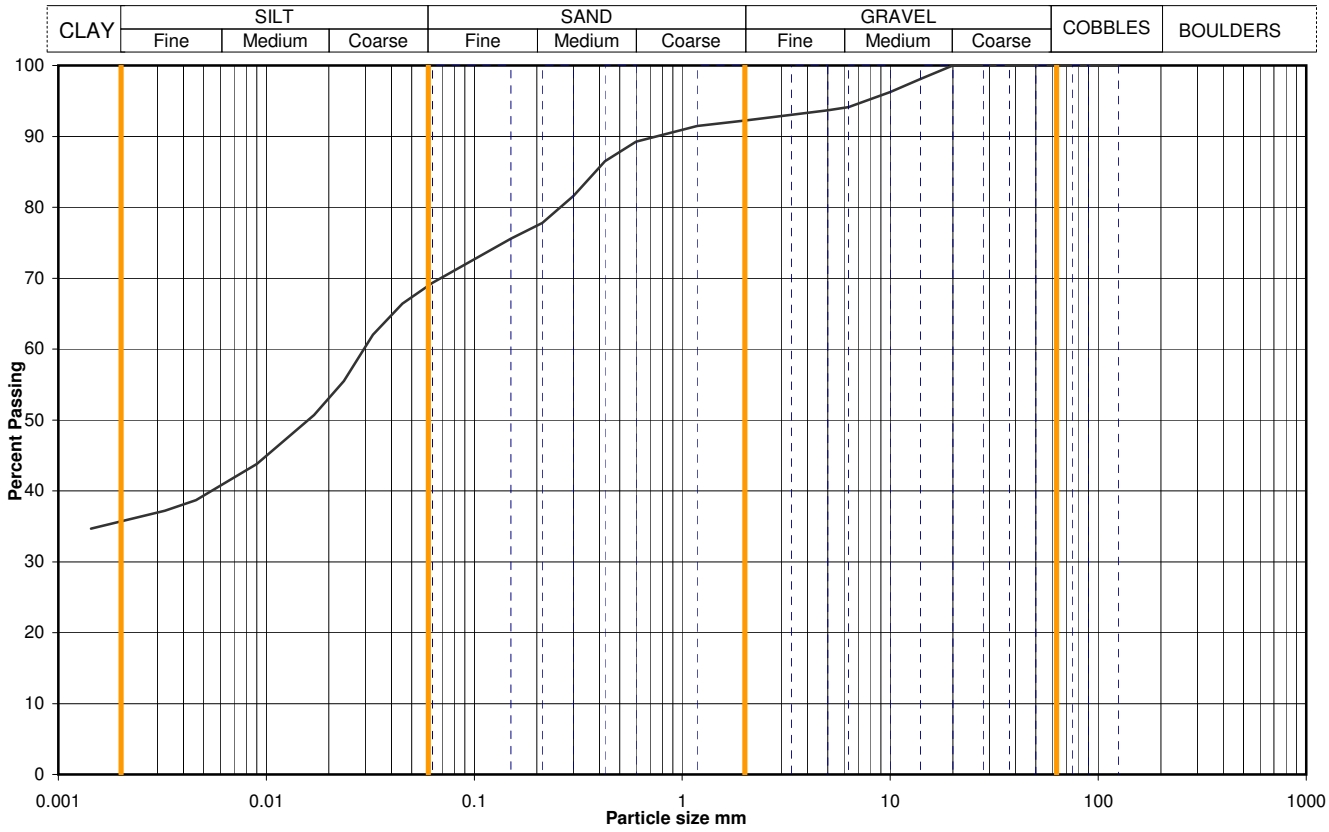
Uniformity Coefficient	D_{60} / D_{10}	5042

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD 16**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	7.50		
			Samp No	16	Type	D
			ID	G5519-1520151218110636		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	69
90	100	0.0452	66
75	100	0.0325	62
63	100	0.0236	55
50	100	0.0170	51
37.5	100	0.0090	44
28	100	0.0046	39
20	100	0.0033	37
14	98	0.0014	35
10	96		
6.3	94		
5.0	94		
3.35	93		
2.00	92		
1.18	91	Particle density, Mg/m3	
0.600	89		
0.425	86	2.65	assumed
0.300	82	Dry mass of sample, kg	
0.212	78		
0.150	76	0.7	
0.063	69		

Soil description	Brown slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	8	8
	Sand	23	23
	Silt	33	33
	Clay	36	36

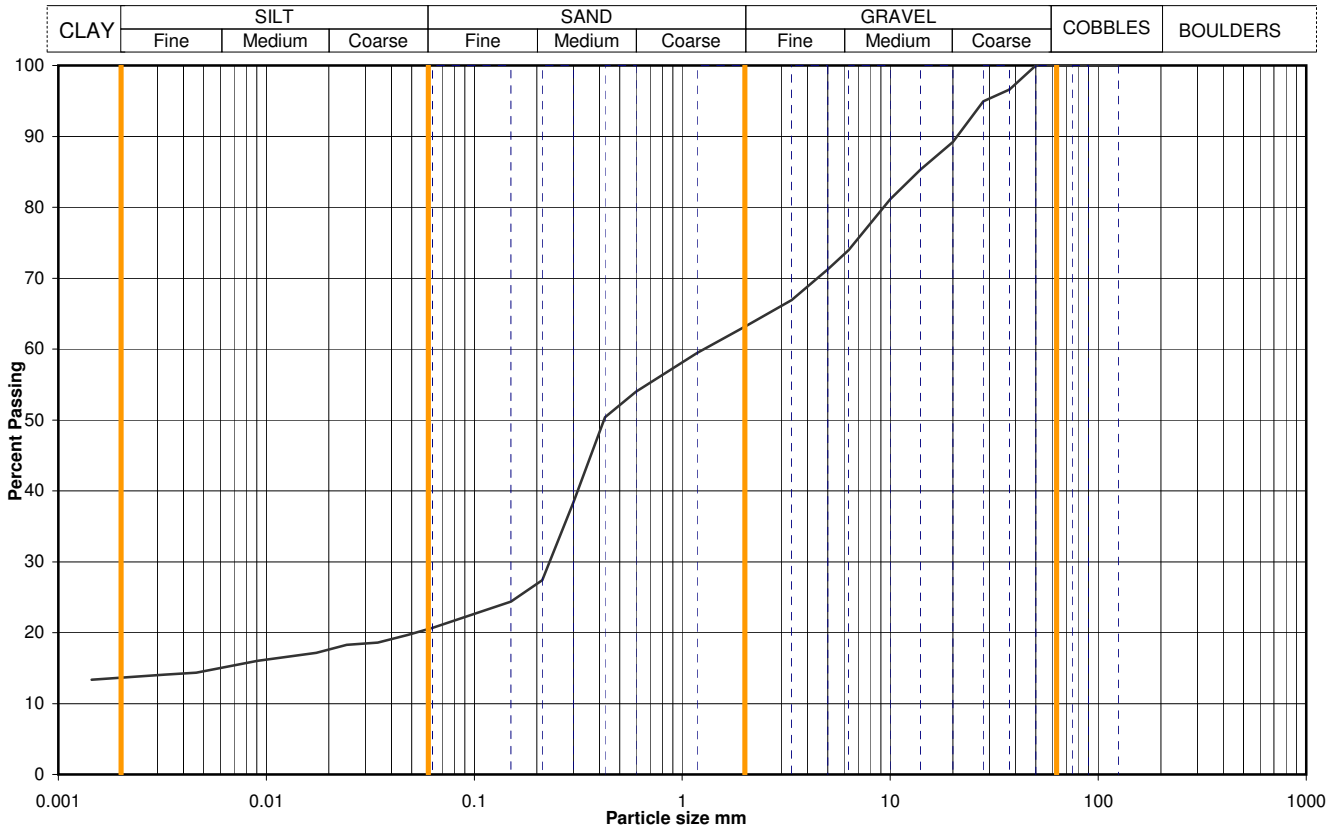
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:54	**Figure** **PSD 17**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	10.50		
			Samp No	23	Type	B
			ID	G5519-1520151218110613		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	21
90	100	0.0480	20
75	100	0.0343	19
63	100	0.0243	18
50	100	0.0174	17
37.5	97	0.0091	16
28	95	0.0046	14
20	89	0.0033	14
14	85	0.0014	13
10	81		
6.3	74		
5.0	71		
3.35	67		
2.00	63		
1.18	59	Particle density, Mg/m3	
0.600	54		
0.425	50	2.65	assumed
0.300	38	Dry mass of sample, kg	
0.212	27		
0.150	24	9.9	
0.063	21		

Soil description	Yellowish brown sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	37	37
	Sand	43	43
	Silt	7	7
	Clay	13	13

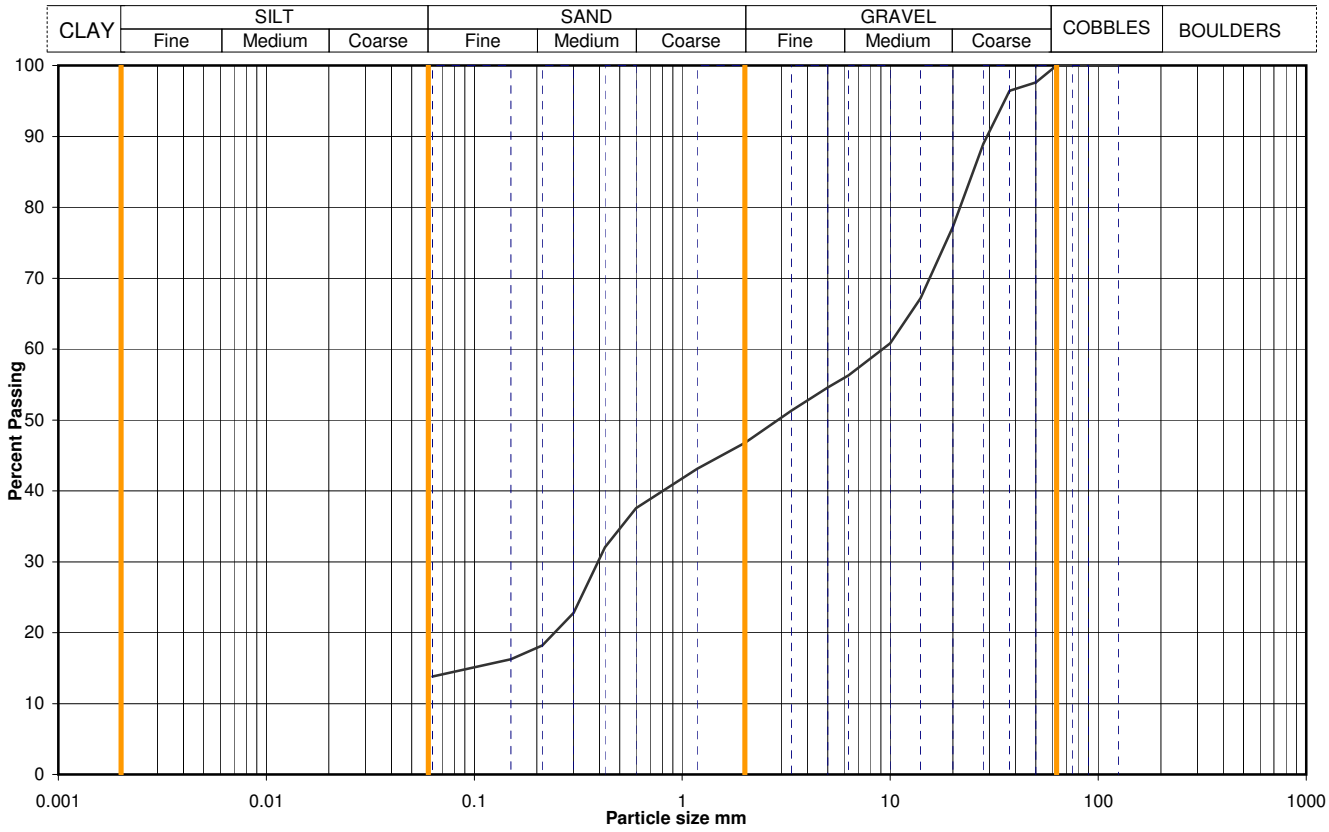
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD18**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	15.00		
			Samp No	33	Type	B
			ID	G5519-1520151218110748		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	98		
37.5	96		
28	89		
20	77		
14	67		
10	61		
6.3	56		
5.0	55		
3.35	51		
2.00	47		
1.18	43		
0.600	38		
0.425	32		
0.300	23	Dry mass of sample, kg	
0.212	18		
0.150	16	11.0	
0.063	14		

Soil description	Brown slightly sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material		
Remarks			
Sample Proportions		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	53	53
	Sand	33	33
*<60mm values to aid description only	Silt	silt+clay =	
	Clay	14	14

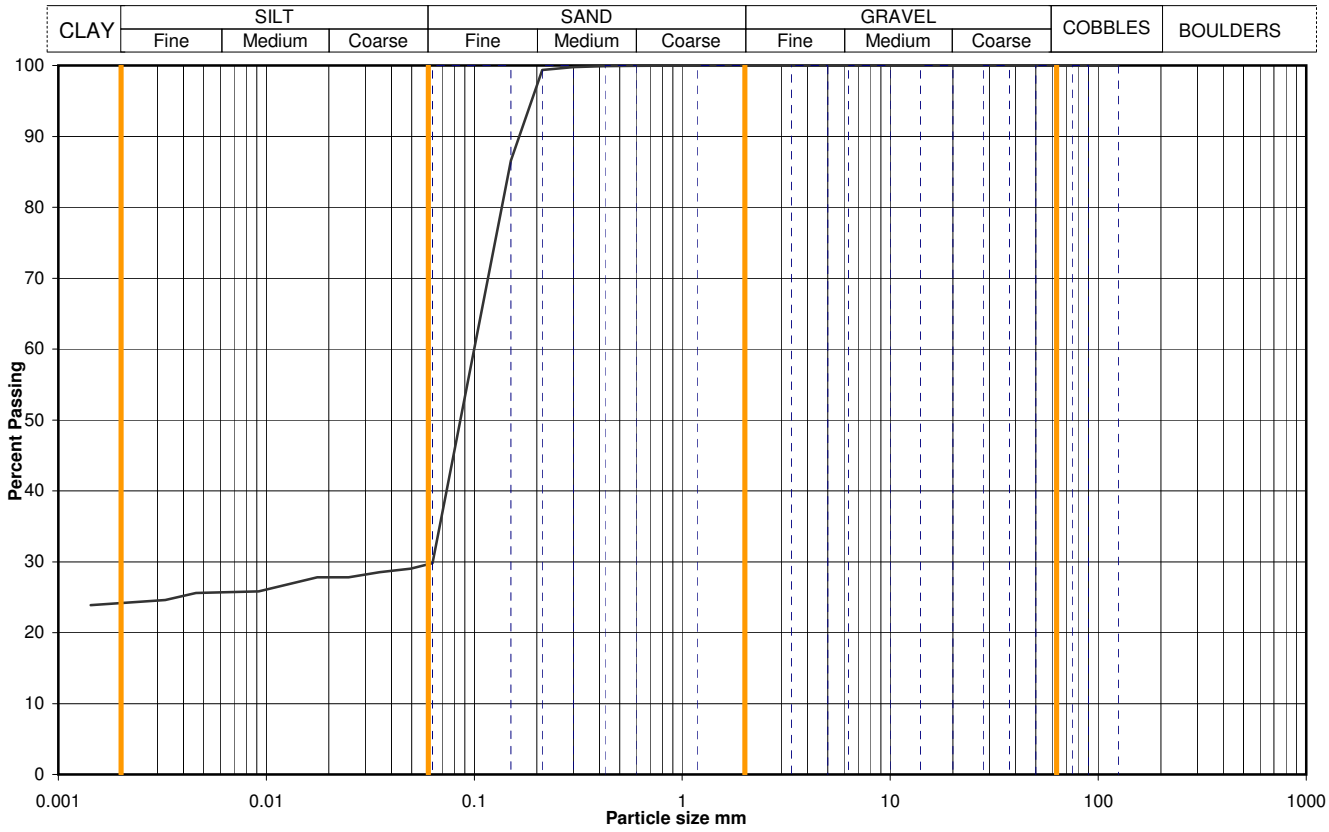
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD19**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	CH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	4.00		
			Samp No	4	Type	D
			ID	G5519-1520160203032334		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	30
90	100	0.0494	29
75	100	0.0350	29
63	100	0.0249	28
50	100	0.0176	28
37.5	100	0.0092	26
28	100	0.0046	26
20	100	0.0033	25
14	100	0.0014	24
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	100		
0.425	100	2.65	assumed
0.300	100	Dry mass of sample, kg	
0.212	99		
0.150	87	0.9	
0.063	30		

Soil description	Orangish brown sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	0	0
	Sand	70	70
	Silt	6	6
	Clay	24	24

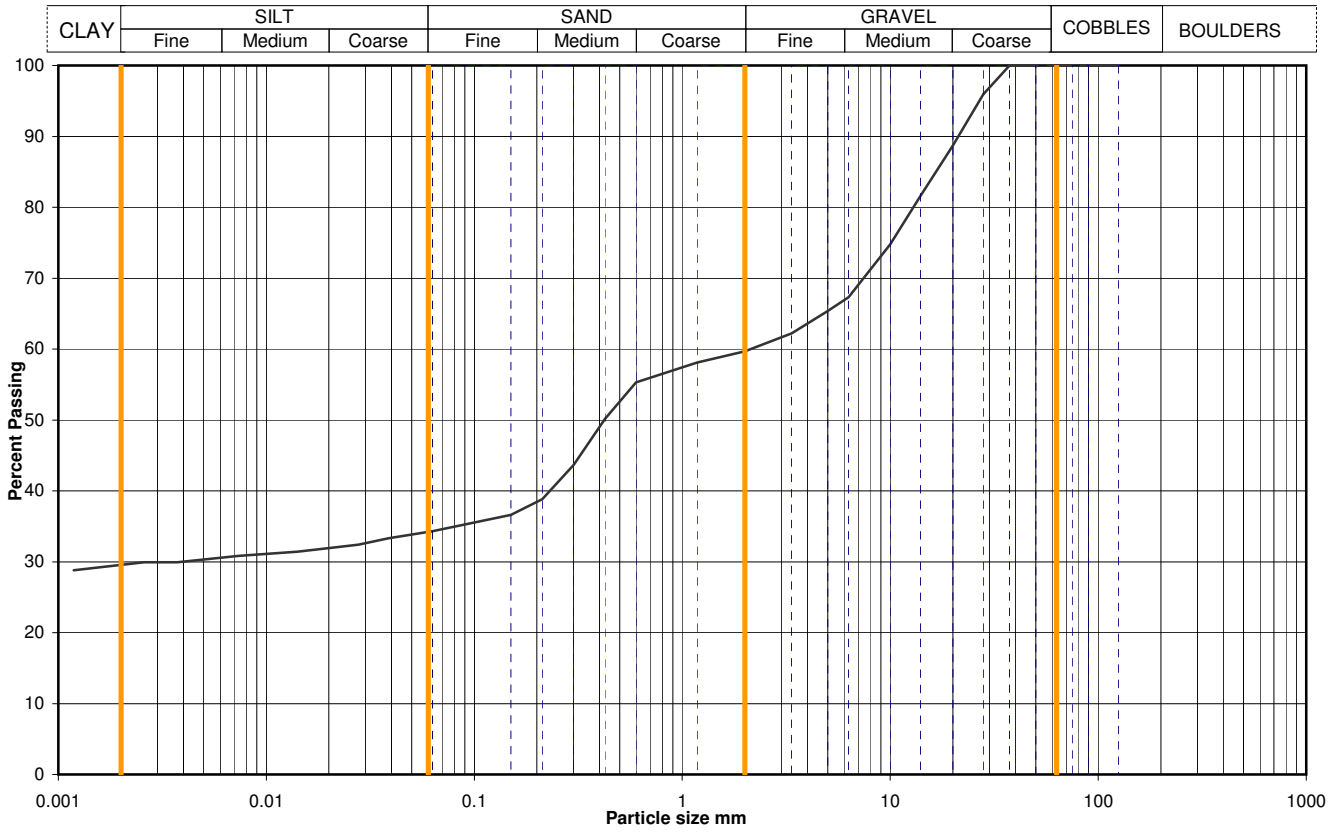
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD20**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	CH102A		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	1.50		
			Samp No	1	Type	D
			ID	G5519-1520160112095421		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	34
90	100	0.0388	33
75	100	0.0278	32
63	100	0.0198	32
50	100	0.0141	31
37.5	100	0.0074	31
28	96	0.0037	30
20	89	0.0026	30
14	82	0.0012	29
10	75		
6.3	67		
5.0	65		
3.35	62		
2.00	60		
1.18	58	Particle density, Mg/m3	
0.600	55		
0.425	50	2.65	assumed
0.300	44	Dry mass of sample, kg	
0.212	39		
0.150	37	1.4	
0.063	34		

Soil description	Orangish cream slightly sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	40	40
	Sand	25	25
	Silt	5	5
	Clay	30	30

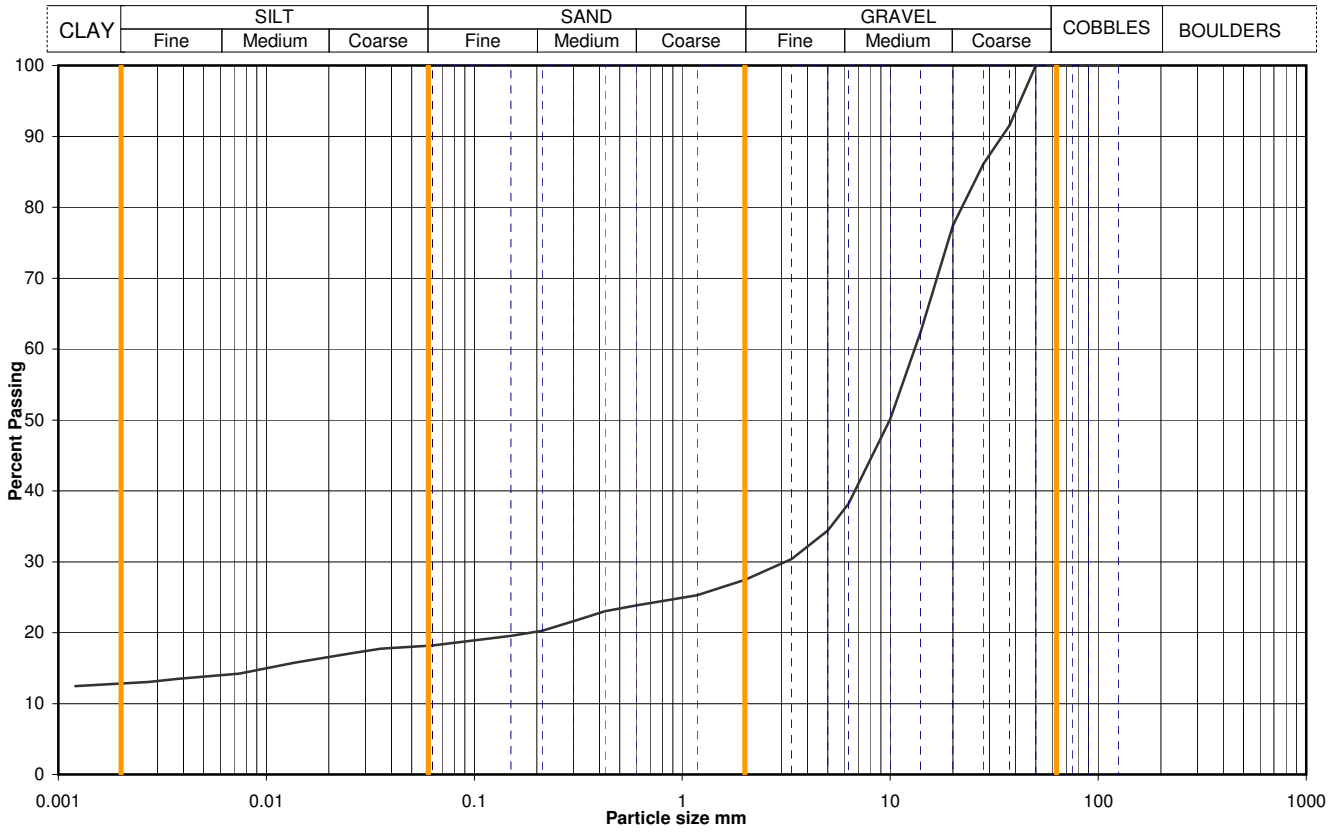
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD 21**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	CH102A		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	2.50		
			Samp No	3	Type	D
			ID	G5519-1520160112095439		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	18
90	100	0.0356	18
75	100	0.0259	17
63	100	0.0188	16
50	100	0.0136	16
37.5	92	0.0074	14
28	86	0.0038	14
20	77	0.0027	13
14	62	0.0012	12
10	50		
6.3	38		
5.0	34		
3.35	30		
2.00	27		
1.18	25	Particle density, Mg/m3	
0.600	24		
0.425	23	2.65	assumed
0.300	22	Dry mass of sample, kg	
0.212	20		
0.150	20	1.4	
0.063	18		

Soil description	Brown slightly sandy very gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	73	73
	Sand	9	9
	Silt	5	5
	Clay	13	13

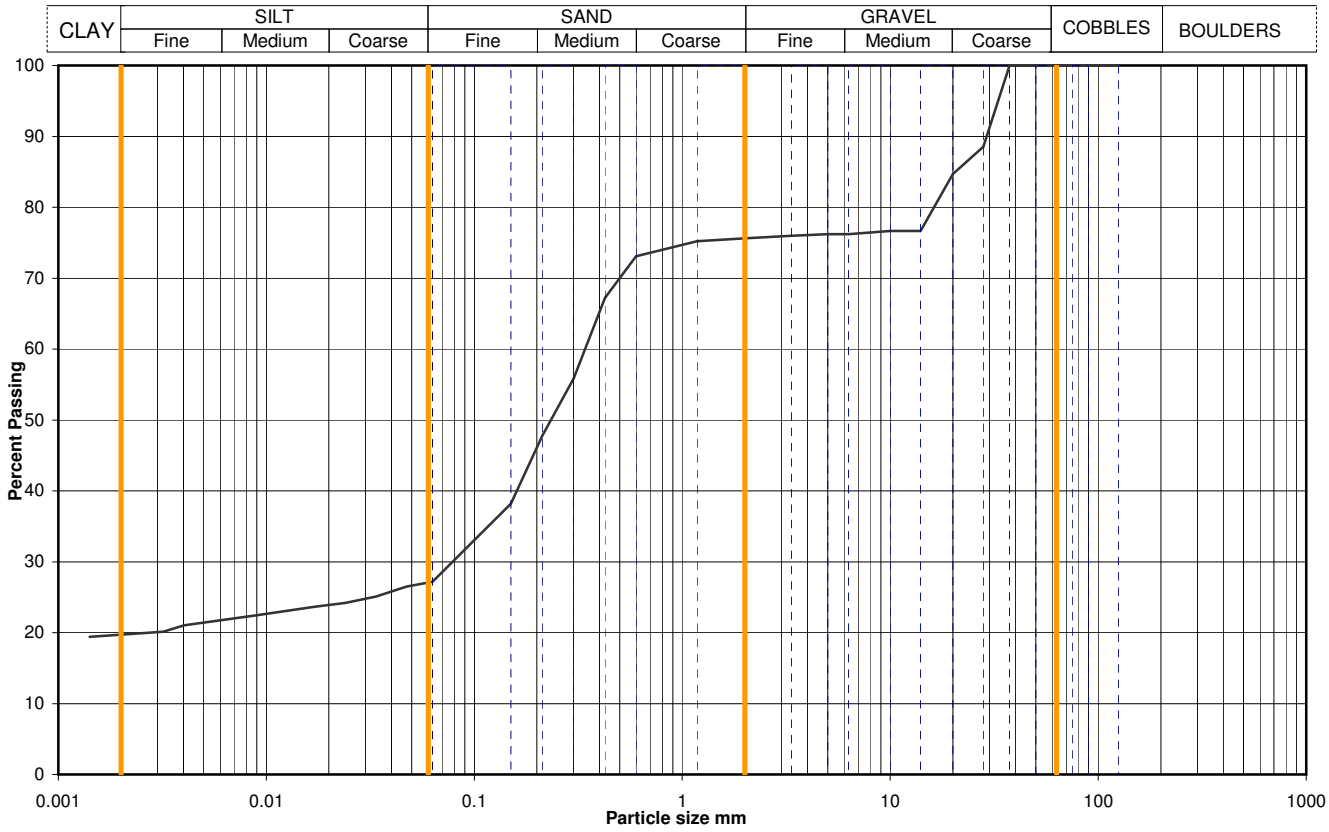
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD 22**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	CH102A		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	13.40		
			Samp No	6	Type	D
			ID	G5519-1520160112095505		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	27
90	100	0.0472	26
75	100	0.0338	25
63	100	0.0240	24
50	100	0.0171	24
37.5	100	0.0089	22
28	89	0.0040	21
20	85	0.0032	20
14	77	0.0014	19
10	77		
6.3	76		
5.0	76		
3.35	76		
2.00	76		
1.18	75	Particle density, Mg/m3	
0.600	73		
0.425	67	2.65	assumed
0.300	56	Dry mass of sample, kg	
0.212	48		
0.150	38	0.9	
0.063	27		

Soil description	Light brown slightly gravelly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	24	24
	Sand	49	49
	Silt	7	7
	Clay	20	20

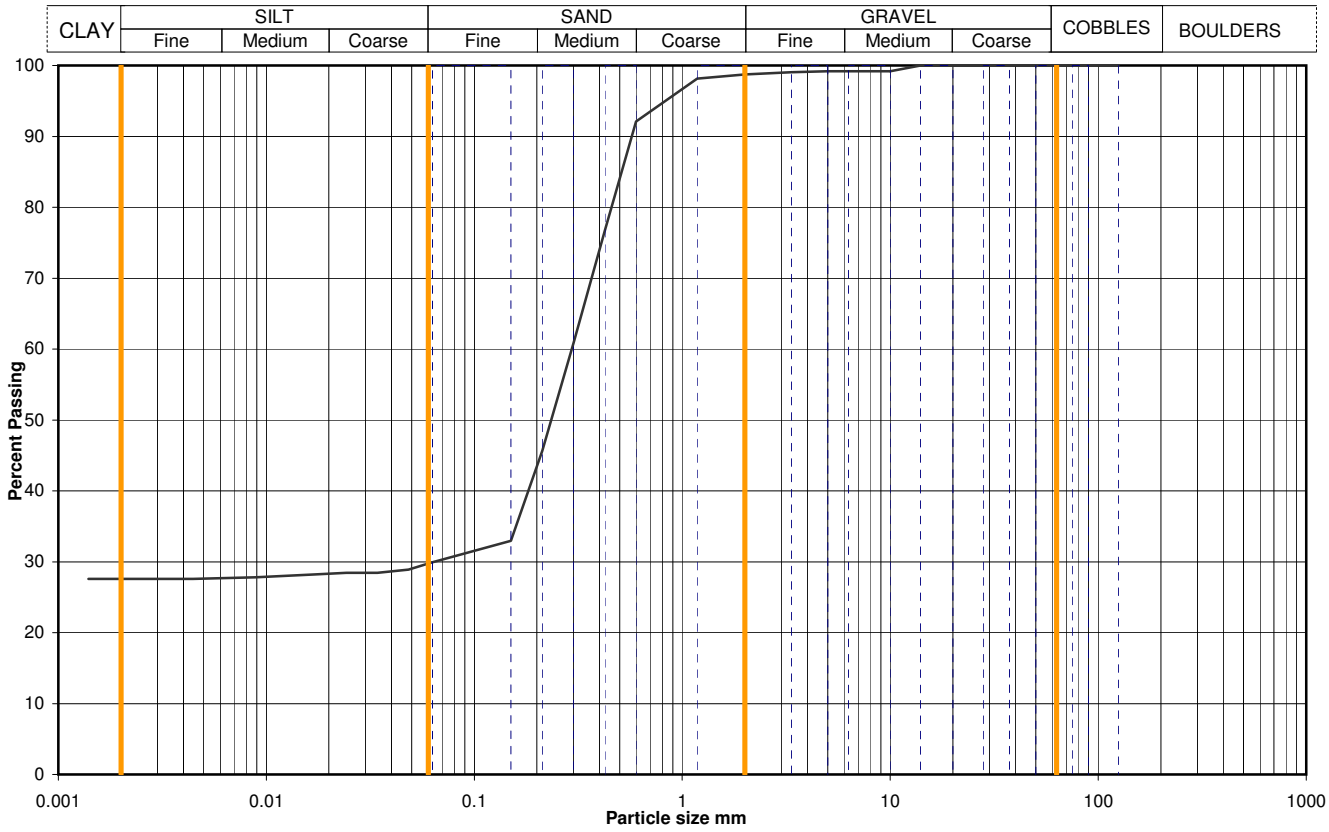
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD23**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	CH103A		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	2.00		
			Samp No	4	Type	D
			ID	G5519-1520160128011448		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	30
90	100	0.0483	29
75	100	0.0343	28
63	100	0.0242	28
50	100	0.0172	28
37.5	100	0.0089	28
28	100	0.0044	28
20	100	0.0031	28
14	100	0.0014	28
10	99		
6.3	99		
5.0	99		
3.35	99		
2.00	99		
1.18	98	Particle density, Mg/m3	
0.600	92		
0.425	77	2.65	assumed
0.300	61	Dry mass of sample, kg	
0.212	46		
0.150	33	0.9	
0.063	30		

Soil description	Orange mottled grey slightly gravelly very sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	1	1
	Sand	69	69
	Silt	2	2
	Clay	28	28

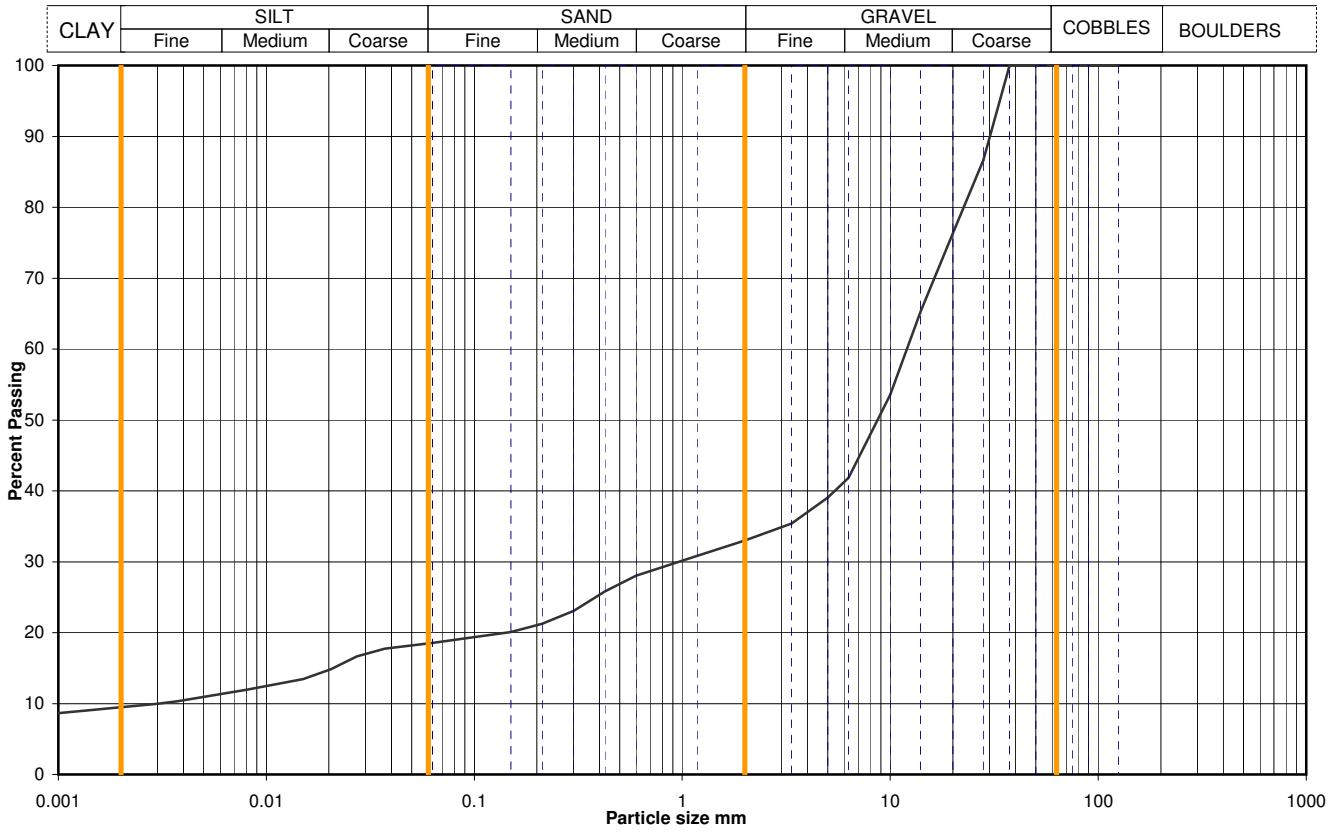
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD24**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	CH104A		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	3.50		
			Samp No	2	Type	D
			ID	G5519-1520151221124647		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	19
90	100	0.0371	18
75	100	0.0273	17
63	100	0.0205	15
50	100	0.0151	13
37.5	100	0.0081	12
28	87	0.0038	10
20	76	0.0030	10
14	65	0.0008	8
10	54		
6.3	42		
5.0	39		
3.35	35		
2.00	33		
1.18	31	Particle density, Mg/m3	
0.600	28		
0.425	26	2.65	assumed
0.300	23	Dry mass of sample, kg	
0.212	21		
0.150	20	1.3	
0.063	19		

Soil description	Dark brown slightly sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	67	67
	Sand	15	15
	Silt	9	9
	Clay	9	9

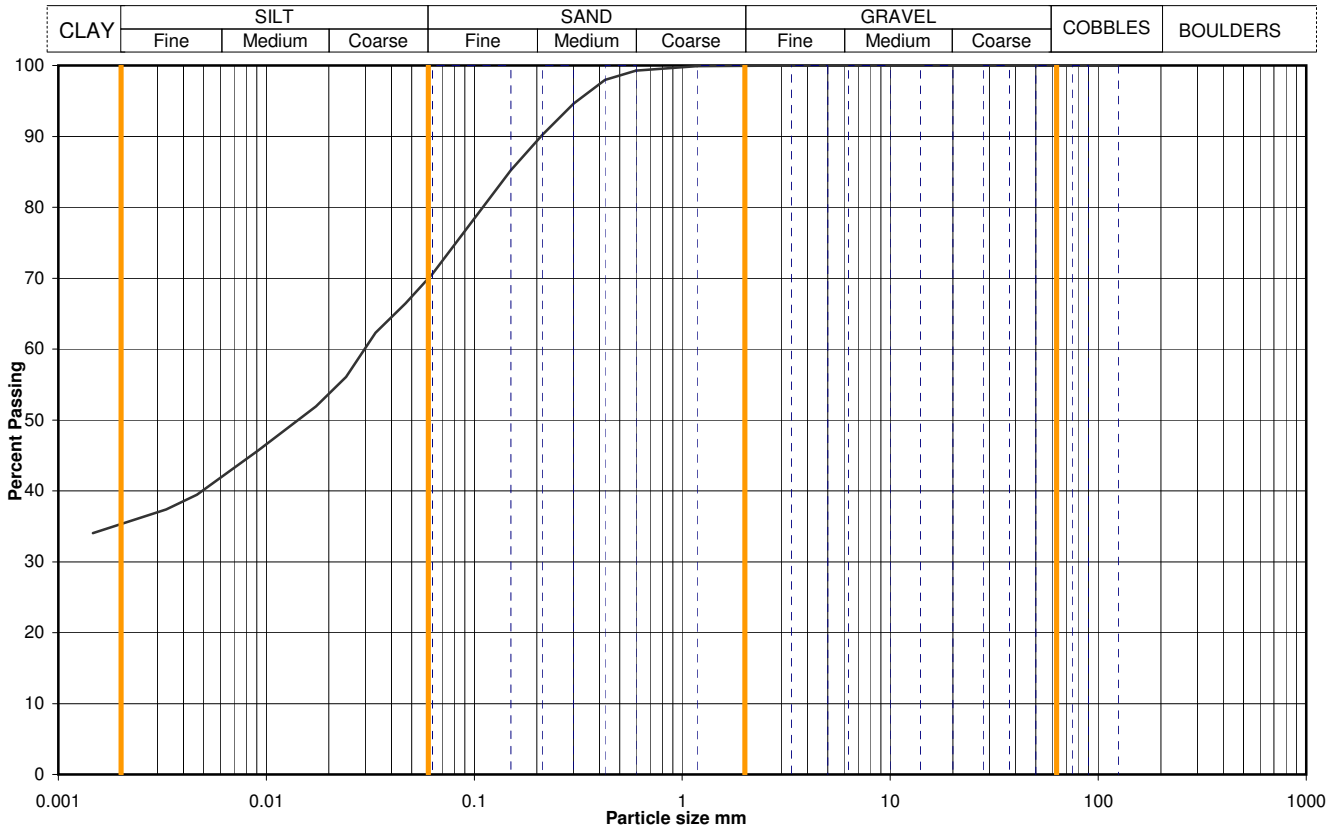
Uniformity Coefficient	D_{60} / D_{10}	3941

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD 25**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	CH104A		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	13.50		
			Samp No	12	Type	D
			ID	G5519-1520151221124803		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	71
90	100	0.0467	66
75	100	0.0335	62
63	100	0.0242	56
50	100	0.0173	52
37.5	100	0.0091	46
28	100	0.0046	39
20	100	0.0033	37
14	100	0.0015	34
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100	Particle density, Mg/m3	
0.600	99		
0.425	98	2.65	assumed
0.300	95	Dry mass of sample, kg	
0.212	90		
0.150	85	0.9	
0.063	71		

Soil description	Orangish red slightly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	0	0
	Sand	30	30
	Silt	35	35
	Clay	35	35

