CC GEOTECHNICAL LIMITED

Consulting Geotechnical and Geoenvironmental Engineers

Site	**Cottam Parkway Station**	**Trial Pit Number**	**TP03**
Job Number:	**CCG-C-21-12093**	**Plate Number**	**3**

Site	**Cottam Parkway Station**
Job Number:	**CCG-C-21-12093**
Trial Pit Number:	**TP03**
Plate Number	**4**

Site	**Cottam Parkway Station**
Job Number:	**CCG-C-21-12093**
Trial Pit Number:	**TP04**
Plate Number	**1**

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Site	**Cottam Parkway Station**	**Trial Pit Number**	**TP04**
Job Number:	**CCG-C-21-12093**	**Plate Number**	**2**

Site	**Cottam Parkway Station**
Job Number:	**CCG-C-21-12093**
Trial Pit Number:	**TP04**
Plate Number	**3**

Site	**Cottam Parkway Station**
Job Number:	**CCG-C-21-12093**
Trial Pit Number:	**TP05**
Plate Number	**1**

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Site	**Cottam Parkway Station**	**Trial Pit Number**	**TP05**
Job Number:	**CCG-C-21-12093**	**Plate Number**	**2**

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Site	**Cottam Parkway Station**	**Trial Pit Number**	**TP05**
Job Number:	**CCG-C-21-12093**	**Plate Number**	**3**

Site	**Cottam Parkway Station**
Job Number:	**CCG-C-21-12093**
Trial Pit Number:	**TP05**
Plate Number	**4**

Site	**Cottam Parkway Station**
Job Number:	**CCG-C-21-12093**
Trial Pit Number:	**TP06**
Plate Number	**1**

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Consulting Geotechnical and Geoenvironmental Engineers

Site	**Cottam Parkway Station**	**Trial Pit Number**	**TP06**
Job Number:	**CCG-C-21-12093**	**Plate Number**	**2**

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Consulting Geotechnical and Geoenvironmental Engineers

Site	**Cottam Parkway Station**	**Trial Pit Number**	**TP06**
Job Number:	**CCG-C-21-12093**	**Plate Number**	**3**

Site	**Cottam Parkway Station**
Job Number:	**CCG-C-21-12093**
Trial Pit Number:	**TP06**
Plate Number	**4**

APPENDIX F

SOIL ENGINEERING LAB REPORT

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Liverpool
L33 7BU

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Email: enquiries@ccgeotechnical.com
www.ccgeotechnical.com

CC GEOTECHNICAL LTD
Consulting Geoenvironmental and Geotechnical Engineers

LABORATORY REPORT

CONTRACT NUMBER: CCG-C-21-12093

CONTRACT TITLE: COTTAM PARKWAY STATION

CLIENT: LANCASHIRE COUNTY COUNCIL

DATE RECEIVED: 15/03/21
DATE COMMENCED: 15/03/21
DATE COMPLETED: 03/05/21
REPORT DATE: 06/05/21

Test Description	Qty
Determination of Moisture Content BS 1377-2:1990 (a)	103
Determination of Liquid & Plastic Limits BS 1377-2:1990 (a)	63
Particle Size Distribution BS 1377-2:1990 (a)	19
Unconsolidated Undrained Triaxial Compression Test BS 1377-7:1990 (a)	3
Unconsolidated Undrained Triaxial Compression Test (multi-stage) BS 1377-7:1990 (a)	10
One-dimensional Consolidation Test BS 1377-5:1990 (a)	11
Sedimentation by Hydrometer BS 1377-2:1990 (#)	16

Notes: Observations and interpretations are not accredited by UKAS
All testing undertaken at laboratory permanent facilities
# denotes non-accredited test
a denotes UKAS accredited test
s denotes test undertaken by approved subcontractor
Test results only relate to the samples tested

This report is issued in accordance with the requirements of the United kingdom Accreditation Services and EN ISO/IEC 17025:2017. The results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without the prior written approval of the laboratory.
Approved Signatories: Chris Bolan (Managing Director) – Daniel Kerfoot (Laboratory Manager)

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Shear Strength (kN/m²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
CP01	D	1.00	1.00	24	-	-	-	42	19	23	96	CI	Y	Dark brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded mudstone and sandstone. (BS1377Pt2:3.2,4.4,5)
CP01	UT	2.00	2.45	13	-	-	>110*	-	-	-	-	-	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to coarse subrounded mudstone and sandstone. (BS1377Pt2:3.2)
CP01	B	4.50	4.50	16	-	-	-	32	16	16	94	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded mudstone. (BS1377Pt2:3.2,4.4,5)
CP01	UT	6.00	6.45	24	2.25	1.82	64	-	-	-	-	-	Y	Brown slightly sandy slightly gravelly silty CLAY of medium undrained shear strength with frequent silt and sand laminations. Gravel is fine to medium subrounded mudstone and sandstone. (BS1377Pt2:3.2,Pt7:8)
CP01	D	7.00	7.45	21	-	-	-	40	18	22	90	CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded mudstone and sandstone. (BS1377Pt2:3.2,4.4,5)
CP01	D	8.00	8.00	25	-	-	-	45	20	25	99	CI	Y	Brown slightly sandy silty CLAY. (BS1377Pt2:3.2,4.4,5)
CP01	D	9.00	9.00	30	-	-	-	42	19	23	100	CI	Y	Brown slightly sandy silty CLAY. (BS1377Pt2:3.2,4.4,5)
CP01	B	12.00	12.00	25	-	-	-	-	-	-	-	-	Y	Brown slightly sandy clayey SILT. (BS1377Pt2:3.2,9.2,9.5)
CP01	D	13.00	13.00	27	-	-	-	-	-	-	-	-	Y	Brown sandy clayey SILT. (BS1377Pt2:3.2,9.2,9.5)
CP01	UT	14.50	14.95	16	2.21	1.91	169	-	-	-	-	-	Y	Brown slightly sandy slightly gravelly silty CLAY of very high undrained shear strength. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,Pt7:8)

SITE: COTTAM PARKWAY STATION (CCG-C-21-12093) DATE: 29.04.21

CLIENT: LANCASHIRE COUNTY COUNCIL

UKAS TESTING 4514

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample
CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic
(* Denotes Hand Shear Vane test result)
Sample description not accredited by UKAS

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Shear Strength (kN/m²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
CP01	B	16.50	16.50	25	-	-	-	-	-	-	99	NP	Y	Brown sandy clayey SILT. (BS1377Pt2:3.2,4.4,5)

SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

DATE: 27.04.21

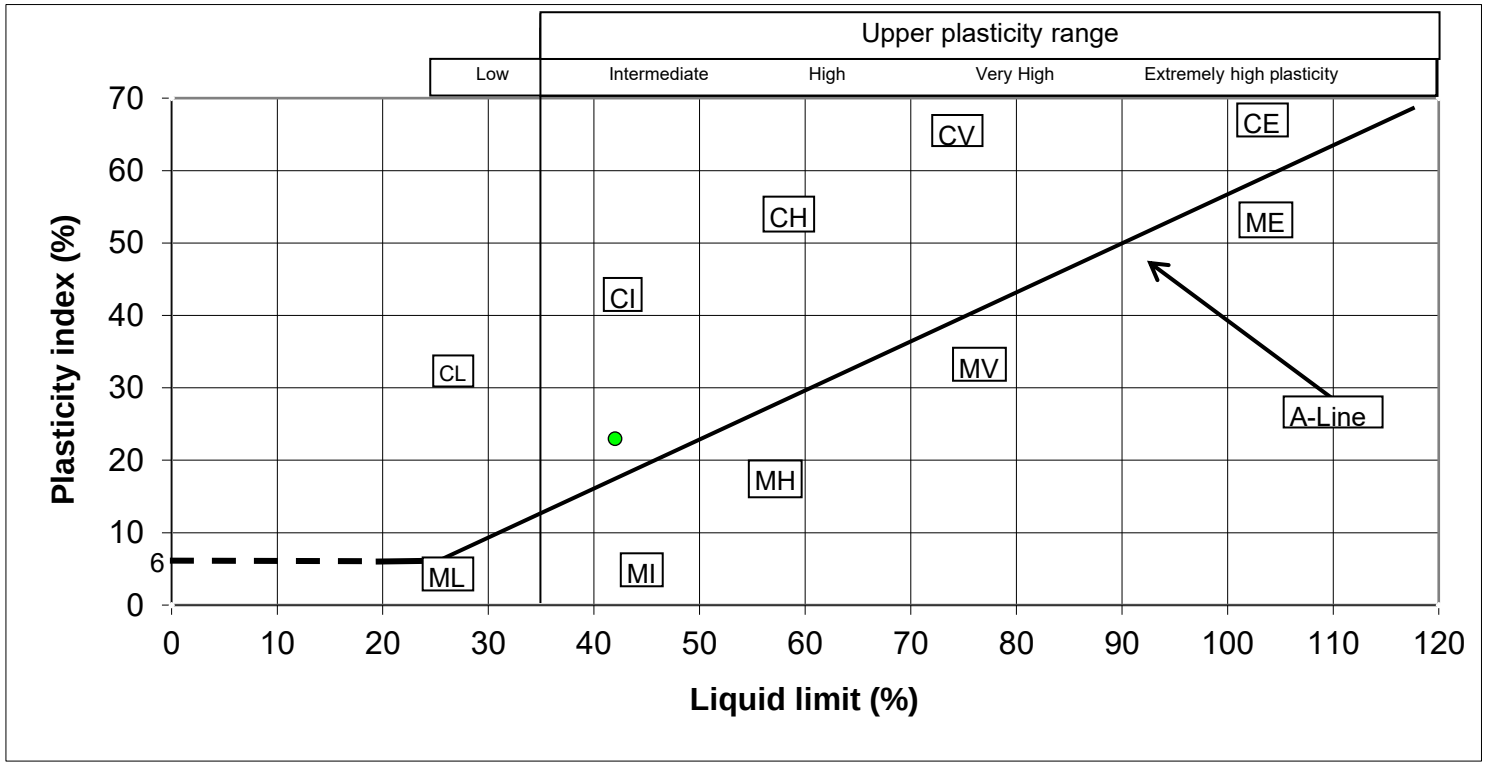
CLIENT: LANCASHIRE COUNTY COUNCIL

UKAS TESTING 4514

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample
CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic
(* Denotes Hand Shear Vane test result)
Sample description not accredited by UKAS