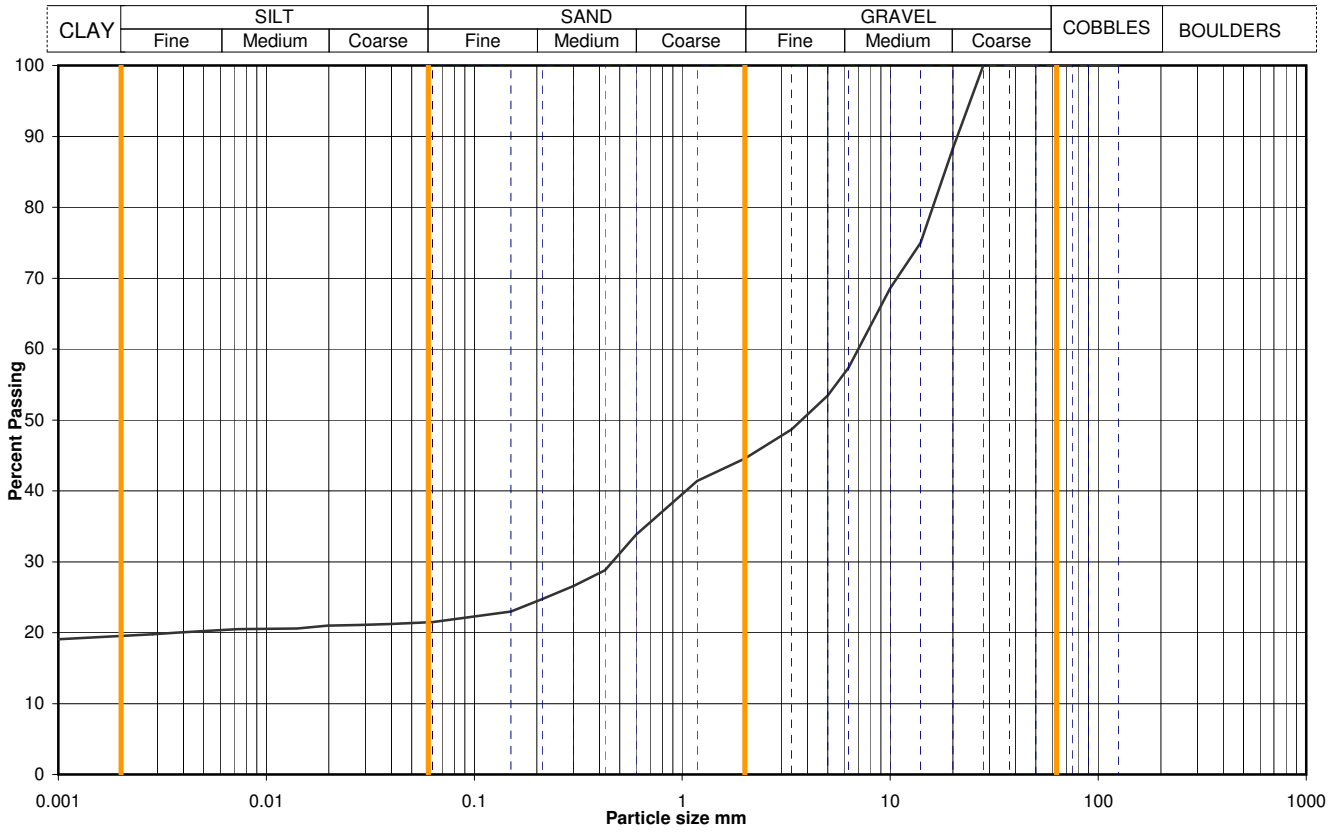
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD26**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	WS102		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	3.00		
			Samp No	4	Type	D
			ID	G5519-1520151216052252		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	21
90	100	0.0392	21
75	100	0.0278	21
63	100	0.0197	21
50	100	0.0141	21
37.5	100	0.0073	21
28	100	0.0037	20
20	88	0.0028	20
14	75	0.0006	19
10	69		
6.3	57		
5.0	53		
3.35	49		
2.00	45		
1.18	41	Particle density, Mg/m3	
0.600	34		
0.425	29	2.65	assumed
0.300	27	Dry mass of sample, kg	
0.212	25		
0.150	23	0.9	
0.063	21		

Soil description	Brown slightly sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	55	55
	Sand	23	23
	Silt	2	2
	Clay	20	20

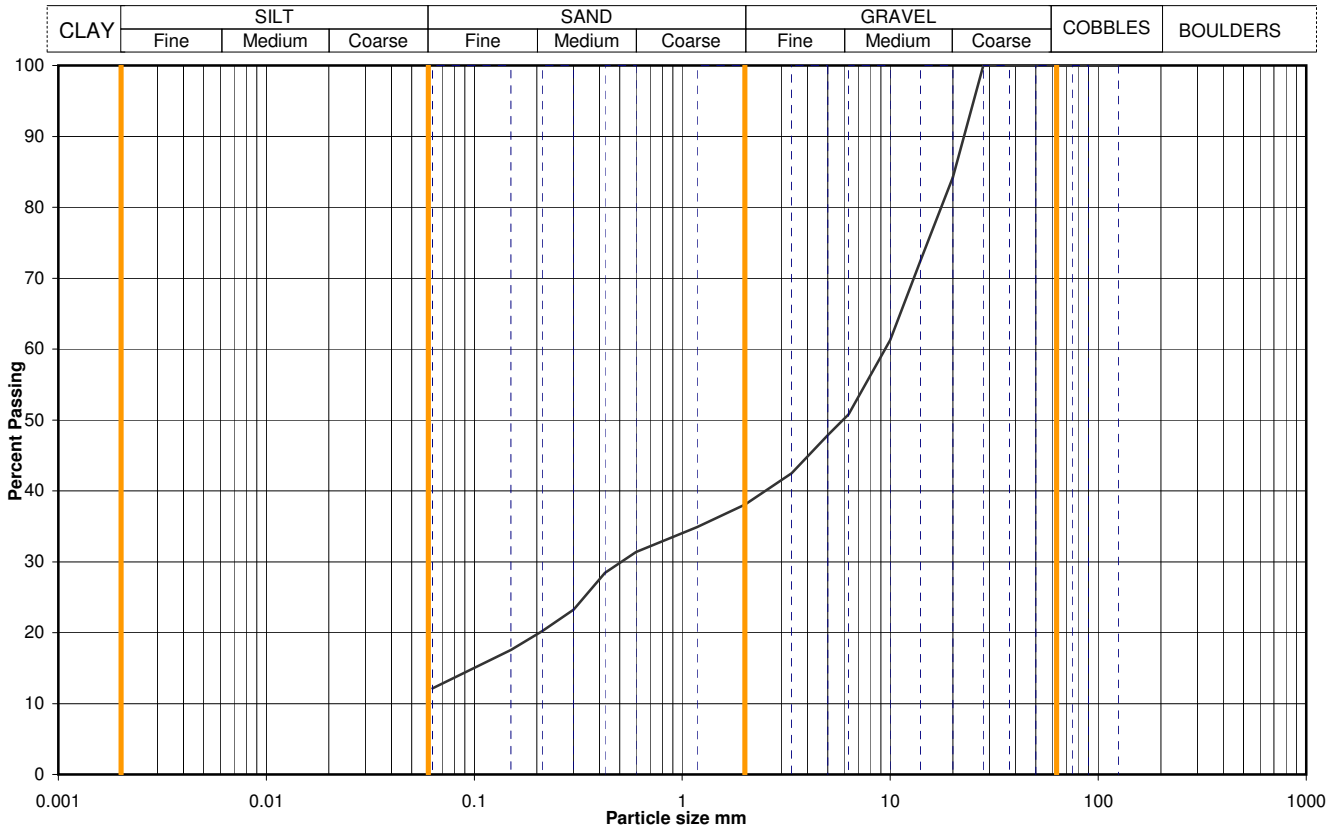
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD 27**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	WS103B		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	3.50		
			Samp No	5	Type	D
			ID	G5519-1520151216053604		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	84		
14	73		
10	61		
6.3	51		
5.0	48		
3.35	42		
2.00	38		
1.18	35		
0.600	31		
0.425	28		
0.300	23	Dry mass of sample, kg	
0.212	20		
0.150	18	0.8	
0.063	12		

Soil description	Light brown very sandy clayey GRAVEL.		
Preparation / Pretreatment	Sieve: natural material		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	62	62
	Sand	26	26
	Silt	silt+clay =	
	Clay	12	12

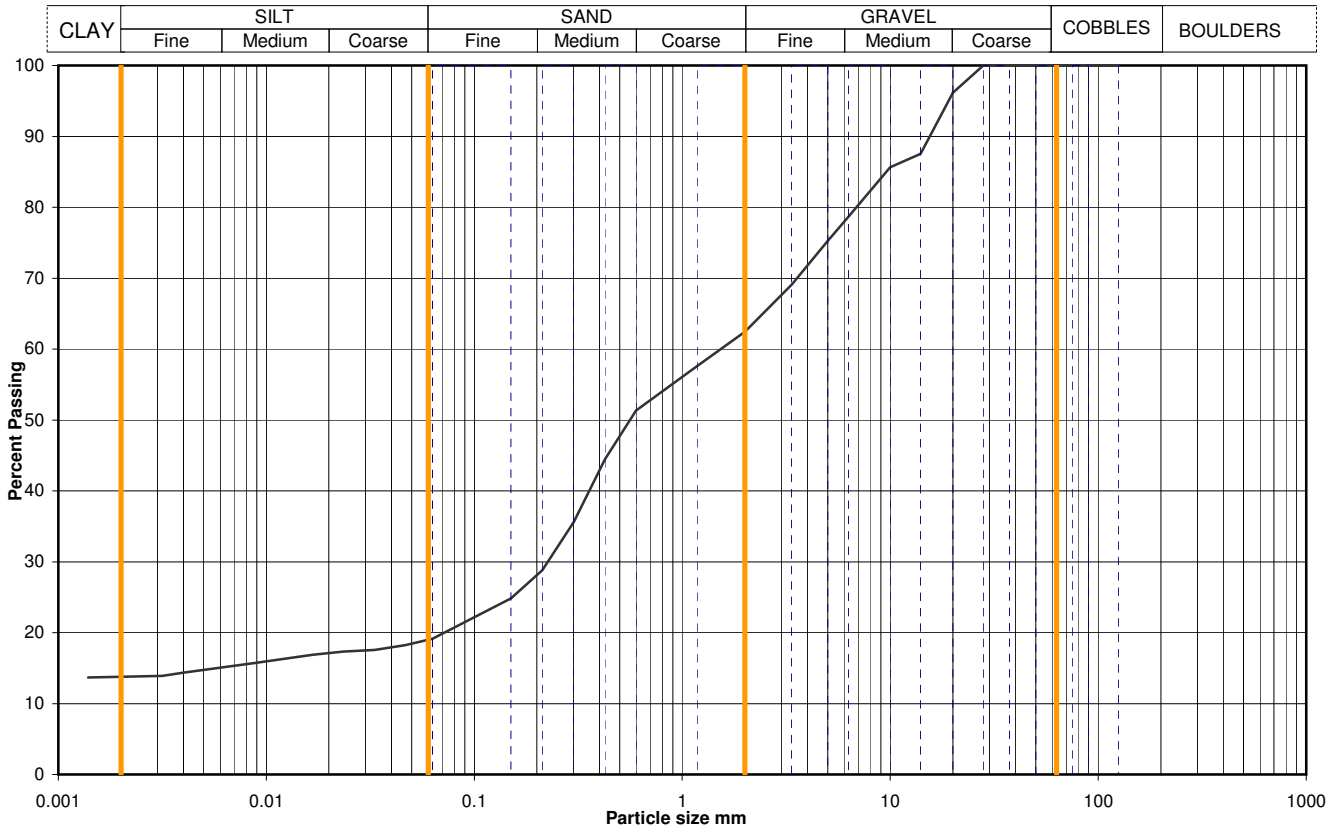
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD 28**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	WS103B		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	4.50		
			Samp No	7	Type	D
			ID	G5519-1520151216053614		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	19
90	100	0.0465	18
75	100	0.0332	18
63	100	0.0235	17
50	100	0.0167	17
37.5	100	0.0088	16
28	100	0.0040	14
20	96	0.0032	14
14	88	0.0014	14
10	86		
6.3	79		
5.0	75		
3.35	69		
2.00	62		
1.18	58	Particle density, Mg/m3	
0.600	51		
0.425	44	2.65	assumed
0.300	36	Dry mass of sample, kg	
0.212	29		
0.150	25	0.5	
0.063	19		

Soil description	Light brown sandy gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	38	38
	Sand	43	43
	Silt	5	5
	Clay	14	14

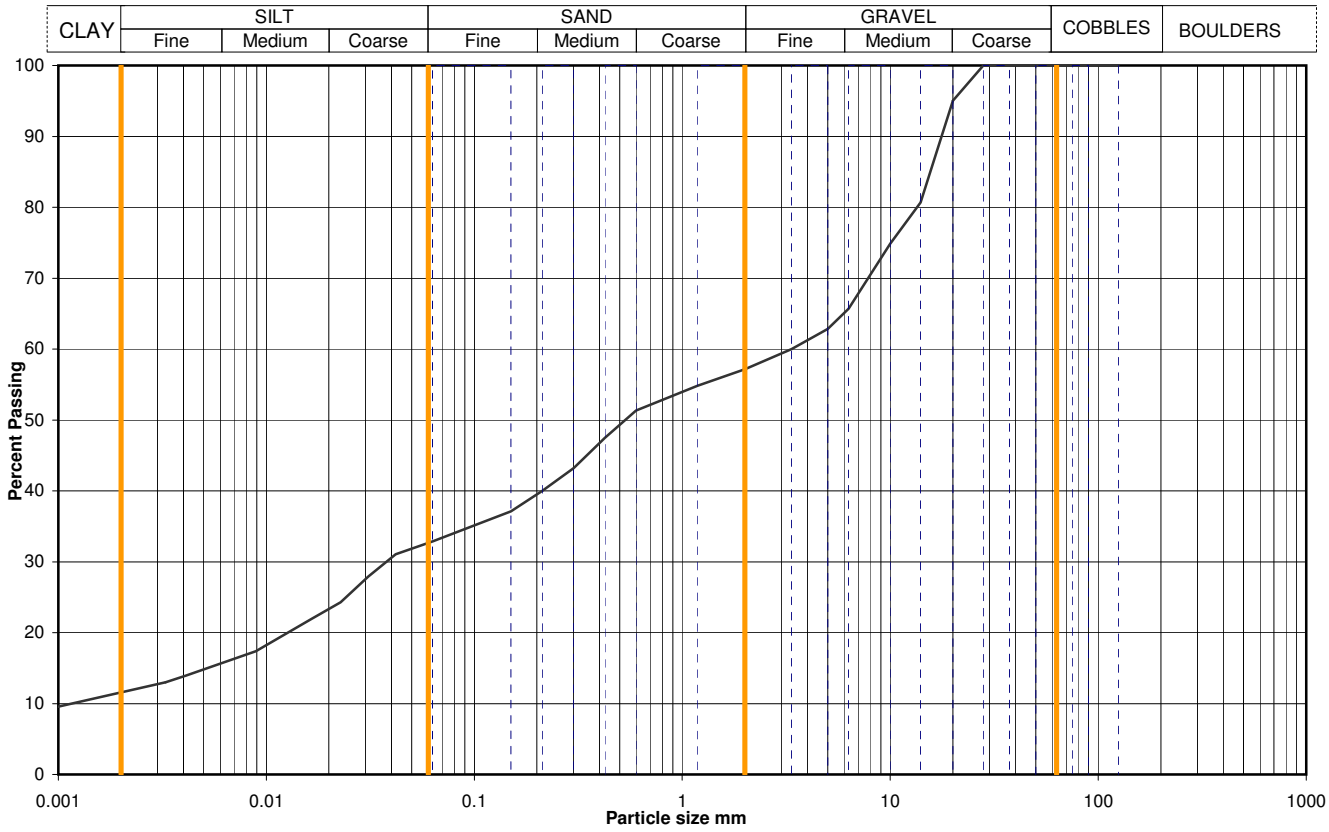
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD29**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	WS107		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	2.20		
			Samp No	5	Type	D
			ID	G5519-1520151215104619		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	33
90	100	0.0419	31
75	100	0.0308	28
63	100	0.0227	24
50	100	0.0165	22
37.5	100	0.0089	17
28	100	0.0041	14
20	95	0.0033	13
14	81	0.0008	9
10	75		
6.3	66		
5.0	63		
3.35	60		
2.00	57		
1.18	55	Particle density, Mg/m3	
0.600	51		
0.425	47	2.65	assumed
0.300	43	Dry mass of sample, kg	
0.212	40		
0.150	37	0.8	
0.063	33		

Soil description	Dark brown slightly sandy gravelly CLAY.
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377
Remarks	

Sample Proportions		Whole	*<63mm
*<60mm values to aid description only	Cobbles / boulders	0	0
	Gravel	43	43
	Sand	24	24
	Silt	21	21
	Clay	12	12

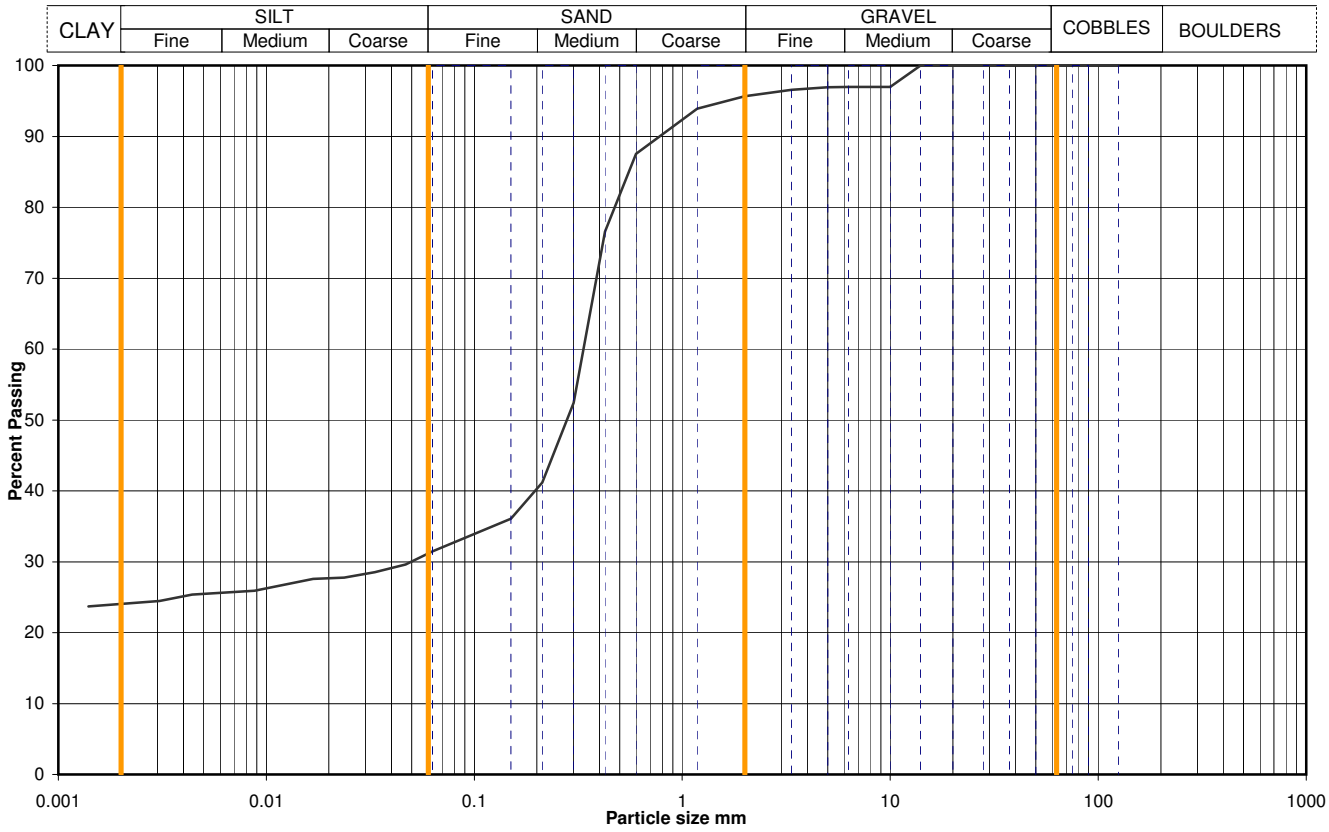
Uniformity Coefficient	D_{60} / D_{10}	2859

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref				Figure
SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**PSD30**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	WS107		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	4.50		
			Samp No	11	Type	D
			ID	G5519-1520151215104734		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	31
90	100	0.0467	30
75	100	0.0333	29
63	100	0.0237	28
50	100	0.0168	28
37.5	100	0.0088	26
28	100	0.0044	25
20	100	0.0031	24
14	100	0.0014	24
10	97		
6.3	97		
5.0	97		
3.35	97		
2.00	96		
1.18	94	Particle density, Mg/m3	
0.600	88		
0.425	77	2.65	assumed
0.300	52	Dry mass of sample, kg	
0.212	41		
0.150	36	0.6	
0.063	31		

Soil description	Orangish brown slightly gravelly clayey SAND.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	4	4
	Sand	64	64
	Silt	8	8
	Clay	24	24

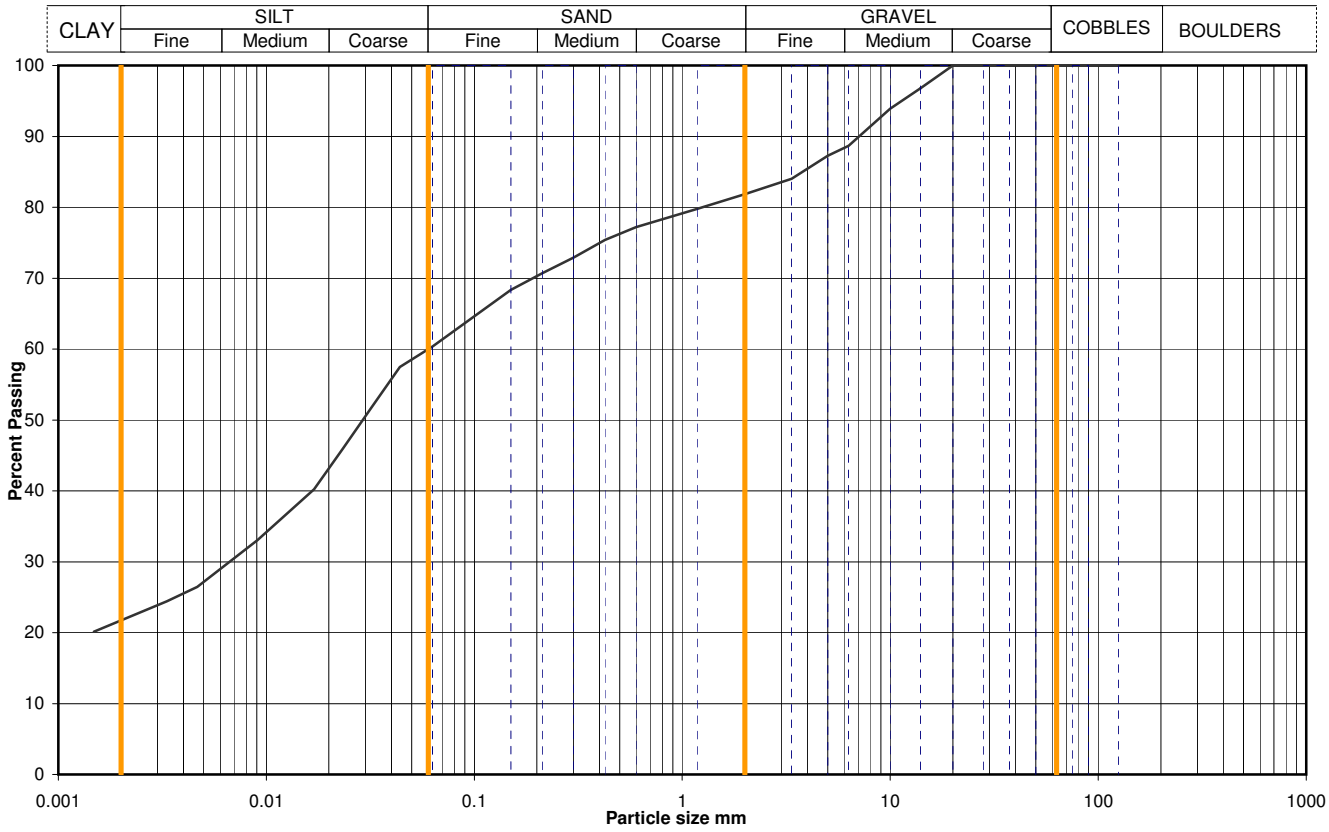
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD31**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	WS109		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	6.50		
			Samp No	11	Type	D
			ID	G5519-1520151216044949		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	60
90	100	0.0439	57
75	100	0.0320	52
63	100	0.0233	46
50	100	0.0170	40
37.5	100	0.0091	33
28	100	0.0047	26
20	100	0.0033	24
14	97	0.0015	20
10	94		
6.3	89		
5.0	87		
3.35	84		
2.00	82		
1.18	80		
0.600	77		
0.425	75		
0.300	73		
0.212	71		
0.150	68		
0.063	60		

Particle density, Mg/m3

2.65 assumed

Dry mass of sample, kg

0.5

Soil description	Brownish grey slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	18	18
	Sand	22	22
	Silt	38	38
	Clay	22	22

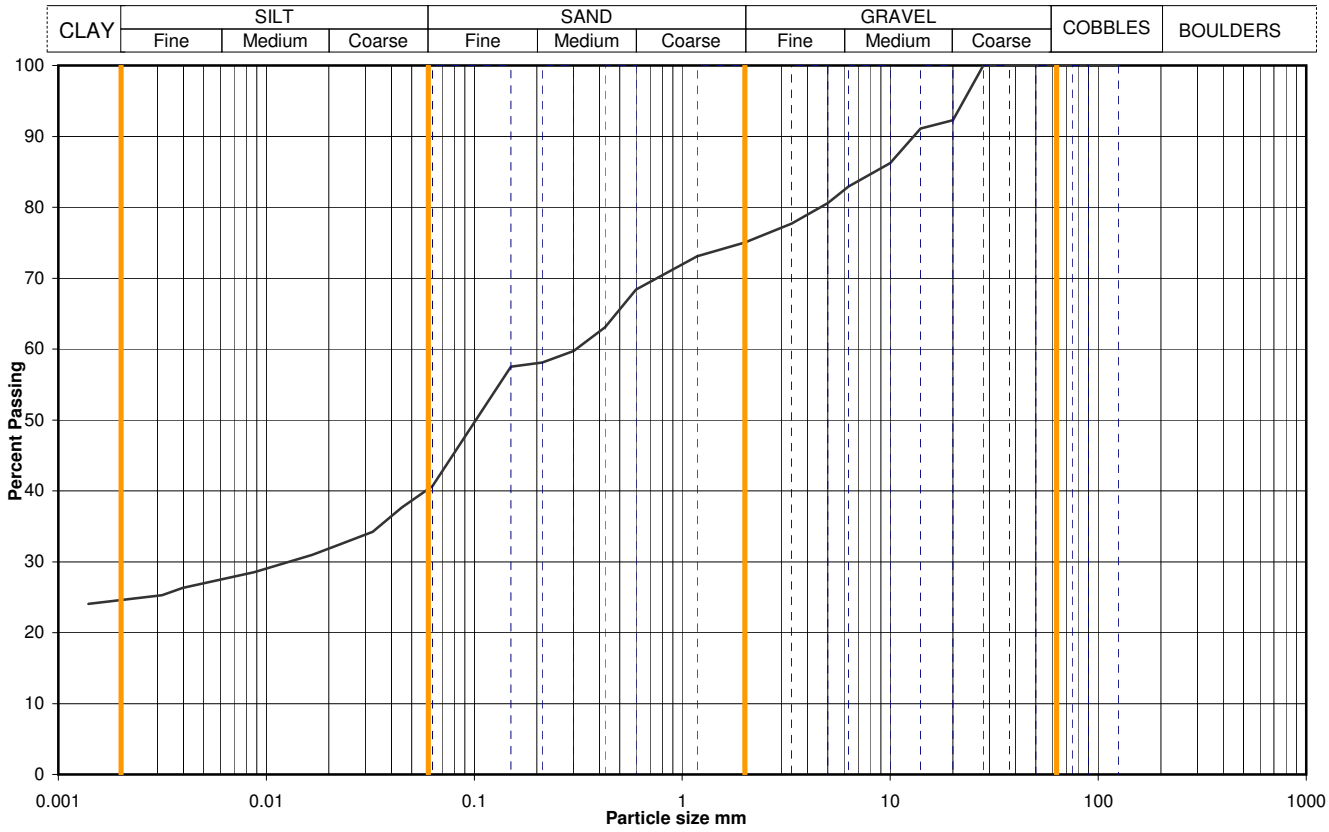
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD32**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	WS110		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	2.50		
			Samp No	3	Type	D
			ID	G5519-1520151216040930		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	41
90	100	0.0448	38
75	100	0.0325	34
63	100	0.0232	33
50	100	0.0166	31
37.5	100	0.0087	29
28	100	0.0040	26
20	92	0.0032	25
14	91	0.0014	24
10	86		
6.3	83		
5.0	81		
3.35	78		
2.00	75		
1.18	73	Particle density, Mg/m3	
0.600	68		
0.425	63	2.65	assumed
0.300	60	Dry mass of sample, kg	
0.212	58		
0.150	58	0.7	
0.063	41		

Soil description	Orange mottled grey slightly gravelly sandy CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	25	25
	Sand	35	35
	Silt	16	16
	Clay	24	24

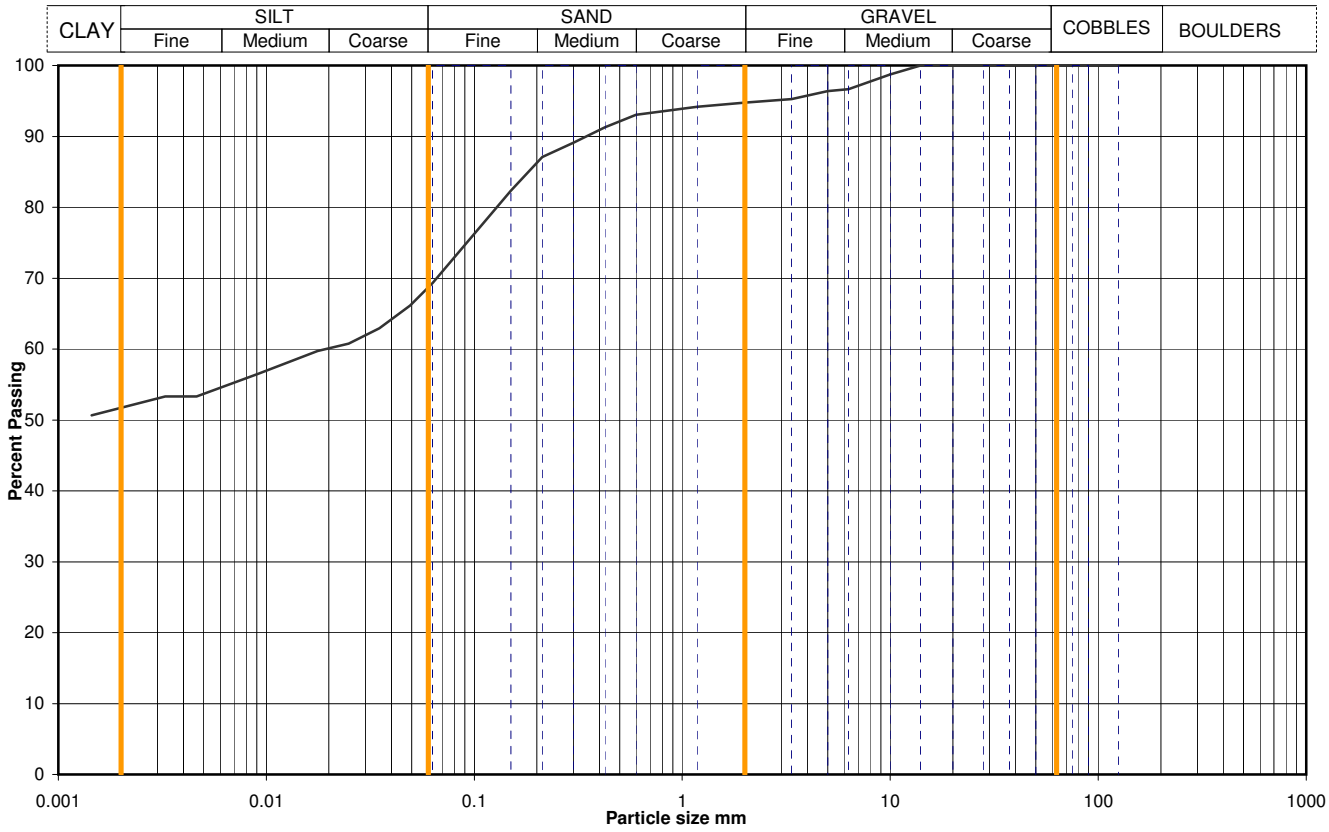
Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD33**

Particle Size Distribution Analysis

Project No	G5519-15	Sample Details:	Hole No	WS110		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	5.50		
			Samp No	9	Type	D
			ID	G5519-1520151216041028		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	69
90	100	0.0490	66
75	100	0.0349	63
63	100	0.0248	61
50	100	0.0176	60
37.5	100	0.0092	57
28	100	0.0046	53
20	100	0.0033	53
14	100	0.0014	51
10	99		
6.3	97		
5.0	96		
3.35	95		
2.00	95		
1.18	94	Particle density, Mg/m3	
0.600	93		
0.425	91	2.65	assumed
0.300	89	Dry mass of sample, kg	
0.212	87		
0.150	82	0.4	
0.063	69		

Soil description	Light grey mottled orange slightly sandy slightly gravelly CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	5	5
	Sand	26	26
	Silt	17	17
	Clay	52	52

Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group	UKAS TESTING 1157	Printed:15/03/2016 13:55	**Figure** **PSD34**

CHEMICAL TESTS - SUMMARY OF RESULTS

Project No	Project Name
G5519-15	Bridle Close & Fontmell Close, St Albans

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	Org %	LOI %	pH	Sulphate as SO_4 Preparation/test *	2:1 water sol. g/L	ground water g/L	acid sol. %	SD1 options TS %	Mg mg/L NO_3 mg/L NH_4	CO_2 %	Chloride, Cl water sol. %	Chloride, Cl acid sol. %	<2 mm %	Remarks
BH101	28	14.50	15.00	B	White CHALK composed of gravelly clayye silt.			8.0	1+3	0.05					35			100	
BH101	34	18.00	18.50	B	White gravelly clayey SILT. Gravel is chalk.			7.8	1+3	0.18					38			100	
BH103	15	9.50	10.00	B	White gravelly clayey SILT. Gravel is chalk.			8.2	1+3	0.02					41			100	
BH103	20	14.50	15.00	B	White gravelly clayey SILT. Gravel is chalk.			8.5	1+3	0.01					39			100	
BH103	31	23.00	23.50	B	White gravelly clayey SILT. Gravel is chalk.			8.3	1+3	0.01					37			100	
BH103	34	27.50	27.95	B	White slightly sandy slightly gravelly CLAY. Gravel is chalk.			8.4	1+3	0.05					37			100	
CH101	7	6.00		D	Cream CHALK composed of slightly sandy silt.			8.4	1+3	0.01					44			100	
CH101	13	8.50		D	White CHALK composed of slightly sandy slightly gravelly silt. Gravel is flint.			8.2	1+3	0.02					41			100	
CH101	21	12.50		D	Cream CHALK composed of slightly sandy slightly gravelly silt.			8.3	1+3	0.03					39			88	
CH101	27	15.50		D	Cream CHALk composed of slightly sandy slightly gravelly silt. Gravel is flint.			8.4	1+3	0.02					39			100	
CH102A	10 (Clay)	22.10	22.50	D	Dark brown slightly sandy slightly gravelly CLAY with chalk fragments.			7.2	1+3	0.05					2.7			100	
CH102A	9 (Chalk)	22.10	22.50	D	White CHALK composed of slightly sandy gravelly silt.			8.5	1+3	0.08					39			100	
CH102A	11	22.70		D	White CHALK composed of slightly sandy gravelly silt.										40				
CH102A	12	23.50		D	Cream CHALK with occasional pockets of brown clay.			8.5	1+3	0.03								100	
CH102A	15	24.80		D	White CHALK composed of slightly sandy slightly gravelly silt.			8.6	1+3	0.01					39			100	
CH102A	20	28.50	28.83	D	White CHALK composed of slightly sandy silt.			8.3	1+3	0.02					41			100	
CH102D	1	16.50		D	Cream CHALK composed of slightly sandy slightly gravelly silt.			8.5	1+3	0.01					42			100	
CH102D	3	17.90		D	White CHALK composed of slightly sandy slightly gravelly silt. Gravel is flint.			8.5	1+3	0.03					39			100	
CH103A	7	18.80		D	White CHALK composed of slightly sandy slightly gravelly silt.			8.7	1+3	0.02					39			100	

BS 1377 : definitive method unless stated :

- Org Organic matter content (s-sulphides, c-chlorides identified)
- LOI Mass loss on ignition at 440°C
- CO_2 Carbonate content (rapid titration)
- Cl Chloride content

* Sulphate tests preparation / test methods :

1. BS 1377:Part 3:1990:clause 5.3
2. BS 1377:Part 3:1990:clause 5.4
3. BS 1377:Part 3:1990:clause 5.5
4. TRL447 - 1 water soluble sulphate
5. TRL447 - 2 acid soluble sulphate
6. BR279 - groundwater sulphate

< 2mm material passing 2mm sieve

BRE Special Digest SD1, dependent options :

- TS Total Sulphur to BR279 / EN ISO15178
- Mg Soluble Magnesium to BR279, colorimetric
- NO3 Soluble Nitrate to BR279, colorimetric
- NH_4 qualitative

CHEMICAL TESTS - SUMMARY OF RESULTS

Project No	Project Name
G5519-15	Bridle Close & Fontmell Close, St Albans

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	Org %	LOI %	pH	Sulphate as SO_4 Preparation/test *	2:1 water sol. g/L	ground water g/L	acid sol. %	SD1 options TS %	Mg mg/L NO_3 mg/L NH_4	CO_2 %	Chloride, Cl water sol. %	Chloride, Cl acid sol. %	<2 mm %	Remarks
CH103A	12	21.00		D	White CHALK composed of slightly sandy slightly gravelly silt. Gravel is flint.			8.5	1+3	0.01					41			100	
CH103A	15	22.00		D	White CHALK composed of slightly sandy slightly gravelly silt. Gravel is flint.			8.5	1+3	0.02					40			61	

BS 1377 : definitive method unless stated :

Org Organic matter content
(s-sulphides, c-chlorides identified)

LOI Mass loss on ignition at 440°C

CO_2 Carbonate content (rapid titration)

Cl Chloride content

* Sulphate tests preparation / test methods :

1. BS 1377:Part 3:1990:clause 5.3
2. BS 1377:Part 3:1990:clause 5.4
3. BS 1377:Part 3:1990:clause 5.5
4. TRL447 - 1 water soluble sulphate
5. TRL447 - 2 acid soluble sulphate
6. BR279 - groundwater sulphate

< 2mm material passing 2mm sieve

BRE Special Digest SD1, dependent options :

TS Total Sulphur to BR279 / EN ISO15178

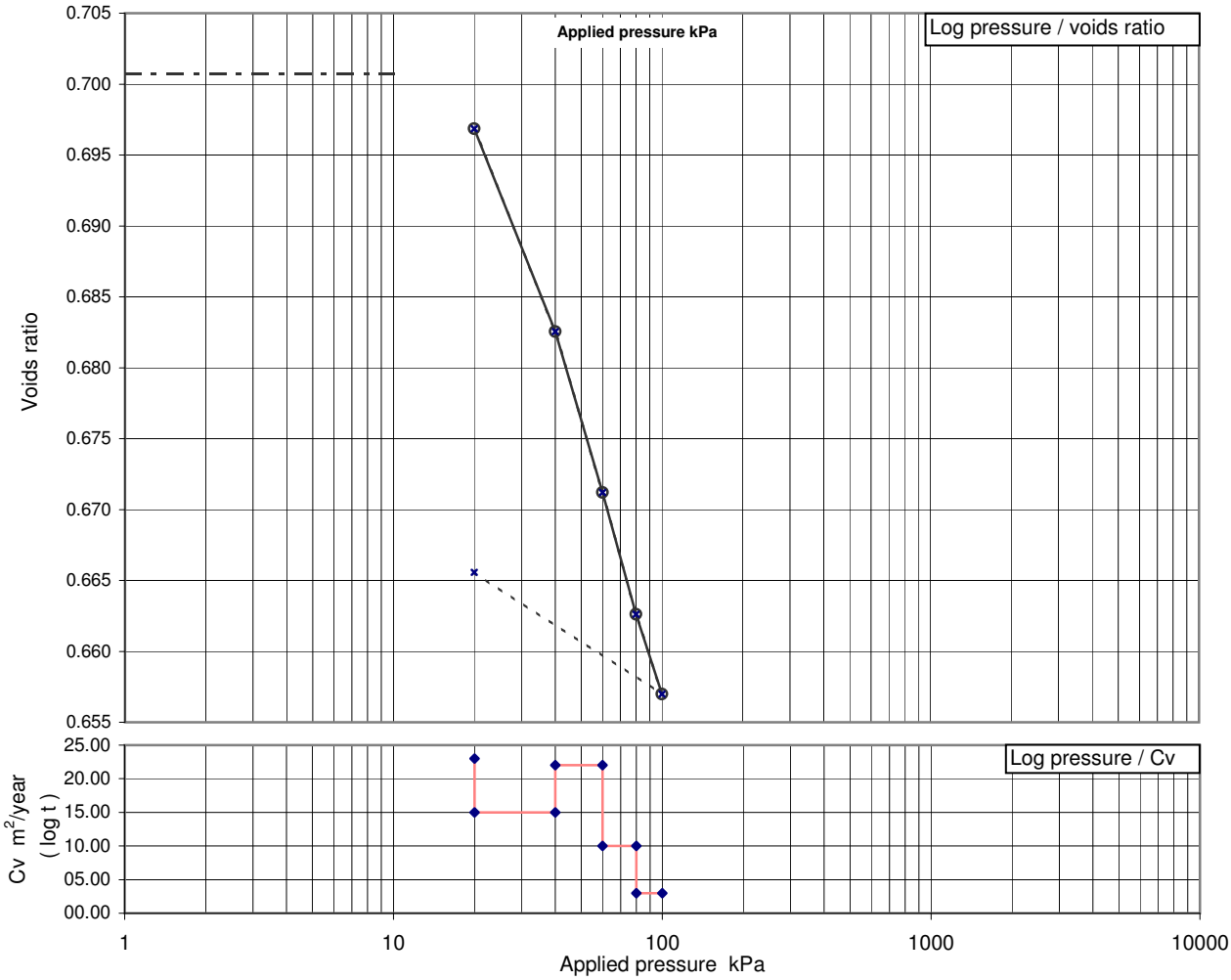
Mg Soluble Magnesium to BR279, colorimetric

NO3 Soluble Nitrate to BR279, colorimetric

NH_4 qualitative

ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3

Project No	G5519-15	Sample Details:	Hole No	BH104		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	3.50		
			Samp No	7	Type	U
			ID	G5519-1520160111094025		
			Spec Ref			



Soil description	Very stiff orangish brown mottled grey slightly sandy slightly gravelly CLAY.
Preparation	Undisturbed
Index properties (if available)	Liquid limit % | Plastic limit %

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m^3
Diameter	75.01		mm
Height	19.02	18.62	mm
Voids ratio	0.701	0.666	
Moisture content	22	24	%
Bulk density	1.89	1.97	Mg/m^3
Dry density	1.56	1.59	Mg/m^3
Saturation	82	95	%
Average temperature for test	20		°C

Swelling pressure: not measured kPa

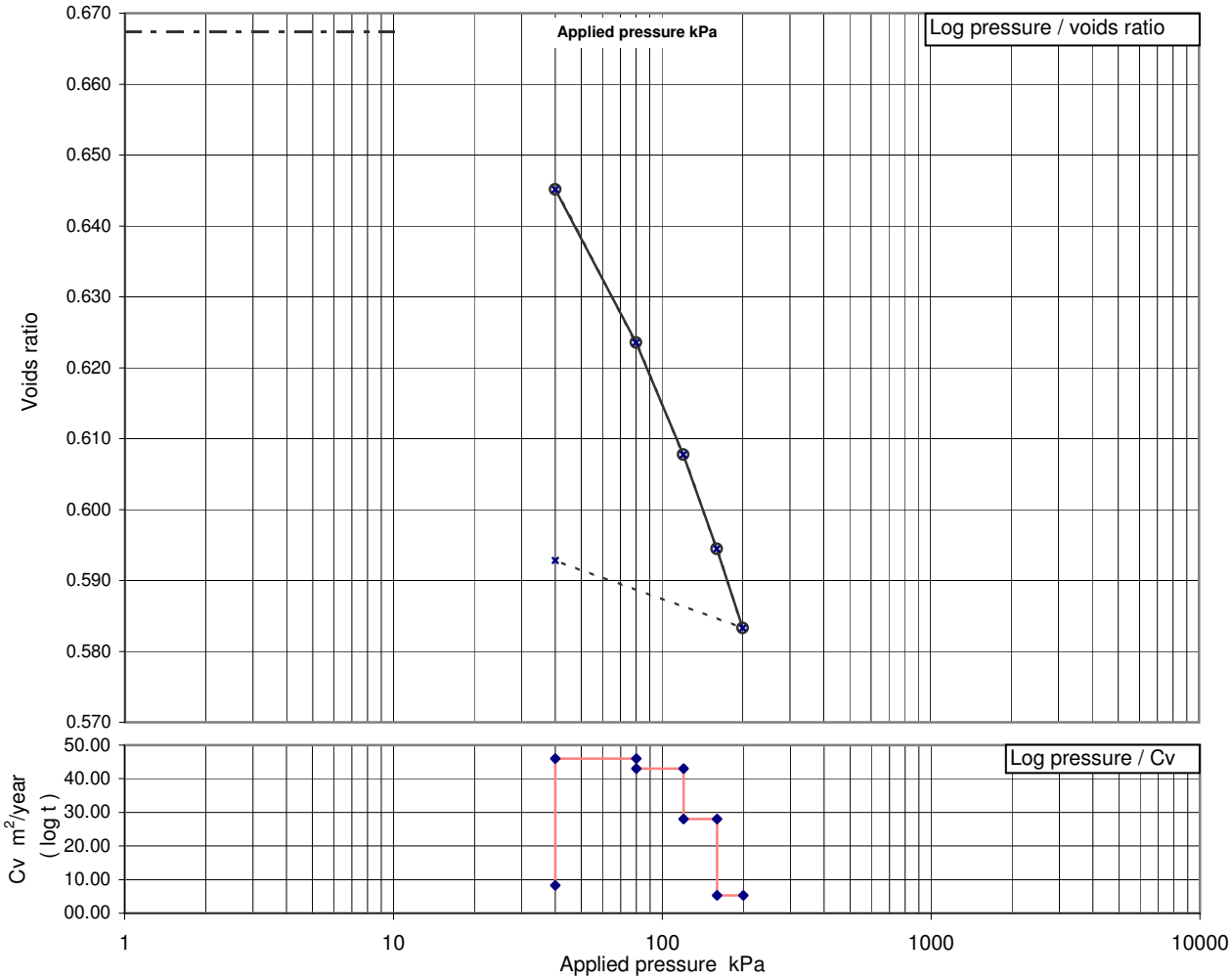
Notes :

Specimen taken 20 mm from base of sample

Applied Pressure kPa	Voids ratio	M_v m^2/MN	C_v ($t_{50, log}$) $m^2/year$	C_v ($t_{90, root}$) $m^2/year$	
0	0.7007				
20	0.6969	0.113	23	25	
40	0.6826	0.422	15	19	
60	0.6712	0.338	22	24	
80	0.6626	0.257	10	11	
100	0.6570	0.169	3	3.3	
20	0.6656	0.065	-	-	

ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3

Project No	G5519-15	Sample Details:	Hole No	BH104		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	8.50		
			Samp No	14	Type	U
			ID	G5519-1520160111094206		
			Spec Ref			



Soil description	Stiff to very stiff orangish brown slightly sandy CLAY.
Preparation	Undisturbed
Index properties (if available)	Liquid limit % | Plastic limit %

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m^3
Diameter	75.04		mm
Height	19.09	18.23	mm
Voids ratio	0.667	0.593	
Moisture content	20	23	%
Bulk density	1.91	2.05	Mg/m^3
Dry density	1.59	1.66	Mg/m^3
Saturation	81	105	%
Average temperature for test	20		°C

Swelling pressure: not measured kPa

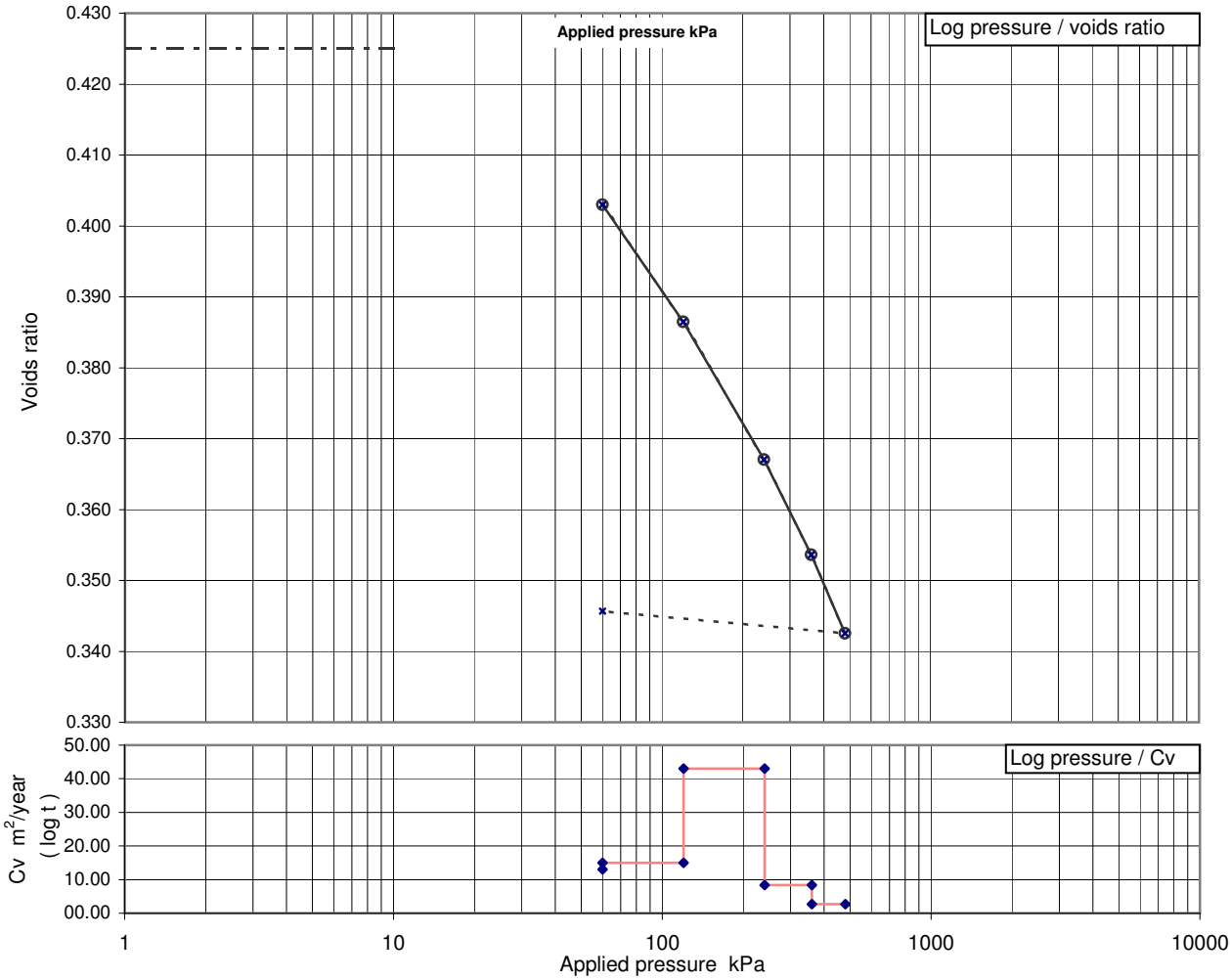
Notes :

Specimen taken 30 mm from base of sample

Applied Pressure kPa	Voids ratio	M_v m^2/MN	C_v ($t_{50, log}$) $m^2/year$	C_v ($t_{90, root}$) $m^2/year$	
0	0.6673				
40	0.6451	0.333	8.3	8.7	
80	0.6236	0.328	46	49	
120	0.6078	0.243	43	46	
160	0.5945	0.206	28	30	
200	0.5833	0.175	5.3	5.5	
40	0.5928	0.038	-	-	

ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3

Project No	G5519-15	Sample Details:	Hole No	BH105		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	12.00		
			Samp No	22	Type	U
			ID	G5519-1520151221085028		
			Spec Ref			



Soil description	Stiff to very stiff brown slightly sandy slightly gravelly CLAY.
Preparation	Undisturbed
Index properties (if available)	Liquid limit % | Plastic limit %

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m^3
Diameter	75.01		mm
Height	19.01	17.95	mm
Voids ratio	0.425	0.346	
Moisture content	13	13	%
Bulk density	2.10	2.22	Mg/m^3
Dry density	1.86	1.97	Mg/m^3
Saturation	81	99	%
Average temperature for test	20		°C

Swelling pressure: not measured kPa

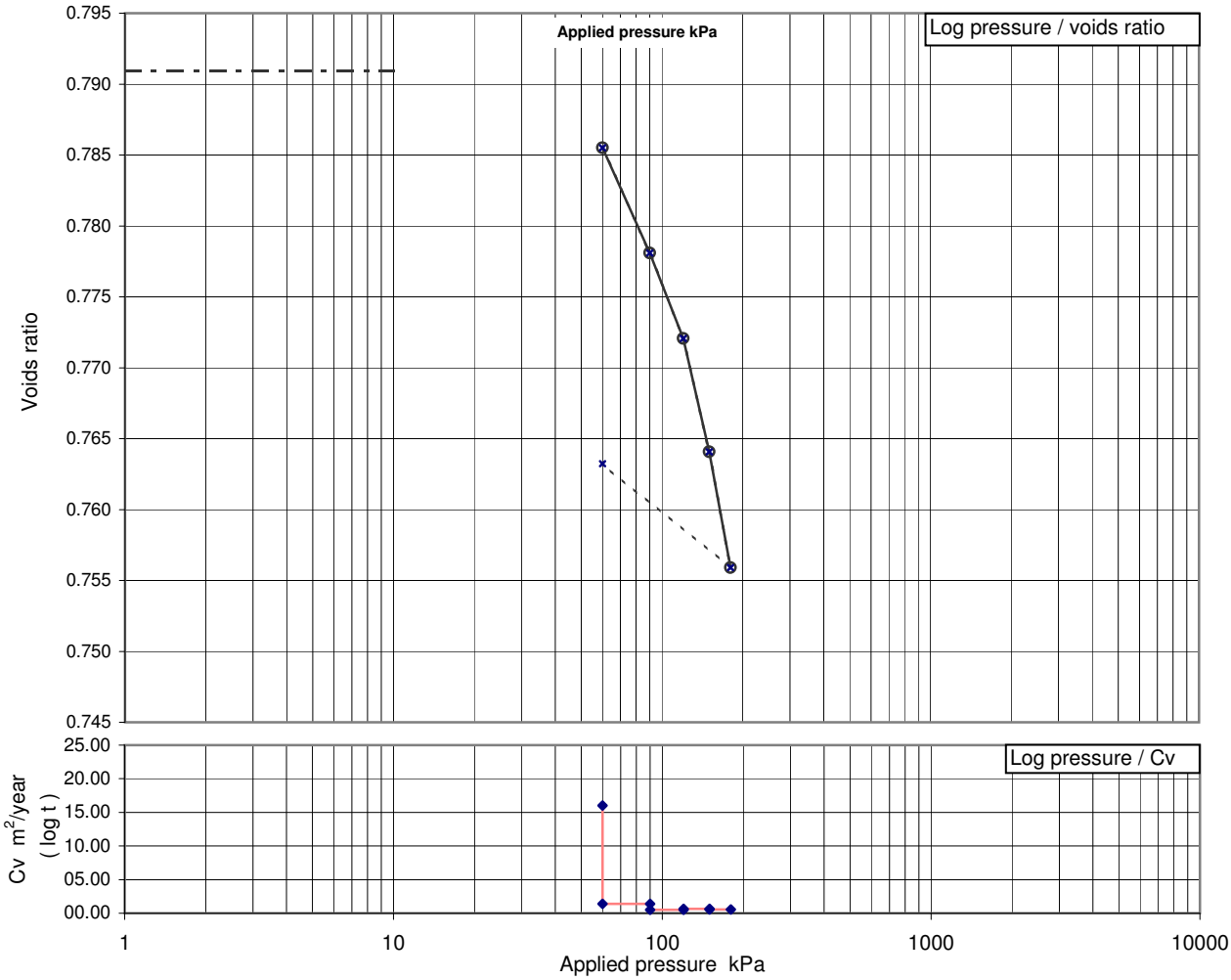
Notes :

Specimen taken 30 mm from base of sample

Applied Pressure kPa	Voids ratio	M_v m^2/MN	C_v ($t_{50, log}$) $m^2/year$	C_v ($t_{90, root}$) $m^2/year$	
0	0.4250				
60	0.4030	0.258	13	12	
120	0.3865	0.196	15	18	
240	0.3671	0.117	43	46	
360	0.3536	0.082	8.4	8.9	
480	0.3425	0.068	2.7	2.9	
60	0.3457	0.006	-	-	

ONE DIMENSIONAL CONSOLIDATION TEST
BS 1377 : Part 5 : 1990 : clause 3

Project No	G5519-15	Sample Details:	Hole No	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	7.00		
			Samp No	15	Type	U
			ID	G5519-1520151218110524		
			Spec Ref			



Soil description	Firm to stiff brown mottled grey slightly sandy slightly gravelly CLAY.
Preparation	Undisturbed
Index properties (if available)	Liquid limit % ; Plastic limit %

Specimen details	Initial	Final	
Particle density	2.65	assumed	Mg/m^3
Diameter	75.05		mm
Height	19.06	18.76	mm
Voids ratio	0.791	0.763	
Moisture content	25	26	%
Bulk density	1.86	1.89	Mg/m^3
Dry density	1.48	1.50	Mg/m^3
Saturation	85	91	%
Average temperature for test	20		°C

Swelling pressure >30 kPa

Notes :

Specimen taken 30 mm from base of sample

Applied Pressure kPa	Voids ratio	M_v m^2/MN	C_v ($t_{50, log}$) $m^2/year$	C_v ($t_{90, root}$) $m^2/year$	
30	0.7910				
60	0.7855	0.101	16	17	
90	0.7781	0.139	1.4	1.5	
120	0.7721	0.113	0.51	0.52	
150	0.7641	0.150	0.66	0.73	
180	0.7559	0.155	0.56	0.58	
60	0.7632	0.035	-	-	

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	3.50 - 4.00		
			Sample No	6	Type	B
			ID			
			Spec Ref			

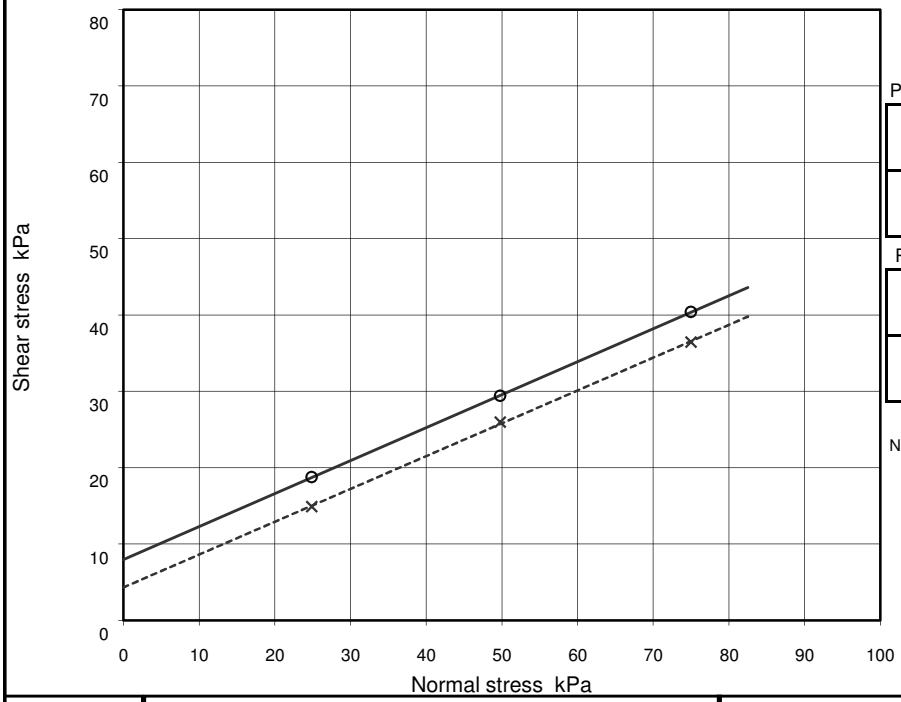
Soil Description	Brownish grey slightly sandy slightly gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.88	1.88	1.88			
	Water Content	%	25.7	26.6	26.6			
	Dry density	Mg/m^3	1.50	1.49	1.49			
	Voids ratio		0.767	0.780	0.780			
	Degree of Saturation	%	89	90	90			
Consol^n	Consolidation / Normal Stress applied	kPa	**25**	**50**	**75**			
	Change in height during consolidation	mm	-0.330	-0.536	-1.092			
	Voids ratio after consolidation		0.744	0.742	0.702			
Shear see note 1	Voids ratio at end of test		0.703	0.682	0.642			
	Moisture content at end of test	%	26.5	25.8	24.2			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.025	0.025	0.025			
	Residual	mm/min	0.061	0.061	0.061			
Peak values, (o)	Relative displacement	mm	4.50	9.00	10.00			
	Shear stress	kPa	18.7	29.4	40.4			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	18.06	20.00	20.00			
	Shear stress	kPa	14.9	26.0	36.5			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	7.9	-
Ø '	degrees	23½	-

Residual strength, (x)			
c'_R	kPa	4.3	-
$Ø'_R$	degrees	23½	-

Notes :

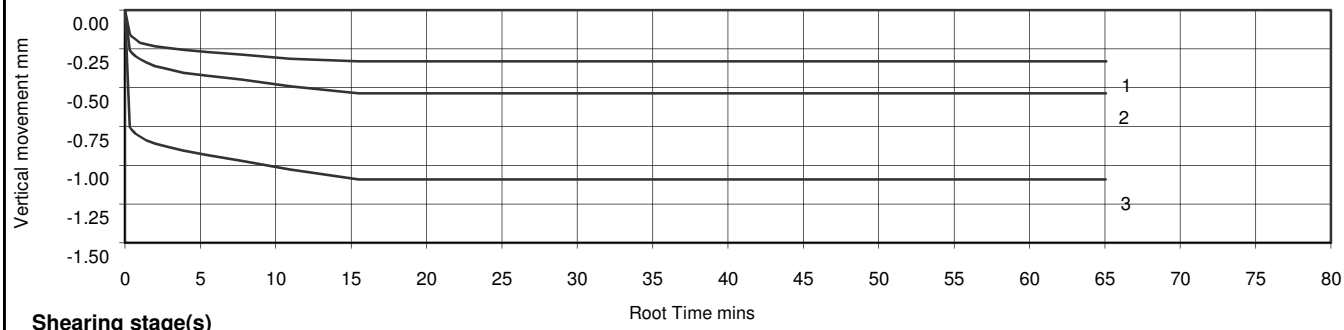
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:24/03/2016 08:46	**SSB1** sheet 1 of 2

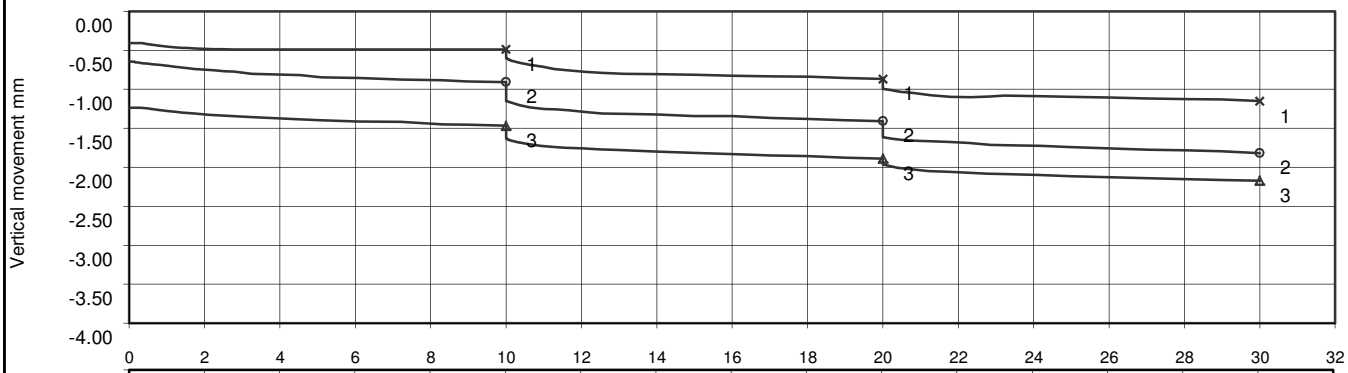
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

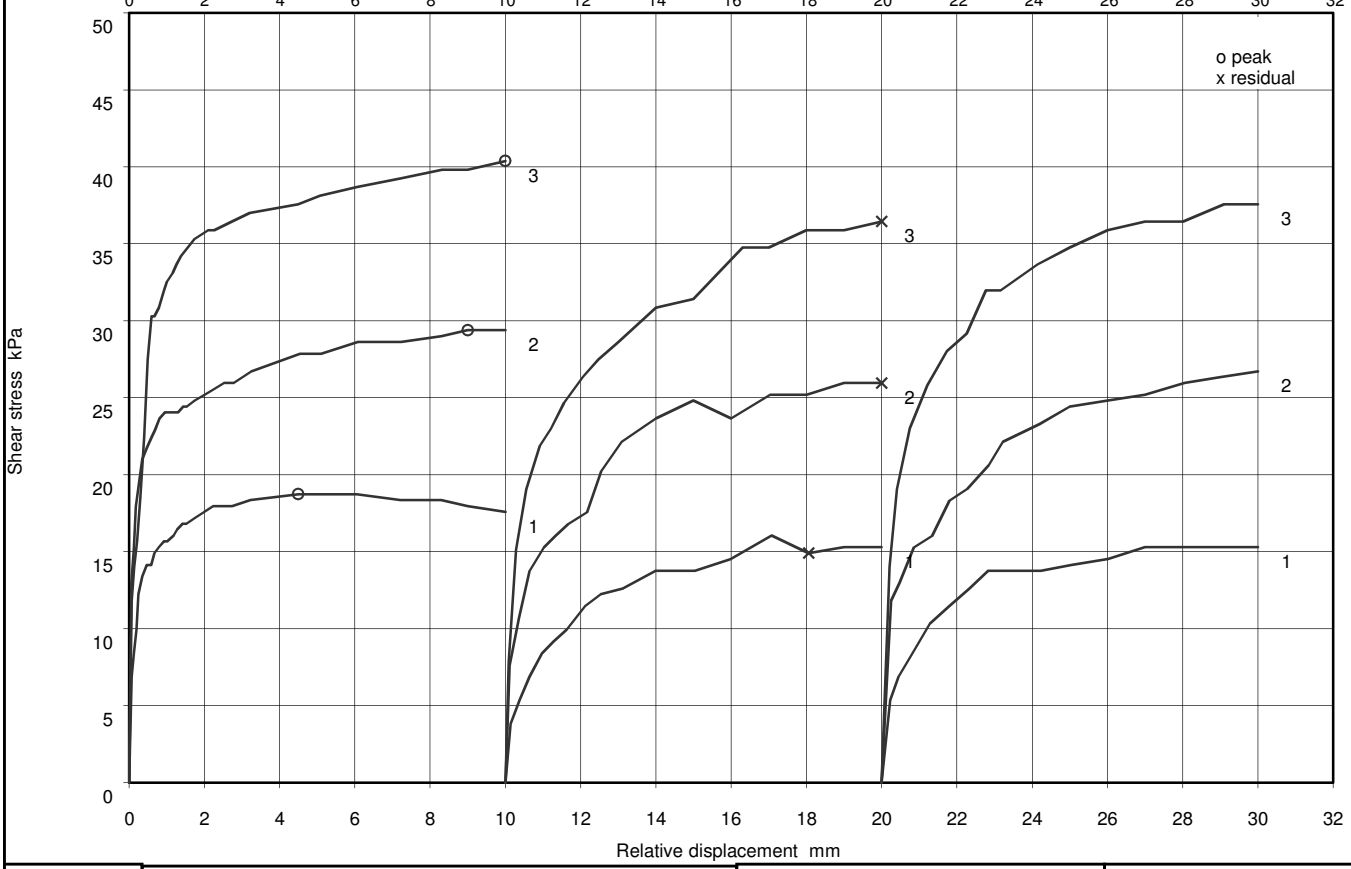
Project No	G5519-15	Sample Details:	Hole No.	BH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	3.50 - 4.00		
			Sample No	6	Type	B
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:24/03/2016 08:46	**SSB1** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	5.50 - 6.00		
			Sample No	9	Type	B
			ID			
			Spec Ref			

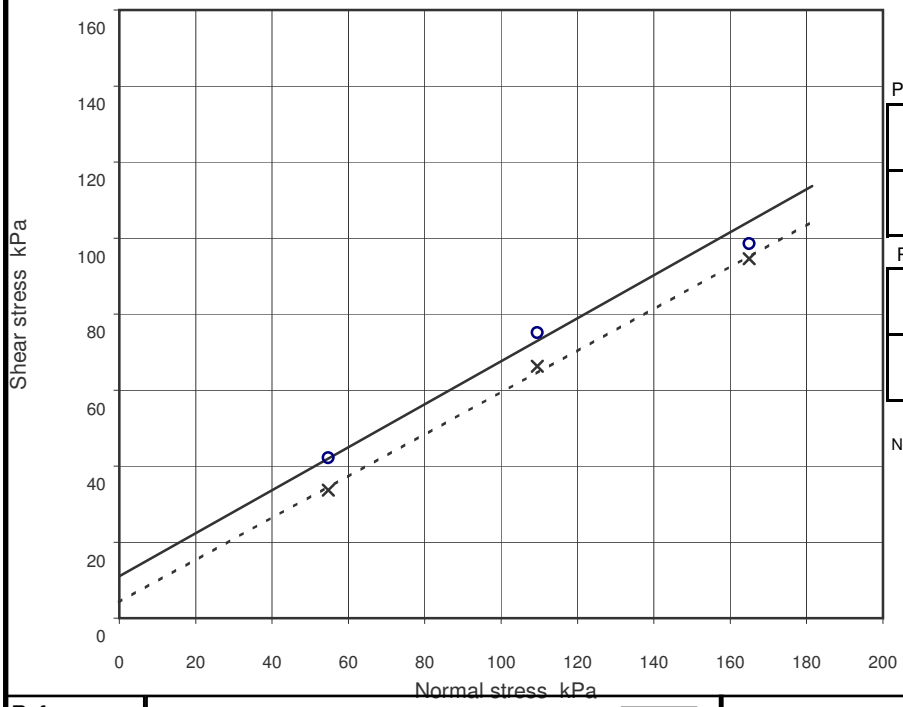
Soil Description	Brown slightly sandy gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.97	1.97	1.97			
	Water Content	%	12.5	12.9	13.6			
	Dry density	Mg/m^3	1.75	1.74	1.73			
	Voids ratio		0.515	0.520	0.529			
	Degree of Saturation	%	64	66	68			
Consol^n	Consolidation / Normal Stress applied	kPa	**55**	**110**	**165**			
	Change in height during consolidation	mm	-1.120	-1.132	-1.244			
	Voids ratio after consolidation		0.447	0.451	0.453			
Shear see note 1	Voids ratio at end of test		0.379	0.370	0.364			
	Moisture content at end of test	%	14.3	14.0	13.7			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.028	0.028	0.028			
	Residual	mm/min	0.070	0.070	0.070			
Peak values, (o)	Relative displacement	mm	10.00	8.55	7.34			
	Shear stress	kPa	42.2	75.1	98.5			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	19.14	20.00	20.00			
	Shear stress	kPa	33.7	66.2	94.6			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	(16)	11
Ø '	degrees	(27)	29½

Residual strength, (x)			
c'_R	kPa	4.2	-
$Ø'_R$	degrees	29	-

Notes :

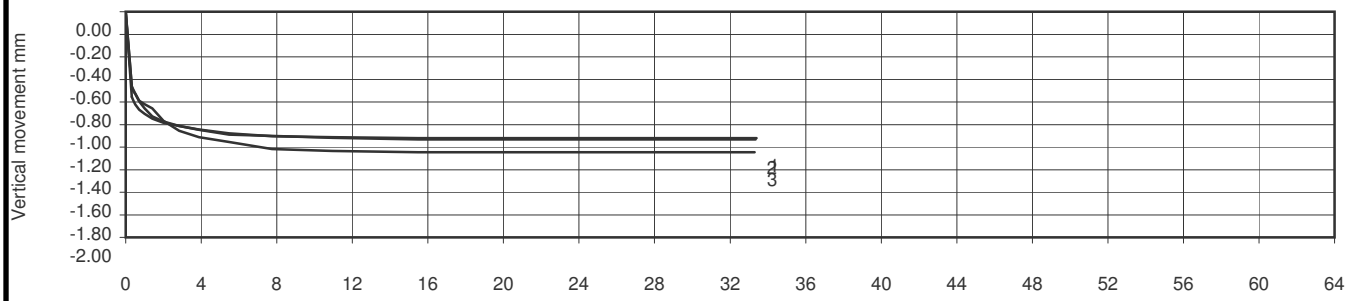
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref				Figure
SLR7.4 Rev 85 Oct 10	ESG	UKAS TESTING 1157	Printed:23/03/2016 10:08	**SSB2** sheet 1 of 2

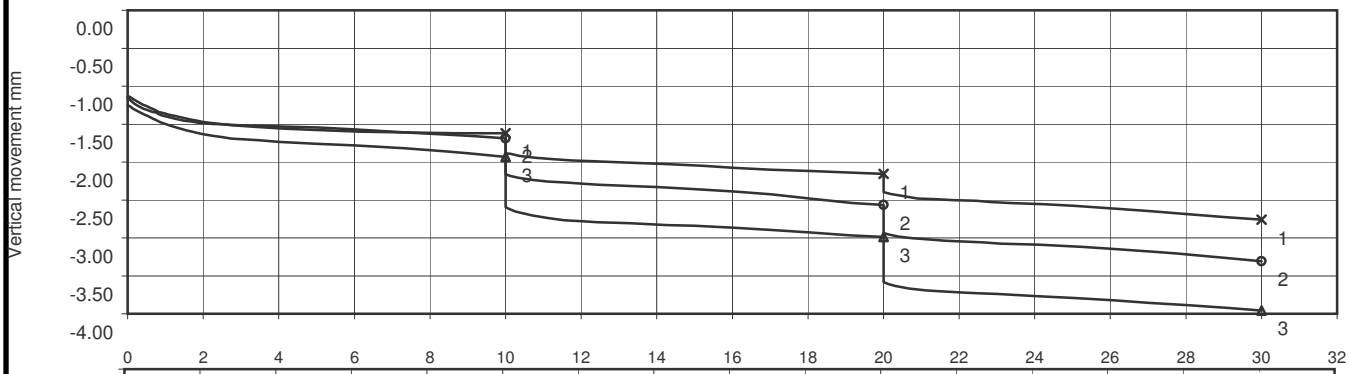
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

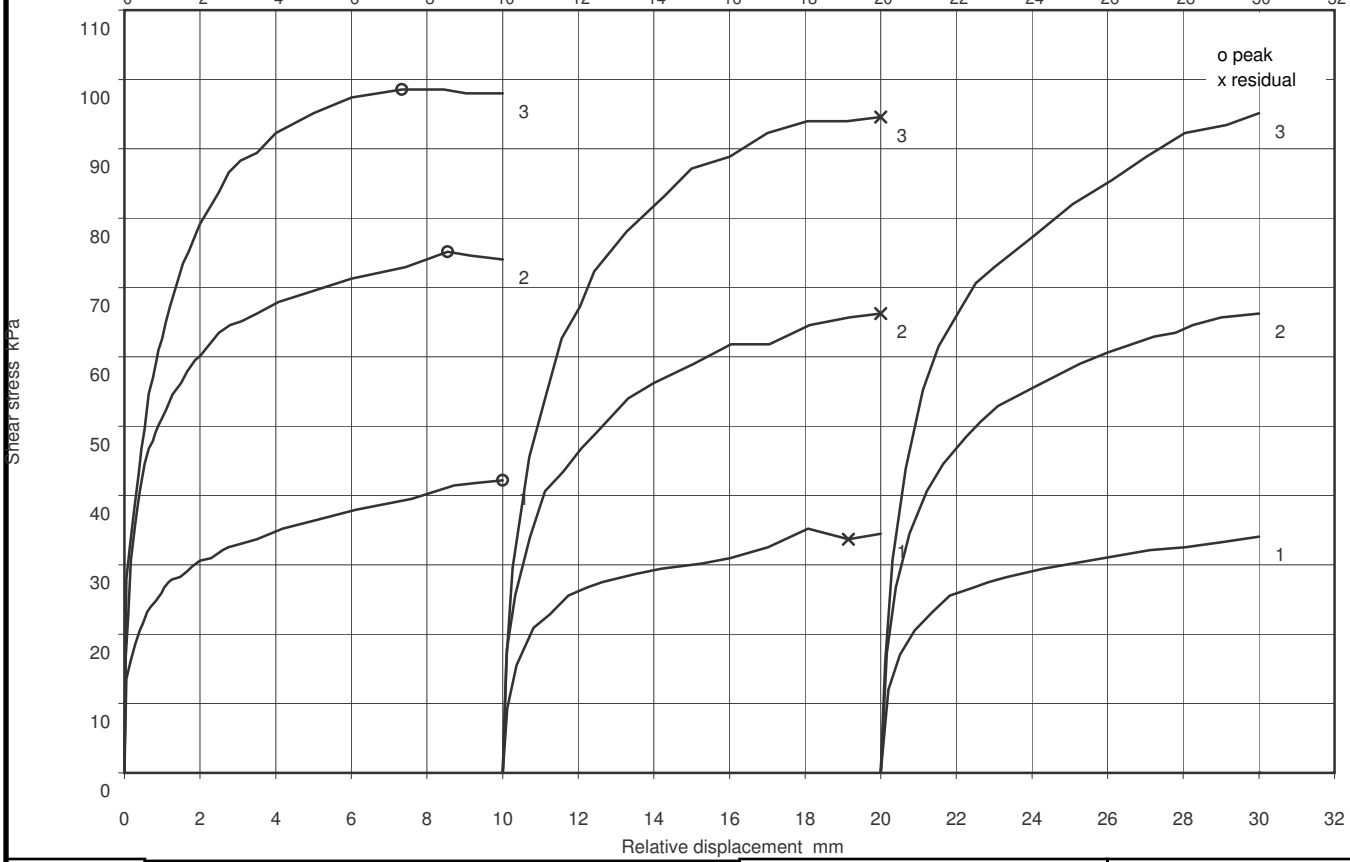
Project No	G5519-15	Sample Details:	Hole No.	BH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	5.50 - 6.00		
			Sample No	9	Type	B
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:23/03/2016 10:08	**SSB2** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	9.50 - 10.00		
			Sample No	19	Type	B
			ID			
			Spec Ref			

Soil Description	Light brown slightly gravellly clayey SAND.
Specimen Type /Preparation	-2mm material. Recompacted to a dense state at as received moisture content.