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP01	1.00	42.0	23.0

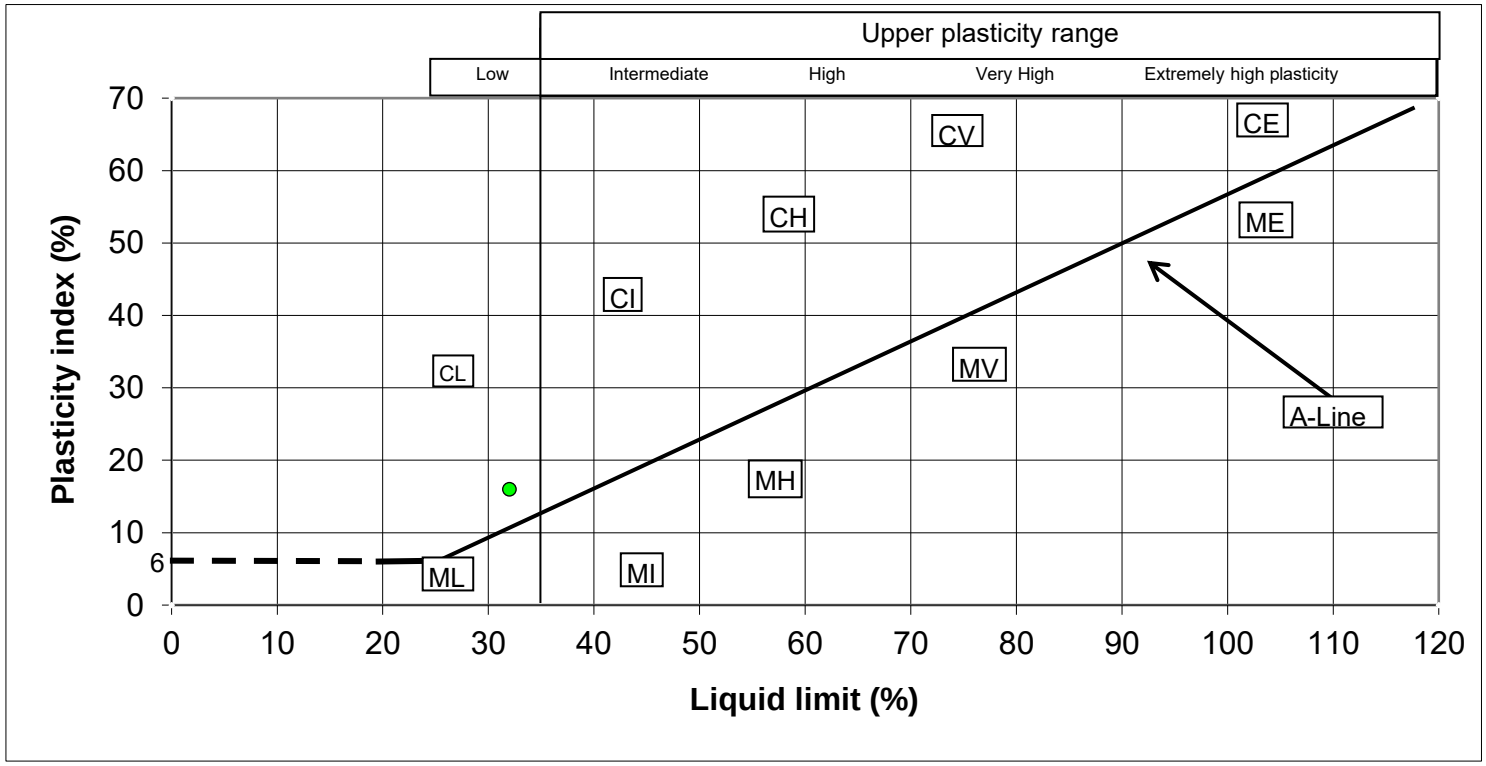
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP01	4.50	32.0	16.0

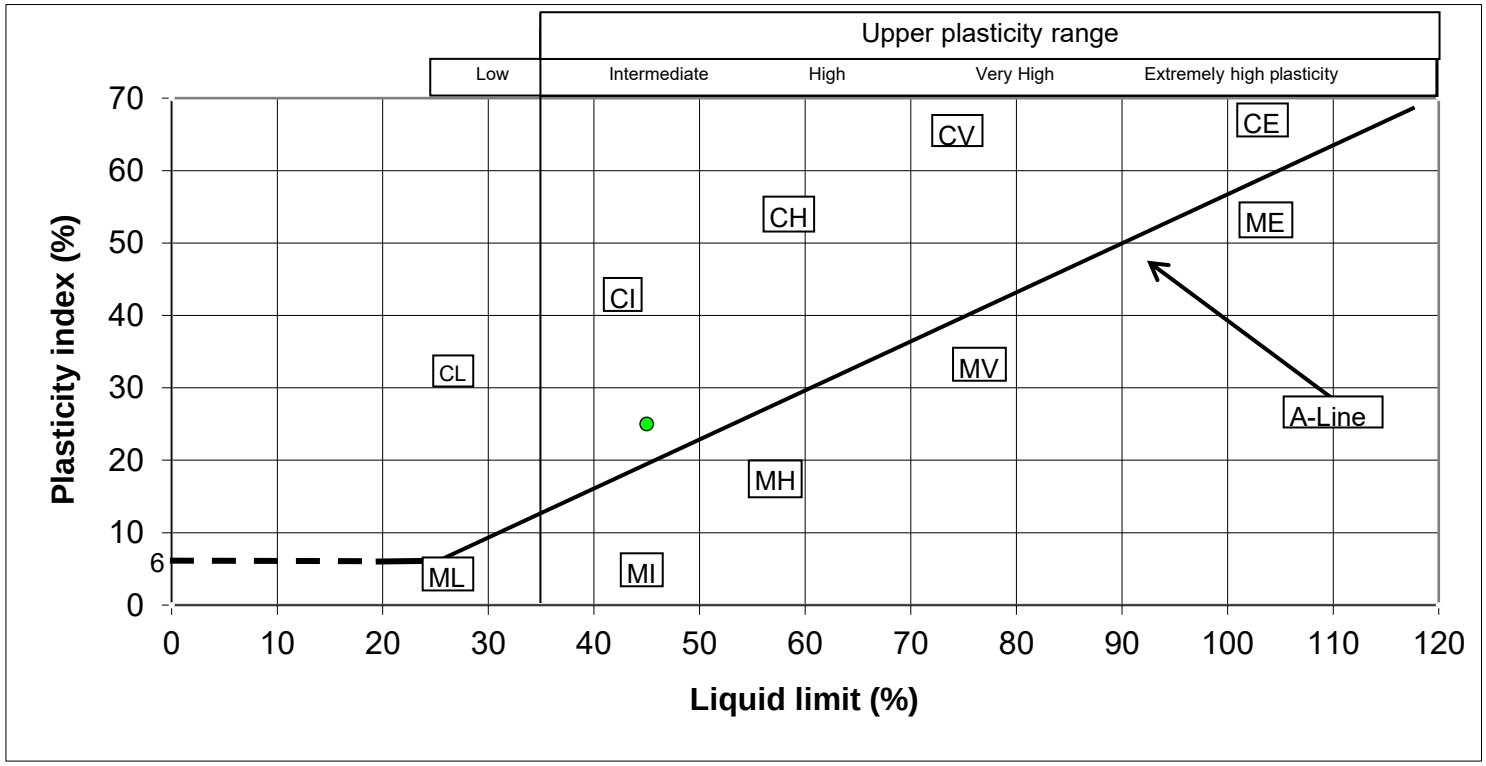
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP01	8.00	45.0	25.0