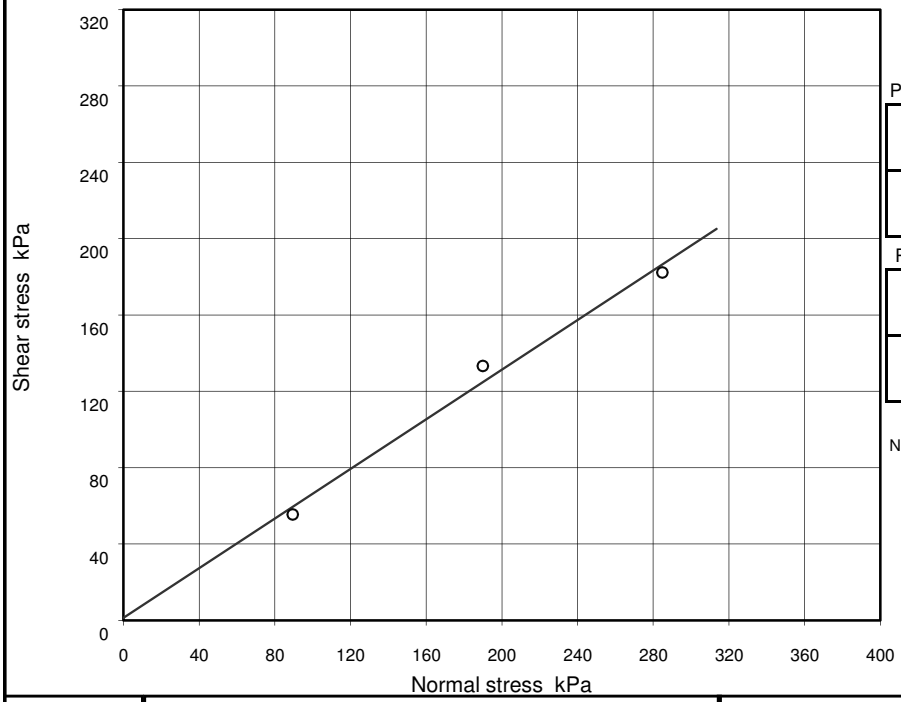
Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details

		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.88	1.88	1.88			
	Water Content	%	13.7	13.6	13.6			
	Dry density	Mg/m^3	1.66	1.66	1.66			
	Voids ratio		0.601	0.600	0.600			
	Degree of Saturation	%	60	60	60			
Consol^n	Consolidation / Normal Stress applied	kPa	**90**	**190**	**285**			
	Change in height during consolidation	mm	-0.376	-0.636	-0.668			
	Voids ratio after consolidation		0.577	0.559	0.557			
Shear see note 1	Voids ratio at end of test		0.543	0.536	0.511			
	Moisture content at end of test	%	18.2	17.5	17.3			
	Saturation at end of test	%	89	87	90			

Shearing stage

Rate of displacement	Peak	mm/min	0.600	0.600	0.600			
	Residual	mm/min						
Peak values, (o)	Relative displacement	mm	10.00	7.00	7.00			
	Shear stress	kPa	55.4	133.1	182.2			
Residual values, (x)	No. of reversals							
	Relative displacement	mm						
	Shear stress	kPa						



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	1.2	-
Ø '	degrees	33	-
Residual strength, (x)			
c'_R	kPa	-	-
$Ø'_R$	degrees	-	-

Notes :

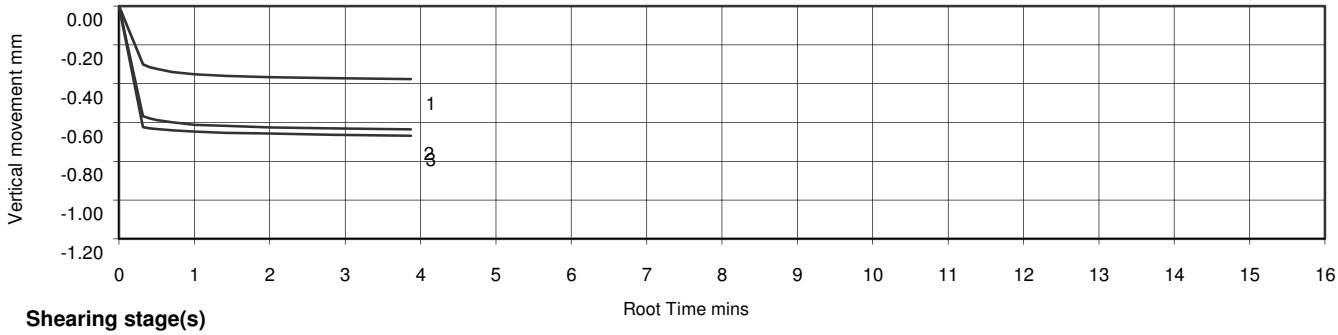
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:55	**SSB3** sheet 1 of 2

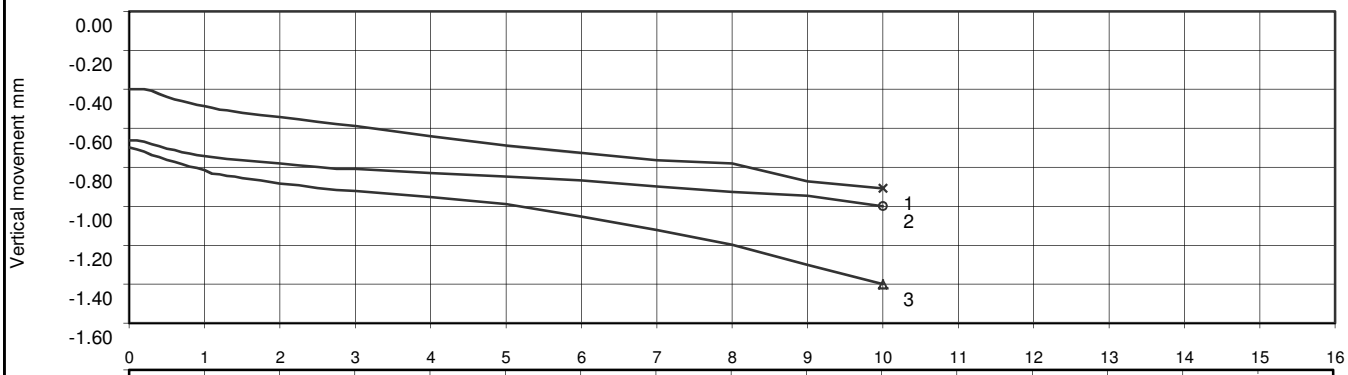
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

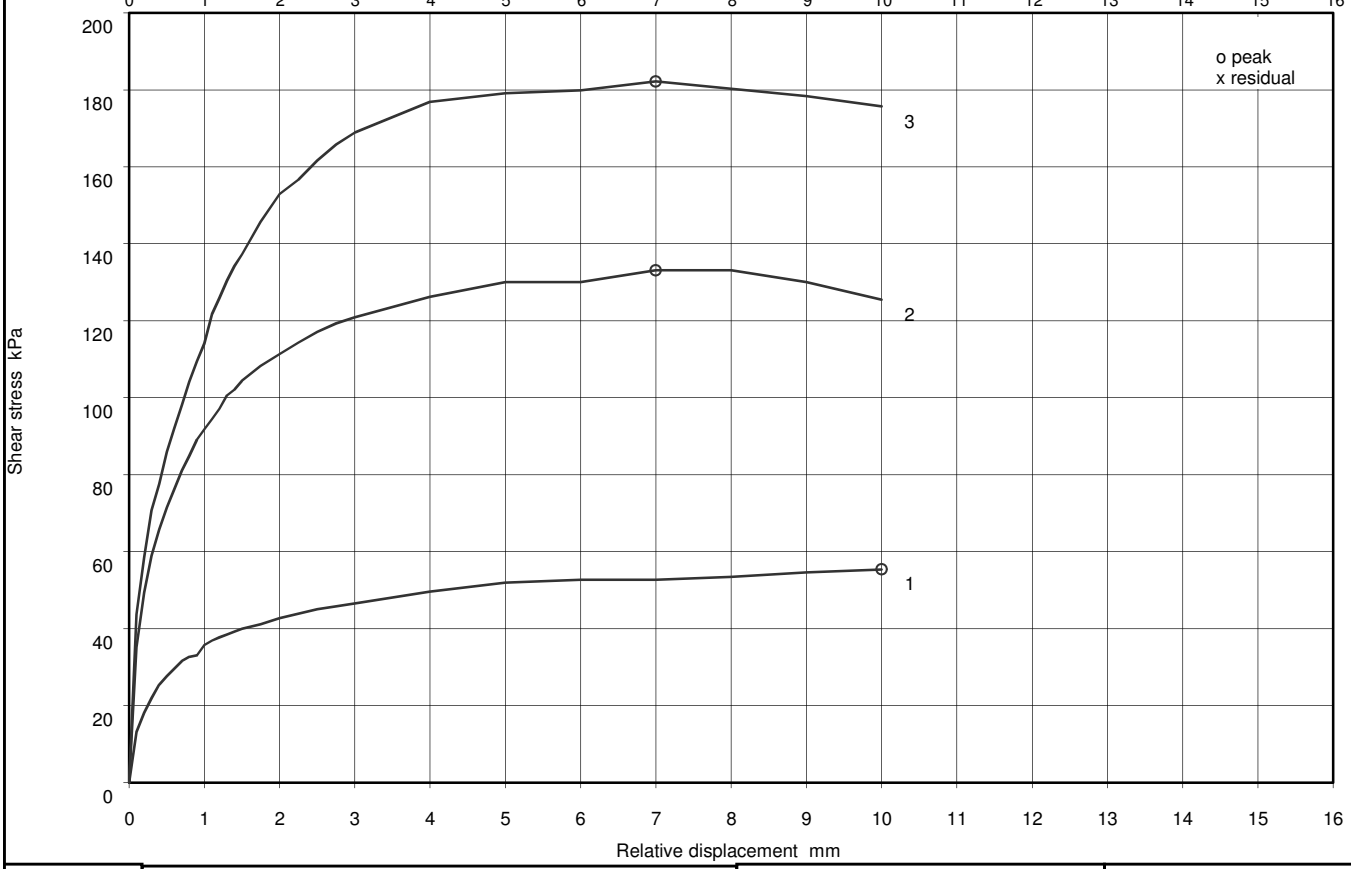
Project No	G5519-15	Sample Details:	Hole No.	BH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	9.50 - 10.00		
			Sample No	19	Type	B
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:55	**SSB3** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH102		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	4.00 - 4.45		
			Sample No	8	Type	D
			ID			
			Spec Ref			

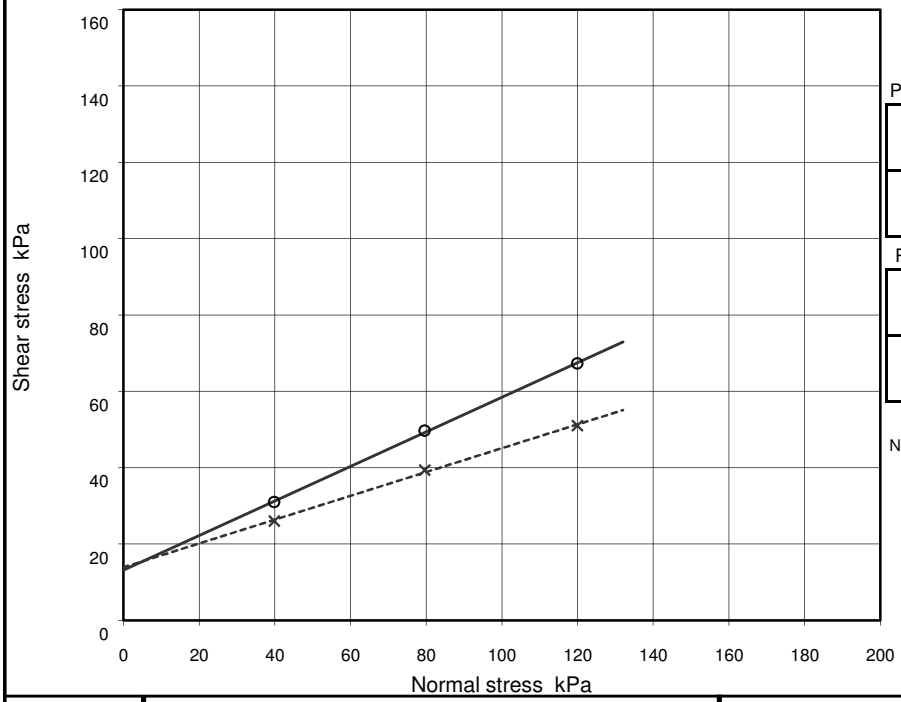
Soil Description	Brownish grey sandy gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	**1**	**2**	**3**	**4**	**5**	**6**
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.96	1.96	1.96			
	Water Content	%	21.9	22.1	21.9			
	Dry density	Mg/m^3	1.61	1.60	1.61			
	Voids ratio		0.650	0.652	0.649			
	Degree of Saturation	%	89	90	89			
Consol^n	Consolidation / Normal Stress applied	kPa	**40**	**80**	**120**			
	Change in height during consolidation	mm	-0.210	-0.388	-0.712			
	Voids ratio after consolidation		0.636	0.627	0.602			
Shear see note 1	Voids ratio at end of test		0.518	0.548	0.560			
	Moisture content at end of test	%	19.6	20.7	21.1			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.030	0.030	0.030			
	Residual	mm/min	0.075	0.075				
Peak values, (o)	Relative displacement	mm	2.75	4.34	3.05			
	Shear stress	kPa	31.0	49.6	67.3			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	28.50	18.25	30.00			
	Shear stress	kPa	26.0	39.3	51.0			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	13	-
Ø '	degrees	24½	-
Residual strength, (x)			
c'_R	kPa	14	-
$Ø'_R$	degrees	17½	-

Notes :

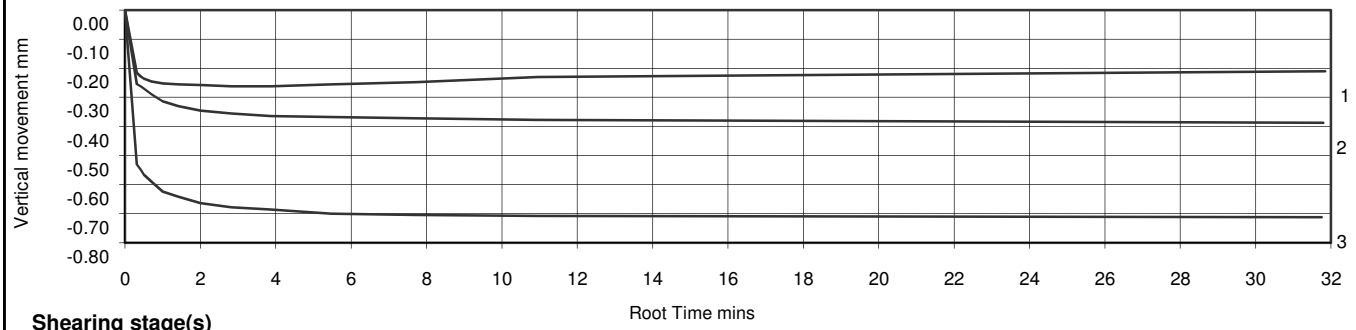
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:56	**SSB4** sheet 1 of 2

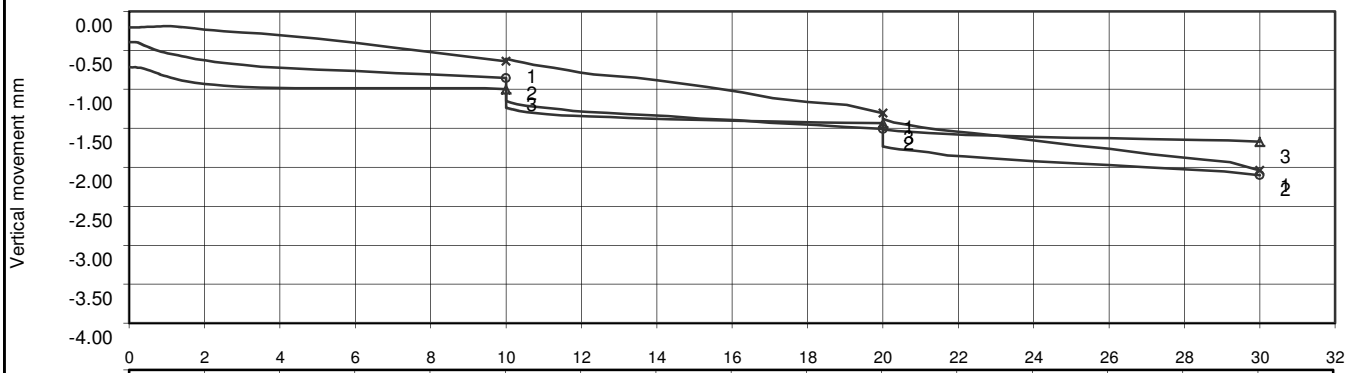
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

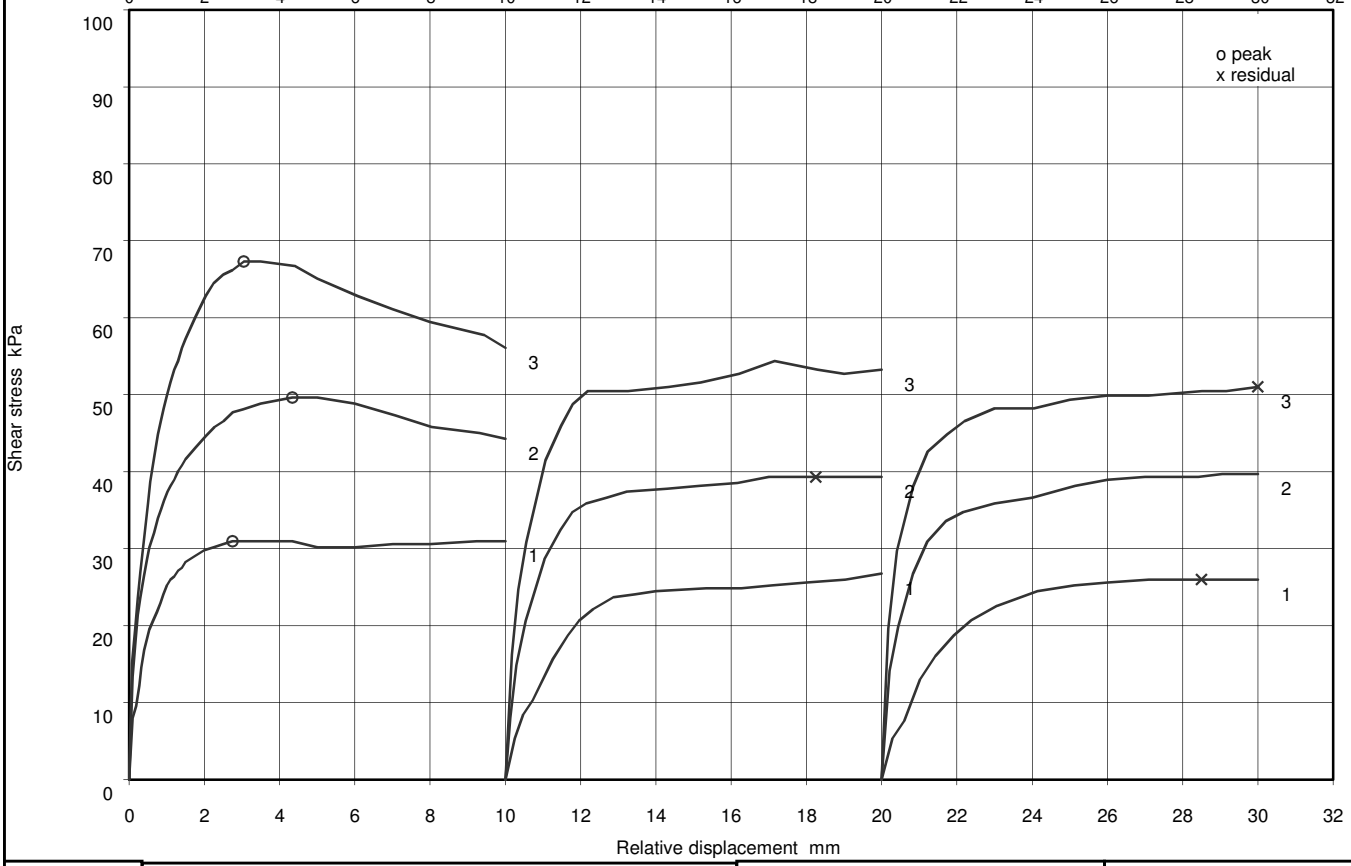
Project No	G5519-15	Sample Details:	Hole No.	BH102		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	4.00 - 4.45		
			Sample No	8	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:56	**SSB4** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH102		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	9.00 - 9.45		
			Sample No	17	Type	D
			ID			
			Spec Ref			

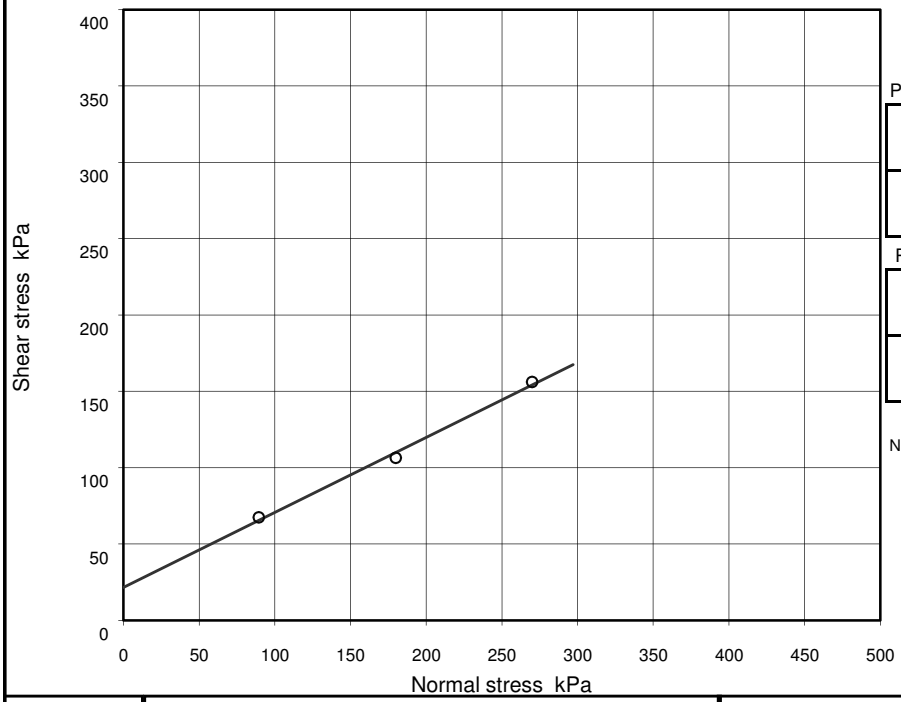
Soil Description	Orangish brown slightly gravelly slightly silty SAND.
Specimen Type /Preparation	-2mm material. Recompacted to a dense state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.77	1.77	1.77			
	Water Content	%	9.7	9.6	9.7			
	Dry density	Mg/m^3	1.61	1.62	1.61			
	Voids ratio		0.644	0.640	0.645			
	Degree of Saturation	%	40	40	40			
Consol^n	Consolidation / Normal Stress applied	kPa	**90**	**180**	**270**			
	Change in height during consolidation	mm	-0.390	-0.600	-0.748			
	Voids ratio after consolidation		0.619	0.601	0.596			
Shear see note 1	Voids ratio at end of test		0.601	0.564	0.571			
	Moisture content at end of test	%	18.5	18.2	18.2			
	Saturation at end of test	%	82	85	84			

Shearing stage

Rate of displacement	Peak	mm/min	0.600	0.600	0.600			
	Residual	mm/min						
Peak values, (o)	Relative displacement	mm	8.00	10.00	7.00			
	Shear stress	kPa	67.3	106.3	155.9			
Residual values, (x)	No. of reversals							
	Relative displacement	mm						
	Shear stress	kPa						



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	22	-
Ø '	degrees	26	-
Residual strength, (x)			
c'_R	kPa	-	-
$Ø'_R$	degrees	-	-

Notes :

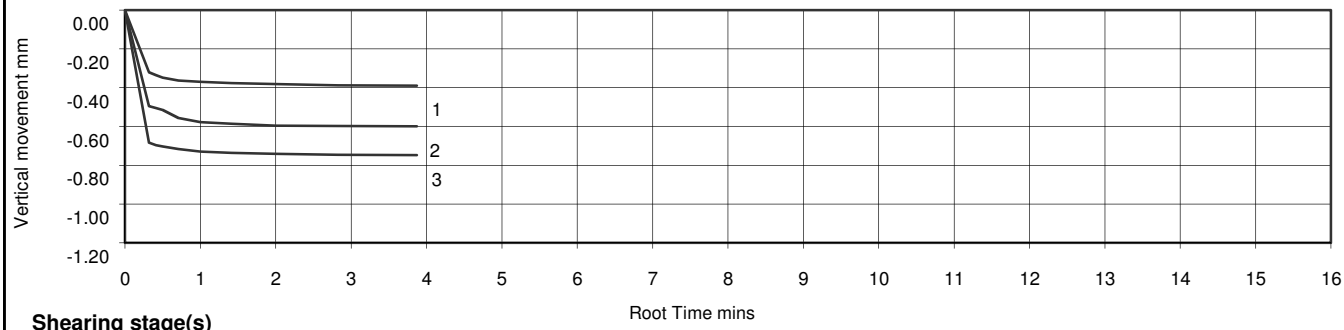
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:57	**SSB5** sheet 1 of 2

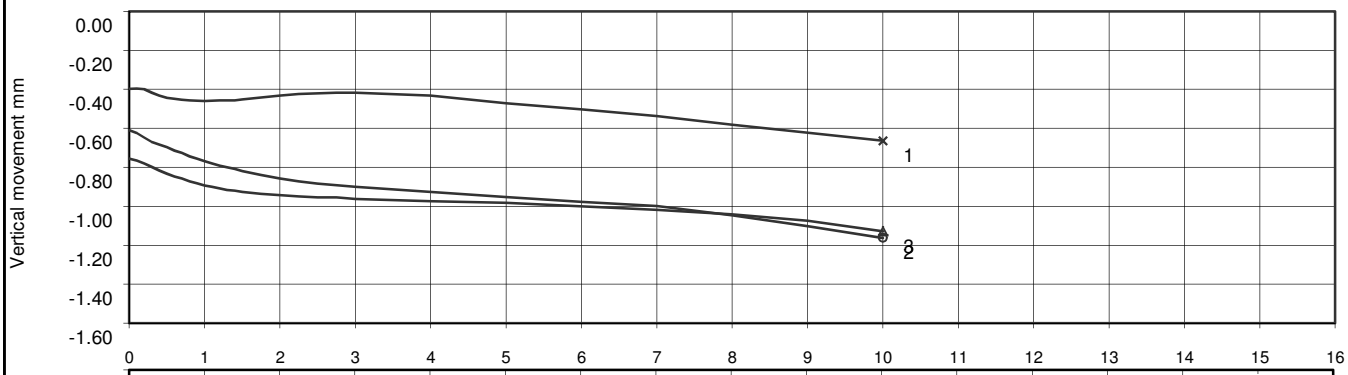
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

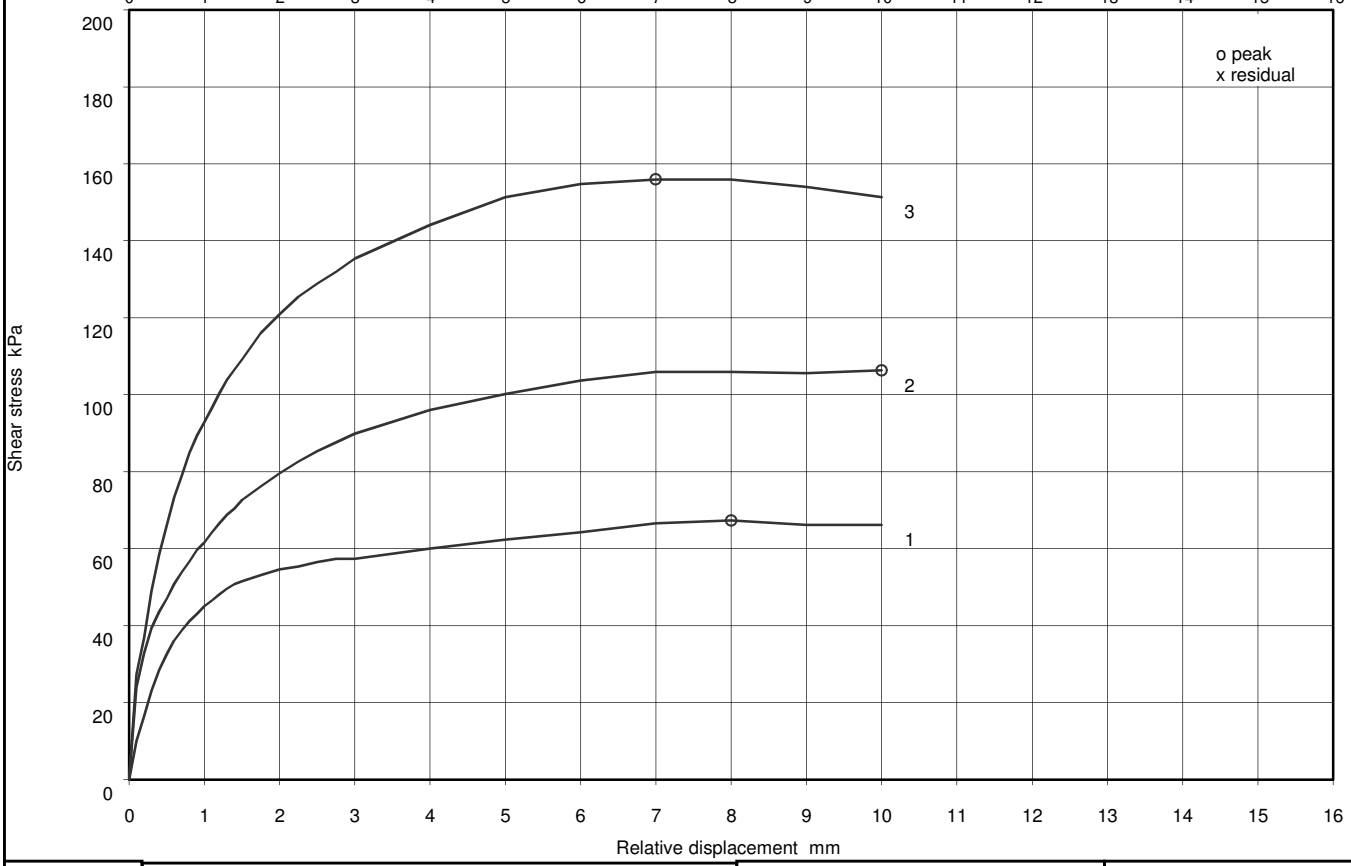
Project No	G5519-15	Sample Details:	Hole No.	BH102		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	9.00 - 9.45		
			Sample No	17	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:57	**SSB5** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH103		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	6.50 - 7.00		
			Sample No	12	Type	B
			ID			
			Spec Ref			

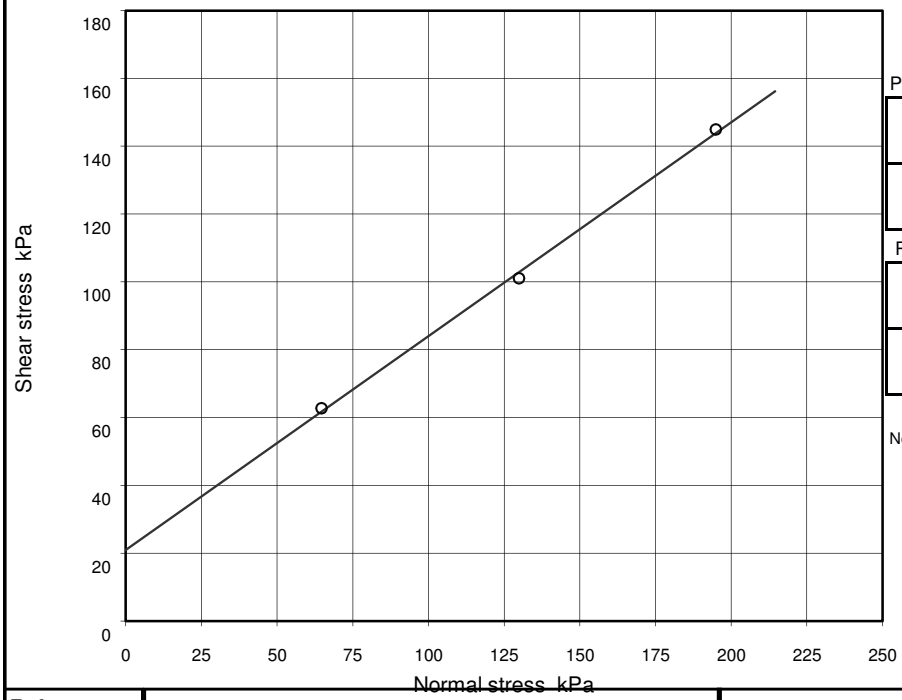
Soil Description	Light brown slightly gravellly clayey SAND.
Specimen Type /Preparation	-2mm material. Recompacted to a dense state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.98	1.98	1.98			
	Water Content	%	17.8	17.8	17.9			
	Dry density	Mg/m^3	1.68	1.68	1.67			
	Voids ratio		0.581	0.580	0.583			
	Degree of Saturation	%	81	81	82			
Consol^n	Consolidation / Normal Stress applied	kPa	**65**	**130**	**195**			
	Change in height during consolidation	mm	-0.480	-0.744	-0.752			
	Voids ratio after consolidation		0.551	0.533	0.535			
Shear see note 1	Voids ratio at end of test		0.566	0.513	0.518			
	Moisture content at end of test	%	18.2	18.0	17.6			
	Saturation at end of test	%	85	93	90			

Shearing stage

Rate of displacement	Peak	mm/min	0.600	0.600	0.600			
	Residual	mm/min						
Peak values, (o)	Relative displacement	mm	3.00	2.50	3.00			
	Shear stress	kPa	62.7	101.0	144.9			
Residual values, (x)	No. of reversals							
	Relative displacement	mm						
	Shear stress	kPa						



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	21	-
Ø '	degrees	32	-
Residual strength, (x)			
c'_R	kPa	-	-
$Ø'_R$	degrees	-	-

Notes :

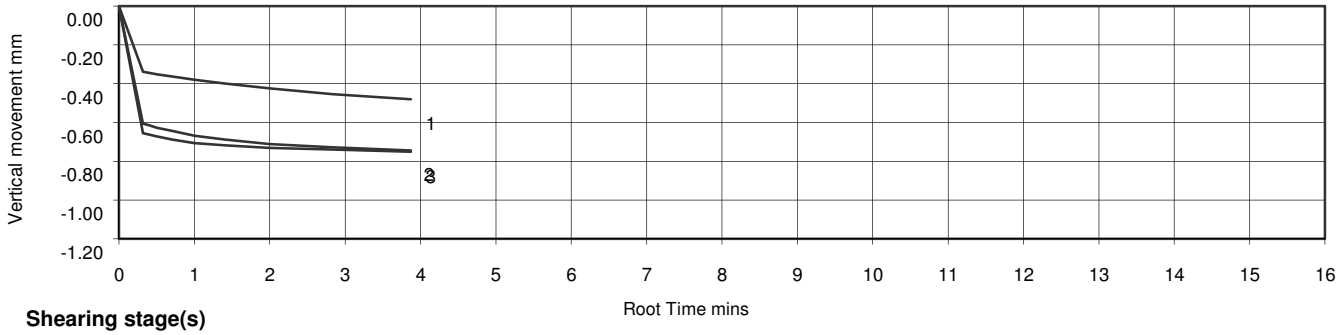
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:57	**SSB6** sheet 1 of 2

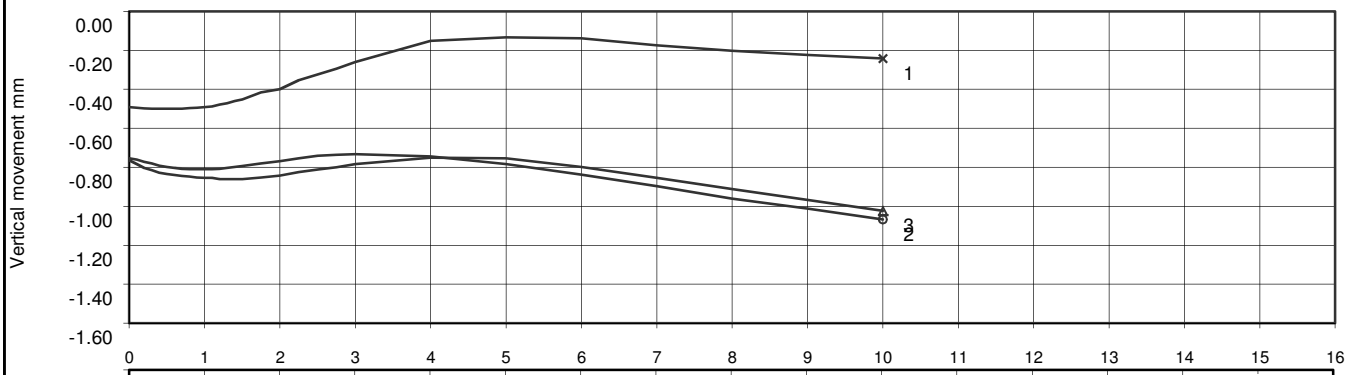
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

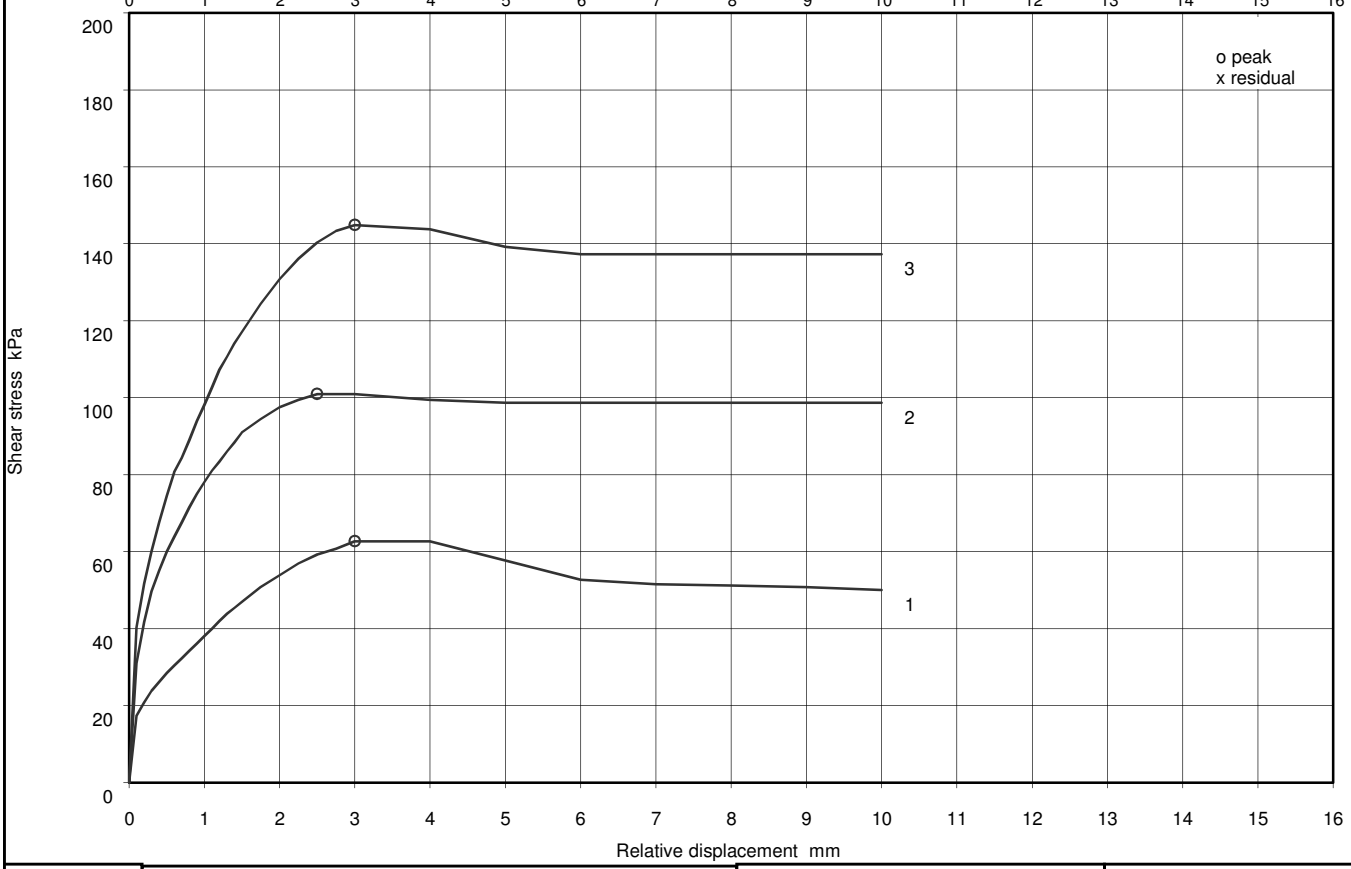
Project No	G5519-15	Sample Details:	Hole No.	BH103		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	6.50 - 7.00		
			Sample No	12	Type	B
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:57	**SSB6** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH104		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	1.50 - 1.90		
			Sample No	4	Type	B
			ID			
			Spec Ref			

Soil Description	Brownish grey slightly sandy slightly gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a dense state at as received moisture content.

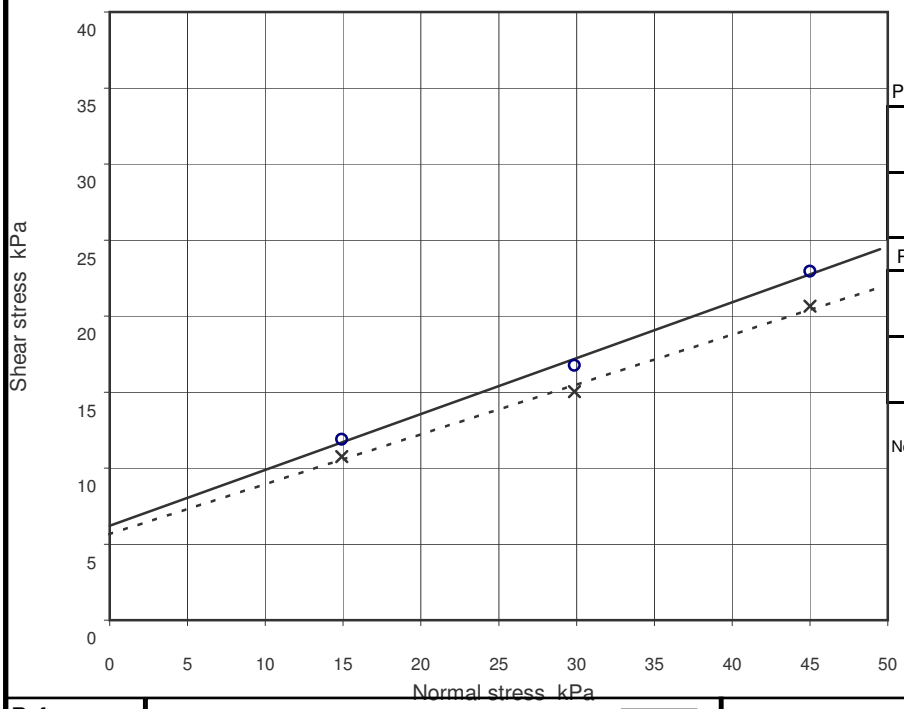
Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details

		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.87	1.87	1.87			
	Water Content	%	26.8	26.6	26.4			
	Dry density	Mg/m^3	1.48	1.48	1.48			
	Voids ratio		0.795	0.791	0.789			
	Degree of Saturation	%	89	89	89			
Consol^n	Consolidation / Normal Stress applied	kPa	**15**	**30**	**45**			
	Change in height during consolidation	mm	-0.056	-0.100	-0.470			
	Voids ratio after consolidation		0.791	0.784	0.755			
Shear see note 1	Voids ratio at end of test		0.742	0.707	0.666			
	Moisture content at end of test	%	28.0	26.7	25.1			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.038	0.038	0.038			
	Residual	mm/min	0.094	0.094	0.094			
Peak values, (o)	Relative displacement	mm	1.97	3.37	0.42			
	Shear stress	kPa	11.9	16.8	23.0			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	6.01	20.00	19.00			
	Shear stress	kPa	10.8	15.0	20.7			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	6.2	-
Ø '	degrees	20	-
Residual strength, (x)			
c'_R	kPa	5.6	-
$Ø'_R$	degrees	18	-

Notes :

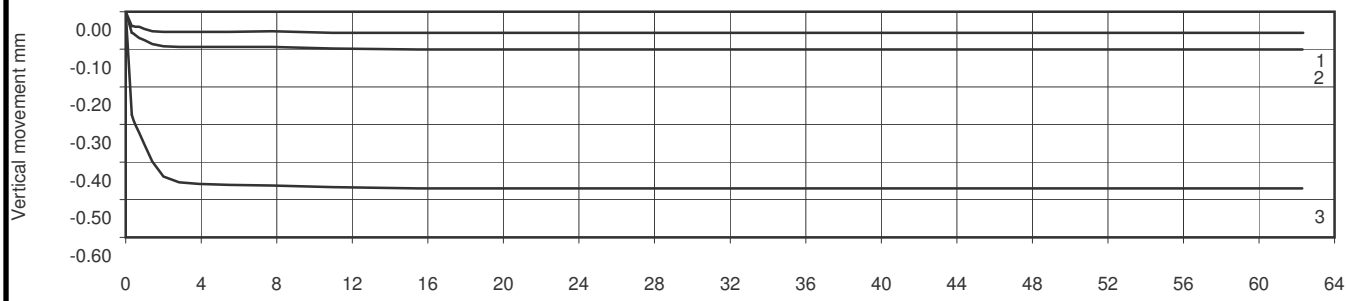
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref				Figure
SLR7.4 Rev 85 Oct 10	ESG	UKAS TESTING 1157	Printed:23/03/2016 10:11	**SSB7** sheet 1 of 2

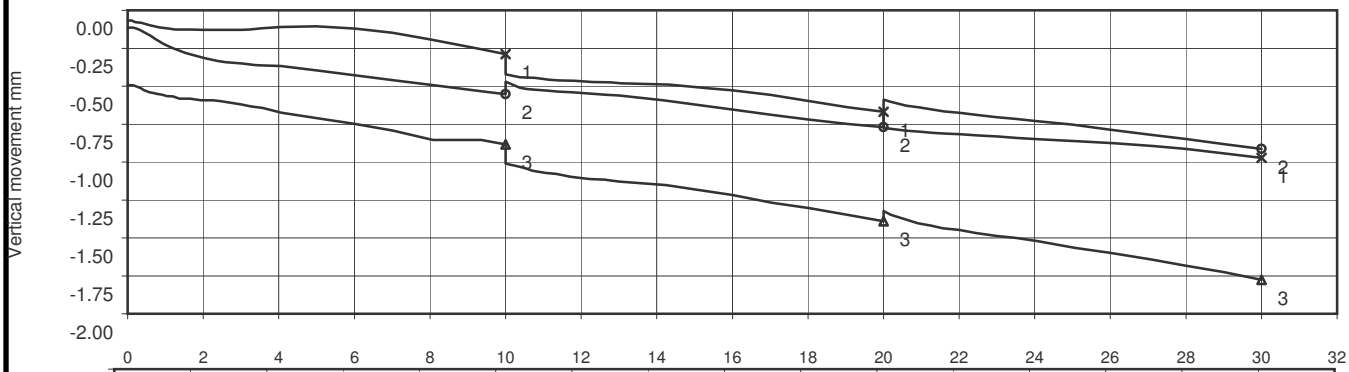
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

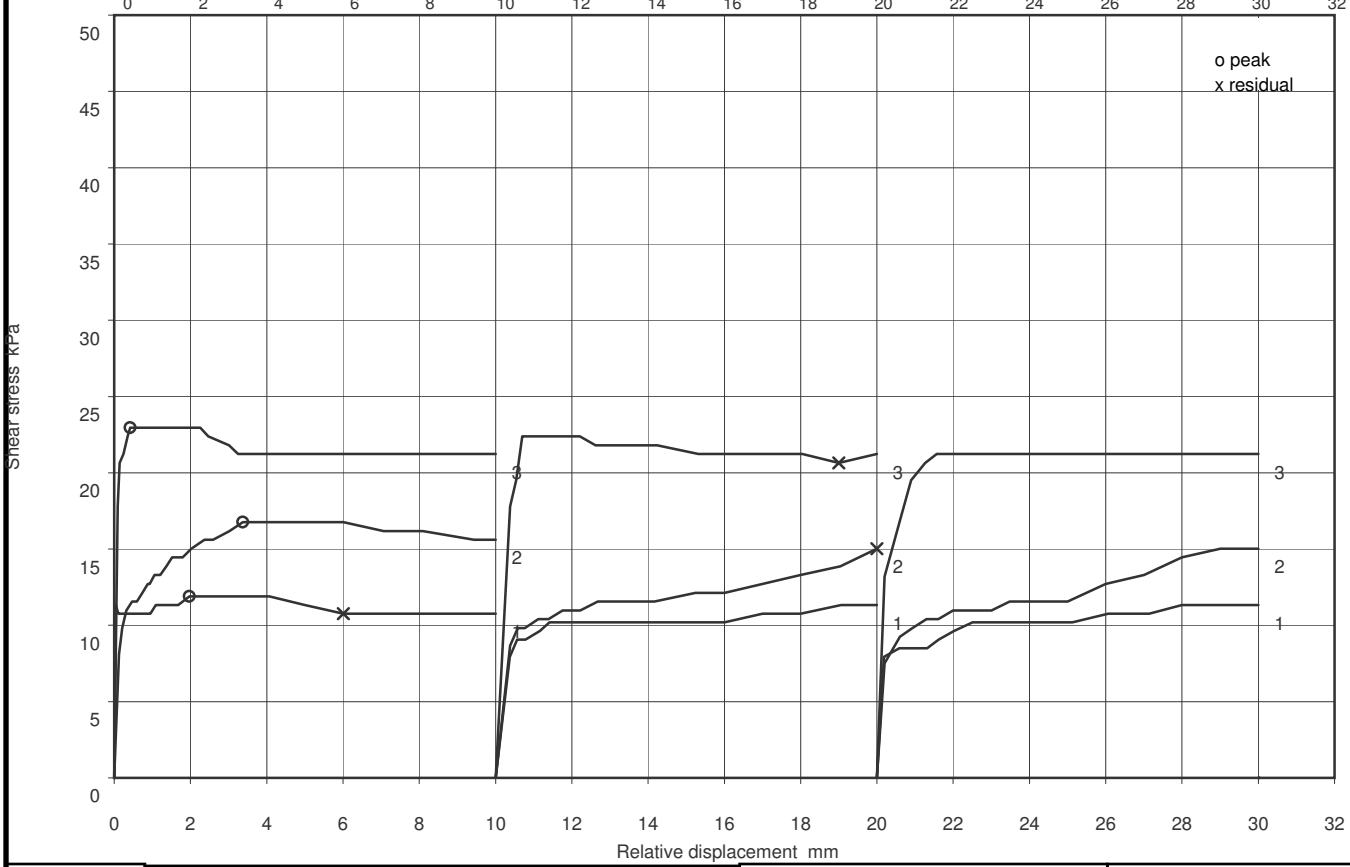
Project No	G5519-15	Sample Details:	Hole No.	BH104		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	1.50 - 1.90		
			Sample No	4	Type	B
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:23/03/2016 10:11	**SSB7** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH105		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	3.00		
			Sample No	5	Type	D
			ID			
			Spec Ref			

Soil Description	Brownish grey slightly sandy slightly gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

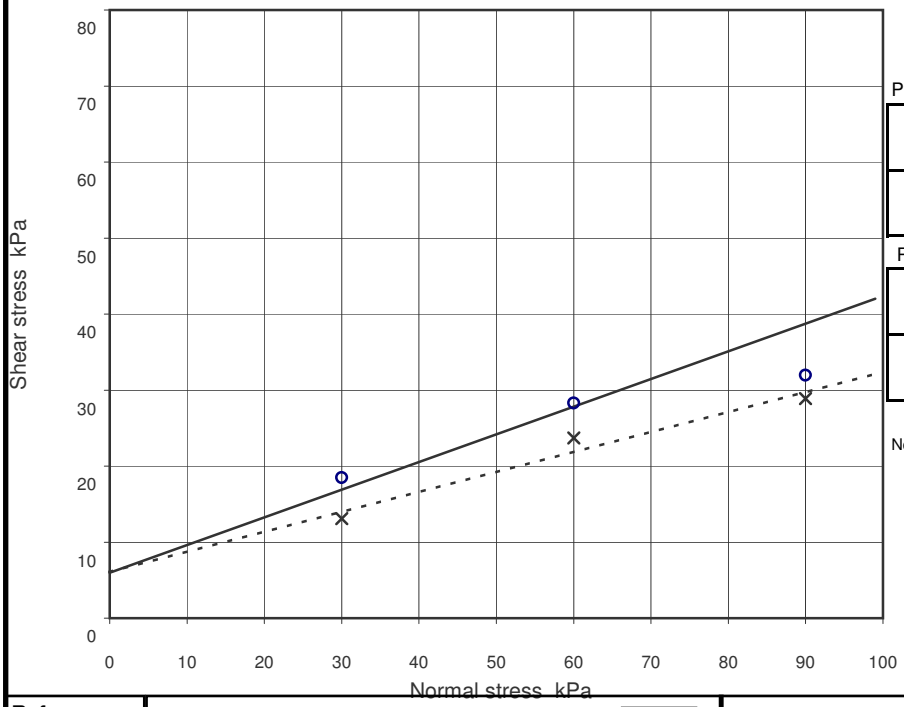
Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details

		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m³	1.79	1.79	1.79			
	Water Content	%	37.3	36.5	34.8			
	Dry density	Mg/m³	1.31	1.31	1.33			
	Voids ratio		1.029	1.018	0.993			
	Degree of Saturation	%	96	95	93			
Consol^n	Consolidation / Normal Stress applied	kPa	**30**	**60**	**90**			
	Change in height during consolidation	mm	-0.182	-0.442	-1.130			
	Voids ratio after consolidation		1.014	0.982	0.903			
Shear see note 1	Voids ratio at end of test		0.992	0.936	0.863			
	Moisture content at end of test	%	37.4	35.3	32.6			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.032	0.032	0.032			
	Residual	mm/min	0.081	0.081	0.081			
Peak values, (o)	Relative displacement	mm	1.36	3.04	5.13			
	Shear stress	kPa	18.5	28.3	31.9			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	20.00	28.00	20.00			
	Shear stress	kPa	13.1	23.7	28.9			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	(13)	6.0
Ø '	degrees	(12½)	20
Residual strength, (x)			
c'_R	kPa	6.1	-
$Ø'_R$	degrees	15	-

Notes :

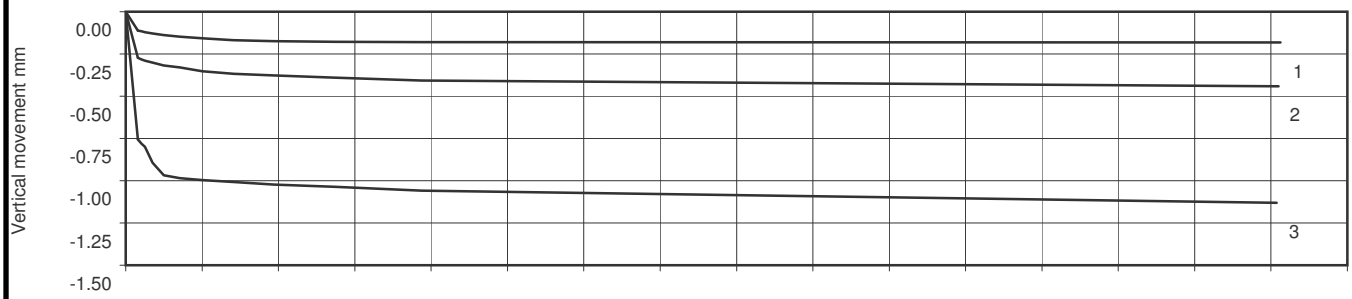
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:23/03/2016 10:11	**SSB8** sheet 1 of 2

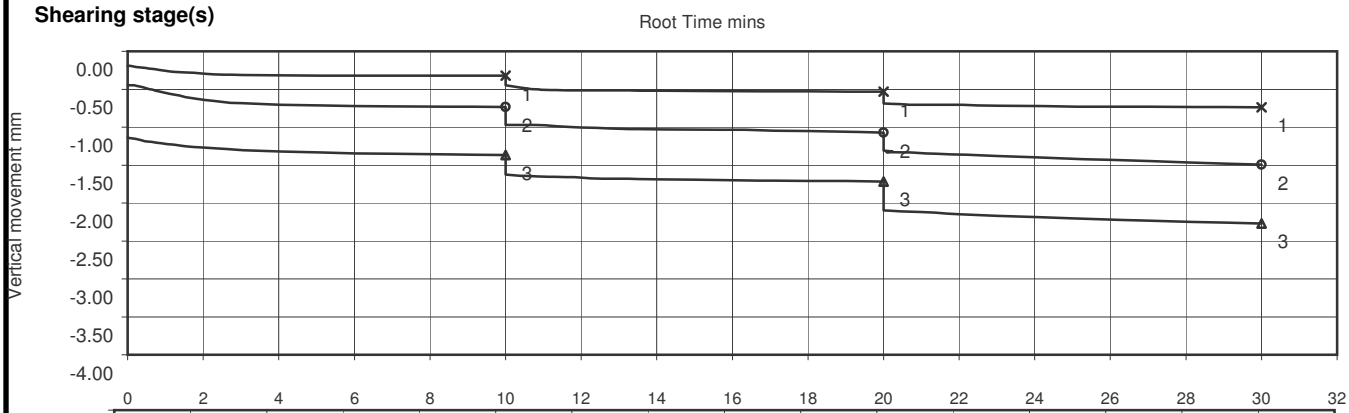
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

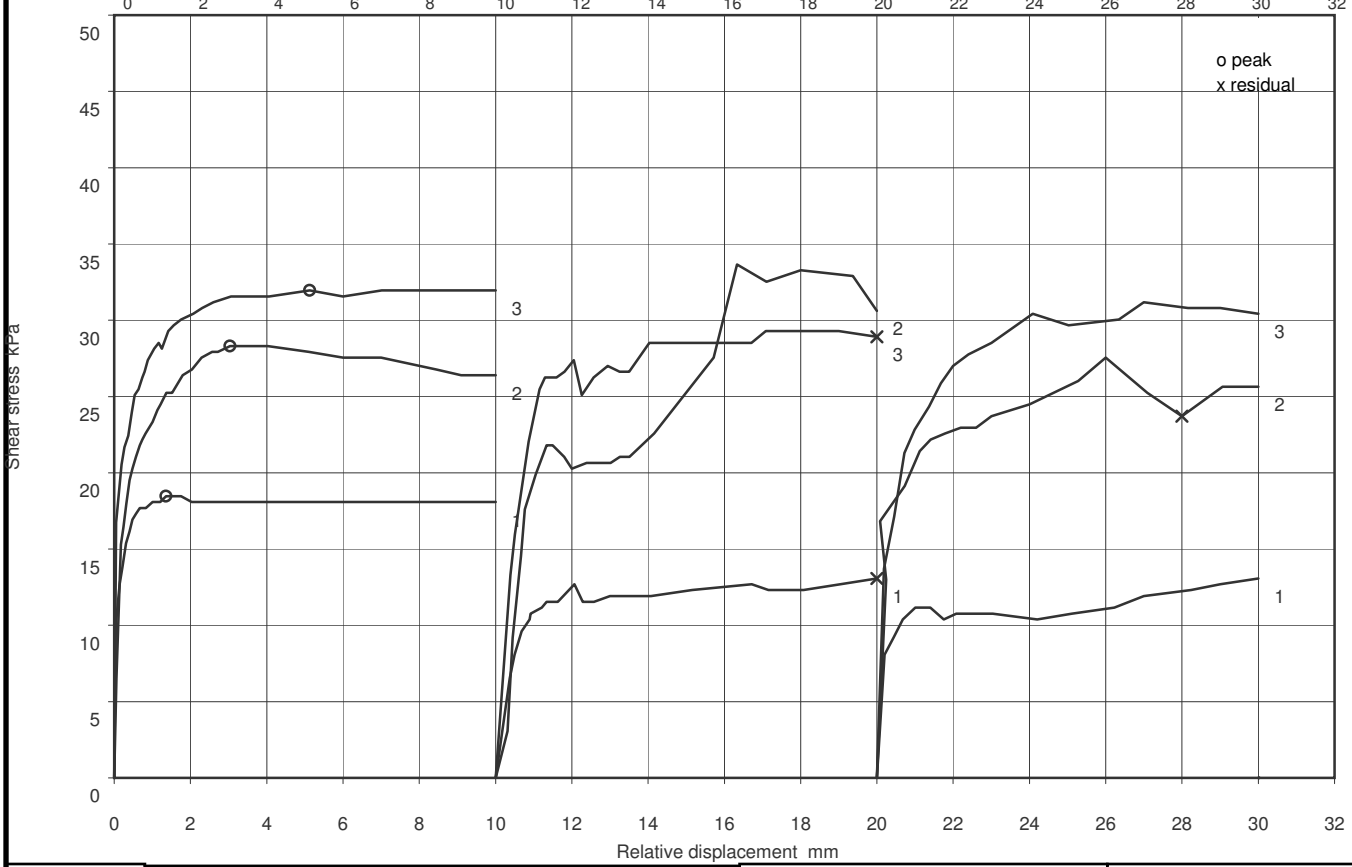
Project No	G5519-15	Sample Details:	Hole No.	BH105		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	3.00		
			Sample No	5	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:23/03/2016 10:11	**SSB8** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH105		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	7.00		
			Sample No	13	Type	D
			ID			
			Spec Ref			

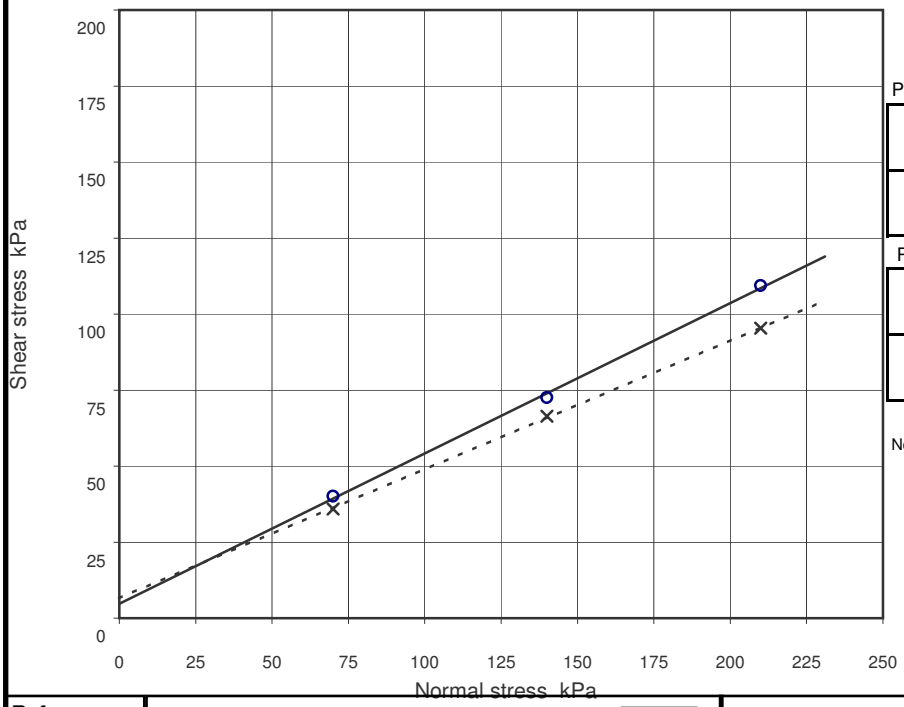
Soil Description	Brownish grey slightly sandy gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m³	1.91	1.91	1.91			
	Water Content	%	28.4	27.0	28.9			
	Dry density	Mg/m³	1.49	1.51	1.48			
	Voids ratio		0.779	0.760	0.786			
	Degree of Saturation	%	96	94	97			
Consol^n	Consolidation / Normal Stress applied	kPa	**70**	**140**	**210**			
	Change in height during consolidation	mm	-1.000	-2.404	-2.858			
	Voids ratio after consolidation		0.708	0.591	0.582			
Shear see note 1	Voids ratio at end of test		0.637	0.514	0.492			
	Moisture content at end of test	%	24.0	19.4	18.6			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.015	0.015	0.015			
	Residual	mm/min	0.037	0.037	0.037			
Peak values, (o)	Relative displacement	mm	6.93	6.79	6.88			
	Shear stress	kPa	40.1	72.5	109.4			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	20.00	20.00	20.00			
	Shear stress	kPa	35.9	66.4	95.3			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	4.8	-
Ø '	degrees	26½	-
Residual strength, (x)			
c'_R	kPa	6.5	-
$Ø'_R$	degrees	23	-

Notes :

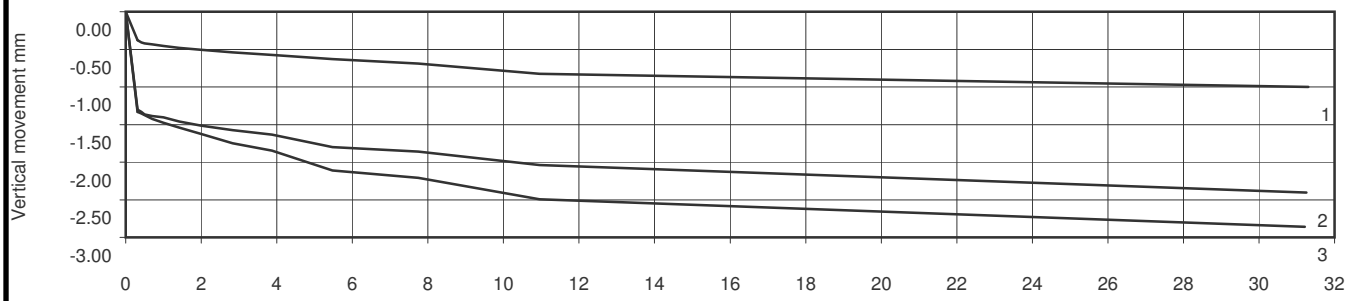
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref				Figure
SLR7.4 Rev 85 Oct 10	ESG	UKAS TESTING 1157	Printed:23/03/2016 10:12	**SSB9** sheet 1 of 2

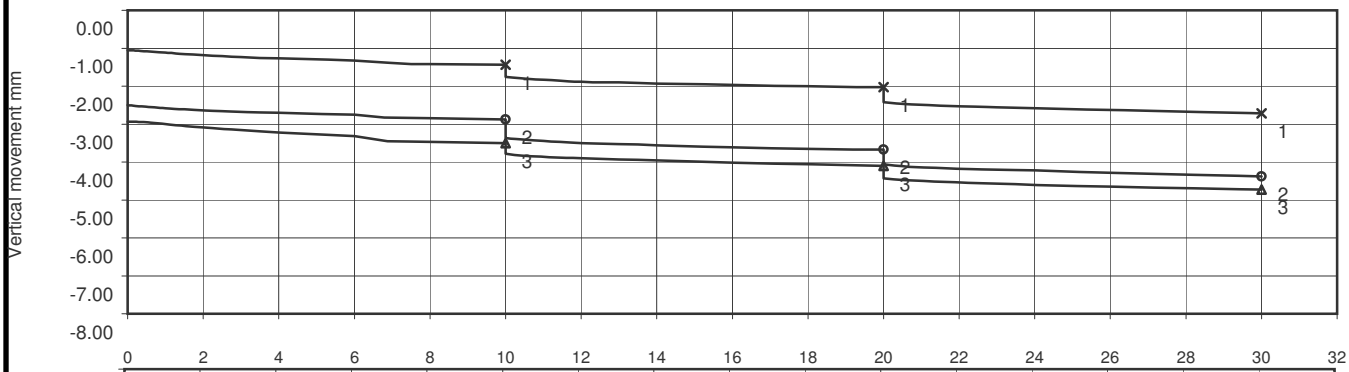
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

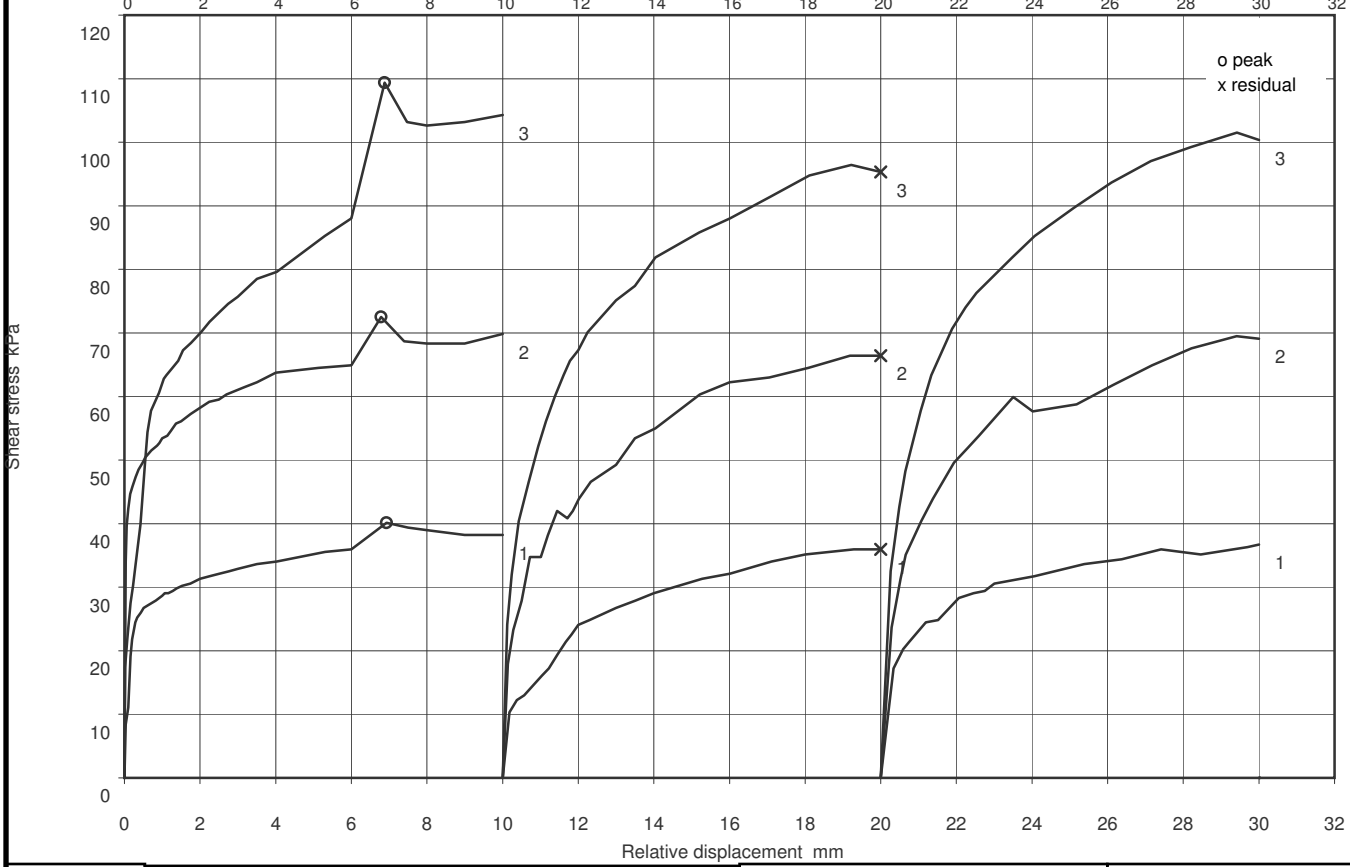
Project No	G5519-15	Sample Details:	Hole No.	BH105		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	7.00		
			Sample No	13	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref				Figure
SLR7.4 Rev 85 Oct 10	ESG	UKAS TESTING 1157	Printed:23/03/2016 10:12	**SSB9** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	9.00 - 9.50		
			Sample No	19	Type	B
			ID			
			Spec Ref			

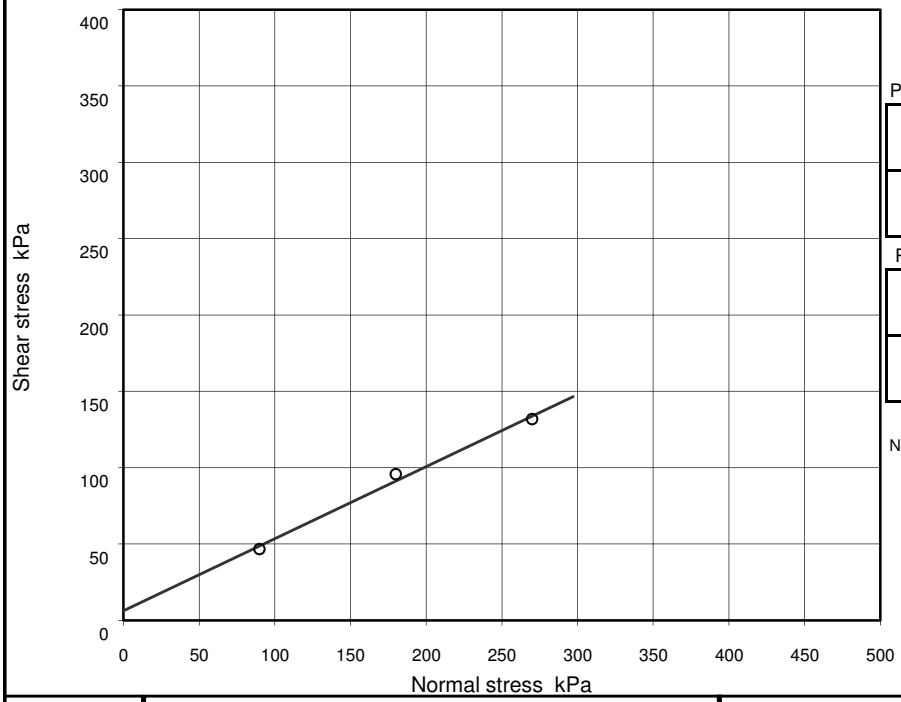
Soil Description	Brownish grey slightly sandy gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m³	2.04	2.04	2.04			
	Water Content	%	19.0	19.0	19.0			
	Dry density	Mg/m³	1.71	1.71	1.71			
	Voids ratio		0.546	0.546	0.546			
	Degree of Saturation	%	92	92	92			
Consol^n	Consolidation / Normal Stress applied	kPa	**90**	**180**	**270**			
	Change in height during consolidation	mm	-0.662	-1.400	-1.800			
	Voids ratio after consolidation		0.505	0.459	0.435			
Shear see note 1	Voids ratio at end of test		0.494	0.427	0.407			
	Moisture content at end of test	%	18.5	16.1	15.4			
	Saturation at end of test	%	99	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.026	0.026	0.026			
	Residual	mm/min						
Peak values, (o)	Relative displacement	mm	10.00	10.00	10.00			
	Shear stress	kPa	46.6	95.6	131.6			
Residual values, (x)	No. of reversals							
	Relative displacement	mm						
	Shear stress	kPa						



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	6.2	-
Ø '	degrees	25½	-
Residual strength, (x)			
c'_R	kPa	-	-
$Ø'_R$	degrees	-	-

Notes :

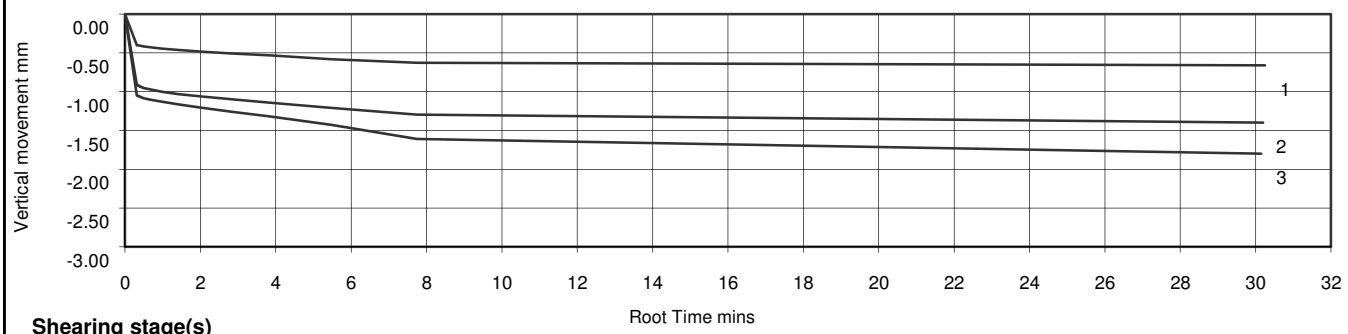
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:58	**SSB10** sheet 1 of 2

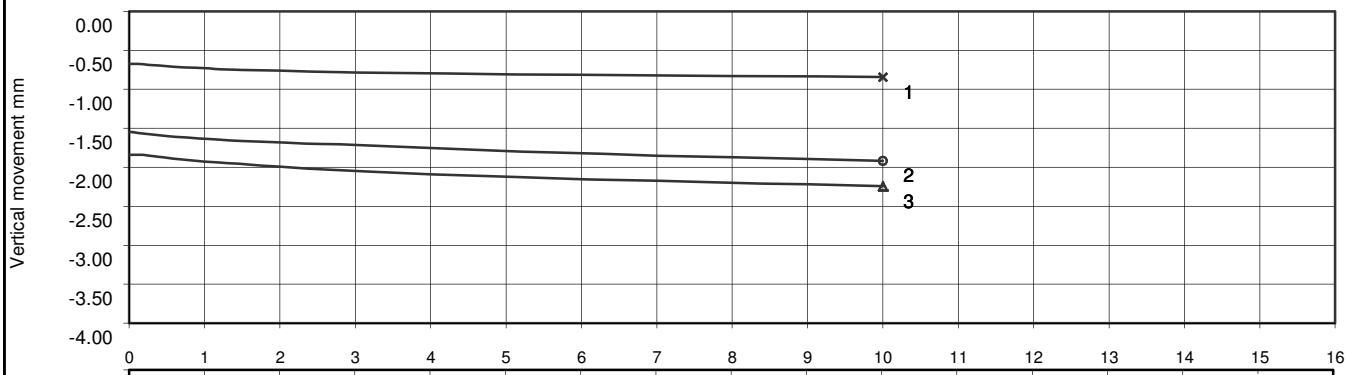
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

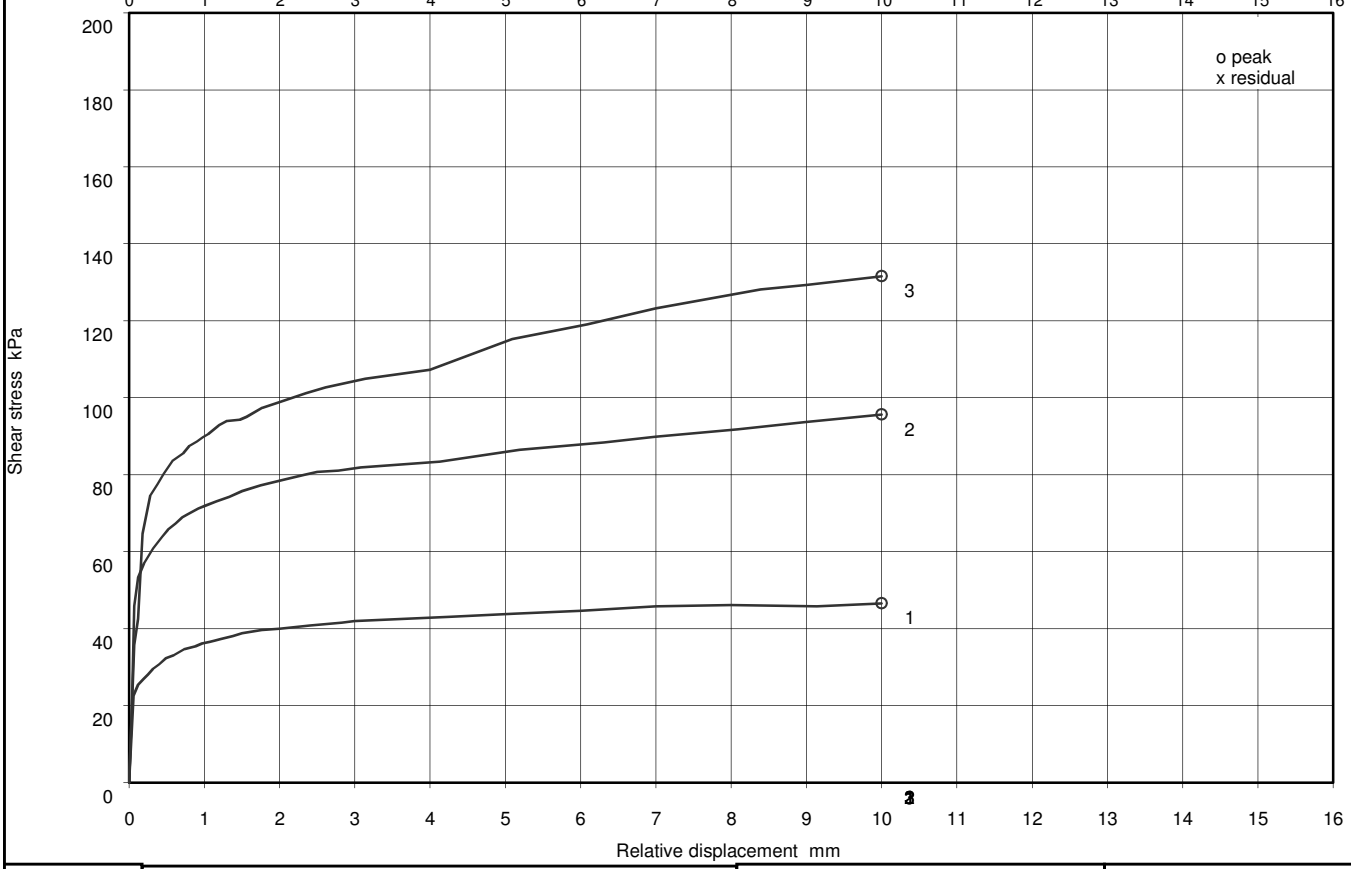
Project No	G5519-15	Sample Details:	Hole No.	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	9.00 - 9.50		
			Sample No	19	Type	B
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:58	**SSB10** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	18.00 - 18.50		
			Sample No	40	Type	B
			ID			
			Spec Ref			

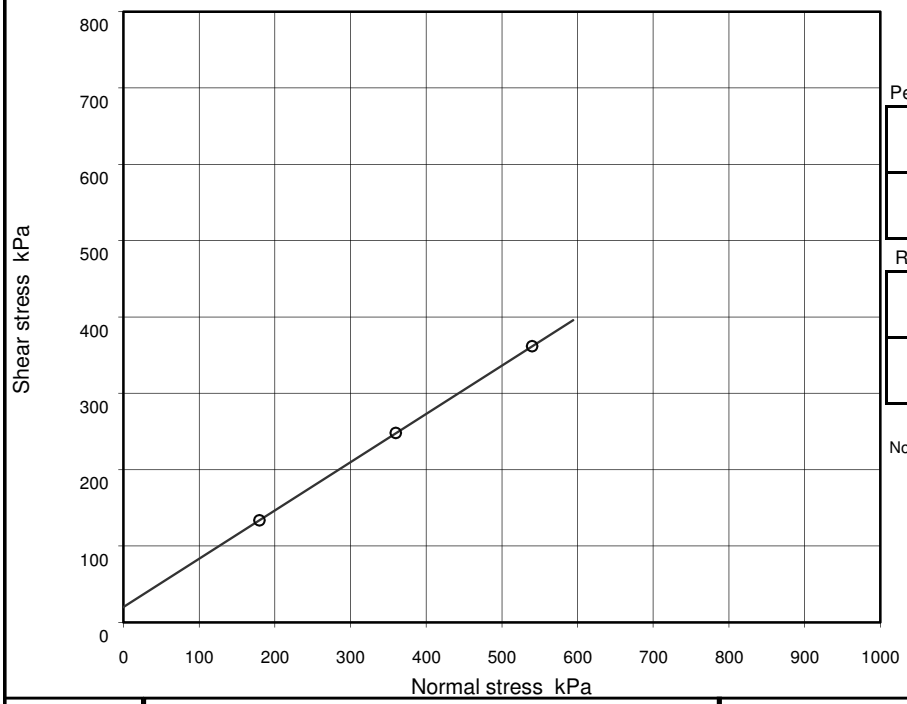
Soil Description	Brownish grey very gravellly clayey SAND.
Specimen Type /Preparation	-2mm material. Recompacted to a dense state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	2.14	2.14	2.14			
	Water Content	%	17.2	17.3	17.1			
	Dry density	Mg/m^3	1.83	1.83	1.83			
	Voids ratio		0.450	0.451	0.448			
	Degree of Saturation	%	101	102	101			
Consol^n	Consolidation / Normal Stress applied	kPa	**180**	**360**	**540**			
	Change in height during consolidation	mm	-1.486	-1.696	-1.692			
	Voids ratio after consolidation		0.364	0.352	0.350			
Shear see note 1	Voids ratio at end of test		0.356	0.332	0.327			
	Moisture content at end of test	%	13.4	12.5	12.4			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.600	0.600	0.600			
	Residual	mm/min						
Peak values, (o)	Relative displacement	mm	5.00	5.00	5.00			
	Shear stress	kPa	133.5	247.9	361.3			
Residual values, (x)	No. of reversals							
	Relative displacement	mm						
	Shear stress	kPa						



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	20	-
Ø '	degrees	32½	-
Residual strength, (x)			
c'_R	kPa	-	-
$Ø'_R$	degrees	-	-

Notes :

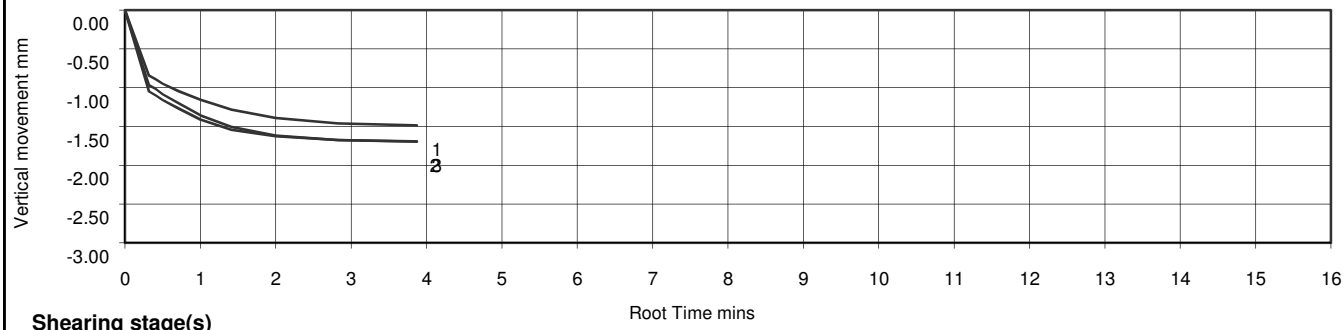
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:59	**SSB11** sheet 1 of 2

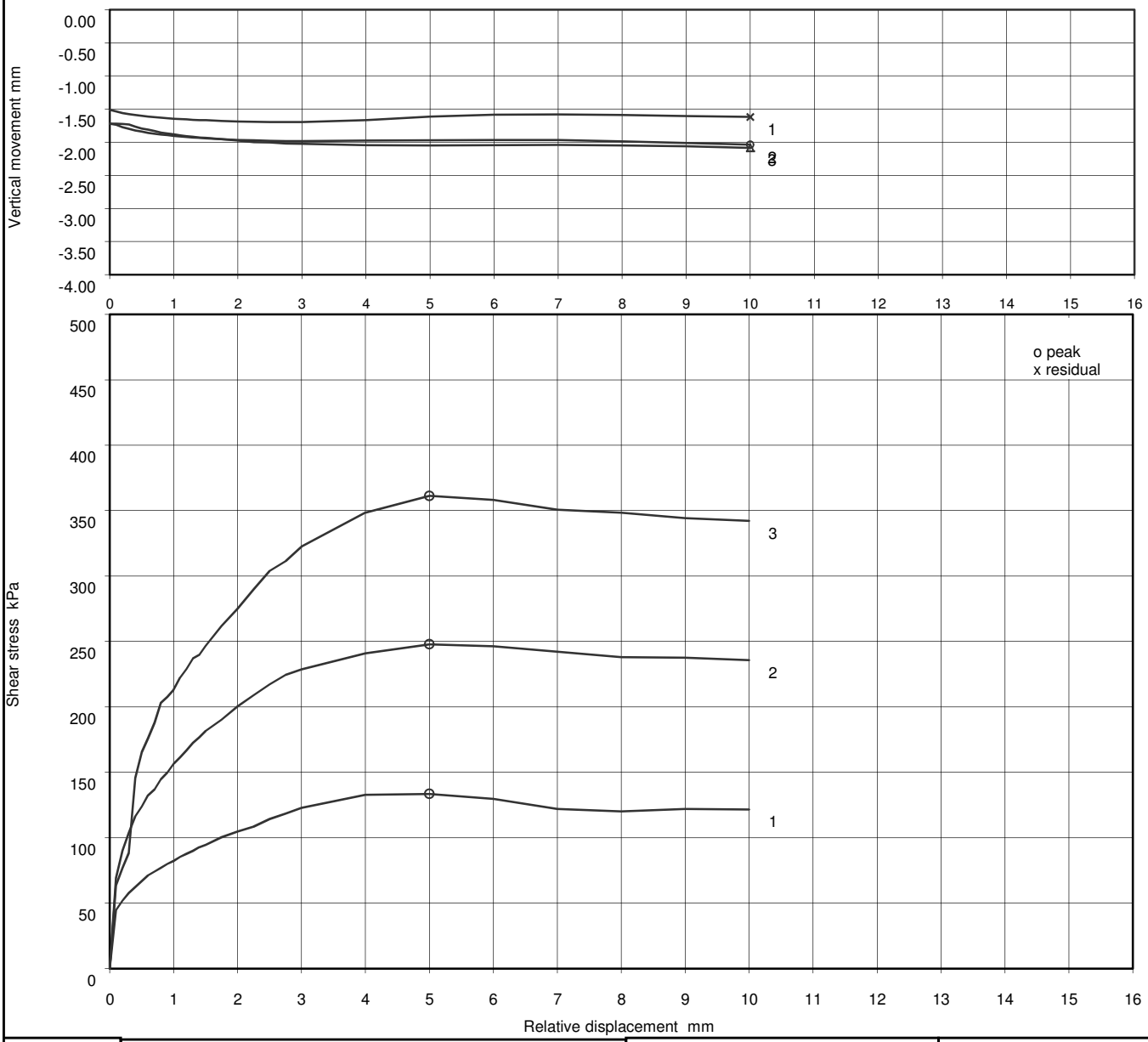
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	18.00 - 18.50		
			Sample No	40	Type	B
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)



Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:59	**SSB11** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	6.30		
			Sample No	13	Type	D
			ID			
			Spec Ref			

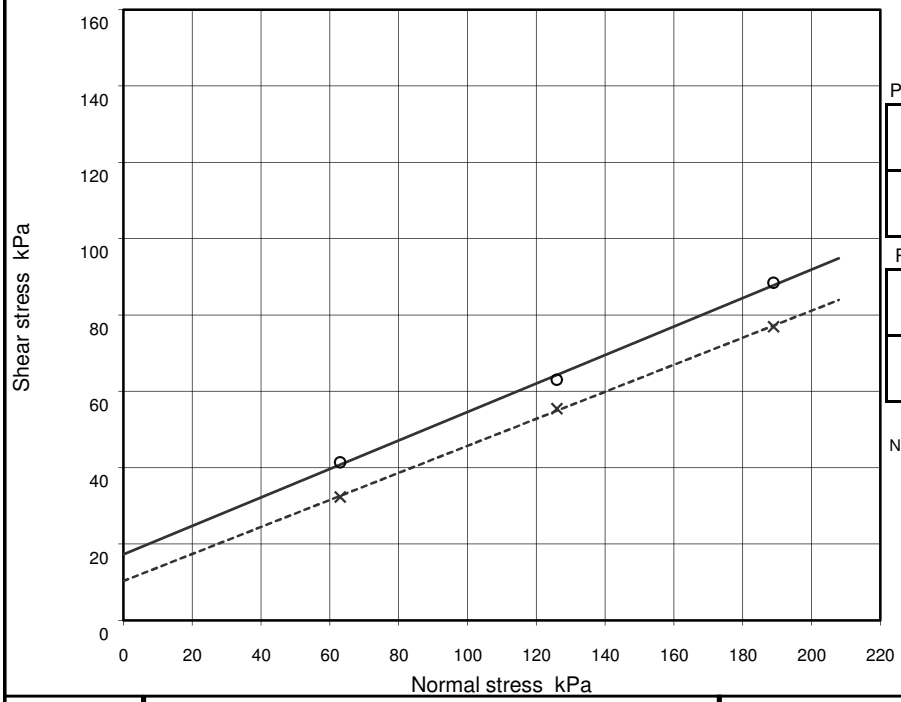
Soil Description	Brownish grey slightly sandy slightly gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.94	1.94	1.94			
	Water Content	%	24.2	23.4	24.7			
	Dry density	Mg/m^3	1.56	1.57	1.56			
	Voids ratio		0.694	0.684	0.701			
	Degree of Saturation	%	92	91	93			
Consol^n	Consolidation / Normal Stress applied	kPa	**63**	**126**	**189**			
	Change in height during consolidation	mm	-0.602	-1.056	-1.416			
	Voids ratio after consolidation		0.654	0.613	0.605			
Shear see note 1	Voids ratio at end of test		0.625	0.564	0.542			
	Moisture content at end of test	%	23.6	21.3	20.5			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.026	0.026	0.026			
	Residual	mm/min	0.066	0.066	0.066			
Peak values, (o)	Relative displacement	mm	2.57	5.00	6.00			
	Shear stress	kPa	41.3	63.0	88.4			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	30.00	20.00	30.00			
	Shear stress	kPa	32.3	55.5	76.9			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	17	-
Ø '	degrees	20½	-
Residual strength, (x)			
c'_R	kPa	10	-
$Ø'_R$	degrees	19½	-

Notes :

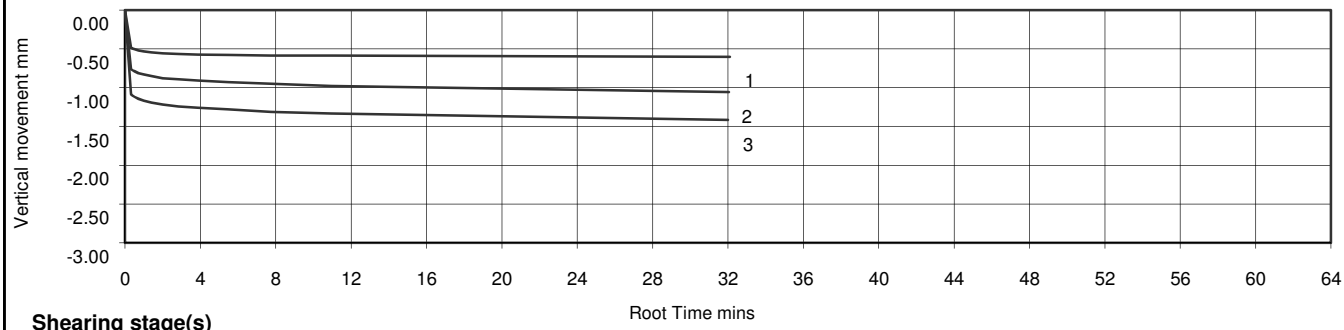
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:59	**SSB12** sheet 1 of 2

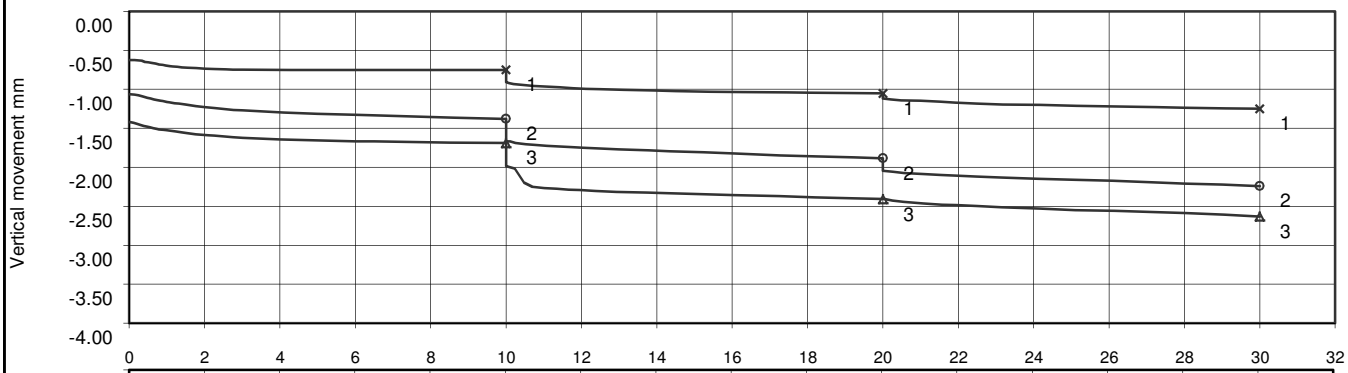
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

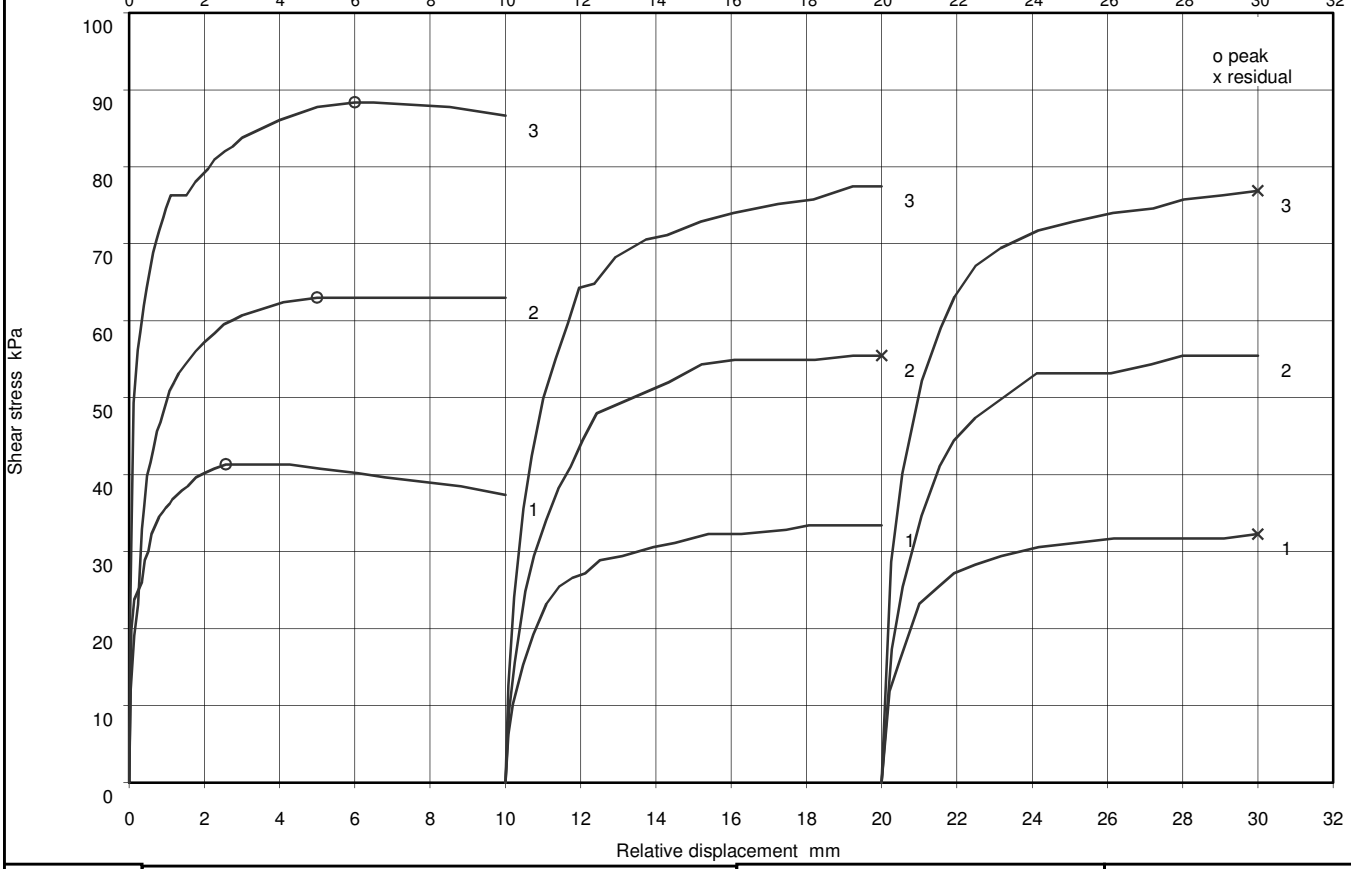
Project No	G5519-15	Sample Details:	Hole No.	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	6.30		
			Sample No	13	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 13:59	**SSB12** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	19.30		
			Sample No	44	Type	D
			ID			
			Spec Ref			

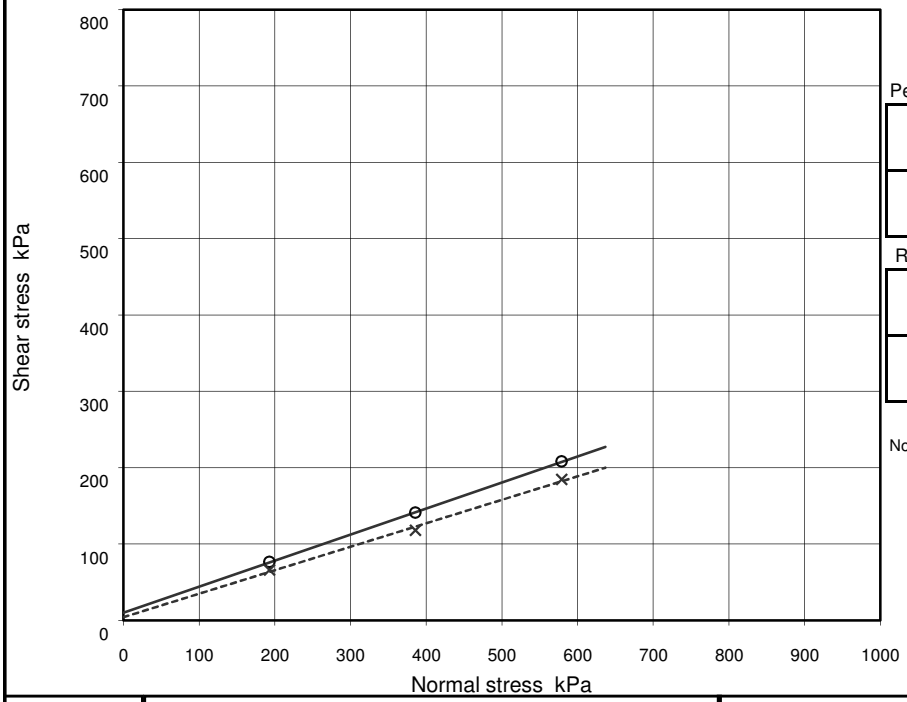
Soil Description	Light brown slightly sandy slightly gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m³	1.96	1.96	1.96			
	Water Content	%	24.0	23.7	22.9			
	Dry density	Mg/m³	1.58	1.59	1.60			
	Voids ratio		0.674	0.670	0.660			
	Degree of Saturation	%	94	94	92			
Consol^n	Consolidation / Normal Stress applied	kPa	**193**	**386**	**579**			
	Change in height during consolidation	mm	-1.324	-1.982	-3.068			
	Voids ratio after consolidation		0.586	0.538	0.456			
Shear see note 1	Voids ratio at end of test		0.532	0.470	0.392			
	Moisture content at end of test	%	20.1	17.8	14.8			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.015	0.015	0.015			
	Residual	mm/min	0.037	0.037	0.037			
Peak values, (o)	Relative displacement	mm	7.87	7.65	7.42			
	Shear stress	kPa	76.3	140.8	207.9			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	19.06	20.00	20.00			
	Shear stress	kPa	65.8	118.0	184.6			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	10	-
Ø '	degrees	19	-
Residual strength, (x)			
c'_R	kPa	4.1	-
$Ø'_R$	degrees	17	-

Notes :

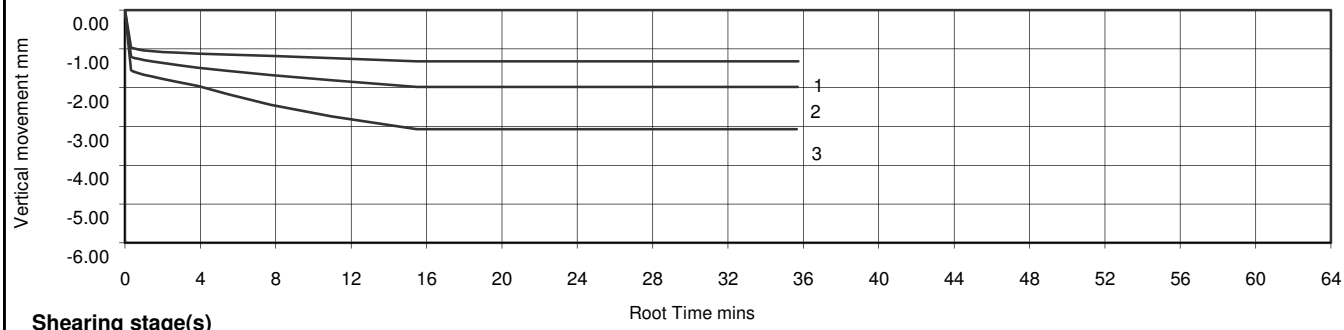
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:00	**SSB13** sheet 1 of 2

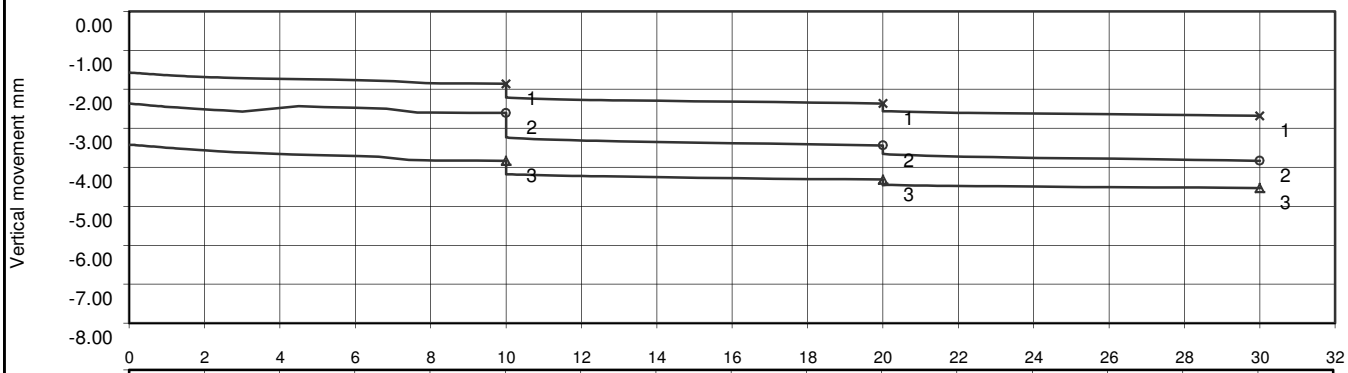
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

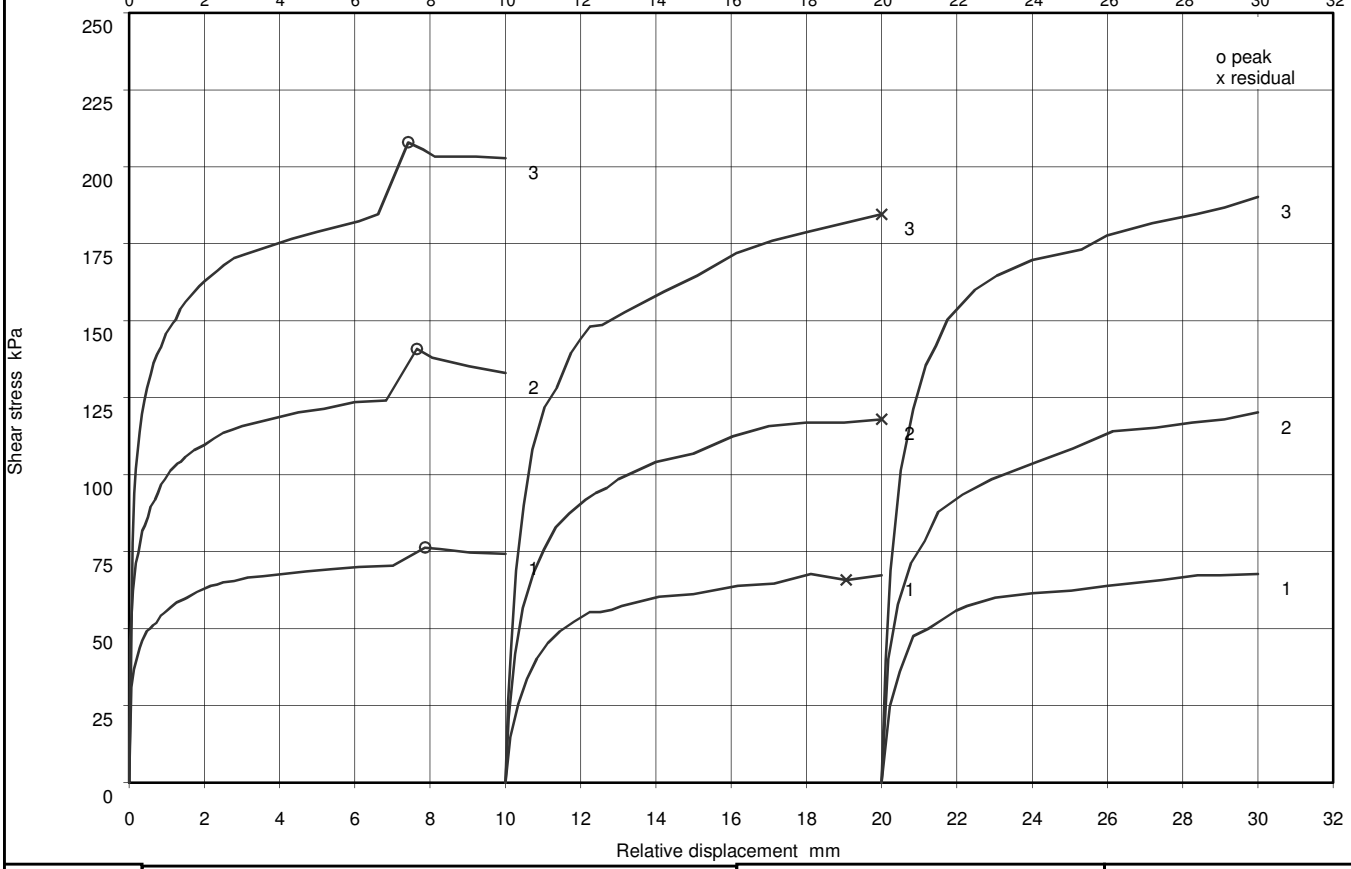
Project No	G5519-15	Sample Details:	Hole No.	BH106		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	19.30		
			Sample No	44	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:00	**SSB13** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	CH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	5.00		
			Sample No	D	Type	5
			ID			
			Spec Ref			

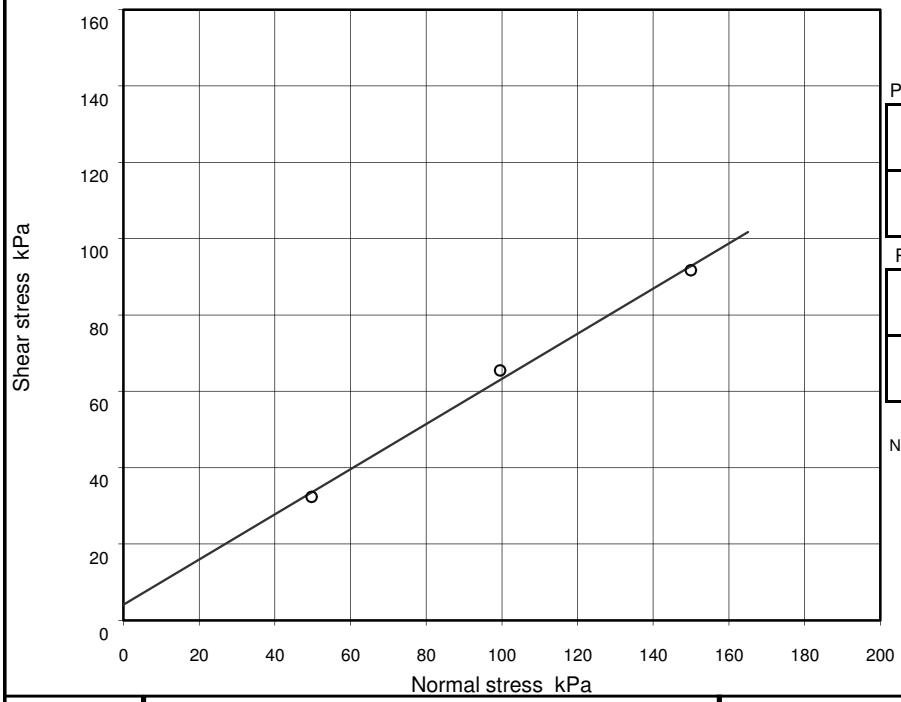
Soil Description	Light brown clayey SAND.
Specimen Type /Preparation	-2mm material. Recompacted to a dense state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.63	1.63	1.63			
	Water Content	%	11.6	11.6	11.6			
	Dry density	Mg/m^3	1.47	1.47	1.46			
	Voids ratio		0.809	0.808	0.810			
	Degree of Saturation	%	38	38	38			
Consol^n	Consolidation / Normal Stress applied	kPa	**50**	**100**	**150**			
	Change in height during consolidation	mm	-0.412	-0.884	-0.872			
	Voids ratio after consolidation		0.779	0.744	0.746			
Shear see note 1	Voids ratio at end of test		0.741	0.689	0.678			
	Moisture content at end of test	%	22.4	22.1	21.7			
	Saturation at end of test	%	80	85	85			

Shearing stage

Rate of displacement	Peak	mm/min	0.600	0.600	0.600			
	Residual	mm/min						
Peak values, (o)	Relative displacement	mm	7.00	9.00	10.00			
	Shear stress	kPa	32.3	65.4	91.7			
Residual values, (x)	No. of reversals							
	Relative displacement	mm						
	Shear stress	kPa						



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	4.1	-
Ø '	degrees	30½	-
Residual strength, (x)			
c'_R	kPa	-	-
$Ø'_R$	degrees	-	-

Notes :

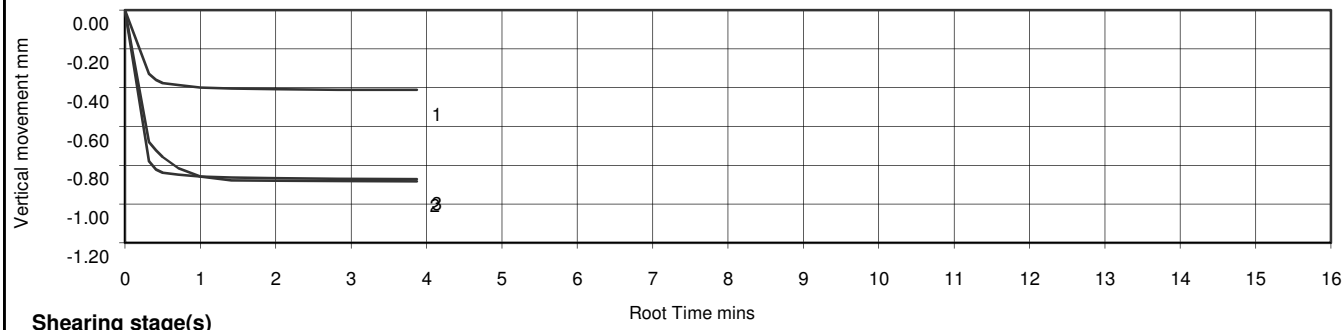
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:01	**SSB14** sheet 1 of 2

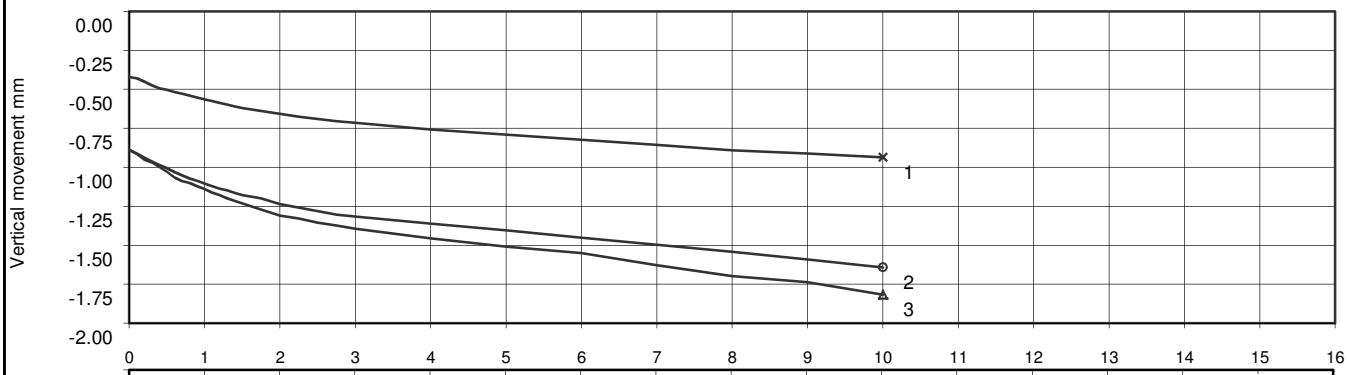
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

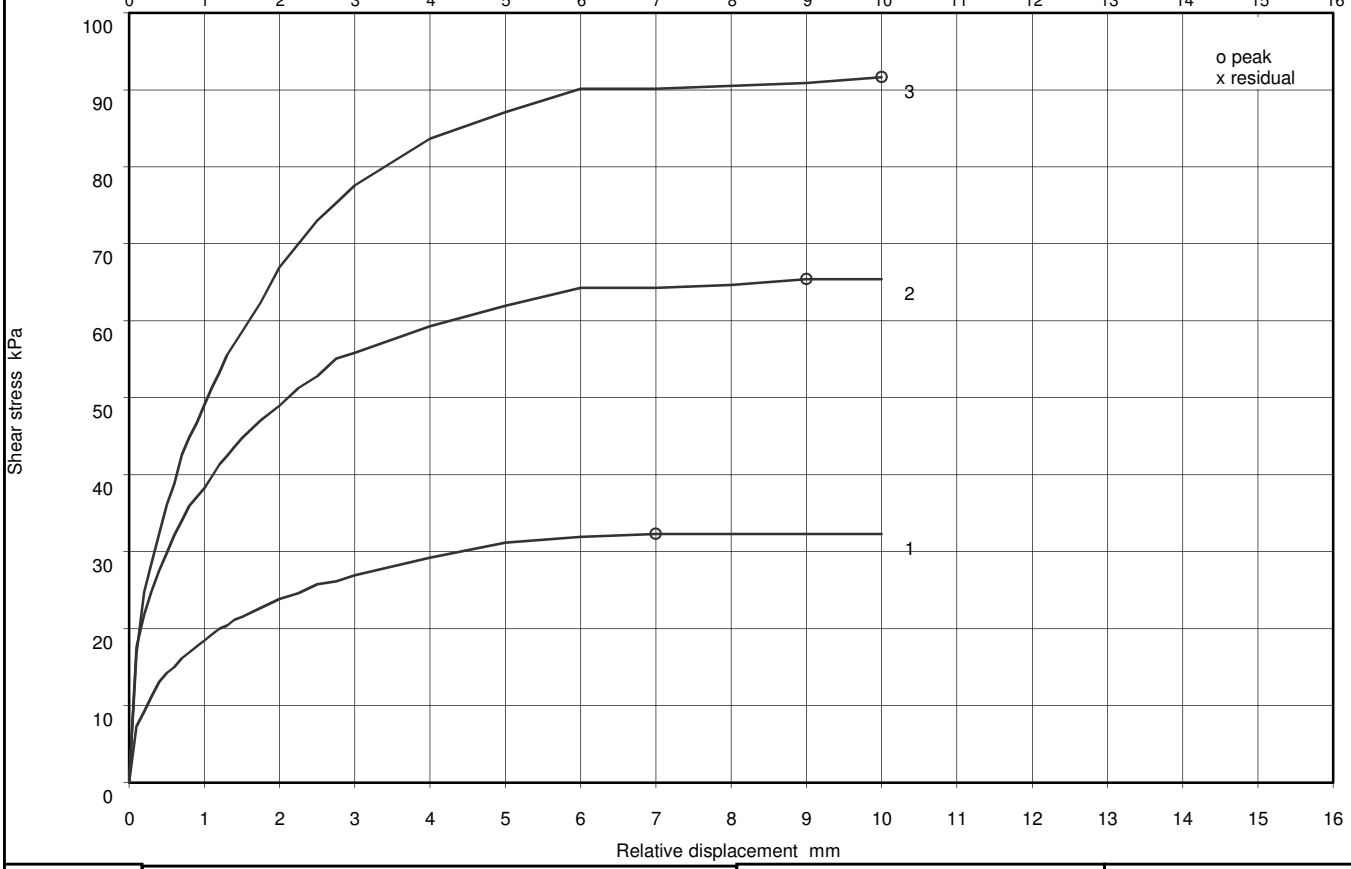
Project No	G5519-15	Sample Details:	Hole No.	CH101		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	5.00		
			Sample No	D	Type	5
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:01	**SSB14** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	CH102A		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	12.50		
			Sample No	5	Type	D
			ID			
			Spec Ref			

Soil Description	Light brown sandy CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

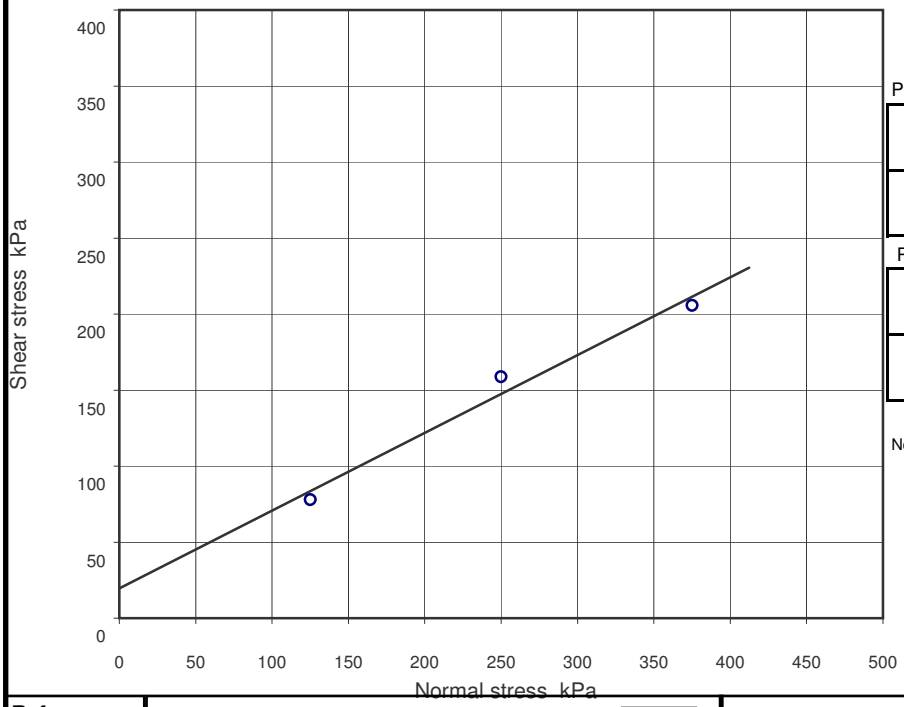
Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details

		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.92	1.92	1.92			
	Water Content	%	17.1	17.2	16.4			
	Dry density	Mg/m^3	1.64	1.64	1.65			
	Voids ratio		0.620	0.620	0.609			
	Degree of Saturation	%	73	73	71			
Consol^n	Consolidation / Normal Stress applied	kPa	**125**	**250**	**375**			
	Change in height during consolidation	mm	-0.646	-0.942	-1.316			
	Voids ratio after consolidation		0.578	0.559	0.525			
Shear see note 1	Voids ratio at end of test		0.554	0.520	0.472			
	Moisture content at end of test	%	20.2	18.9	17.8			
	Saturation at end of test	%	97	96	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.059	0.059	0.059			
	Residual	mm/min						
Peak values, (o)	Relative displacement	mm	9.51	7.02	5.41			
	Shear stress	kPa	77.8	158.6	205.6			
Residual values, (x)	No. of reversals							
	Relative displacement	mm						
	Shear stress	kPa						



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	20	-
Ø '	degrees	27	-
Residual strength, (x)			
c'_R	kPa	-	-
$Ø'_R$	degrees	-	-

Notes :

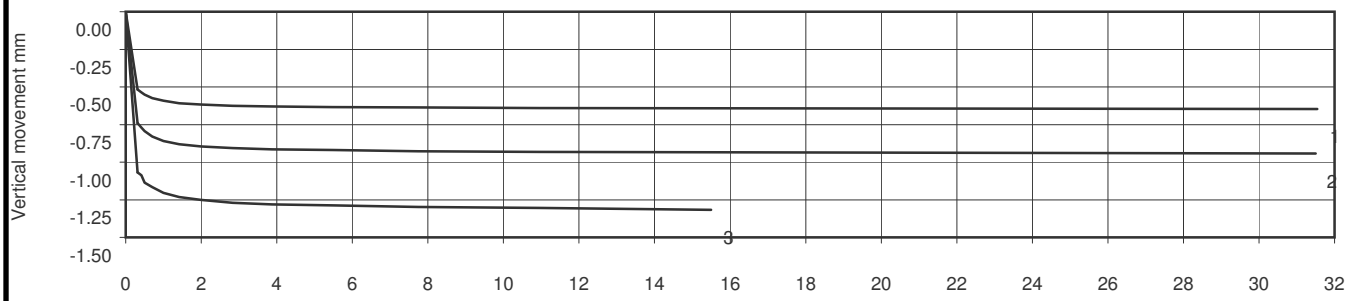
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref				Figure
SLR7.4 Rev 85 Oct 10	ESG	UKAS TESTING 1157	Printed:23/03/2016 10:14	**SSB15** sheet 1 of 2

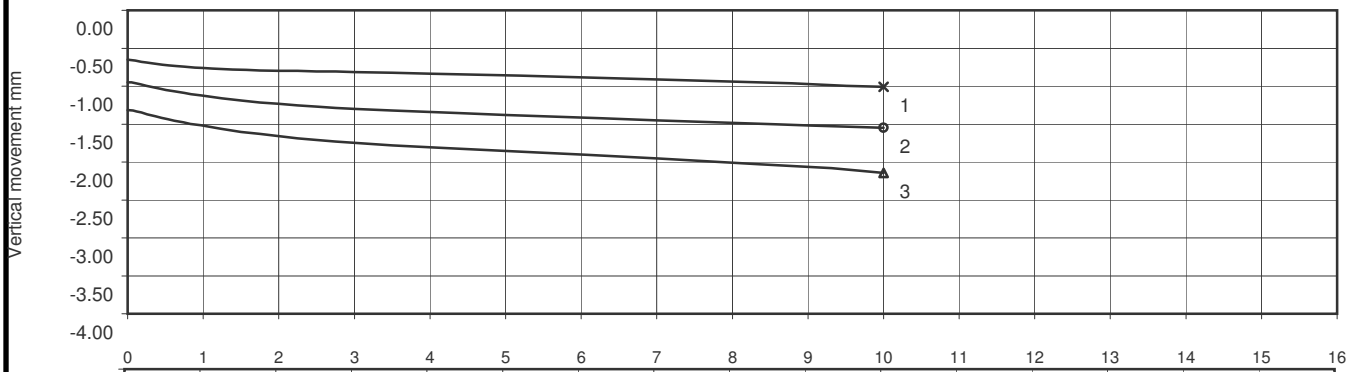
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

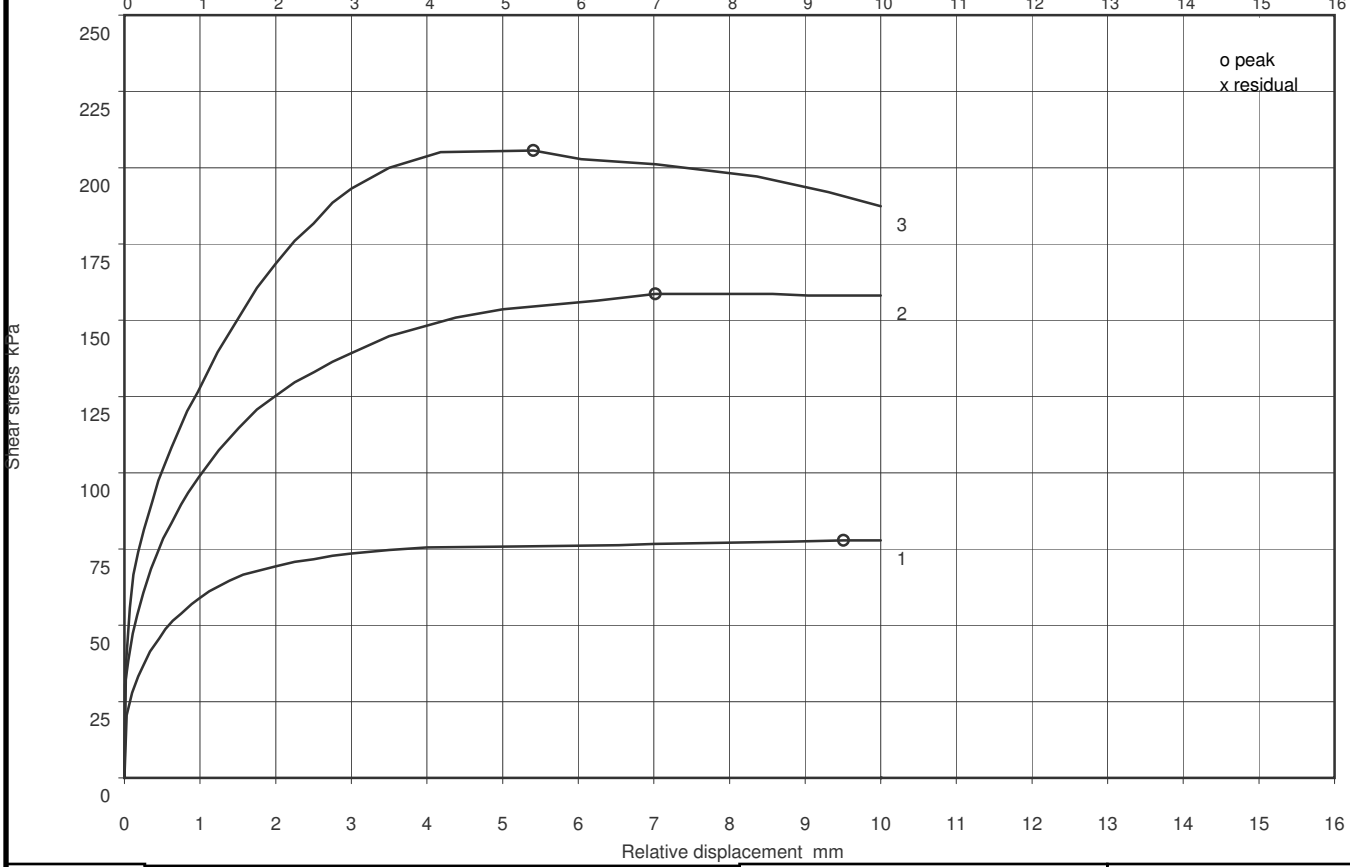
Project No	G5519-15	Sample Details:	Hole No.	CH102A		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	12.50		
			Sample No	5	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref				Figure
SLR7.4 Rev 85 Oct 10	ESG	UKAS TESTING 1157	Printed:23/03/2016 10:14	**SSB15** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	CH104A		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	4.00		
			Sample No	3	Type	D
			ID			
			Spec Ref			

Soil Description	Dark grey gravelly sandy SILT.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