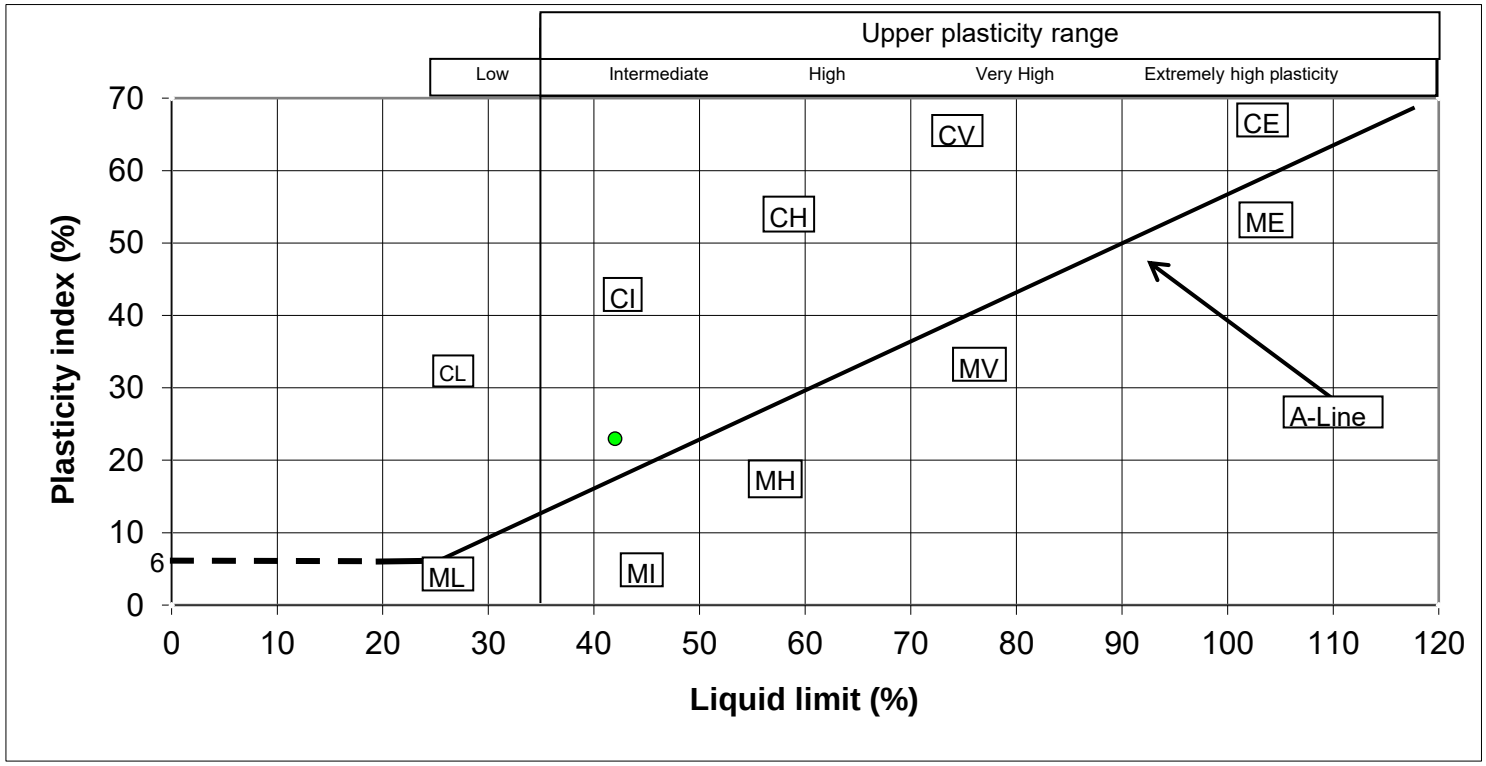
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP01	9.00	42.0	23.0

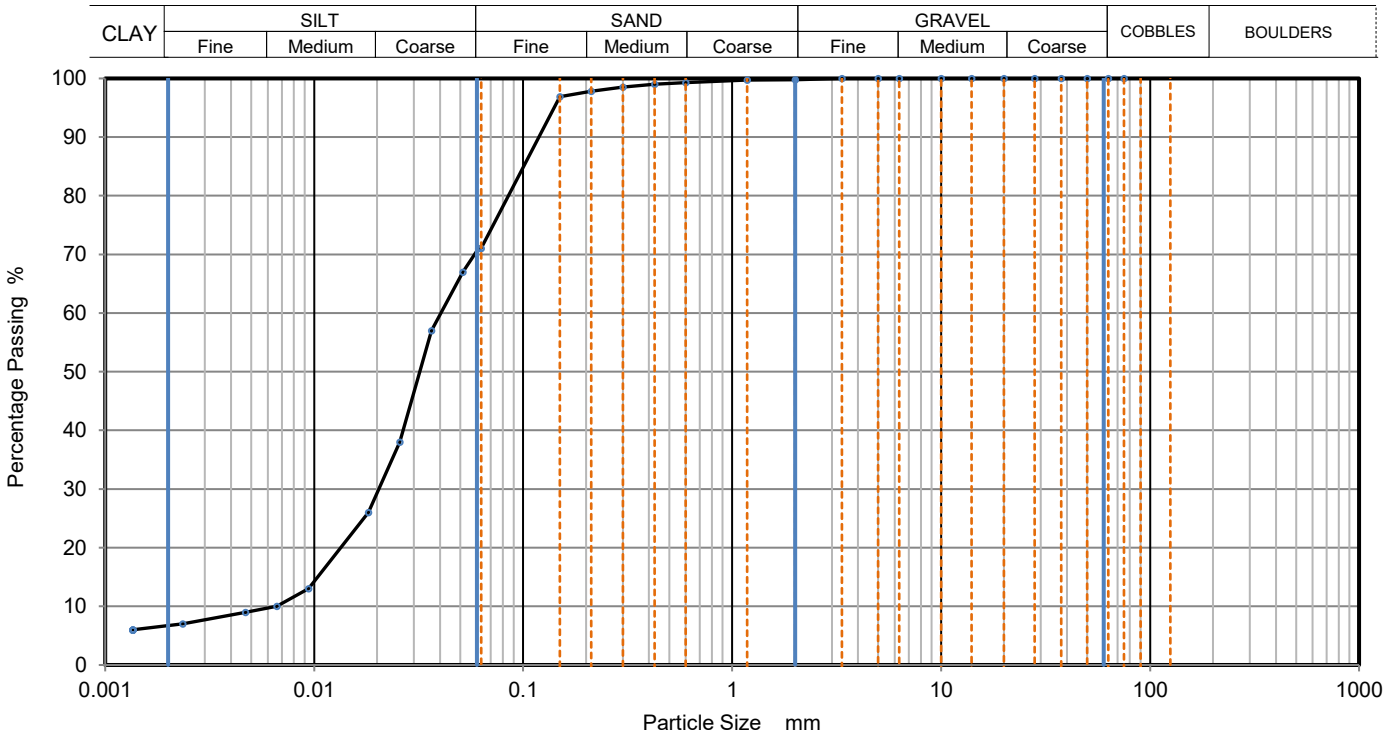
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**PARTICLE SIZE DISTRIBUTION**	Job Ref	**CCG-C-21-12093**
		Borehole/Pit No.	CP01

Site Name	COTTAM PARKWAY STATION			Sample No.	1
Specimen Description	Brown slightly sandy clayey SILT			Depth, m	12.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	CCGL202104142



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0612	71
		0.0514	67
75	100	0.0364	57
63	100	0.0257	38
50	100	0.0182	26
37.5	100	0.0094	13
28	100	0.0066	10
20	100	0.0047	9
14	100	0.0023	7
10	100	0.0014	6
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	99	2.65 Mg/m3	
0.3	99		
0.212	98		
0.15	97		
0.063	71		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	29
Silt	64
Clay	7

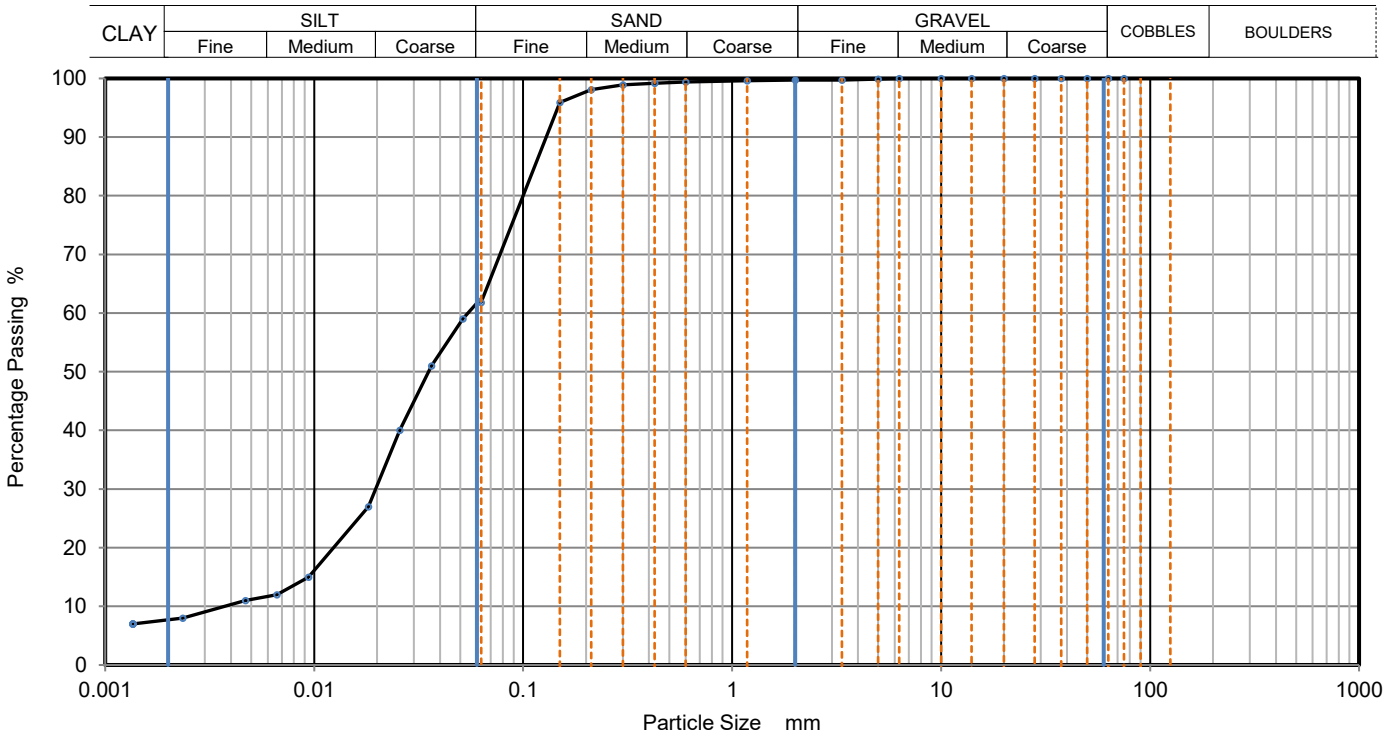
Grading Analysis		
D100	mm	
D60	mm	0.0402
D30	mm	0.0203
D10	mm	0.0066
Uniformity Coefficient		6.1
Curvature Coefficient		1.6

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig 1
JE	DK	DK	29/04/2021 08:29	Sheet

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**PARTICLE SIZE DISTRIBUTION**	Job Ref	**CCG-C-21-12093**
		Borehole/Pit No.	CP01
Site Name	COTTAM PARKWAY STATION	Sample No.	1
Specimen Description	Brown sandy clayey SILT	Depth, m	13.00
Specimen Reference	Specimen Depth: m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	KeyLAB ID	CCGL202104143



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0612	62
		0.0514	59
75	100	0.0364	51
63	100	0.0257	40
50	100	0.0182	27
37.5	100	0.0094	15
28	100	0.0066	12
20	100	0.0047	11
14	100	0.0023	8
10	100	0.0014	7
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	99	2.65 Mg/m3	
0.3	99		
0.212	98		
0.15	96		
0.063	62		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	38
Silt	54
Clay	8

Grading Analysis		
D100	mm	
D60	mm	0.0534
D30	mm	0.0198
D10	mm	0.00395
Uniformity Coefficient		14
Curvature Coefficient		1.9

Remarks

Preparation and testing in accordance with BS1377 unless noted below

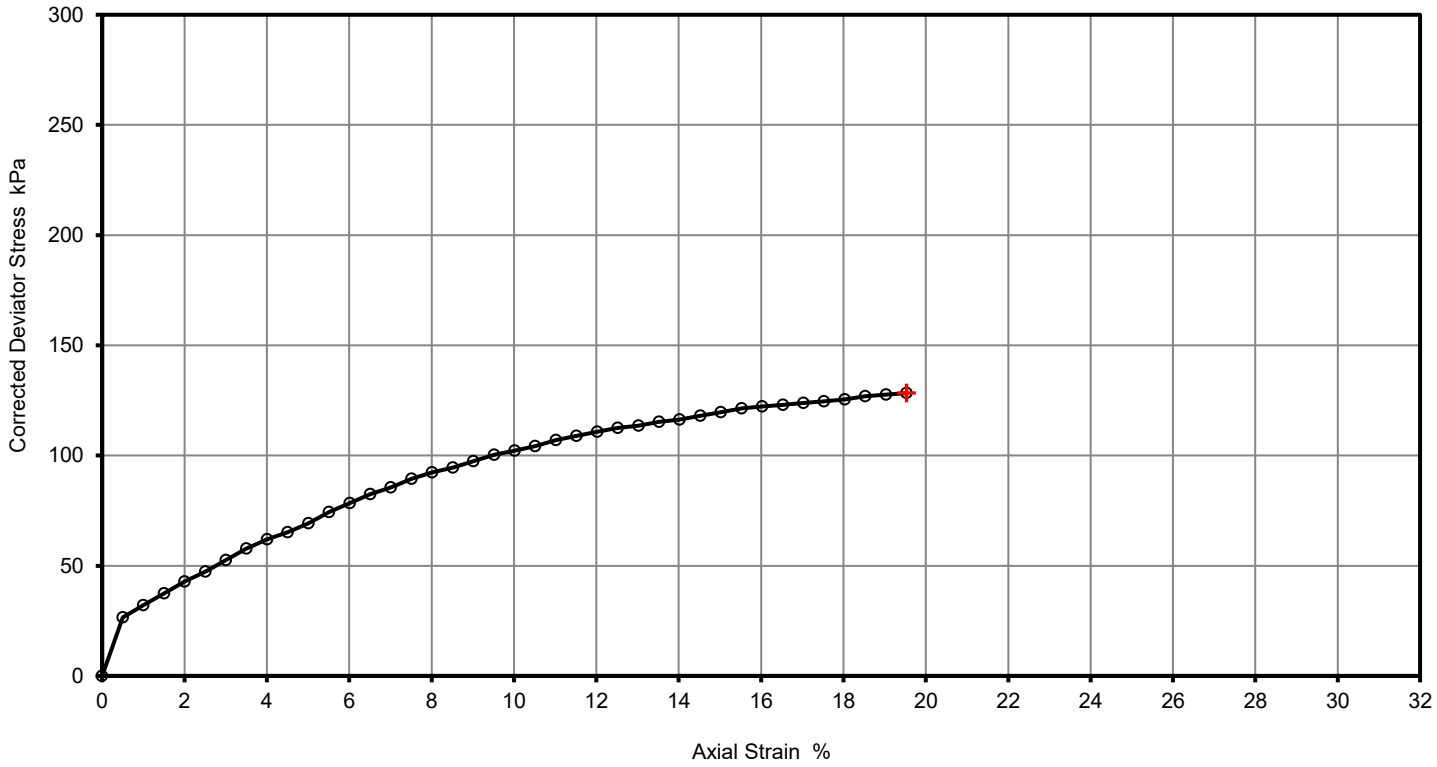
Operator	Checked	Approved	Sheet printed	**Fig** 1
JE	DK	DK	29/04/2021 08:29	Sheet

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	CCG-C-21-12093
				Borehole/Pit No.	CP01
Site Name	COTTAM PARKWAY STATION			Sample No.	1
Soil Description				Depth	6.00
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Brown slightly sandy slightly gravelly silty CLAY with frequent silt and sand laminations			Date of test	14/04/2021
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen				

UKAS TESTING 4514

Test Number		1	
Length		199.7	mm
Diameter		101.5	mm
Bulk Density		2.25	Mg/m3
Moisture Content		23.5	%
Dry Density		1.82	Mg/m3
Rate of Strain		2.0	%/min
Cell Pressure		60	kPa
At failure	Axial Strain	19.5	%
	Deviator Stress, (σ1 - σ3)f	128	kPa
	Undrained Shear Strength, cu	64	kPa ½(σ1 - σ3)f
	Mode of Failure	Plastic	

Deviator Stress v Axial Strain



Remarks

Test scheduled for multi-stage test but sample failed at cell pressure stage one

Approved: DanielKerfoot

Printed: 27/04/2021 12:10

Fig. No. 1

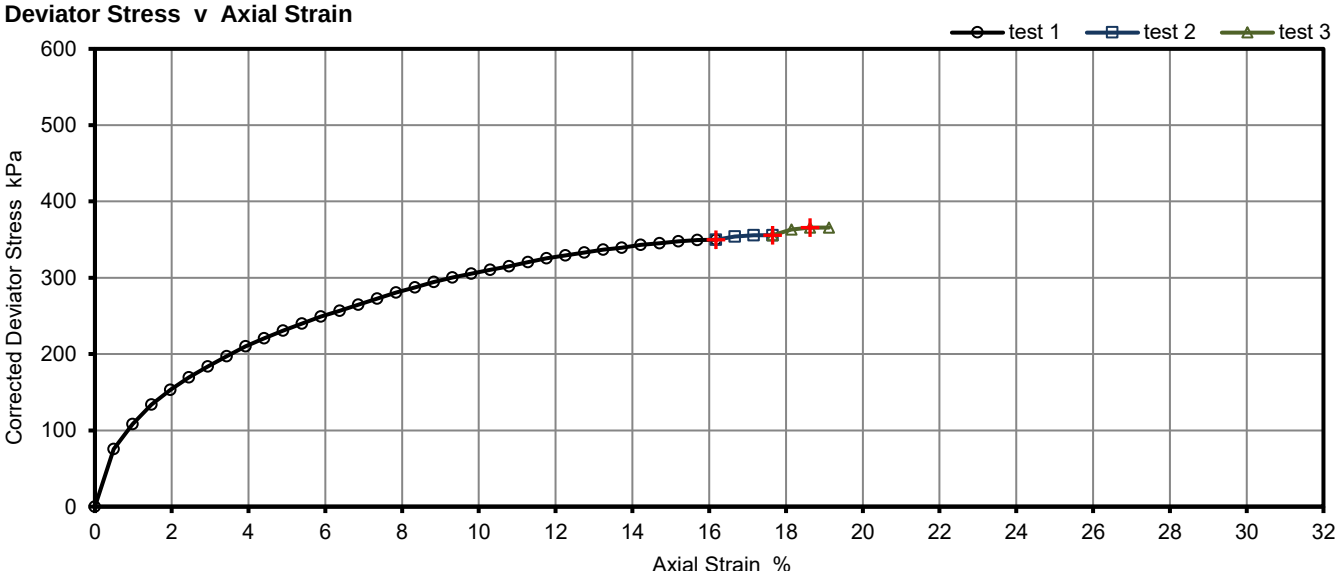
Sheet 1

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test			Job Ref	CCG-C-21-12093
				Borehole/Pit No.	CP01
Site Name	COTTAM PARKWAY STATION			Sample No.	1
Soil Description				Depth	14.50
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Brown slightly sandy slightly gravelly silty CLAY			KeyLAB ID	CCGL202104144
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single specir			Date of test	14/04/2021

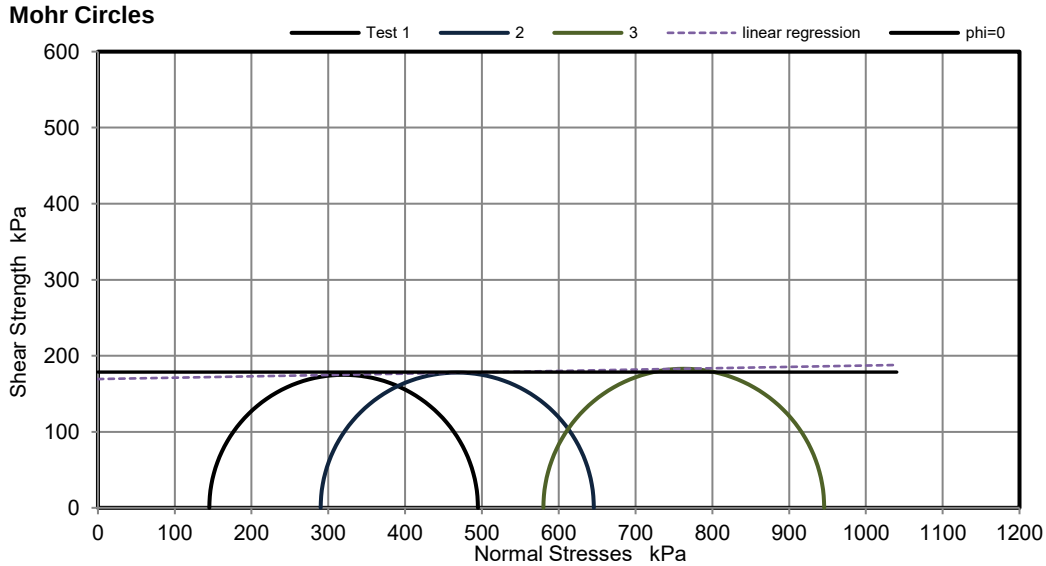
Length	mm	204.0
Diameter	mm	103.3
Bulk Density	Mg/m3	2.21
Moisture Content	%	15.9
Dry Density	Mg/m3	1.91