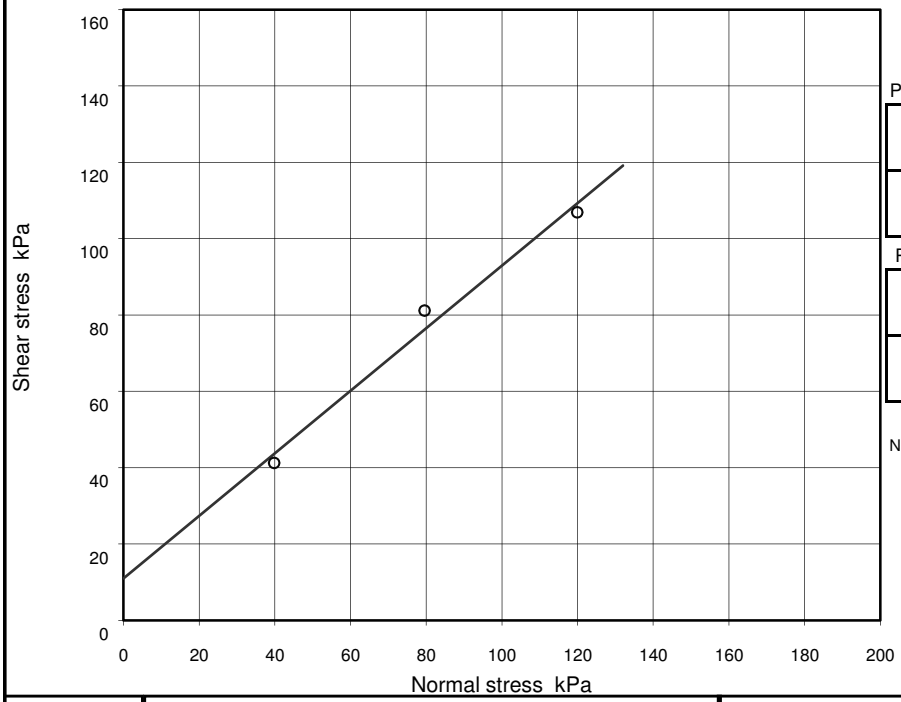
Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details

		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.50	1.50	1.50			
	Water Content	%	68.9	70.7	68.3			
	Dry density	Mg/m^3	0.89	0.88	0.89			
	Voids ratio		1.976	2.007	1.965			
	Degree of Saturation	%	92	93	92			
Consol^n	Consolidation / Normal Stress applied	kPa	**40**	**80**	**120**			
	Change in height during consolidation	mm	-1.402	-2.024	-2.216			
	Voids ratio after consolidation		1.809	1.763	1.702			
Shear see note 1	Voids ratio at end of test		1.798	1.734	1.667			
	Moisture content at end of test	%	57.6	57.9	55.7			
	Saturation at end of test	%	85	88	89			

Shearing stage

Rate of displacement	Peak	mm/min	0.038	0.038	0.038			
	Residual	mm/min						
Peak values, (o)	Relative displacement	mm	5.39	6.00	6.00			
	Shear stress	kPa	41.2	81.1	106.9			
Residual values, (x)	No. of reversals							
	Relative displacement	mm						
	Shear stress	kPa						



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	11	-
Ø '	degrees	39½	-
Residual strength, (x)			
c'_R	kPa	-	-
$Ø'_R$	degrees	-	-

Notes :

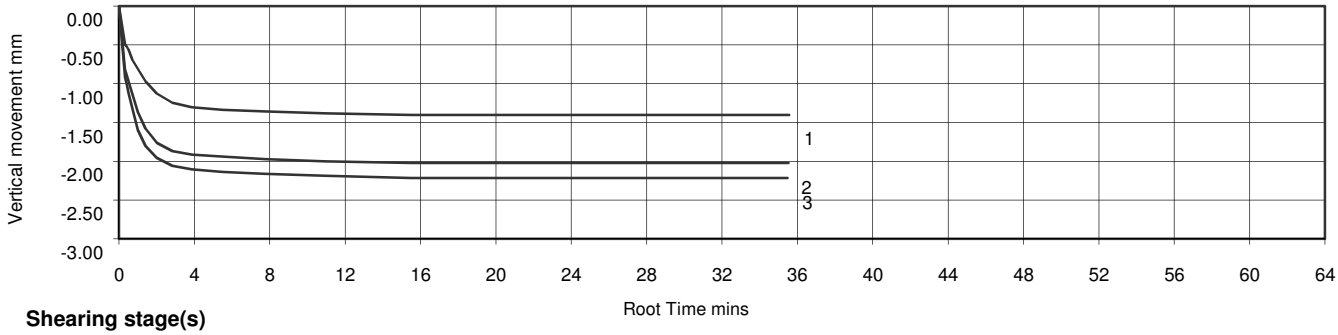
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:01	**SSB16** sheet 1 of 2

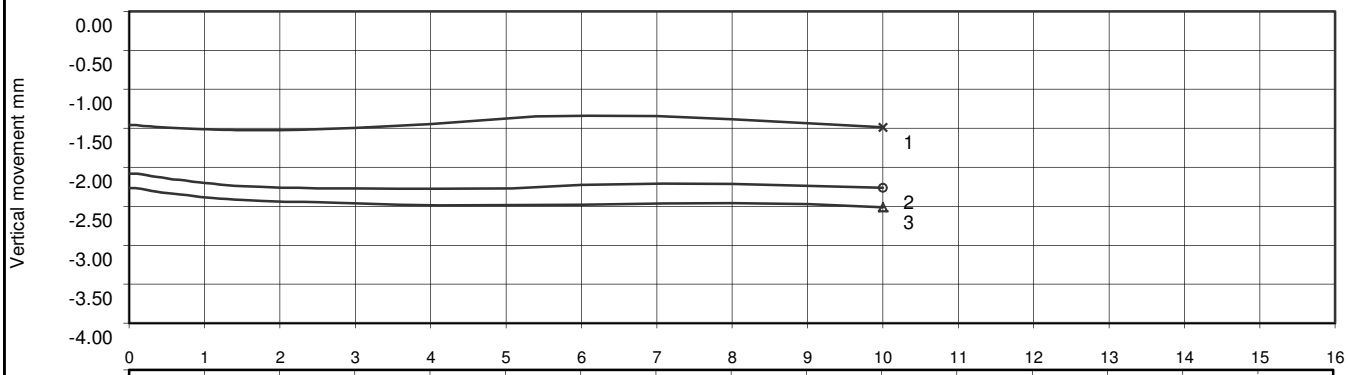
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

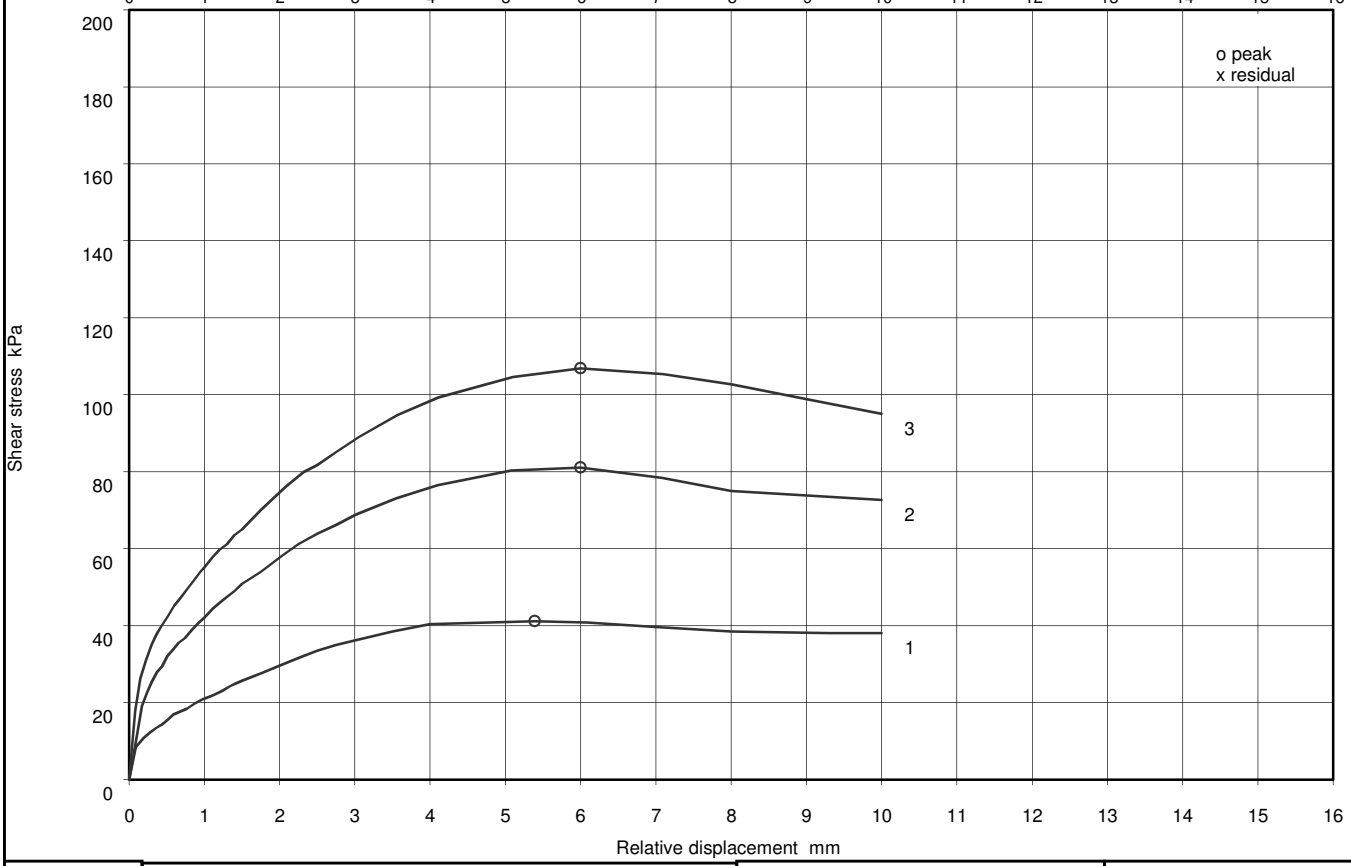
Project No	G5519-15	Sample Details:	Hole No.	CH104A		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	4.00		
			Sample No	3	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:01	**SSB16** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	CH104A		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	6.90		
			Sample No	5	Type	D
			ID			
			Spec Ref			

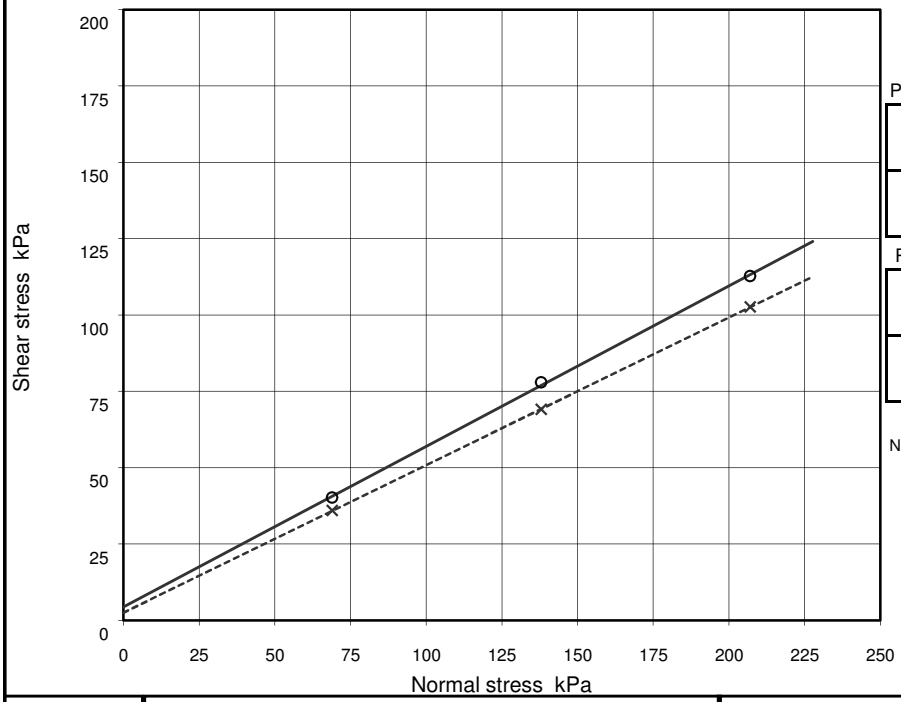
Soil Description	Brownish grey slightly sandy slightly gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m³	1.98	1.98	1.98			
	Water Content	%	24.3	24.4	24.0			
	Dry density	Mg/m³	1.59	1.59	1.59			
	Voids ratio		0.665	0.667	0.662			
	Degree of Saturation	%	97	97	96			
Consol^n	Consolidation / Normal Stress applied	kPa	**69**	**138**	**207**			
	Change in height during consolidation	mm	-0.674	-1.050	-1.372			
	Voids ratio after consolidation		0.620	0.597	0.571			
Shear see note 1	Voids ratio at end of test		0.584	0.537	0.507			
	Moisture content at end of test	%	22.0	20.3	19.1			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.016	0.016	0.016			
	Residual	mm/min	0.041	0.041	0.041			
Peak values, (o)	Relative displacement	mm	4.00	8.55	8.77			
	Shear stress	kPa	40.1	77.9	112.7			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	28.34	30.00	19.00			
	Shear stress	kPa	35.9	69.1	102.6			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	4.3	-
Ø '	degrees	27½	-

Residual strength, (x)			
c'_R	kPa	2.5	-
$Ø'_R$	degrees	26	-

Notes :

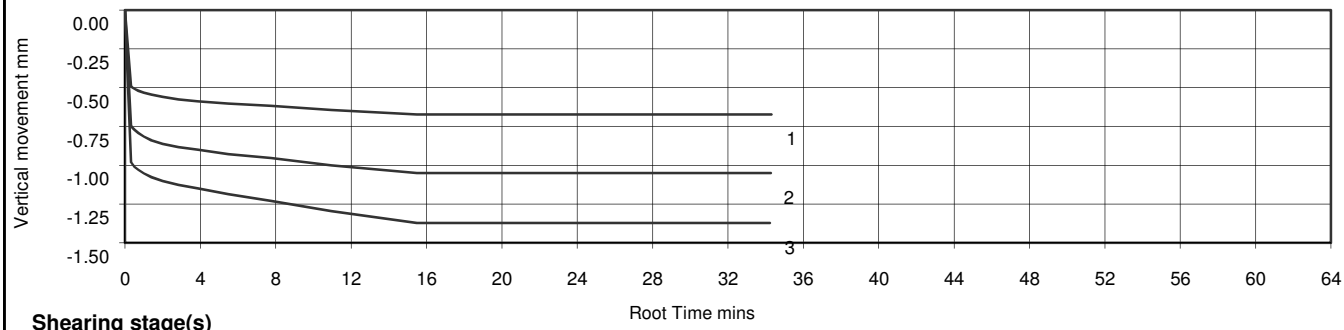
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:02	**SSB17** sheet 1 of 2

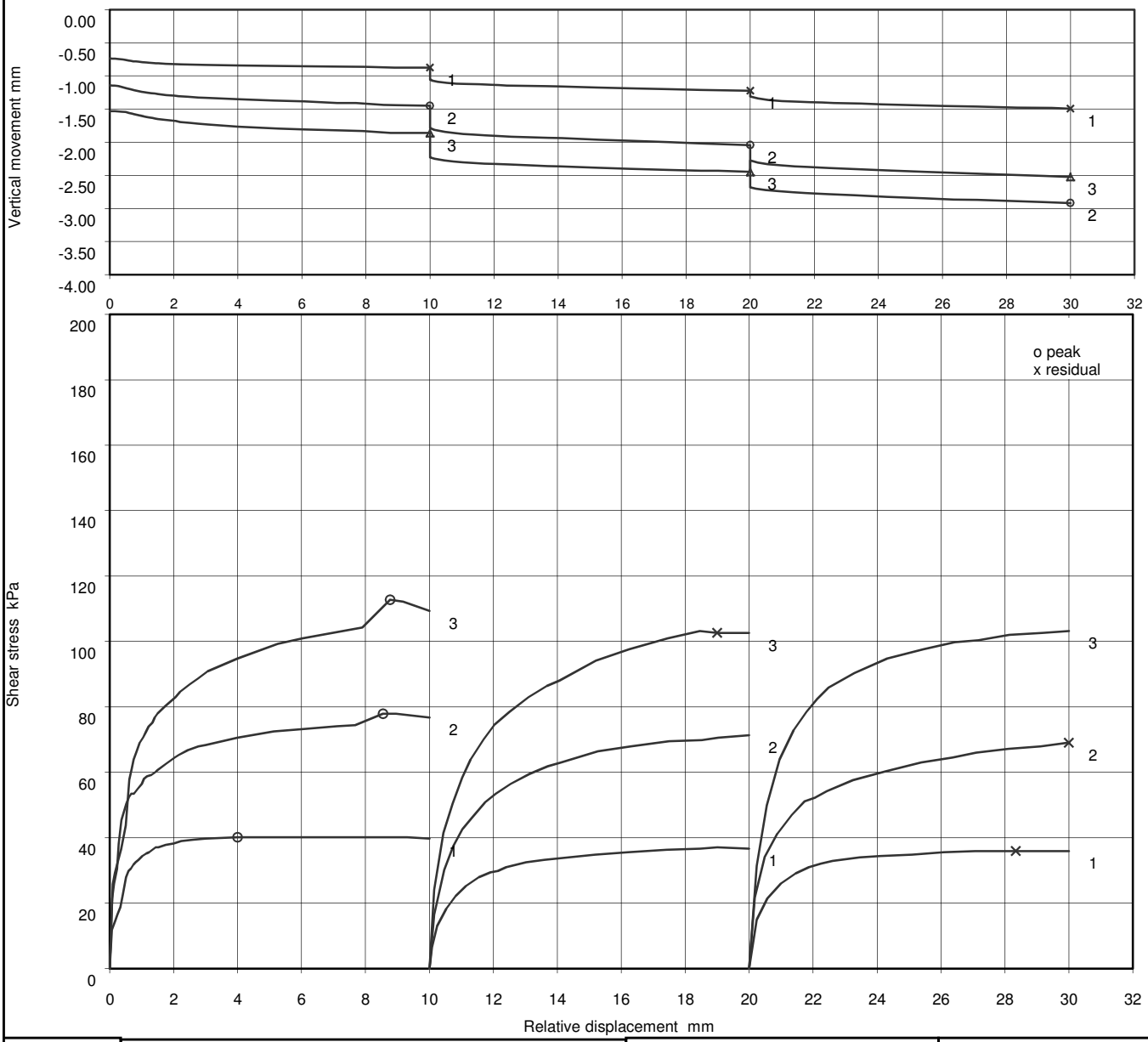
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	CH104A		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	6.90		
			Sample No	5	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)



Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:02	**SSB17** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	CH104A		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	10.50		
			Sample No	9	Type	D
			ID			
			Spec Ref			

Soil Description	Orangish brown slightly gravelly sandy CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

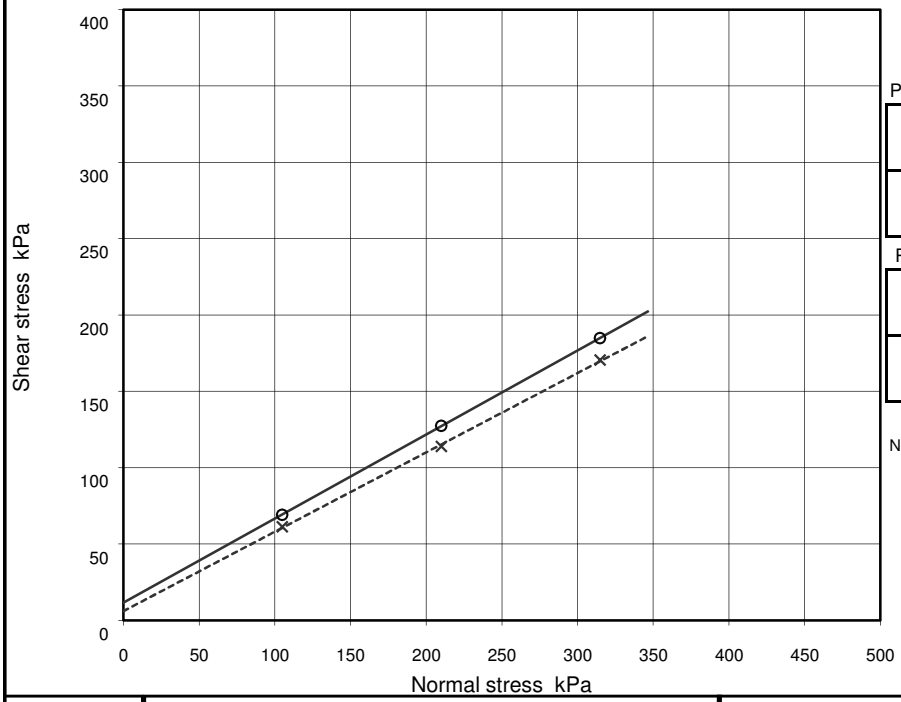
Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details

		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	2.07	2.07	2.07			
	Water Content	%	19.0	19.0	18.9			
	Dry density	Mg/m^3	1.74	1.74	1.74			
	Voids ratio		0.524	0.524	0.523			
	Degree of Saturation	%	96	96	96			
Consol^n	Consolidation / Normal Stress applied	kPa	**105**	**210**	**315**			
	Change in height during consolidation	mm	-0.988	-1.300	-1.520			
	Voids ratio after consolidation		0.464	0.445	0.430			
Shear see note 1	Voids ratio at end of test		0.412	0.384	0.371			
	Moisture content at end of test	%	15.6	14.5	14.0			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.011	0.011	0.011			
	Residual	mm/min	0.027	0.027	0.027			
Peak values, (o)	Relative displacement	mm	6.31	8.02	5.90			
	Shear stress	kPa	69.1	127.3	184.8			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	30.00	30.00	30.00			
	Shear stress	kPa	61.2	113.9	170.4			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	11	-
Ø '	degrees	29	-
Residual strength, (x)			
c'_R	kPa	5.9	-
$Ø'_R$	degrees	27½	-

Notes :

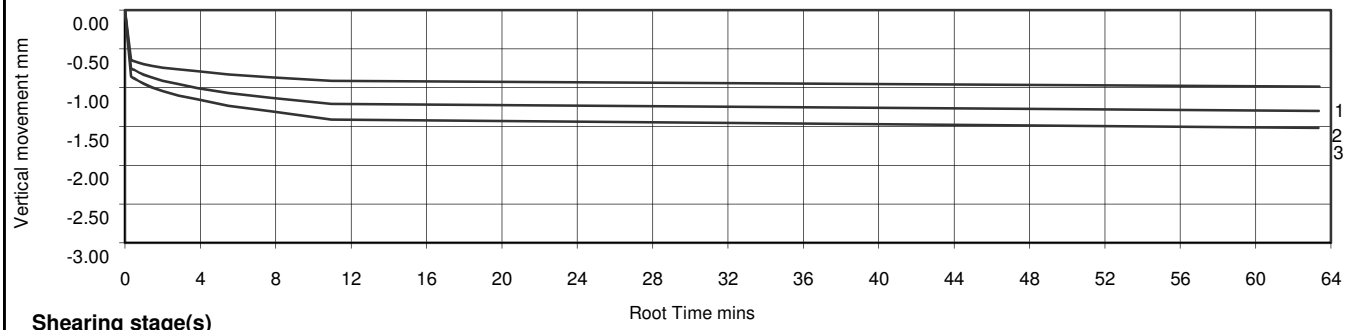
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:03	**SSB18** sheet 1 of 2

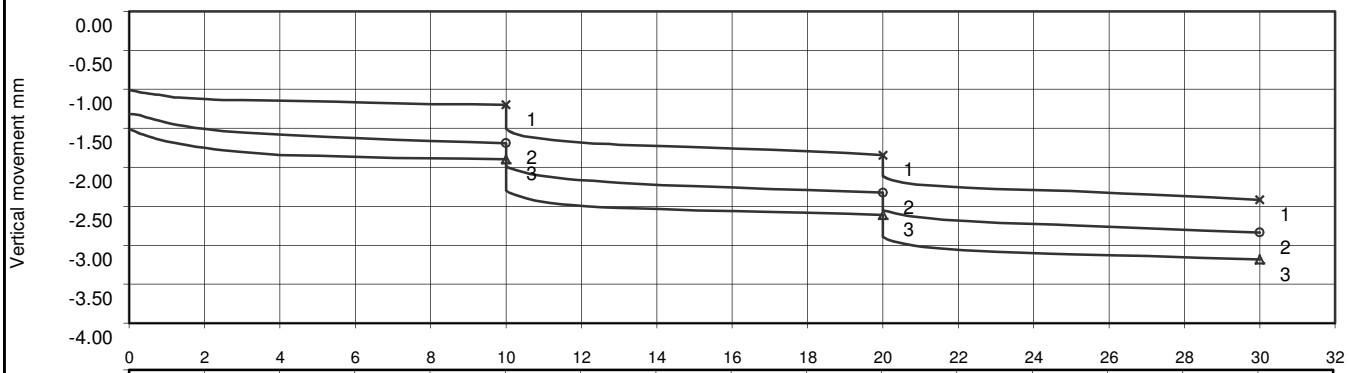
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

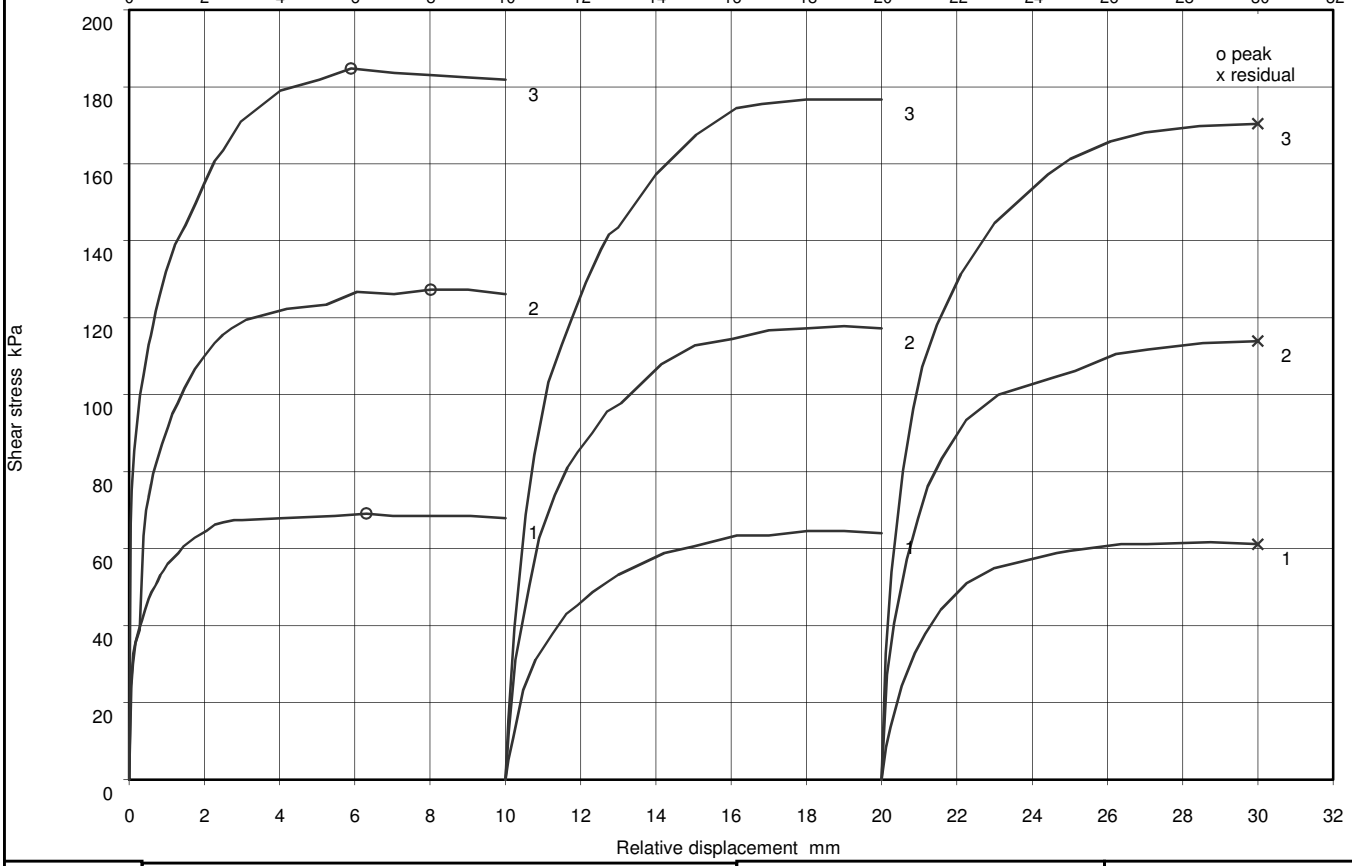
Project No	G5519-15	Sample Details:	Hole No.	CH104A		
Project Name	Bridle Close & Fontmell Close, St Albans.		Depth (m BGL)	10.50		
			Sample No	9	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:03	**SSB18** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	WS103B		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	2.50		
			Sample No	3	Type	D
			ID			
			Spec Ref			

Soil Description	Orangish brown sandy gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

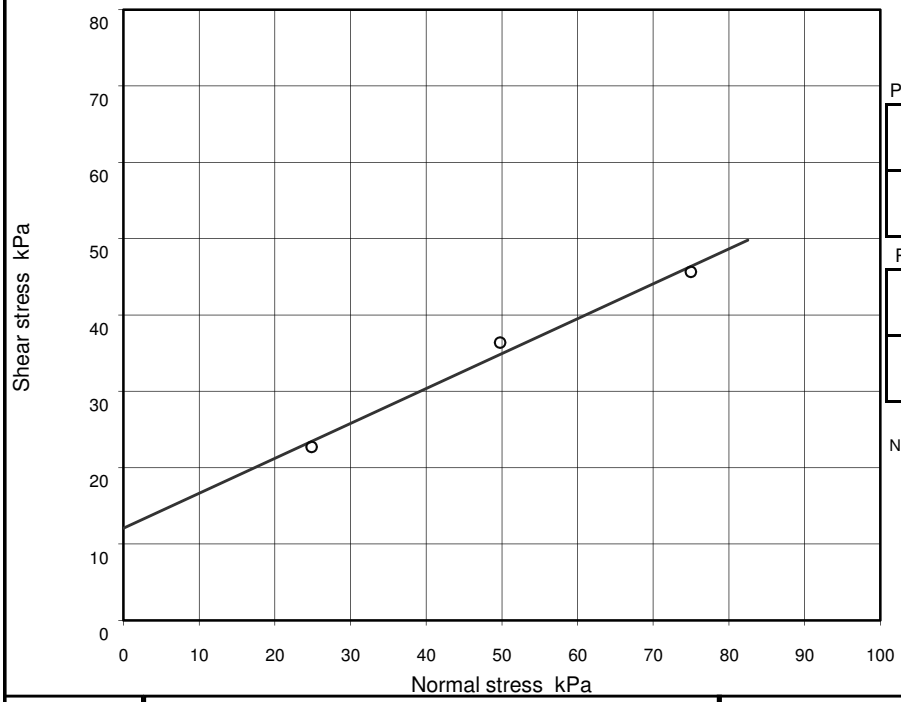
Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details

		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	2.09	2.09	2.09			
	Water Content	%	13.5	13.5	13.5			
	Dry density	Mg/m^3	1.84	1.84	1.84			
	Voids ratio		0.441	0.441	0.441			
	Degree of Saturation	%	81	81	81			
Consol^n	Consolidation / Normal Stress applied	kPa	**25**	**50**	**75**			
	Change in height during consolidation	mm	-0.186	-0.364	-0.474			
	Voids ratio after consolidation		0.430	0.420	0.414			
Shear see note 1	Voids ratio at end of test		0.442	0.418	0.407			
	Moisture content at end of test	%	16.7	15.8	15.4			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.028	0.028	0.028			
	Residual	mm/min						
Peak values, (o)	Relative displacement	mm	1.76	2.29	2.80			
	Shear stress	kPa	22.7	36.3	45.6			
Residual values, (x)	No. of reversals							
	Relative displacement	mm						
	Shear stress	kPa						



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	12	-
Ø '	degrees	24½	-
Residual strength, (x)			
c'_R	kPa	-	-
$Ø'_R$	degrees	-	-

Notes :

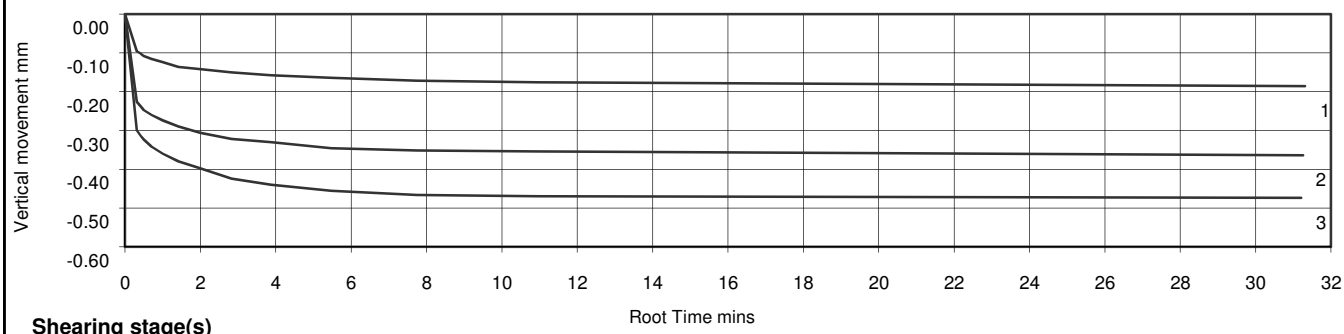
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:03	**SSB19** sheet 1 of 2

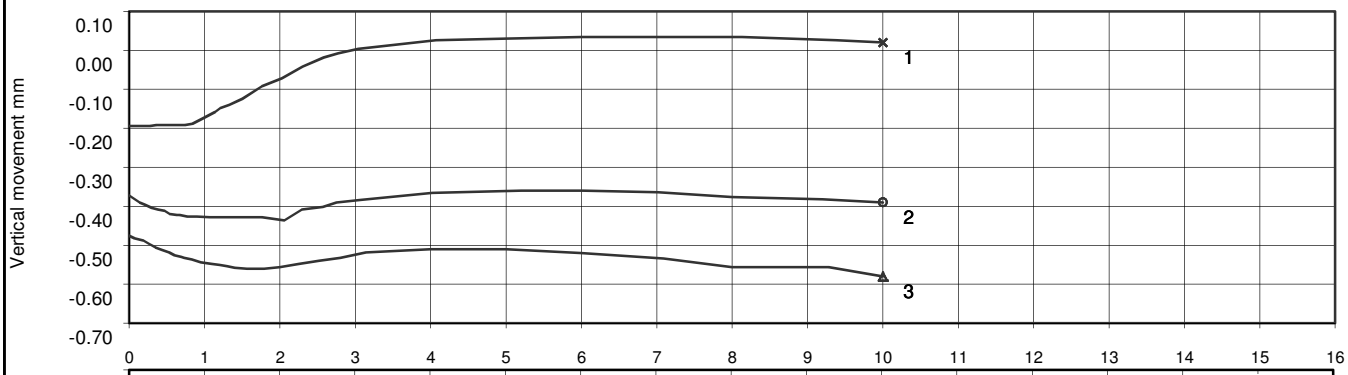
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

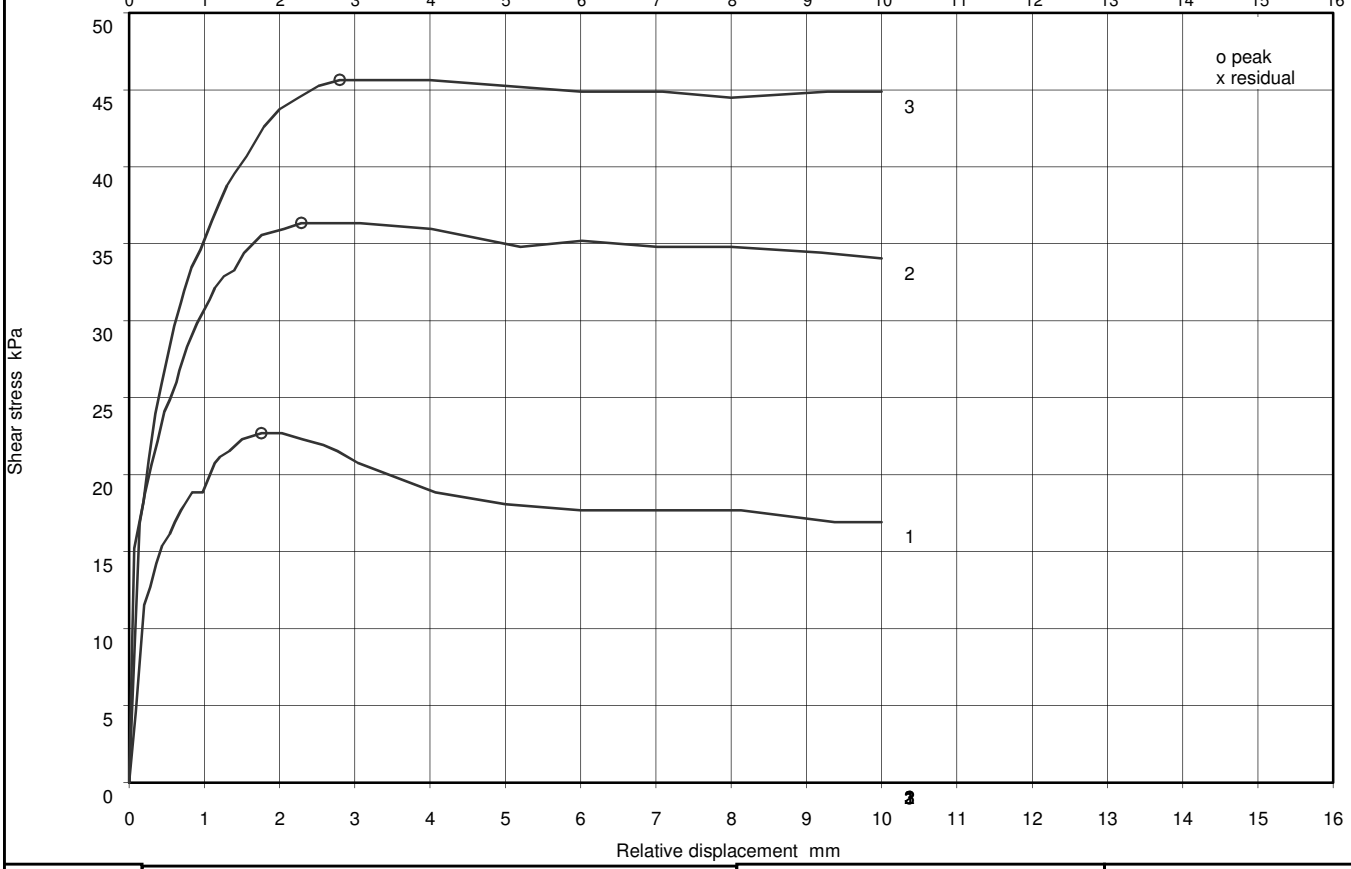
Project No	G5519-15	Sample Details:	Hole No.	WS103B		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	2.50		
			Sample No	3	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:03	**SSB19** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	WS107		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	2.50		
			Sample No	6	Type	D
			ID			
			Spec Ref			

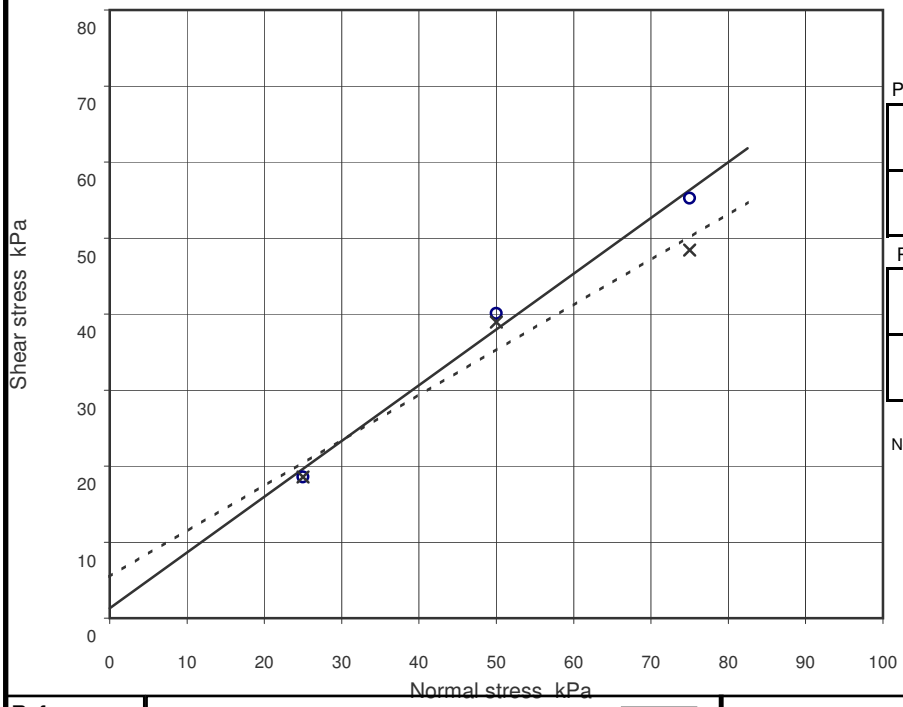
Soil Description	Greyish brown slightly sandy gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	2.01	2.01	2.01			
	Water Content	%	16.3	16.1	16.0			
	Dry density	Mg/m^3	1.73	1.73	1.73			
	Voids ratio		0.533	0.531	0.529			
	Degree of Saturation	%	81	80	80			
Consol^n	Consolidation / Normal Stress applied	kPa	**25**	**50**	**75**			
	Change in height during consolidation	mm	-0.366	-0.682	-1.166			
	Voids ratio after consolidation		0.511	0.489	0.458			
Shear see note 1	Voids ratio at end of test		0.461	0.413	0.406			
	Moisture content at end of test	%	17.4	15.6	15.3			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.026	0.026	0.026			
	Residual	mm/min	0.066	0.066	0.066			
Peak values, (o)	Relative displacement	mm	9.02	10.00	6.18			
	Shear stress	kPa	18.6	40.1	55.3			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	10.00	30.00	20.00			
	Shear stress	kPa	18.6	39.0	48.4			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	1.3	-
Ø '	degrees	36½	-