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	145	290	580
End of stage	Axial Strain	%	16.2	17.6	18.6
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	349.8	355.7	365.7
	Shear strength, cu	kPa	174.9	177.9	182.9
	Mode of failure		Plastic		

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 179 kPa

Linear Regression

ϕu 1.0 °

cu 169 kPa

Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks

Approved: DanielKerfoot

Printed: 27/04/2021 12:11

Fig. No. 1

Sheet 1

Lab Sheet Reference :

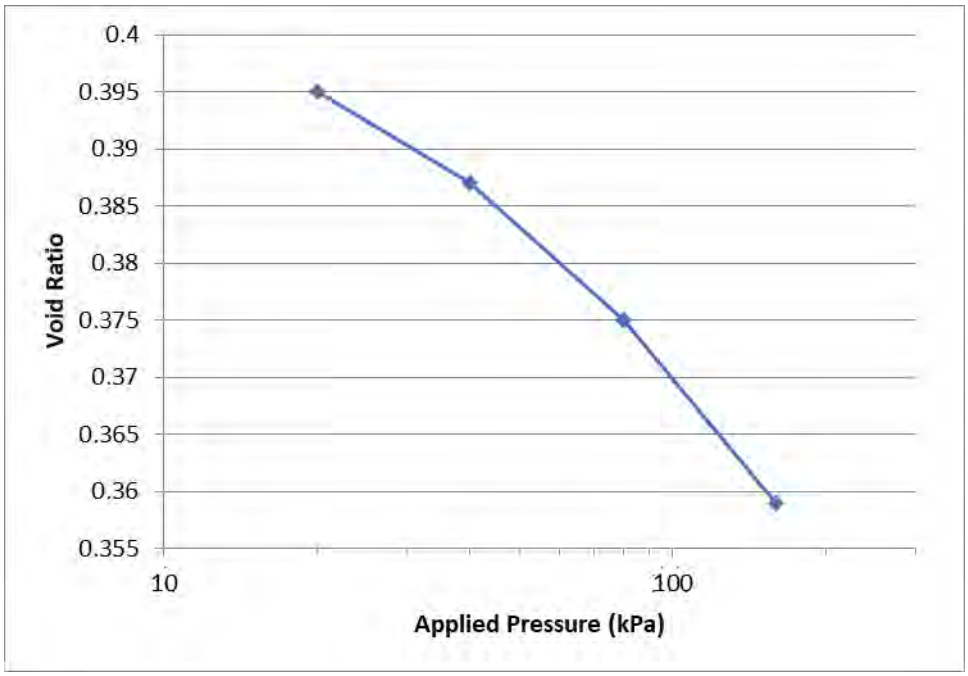
One Dimensional Consolidation Properties
(Oedometer)

Client	LCC	**Lab Ref**	
Project	COTTAM PARKWAY STATION	**Job**	CCG C 21 12093
Borehole	CP01	**Sample**	1

Test Details			
Standard	BS 1377: Part 5: 1990: Clause 3	**Particle Density (assumed)**	2.65 Mg/m3
Sample Type	Undisturbed sample - open drive	**Lab Temperature**	20.0 deg.C
Sample Depth	4.00 m		
Sample Description	Brown slightly sandy slightly gravelly silty CLAY		
Variations from Procedure	None		

Specimen Details			
Specimen Reference	A	**Description**	
Depth within Sample	0.00 mm	**Orientation within Sample**	
Specimen Mass	195.64 g	**Condition**	Natural Moisture
Specimen Height	20.20 mm	**Preparation**	
Comments			

Test Apparatus			
Ring Number	10	**Ring Diameter**	75.08 mm
Ring Height	20.20 mm	**Ring Weight**	126.76 g
Lever Ratio	9.00: 1		



Height of Solid Particles	14.37 mm	**Swelling Pressure**	

One Dimensional Consolidation Properties
(Oedometer)

Client	LCC	**Lab Ref**	
Project	COTTAM PARKWAY STATION	**Job**	CCG C 21 12093
Borehole	CP01	**Sample**	1

Initial Moisture Content*	16.0 %	**Final Moisture Content**	15.9 %
Initial Bulk Density	2.19 Mg/m^3	**Final Bulk Density**	2.26 Mg/m^3
Initial Dry Density	1.89 Mg/m^3	**Final Dry Density**	1.95 Mg/m^3
Initial Void Ratio	0.4057	**Final Void Ratio**	0.3592
Initial Degree of Saturation	104.79 %	**Final Degree of Saturation**	117.11 %

* Calculated from initial and dry weights of whole specimen

Pressure (Loading Stages)	**Coefficient of Volume Compressibility (m_v)**	**Coefficient of Consolidation (c_v)**
0.00		
20.0 kPa	0.37 m^2/MN	**5.5 m^2/ yr**
40.0 kPa	0.30 m^2/MN	**2.4 m^2/ yr**
80.0 kPa	0.22 m^2/MN	**2.9 m^2/ yr**
160.0 kPa	0.14 m^2/MN	**2.4 m^2/ yr**

Method of Time Fitting Used	Log time

Tested by and Date:	DK 07.04.21
Checked by and Date:	DK 07.04.21
Approved by and Date:	CB 07.04.21

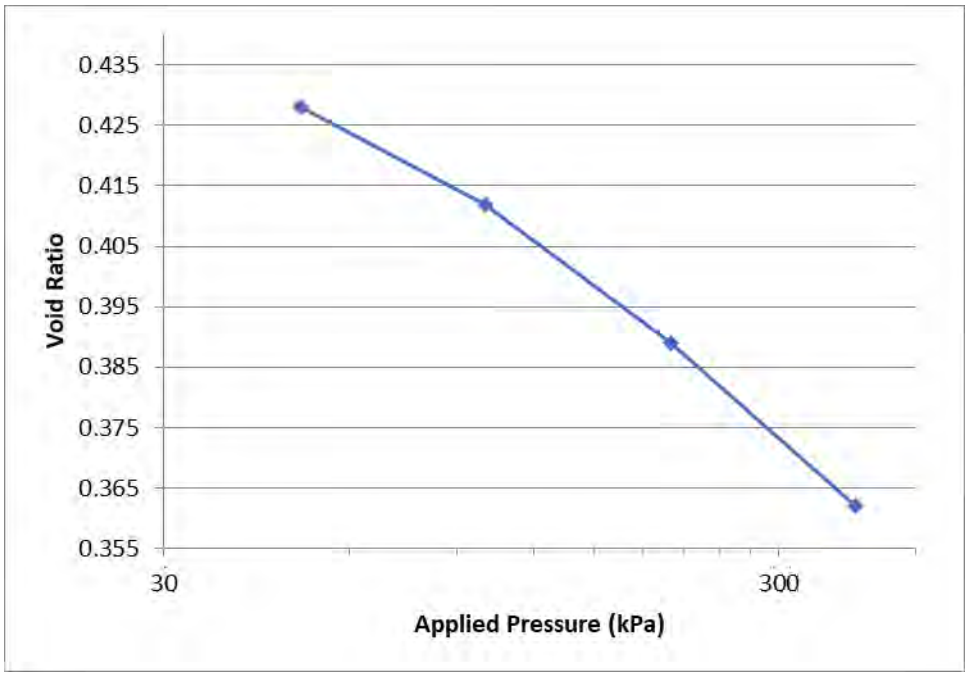
One Dimensional Consolidation Properties
(Oedometer)

Client	LCC	**Lab Ref**	
Project	COTTAM PARKWAY STATION	**Job**	CCG C 21 12093
Borehole	CP01	**Sample**	1

Test Details			
Standard	BS 1377: Part 5: 1990: Clause 3	**Particle Density (assumed)**	2.65 Mg/m3
Sample Type	Undisturbed sample - open drive	**Lab Temperature**	20.0 deg.C
Sample Depth	10.00 m		
Sample Description	Brown slightly sandy slightly gravelly silty CLAY		
Variations from Procedure	None		

Specimen Details			
Specimen Reference	A	**Description**	
Depth within Sample	0.00 mm	**Orientation within Sample**	
Specimen Mass	181.55 g	**Condition**	Natural Moisture
Specimen Height	19.08 mm	**Preparation**	
Comments			

Test Apparatus			
Ring Number	8	**Ring Diameter**	74.92 mm
Ring Height	19.08 mm	**Ring Weight**	117.39 g
Lever Ratio	9.00: 1		



Height of Solid Particles	13.05 mm	**Swelling Pressure**	

One Dimensional Consolidation Properties
(Oedometer)

Client	LCC	**Lab Ref**	
Project	COTTAM PARKWAY STATION	**Job**	CCG C 21 12093
Borehole	CP01	**Sample**	1

Initial Moisture Content*	19.0 %	**Final Moisture Content**	17.5 %
Initial Bulk Density	2.16 Mg/m^3	**Final Bulk Density**	2.29 Mg/m^3
Initial Dry Density	1.81 Mg/m^3	**Final Dry Density**	1.95 Mg/m^3
Initial Void Ratio	0.4615	**Final Void Ratio**	0.3620
Initial Degree of Saturation	109.33 %	**Final Degree of Saturation**	128.40 %

* Calculated from initial and dry weights of whole specimen

Pressure (Loading Stages)	**Coefficient of Volume Compressibility (m_v)**	**Coefficient of Consolidation (c_v)**
0.00		
50.0 kPa	0.46 m^2/MN	**1.2 m^2/ yr**
100.0 kPa	0.22 m^2/MN	**1.2 m^2/ yr**
200.0 kPa	0.16 m^2/MN	**1.5 m^2/ yr**
400.0 kPa	0.10 m^2/MN	**1.5 m^2/ yr**

Method of Time Fitting Used	Log time

Tested by and Date:	DK 07.04.21
Checked by and Date:	DK 07.04.21
Approved by and Date:	CB 07.04.21

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Shear Strength (kN/m²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
CP02	D	0.50	0.50	26	-	-	-	41	18	23	94	CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,4.4,5)
CP02	B	3.60	3.60	21	-	-	-	-	-	-	-	-	Y	Brown slightly sandy clayey SILT. (BS1377Pt2:3.2,9.2,9.5)
CP02	U	4.00	4.45	15	-	-	>110*	-	-	-	-	-	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to coarse subrounded sandstone and mudstone. (BS1377Pt2:3.2)
CP02	B	5.50	5.50	19	-	-	-	34	16	18	93	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,4.4,5)
CP02	B	7.50	7.50	20	-	-	-	37	17	20	94	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,4.4,5)
CP02	U	8.00	8.45	25	-	-	50*	-	-	-	-	-	Y	Brown slightly sandy silty CLAY with frequent silt and sand laminations. (BS1377Pt2:3.2)
CP02	B	9.50	9.50	28	-	-	-	35	17	18	98	CL / CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,4.4,5)
CP02	D	11.00	11.00	30	-	-	-	36	17	19	97	CI	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,4.4,5)
CP02	B	11.40	11.40	26	-	-	-	-	-	-	-	-	Y	Brown slightly sandy clayey SILT. (BS1377Pt2:3.2,9.2,9.5)
CP02	B	12.50	12.50	19	-	-	-	-	-	-	-	-	Y	Brown sandy slightly clayey SILT. (BS1377Pt2:3.2,9.2,9.5)

SITE: COTTAM PARKWAY STATION (CCG-C-21-12093) DATE: 04.05.21

CLIENT: LANCASHIRE COUNTY COUNCIL

UKAS TESTING 4514

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample
CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic
(* Denotes Hand Shear Vane test result)
Sample description not accredited by UKAS

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Shear Strength (kN/m²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
CP02	B	14.00	14.00	18	-	-	-	33	16	17	96	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,4.4,5)
CP02	B	15.00	15.00	13	-	-	-	31	16	15	96	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,4.4,5)
CP02	B	16.50	16.50	14	-	-	-	-	-	-	-	-	Y	Brown very gravelly silty clayey SAND. Gravel is fine to coarse subrounded mudstone and sandstone. (BS1377Pt2:3.2,9.2,9.5)

SITE: COTTAM PARKWAY STATION (CCG-C-21-12093) DATE: 29.04.21

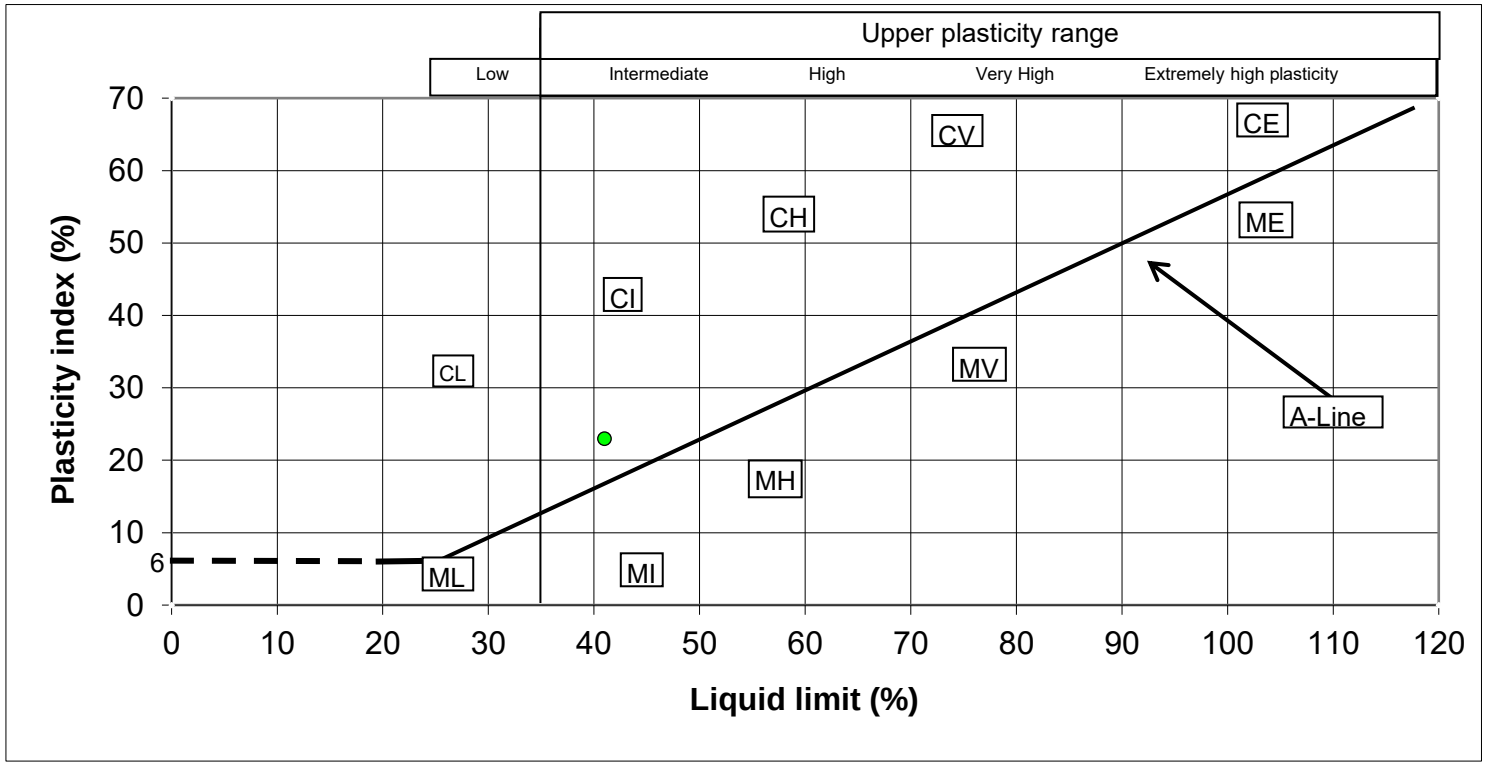
CLIENT: LANCASHIRE COUNTY COUNCIL

UKAS TESTING 4514

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample
CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic
(* Denotes Hand Shear Vane test result)
Sample description not accredited by UKAS

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP02	0.50	41.0	23.0

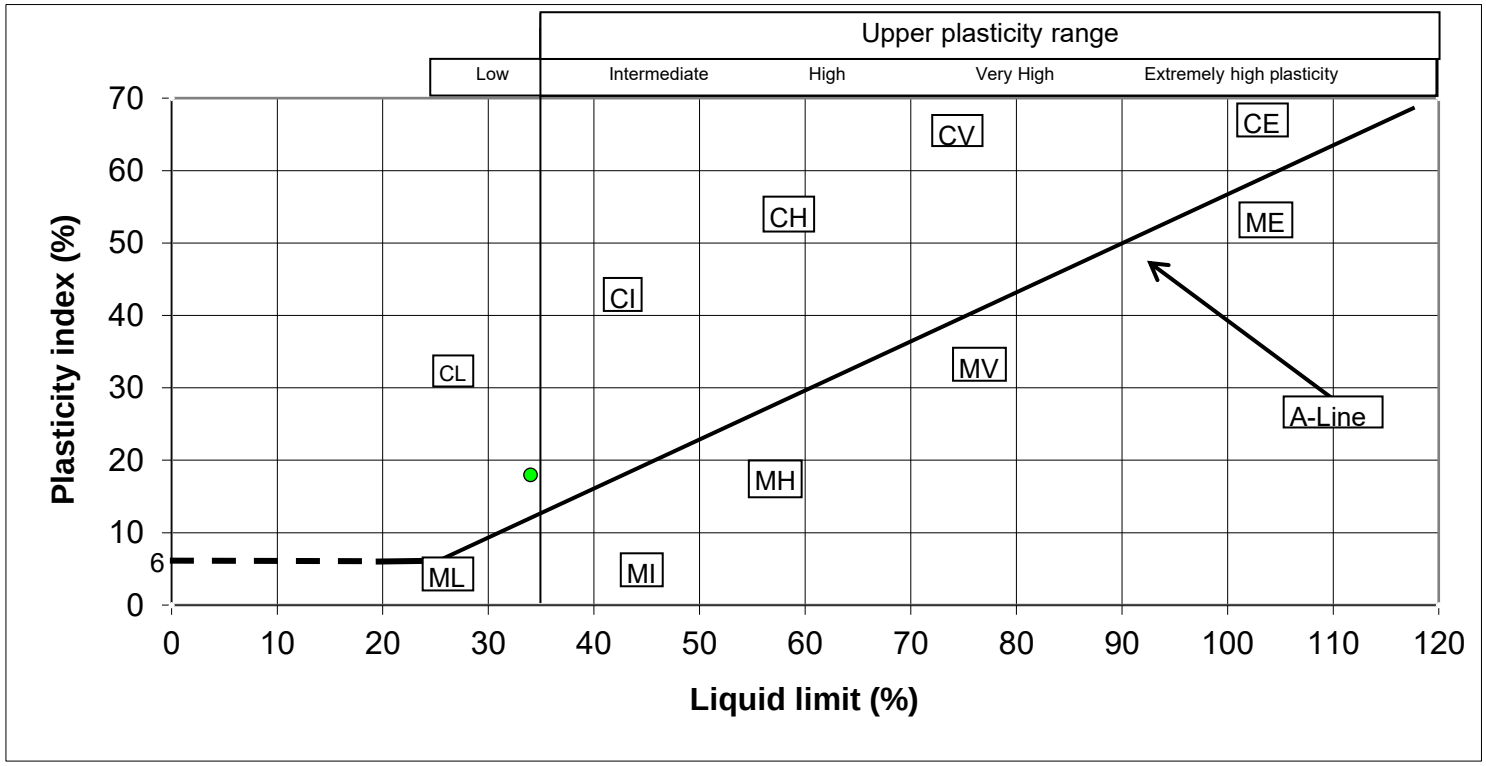
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP02	5.50	34.0	18.0