Residual strength, (x)			
c'_R	kPa	5.5	-
$Ø'_R$	degrees	31	-

Notes :

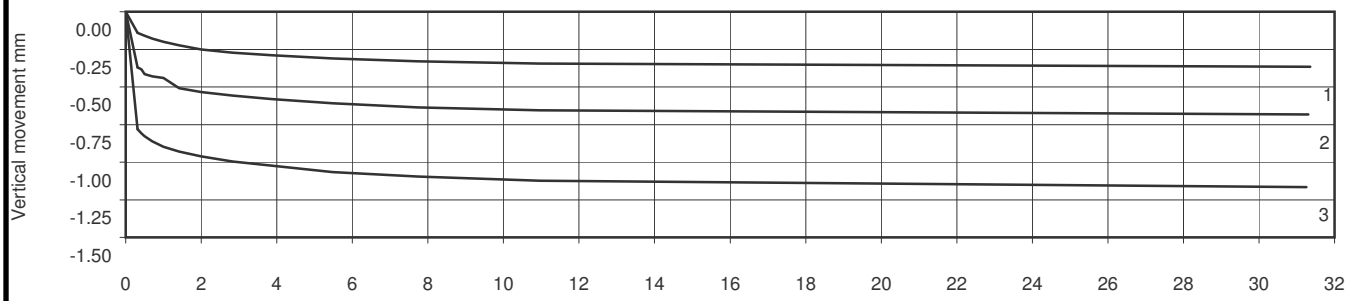
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:23/03/2016 10:16	**SSB20** sheet 1 of 2

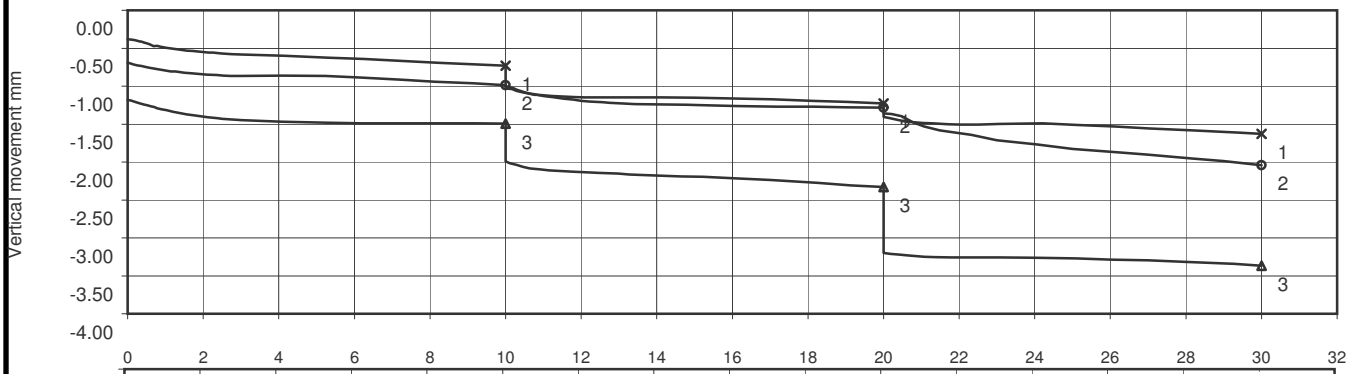
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

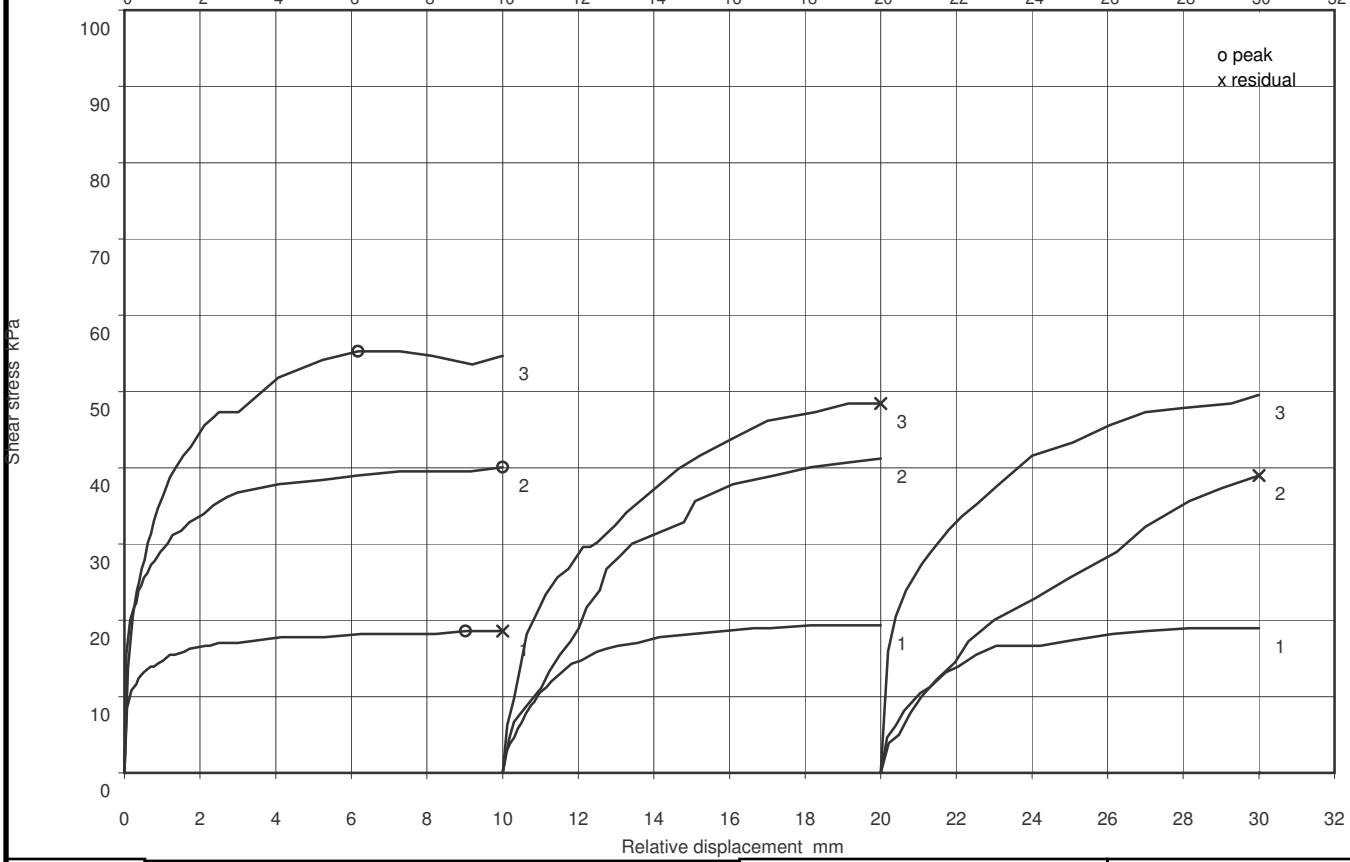
Project No	G5519-15	Sample Details:	Hole No.	WS107		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	2.50		
			Sample No	6	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:23/03/2016 10:16	**SSB20** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	WS107		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	5.00		
			Sample No	12	Type	D
			ID			
			Spec Ref			

Soil Description	Orangish brown slightly gravelly silty SAND.
Specimen Type /Preparation	-2mm material. Recompacted to a dense state at as received moisture content.

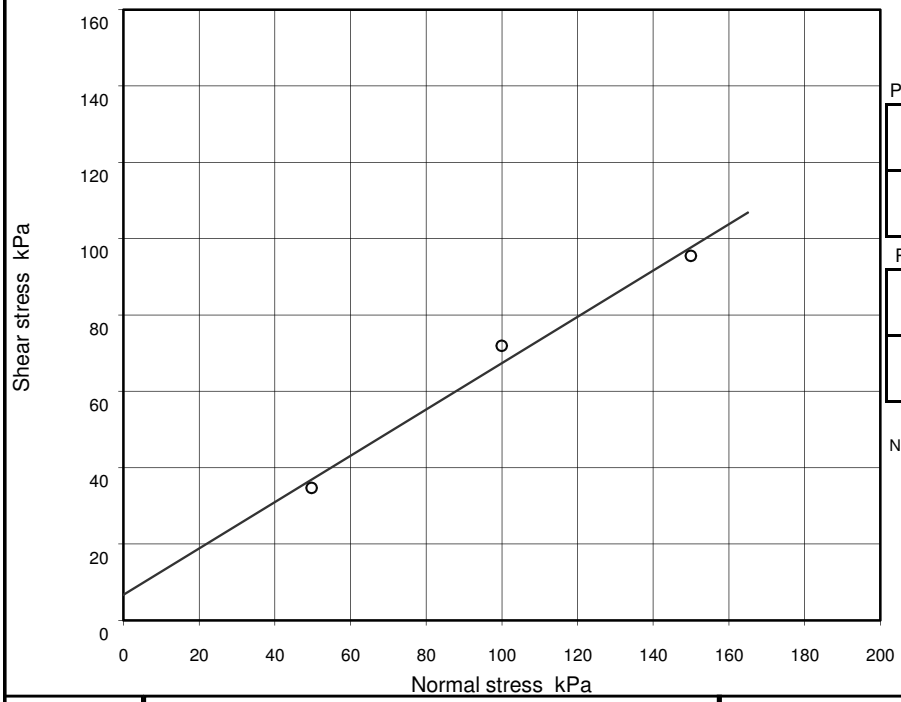
Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details

		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.72	1.72	1.72			
	Water Content	%	11.1	10.9	10.6			
	Dry density	Mg/m^3	1.55	1.55	1.56			
	Voids ratio		0.708	0.704	0.701			
	Degree of Saturation	%	42	41	40			
Consol^n	Consolidation / Normal Stress applied	kPa	**50**	**100**	**150**			
	Change in height during consolidation	mm	-0.590	-1.808	-1.808			
	Voids ratio after consolidation		0.668	0.581	0.578			
Shear see note 1	Voids ratio at end of test		0.610	0.508	0.515			
	Moisture content at end of test	%	18.0	17.4	16.9			
	Saturation at end of test	%	78	91	87			

Shearing stage

Rate of displacement	Peak	mm/min	0.600	0.600	0.600			
	Residual	mm/min						
Peak values, (o)	Relative displacement	mm	10.00	10.00	9.00			
	Shear stress	kPa	34.6	71.9	95.5			
Residual values, (x)	No. of reversals							
	Relative displacement	mm						
	Shear stress	kPa						



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	6.7	-
Ø '	degrees	31½	-
Residual strength, (x)			
c'_R	kPa	-	-
$Ø'_R$	degrees	-	-

Notes :

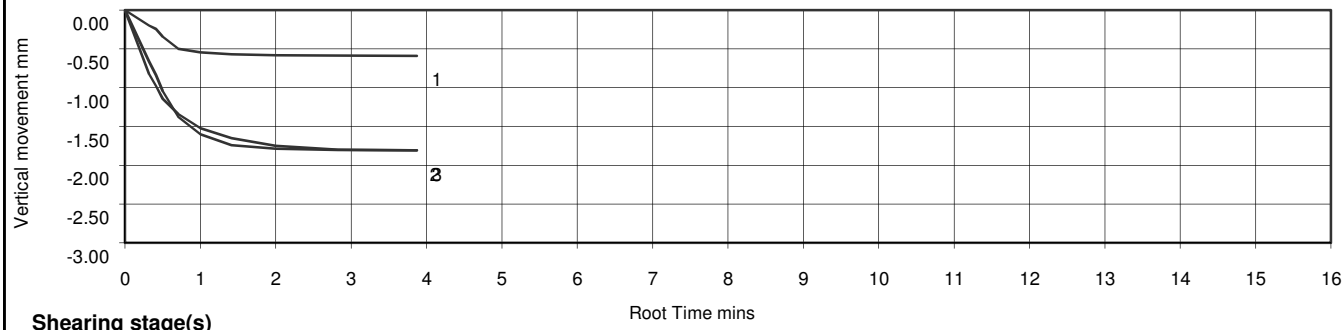
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:04	**SSB21** sheet 1 of 2

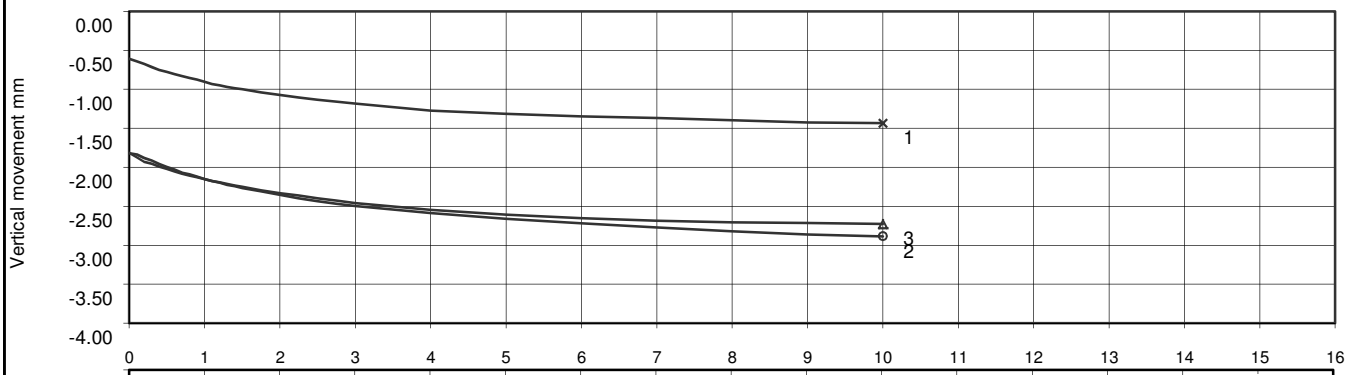
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

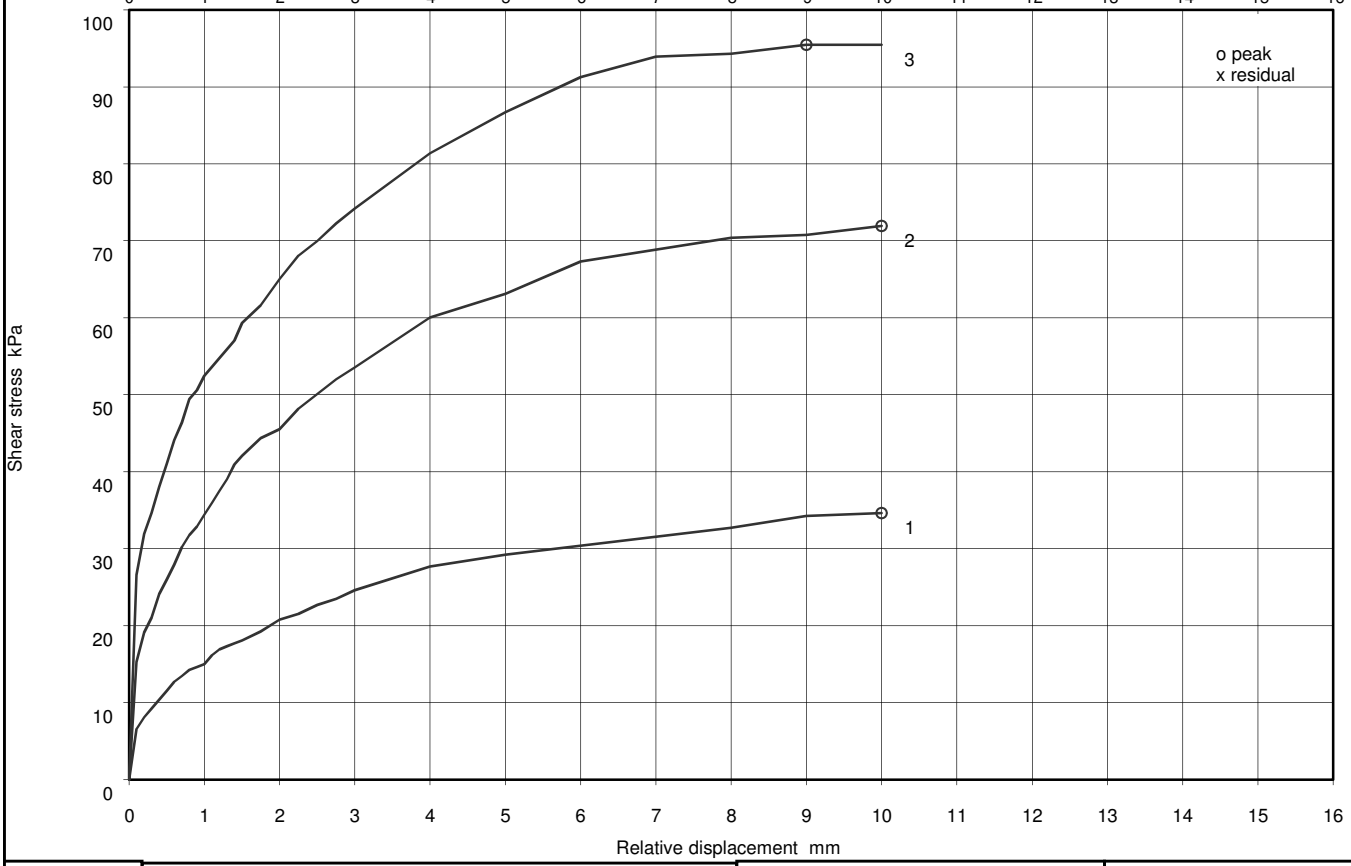
Project No	G5519-15	Sample Details:	Hole No.	WS107		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	5.00		
			Sample No	12	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:04	**SSB21** sheet 2 of 2

Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

Project No	G5519-15	Sample Details:	Hole No.	WS110		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	4.00		
			Sample No	6	Type	D
			ID			
			Spec Ref			

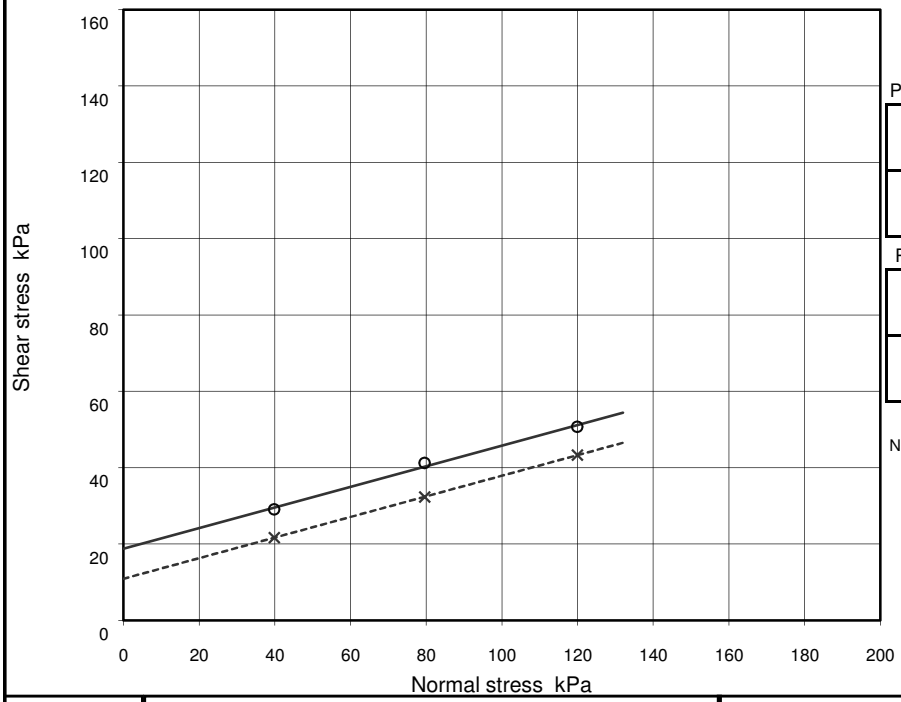
Soil Description	Brownish grey slightly sandy slightly gravelly CLAY.
Specimen Type /Preparation	-2mm material. Recompacted to a stiff state at as received moisture content.

Specimen(s) nominally 60mm x 60mm square
Test(s) carried out in submerged condition
Particle density, assumed 2.65 Mg/m^3

Specimen Details		No.	1	2	3	4	5	6
Initial	Height	mm	25.0	25.0	25.0			
	Bulk Density	Mg/m^3	1.91	1.91	1.91			
	Water Content	%	26.9	27.4	26.7			
	Dry density	Mg/m^3	1.50	1.50	1.50			
	Voids ratio		0.765	0.772	0.762			
	Degree of Saturation	%	93	94	93			
Consol^n	Consolidation / Normal Stress applied	kPa	**40**	**80**	**120**			
	Change in height during consolidation	mm	-0.294	-0.658	-0.750			
	Voids ratio after consolidation		0.744	0.725	0.709			
Shear see note 1	Voids ratio at end of test		0.716	0.694	0.665			
	Moisture content at end of test	%	27.0	26.2	25.1			
	Saturation at end of test	%	100	100	100			

Shearing stage

Rate of displacement	Peak	mm/min	0.038	0.038	0.038			
	Residual	mm/min	0.094	0.094	0.094			
Peak values, (o)	Relative displacement	mm	3.50	2.36	4.00			
	Shear stress	kPa	29.0	41.2	50.7			
Residual values, (x)	No. of reversals		2	2	2			
	Relative displacement	mm	30.00	19.01	18.00			
	Shear stress	kPa	21.7	32.3	43.3			



Shear Strength Parameters

Peak strength, (o)		Regression	Manual
c '	kPa	19	-
Ø '	degrees	15	-
Residual strength, (x)			
c'_R	kPa	11	-
$Ø'_R$	degrees	15	-

Notes :

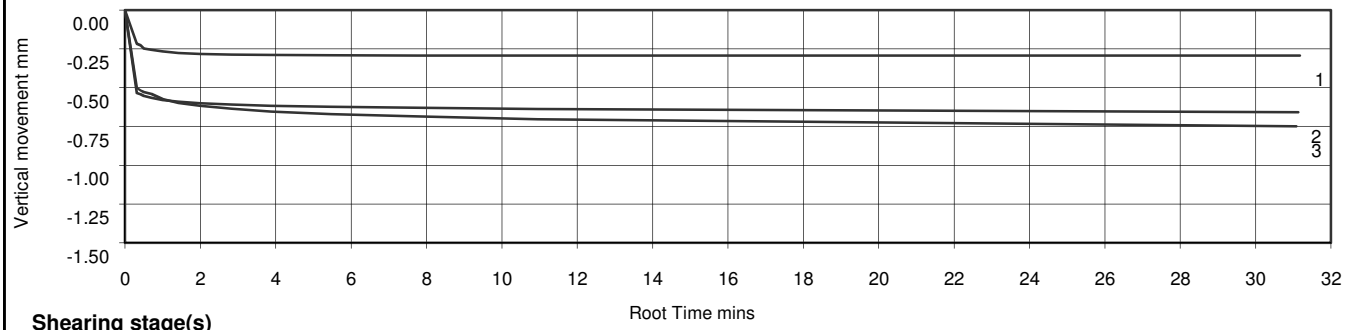
1 After shear values based on BS1377. Pt 7 cl. 4.6.1.6 using δH calculated from consolidation and shear stages

Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:04	**SSB22** sheet 1 of 2

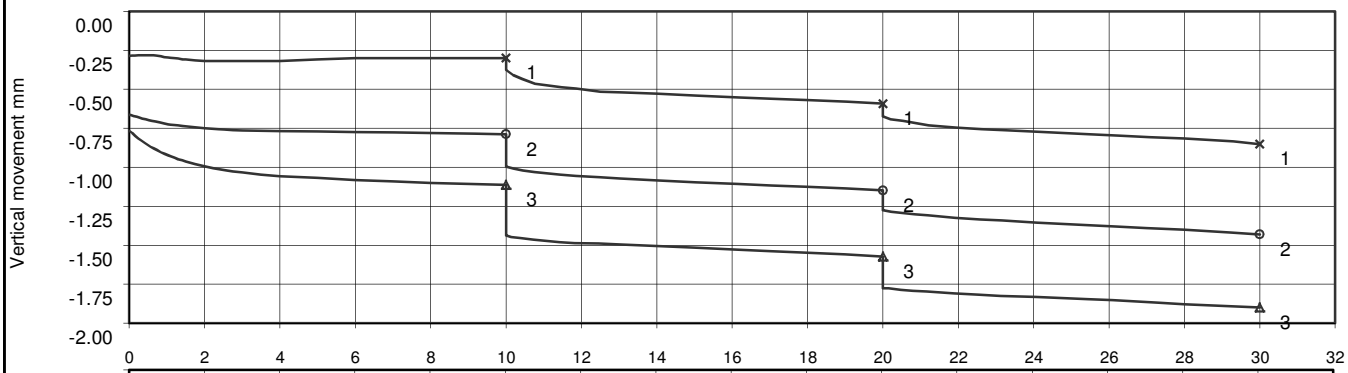
Determination of shear strength by direct shear (Small shearbox apparatus)
(BS1377 : Part 7 : clause 4 : 1990)

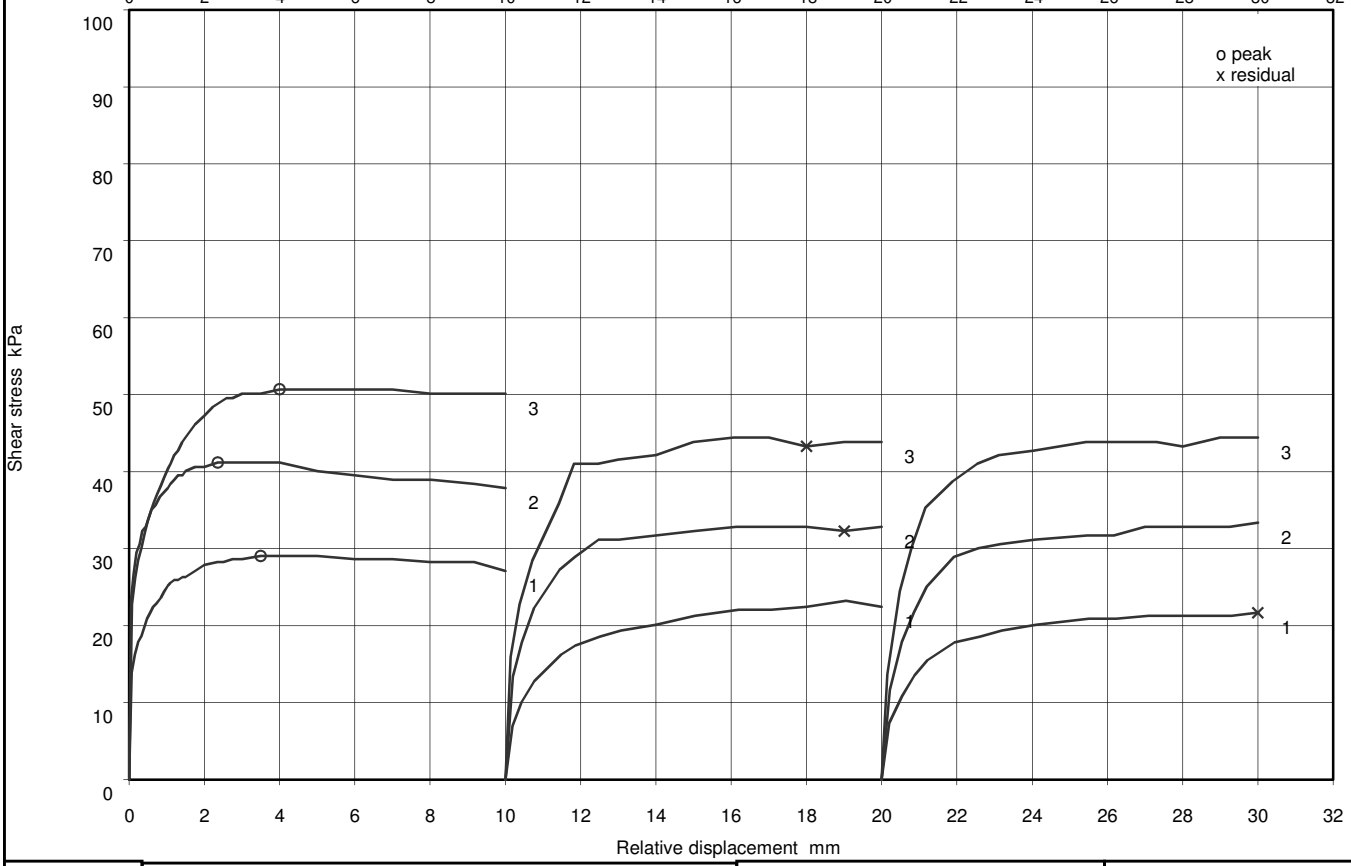
Project No	G5519-15	Sample Details:	Hole No.	WS110		
Project Name	Bridle Close & Fontmell Close, St Albans		Depth (m BGL)	4.00		
			Sample No	6	Type	D
			ID			
			Spec Ref			

Consolidation stage(s)



Shearing stage(s)





Ref			Figure
SLR7.4 Rev 85 Oct 10	ESG	Printed:15/03/2016 14:04	**SSB22** sheet 2 of 2

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TESTS WITHOUT MEASUREMENT OF PORE PRESSURE - SUMMARY OF RESULTS

Project No	Project Name
G5519-15	Bridle Close & Fontmell Close, St Albans

Hole No.	Sample No.	Depth (m) from	Depth (m) to	type	Soil Description	Density bulk (Mg/m³)	Density dry (Mg/m³)	*w* %	Test type	Dia. mm	σ_3 kPa	At failure / end of stage: Axial strain %	$\sigma_1 - \sigma_3$ kPa	c_u kPa	MOD	Remarks
BH104	7	3.50	3.95	U	Very stiff orangish brown mottled grey slightly sandy slightly gravelly CLAY.	2.03	1.65	23	UUM	105.9 105.9 105.9	35 70 140	7.4 8.9 18.3	254 268 307	127 134 153	E P	
BH104	10	5.50	5.95	U	Stiff to very stiff orangish brown mottled grey slightly gravelly CLAY.	2.05	1.69	21	UUM	105.0 105.0 105.0	55 110 220	3.0 4.5 16.3	139 148 187	70 74 93	B	
BH104	14	8.50	8.95	U	Stiff to very stiff orangish brown slightly sandy CLAY.	2.08	1.73	20	UUM	104.5 104.5 104.5	85 170 340	5.0 8.4 17.8	295 342 407	148 171 204	C	
BH104	17	11.50	11.95	U	Very stiff orangish brown slightly sandy gravelly CLAY.	1.99	1.79	11	UUM	105.5 105.5 105.5	115 230 460	4.4 9.4 18.7	150 220 278	75 110 139	P	
BH105	22	12.00	12.45	U	Stiff to very stiff brown slightly sandy slightly gravelly CLAY.	2.27	2.07	9.6	UUM	104.7 104.7	120 240	16.7 19.7	258 279	129 139	P	Ran to 20% on stage 2.
BH106	15	7.00	7.45	U	Firm to stiff brown mottled grey slightly sandy slightly gravelly CLAY.	1.98	1.62	23	UUM	105.3 105.3 105.3	70 140 280	8.9 13.4 16.8	228 250 268	114 125 134	C	

General notes: Tests carried out in accordance with BS1377: Part 7: 1990, clause 8 for single stage, clause 9 for multistage tests. Specimens nominally 2:1 height diameter ratio and tested at a rate of strain of 2%/minute, unless annotated otherwise. See individual test reports for further details.

Legend						
	UU - single stage test (may be in sets of specimens)	σ_3	cell pressure	Mode of failure	P	plastic
	UUM - multistage test on a single specimen	$\sigma_1 - \sigma_3$	deviator stress		B	brittle
	suffix R - remoulded or recompacted	c_u	undrained shear strength		C	compound

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Porosity / Density by Saturation and Bouyancy - ISRM :1981, Page 84

Project		Bridle Close & Fontmell Close, St Albans		Project No.	G5519-15
Hole No	CH103	Sample No C1	Specimen Ref 0	Depth (m)	0.00-0.30

Description

CONCRETE CONGLOMERATE

Porosity (n)	10.3 %
Dry density	2.28 Mg/m^3

Bulk volume was was obtained by a bouyancy technique and pore volume was obtained by water saturation

	Approved Signatories
	R Barnes - Manager
	K Lomax - Principal Technician
✓	C Marshall - Senior Technician

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Porosity / Density by Saturation and Bouyancy - ISRM :1981, Page 84

Project		Bridle Close & Fontmell Close, St Albans		Project No.	G5519-15
Hole No	CH103A	Sample No C1	Specimen Ref 0	Depth (m)	0.00-0.32

Description

CONCRETE CONGLOMERATE

Porosity (n)	12.1 %
Dry density	2.26 Mg/m^3

Bulk volume was was obtained by a bouyancy technique and pore volume was obtained by water saturation

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	K Lomax - Principal Technician
✓	C Marshall - Senior Technician

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Porosity / Density by Saturation and Bouyancy - ISRM :1981, Page 84

Project	Bridle Close & Fontmell Close, St Albans		Project No.	G5519-15
Hole No CH103B	Sample No C1	Specimen Ref 0	Depth (m)	0.00-0.36

Description

CONCRETE CONGLOMERATE

Porosity (n)	12.3 %
Dry density	2.24 Mg/m^3

Bulk volume was was obtained by a bouyancy technique and pore volume was obtained by water saturation

	Approved Signatories
	R Barnes - Manager
	K Lomax - Principal Technician
✓	C Marshall - Senior Technician

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UKAS TESTING 0001

TEST REPORT

COMPRESSIVE STRENGTH OF A CONCRETE CORE
BS EN 12504-1:2009

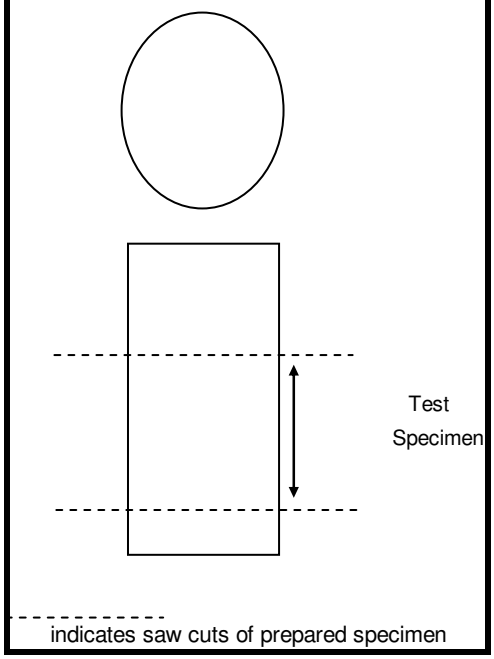
Client: ESG
Client Address: Askern Road Carcroft DN6 8DG
Site: G5519 Fontmell Close

Report No. 51021721/16/01
Report Date: 09/03/2016
Date Cast: Not Known
Date Cored: Not Known
Date Received: 23/02/16
Job No. DAM0059072

Sample Details

Laboratory Reference:	45271686
Client Reference:	1
Location:	CH103
Mix Details:	Not Known
Aggregate Details:	Gravel/Brick 5-40mm Sub Rounded Fair Distribution
Condition on Receipt:	Satisfactory
Excess Voidage (%)	1.0
Average Diameter (mm)	100
Max. & Min. Lengths as received (mm)	230 & 228
Max./Min. lengths trimmed from top & base (mm)	100, 100 & 30, 28
Visual Inspection	Satisfactory
Length/Diameter Ratio as Received	2.29
Hours stored in water before capping @ 20 ± 2^{0}C	72
Hours stored in water after capping @ 20 ± 2^{0}C	303.0
Date of Test	07/03/16
Age at Test (days)	Not Known
Saturated Density inc. steel where shown (kg/m³)	2230
Density determined by water displacement.	
Appearance of Concrete	Normal
Surface Moisture at Test	Saturated
Type of Fracture	Normal
Length/Diameter Ratio at test	1.00
Core Compressive Strength (N/mm²)	**22.1**
Corrected In-situ Cube Strength (N/mm²)	**22.1**
Rig Operator:	Client
Drilling Angle (assumed):	Vertical
Preparation method by Sawing/Grinding.	

Core Details - as received
Reinforcement Bar(s) Diameter (mm)
No Reinforcement bars in sample
Distance from Top (mm)
Not Applicable
Core Details - as tested
Reinforcement Bar(s) Diameter (mm)
No Reinforcement bars in test core
Distance from Nearest End (mm)
Not Applicable



Copies of report issued to:-
1. Client

Certified that core examination and testing was carried out in accordance with BS EN 12504-1:2009

Signed:_____

[ ] D. Berrill - Laboratory Manager
[✓] S. Hudspeth - Section Manager
[ ] J. Keegan - Section Manager

For and on behalf of Environmental Scientifics Group Limited

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UKAS TESTING 0001

TEST REPORT

COMPRESSIVE STRENGTH OF A CONCRETE CORE
BS EN 12504-1:2009

Client: ESG
Client Address: Askern Road Carcroft DN6 8DG
Site: G5519 Fontmell Close

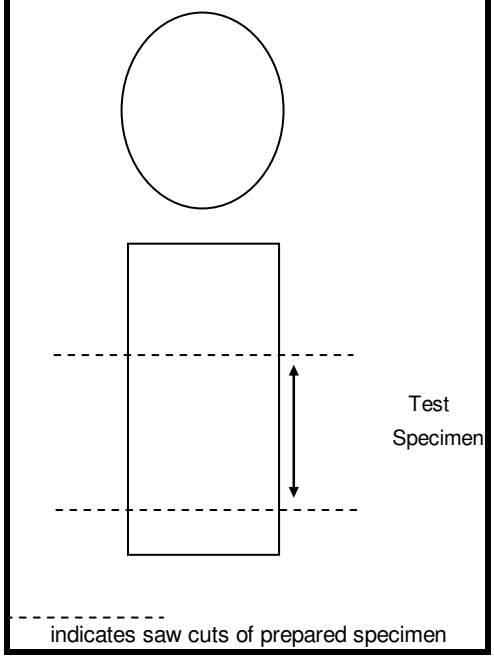
Report No. 51021721/16/02
Report Date: 09/03/2016
Date Cast: Not Known
Date Cored: Not Known
Date Received: 23/02/16
Job No. DAM0059072

Sample Details

Laboratory Reference:	45271687
Client Reference:	2
Location:	CH103A
Mix Details:	Not Known
Aggregate Details:	Gravel/Brick 5-40mm Sub Rounded Fair Distribution
Condition on Receipt:	Satisfactory
Excess Voidage (%)	1.5
Average Diameter (mm)	100
Max. & Min. Lengths as received (mm)	190 & 188
Max./Min. lengths trimmed from top & base (mm)	50, 50 & 40, 38
Visual Inspection	Satisfactory
Length/Diameter Ratio as Received	1.89
Hours stored in water before capping @ 20 ± 2^{0}C	72
Hours stored in water after capping @ 20 ± 2^{0}C	231.0
Date of Test	07/03/16
Age at Test (days)	Not Known
Saturated Density inc. steel where shown (kg/m³)	2290
Density determined by water displacement.	
Appearance of Concrete	Normal
Surface Moisture at Test	Saturated
Type of Fracture	Normal
Length/Diameter Ratio at test	1.00
Core Compressive Strength (N/mm²)	**17.7**
Corrected In-situ Cube Strength (N/mm²)	**17.7**
Rig Operator:	Client
Drilling Angle (assumed):	Vertical

Preparation method by Sawing/Grinding.

Core Details - as received
Reinforcement Bar(s) Diameter (mm)
No Reinforcement bars in sample
Distance from Top (mm)
Not Applicable
Core Details - as tested
Reinforcement Bar(s) Diameter (mm)
No Reinforcement bars in test core
Distance from Nearest End (mm)
Not Applicable



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[✓] S. Hudspeth - Section Manager
[ ] J. Keegan - Section Manager

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UKAS TESTING 0001

TEST REPORT

COMPRESSIVE STRENGTH OF A CONCRETE CORE
BS EN 12504-1:2009

Client: ESG
Client Address: Askern Road Carcroft DN6 8DG
Site: G5519 Fontmell Close

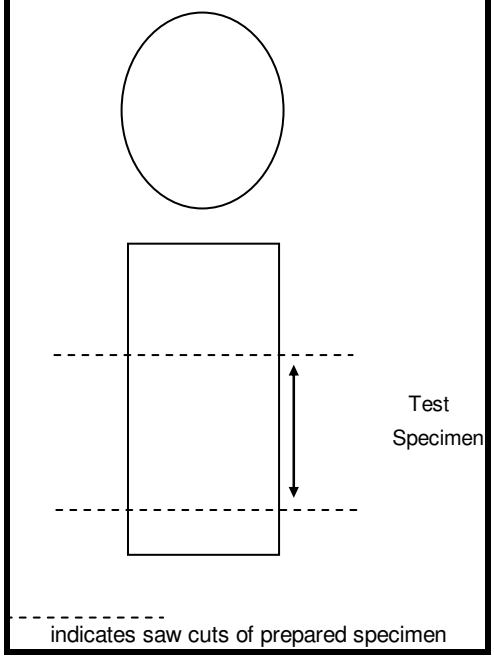
Report No. 51021721/16/03
Report Date: 09/03/2016
Date Cast: Not Known
Date Cored: Not Known
Date Received: 23/02/16
Job No. DAM0059072

Sample Details

Laboratory Reference:	45271688
Client Reference:	3
Location:	CH103B
Mix Details:	Not Known
Aggregate Details:	Gravel/Brick 5-40mm Sub Rounded Fair Distribution
Condition on Receipt:	Satisfactory
Excess Voidage (%)	1.0
Average Diameter (mm)	100
Max. & Min. Lengths as received (mm)	200 & 198
Max./Min. lengths trimmed from top & base (mm)	50, 50 & 50, 48
Visual Inspection	Satisfactory
Length/Diameter Ratio as Received	1.99
Hours stored in water before capping @ 20 ± 2^{0}C	72
Hours stored in water after capping @ 20 ± 2^{0}C	231.0
Date of Test	07/03/16
Age at Test (days)	Not Known
Saturated Density inc. steel where shown (kg/m³)	2250
Density determined by water displacement.	
Appearance of Concrete	Normal
Surface Moisture at Test	Saturated
Type of Fracture	Normal
Length/Diameter Ratio at test	1.00
Core Compressive Strength (N/mm²)	**31.2**
Corrected In-situ Cube Strength (N/mm²)	**31.2**
Rig Operator:	Client
Drilling Angle (assumed):	Vertical

Preparation method by Sawing/Grinding.

Core Details - as received
Reinforcement Bar(s) Diameter (mm)
No Reinforcement bars in sample
Distance from Top (mm)
Not Applicable
Core Details - as tested
Reinforcement Bar(s) Diameter (mm)
No Reinforcement bars in test core
Distance from Nearest End (mm)
Not Applicable



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