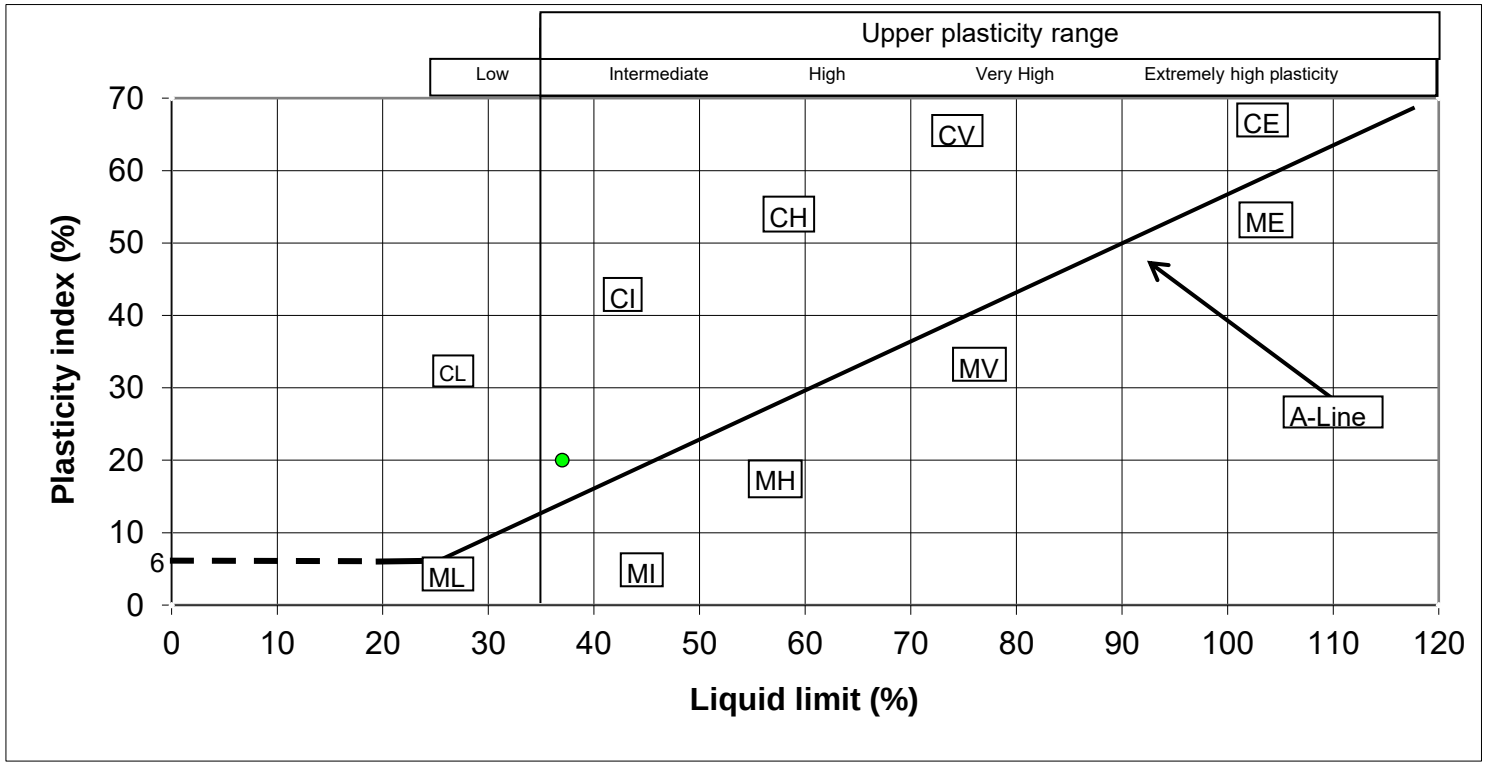
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP02	7.50	37.0	20.0

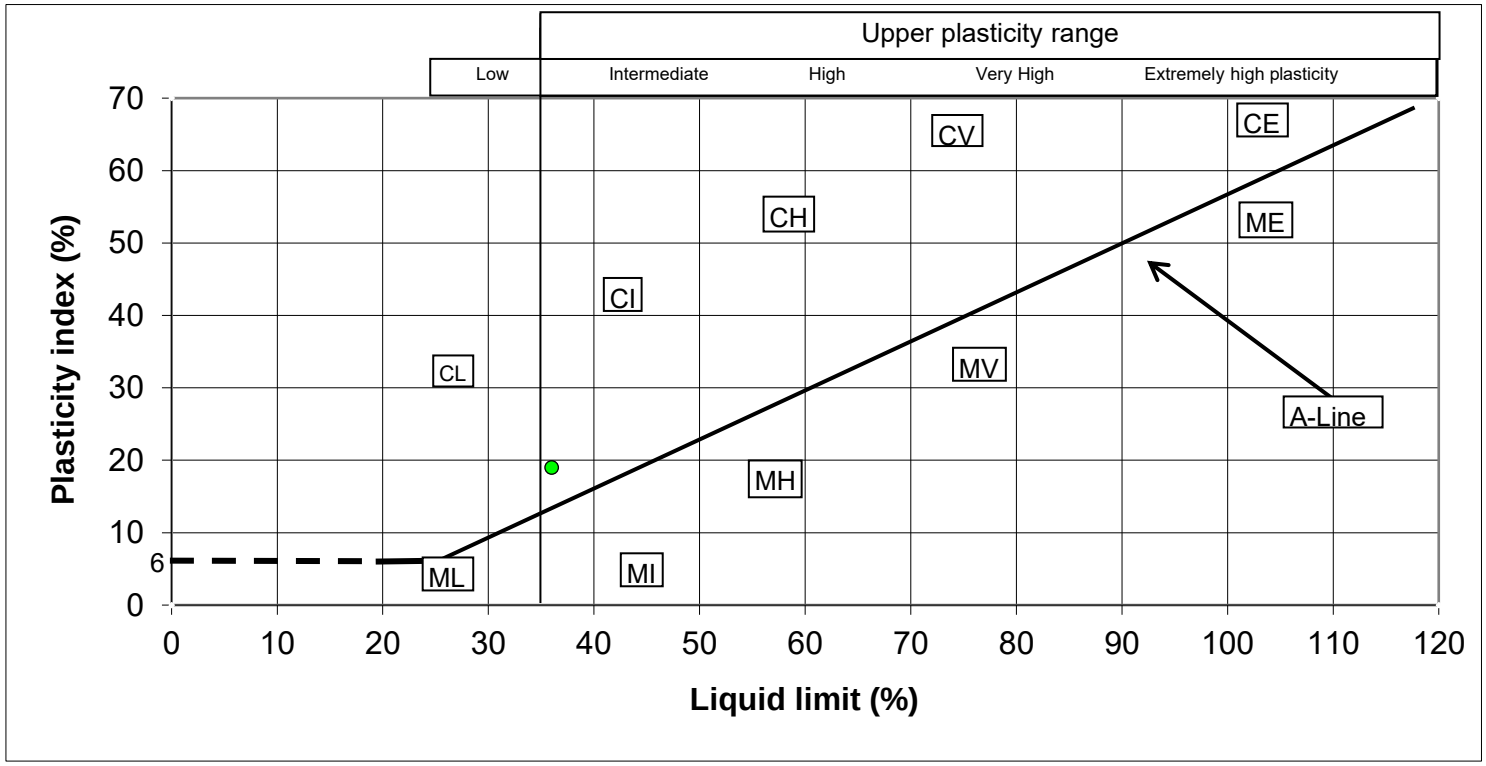
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP02	11.00	36.0	19.0

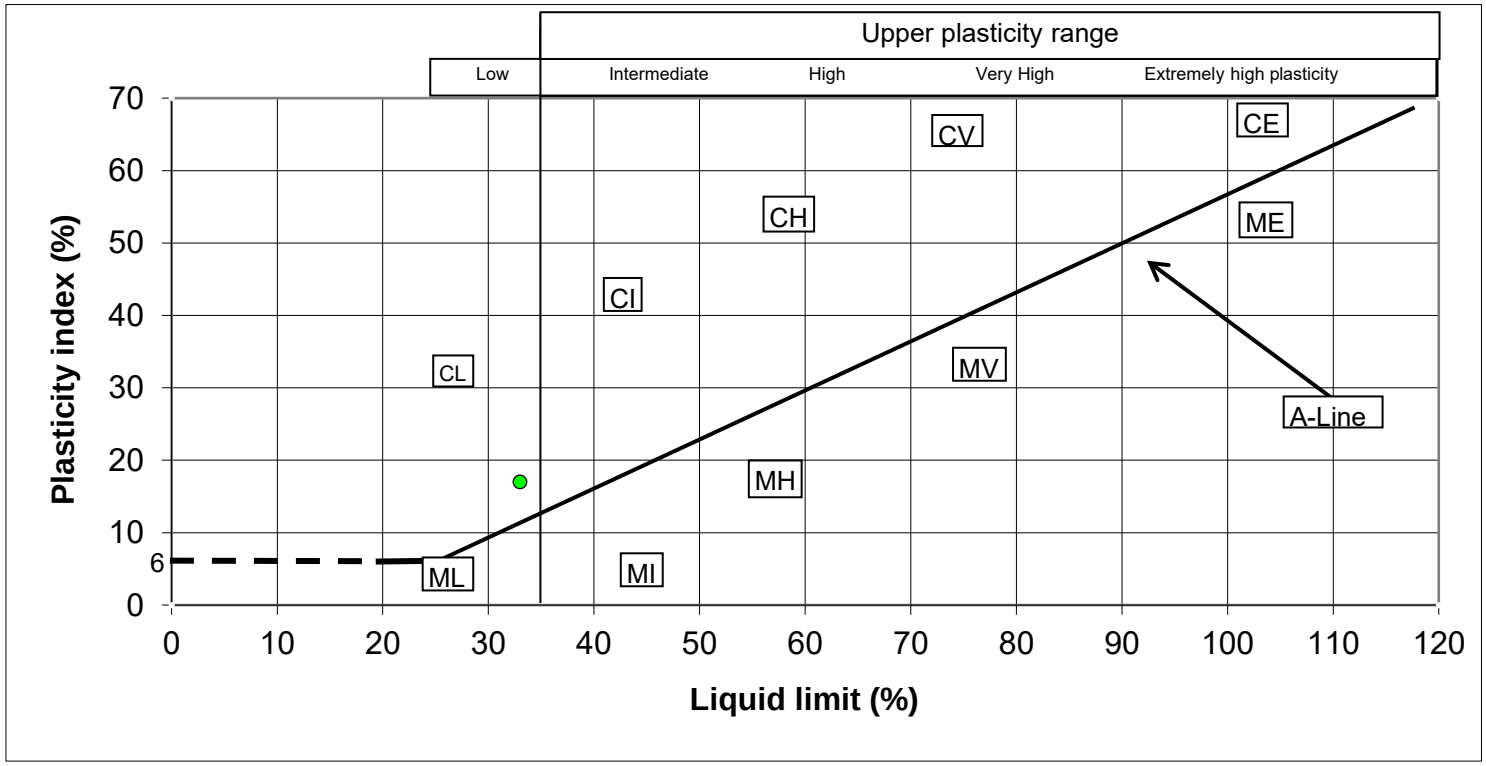
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP02	14.00	33.0	17.0

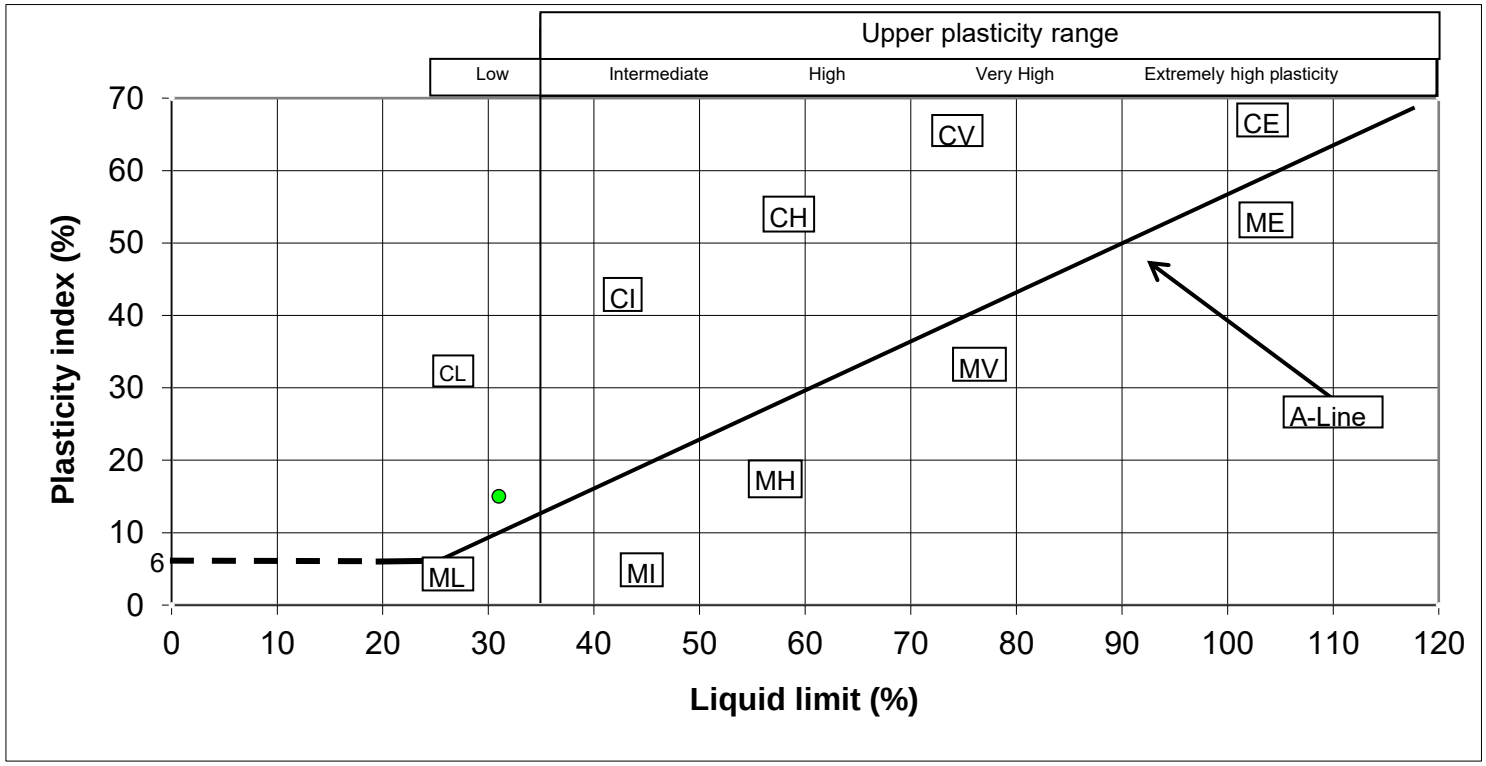
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP02	15.00	31.0	15.0

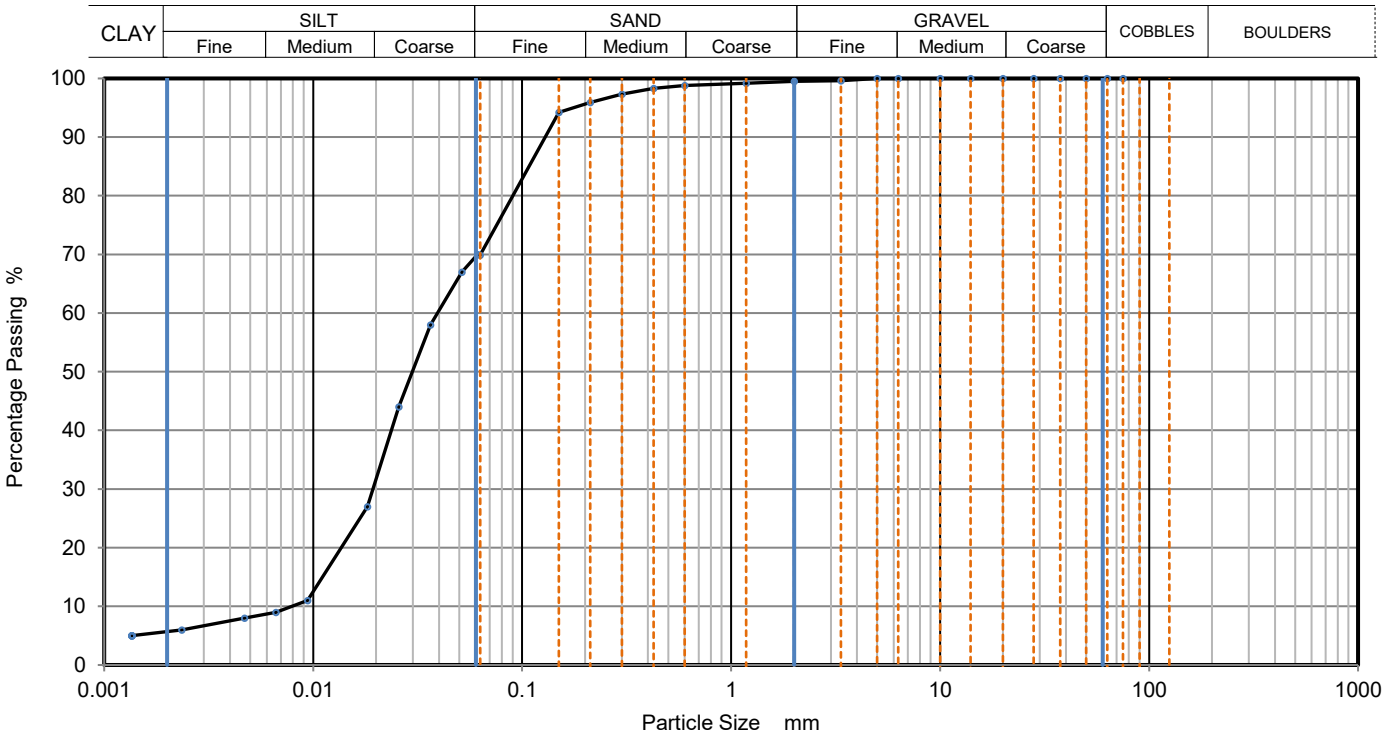
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**PARTICLE SIZE DISTRIBUTION**	Job Ref	**CCG-C-21-12093**
		Borehole/Pit No.	CP02

Site Name	COTTAM PARKWAY STATION			Sample No.	1
Specimen Description	Brown slightly sandy clayey SILT			Depth, m	3.60
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	CCGL202104270



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0612	70
		0.0514	67
75	100	0.0364	58
63	100	0.0257	44
50	100	0.0182	27
37.5	100	0.0094	11
28	100	0.0066	9
20	100	0.0047	8
14	100	0.0023	6
10	100	0.0014	5
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	99	Particle density (assumed)	
0.425	98	2.65 Mg/m3	
0.3	97		
0.212	96		
0.15	94		
0.063	70		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	30
Silt	64
Clay	6

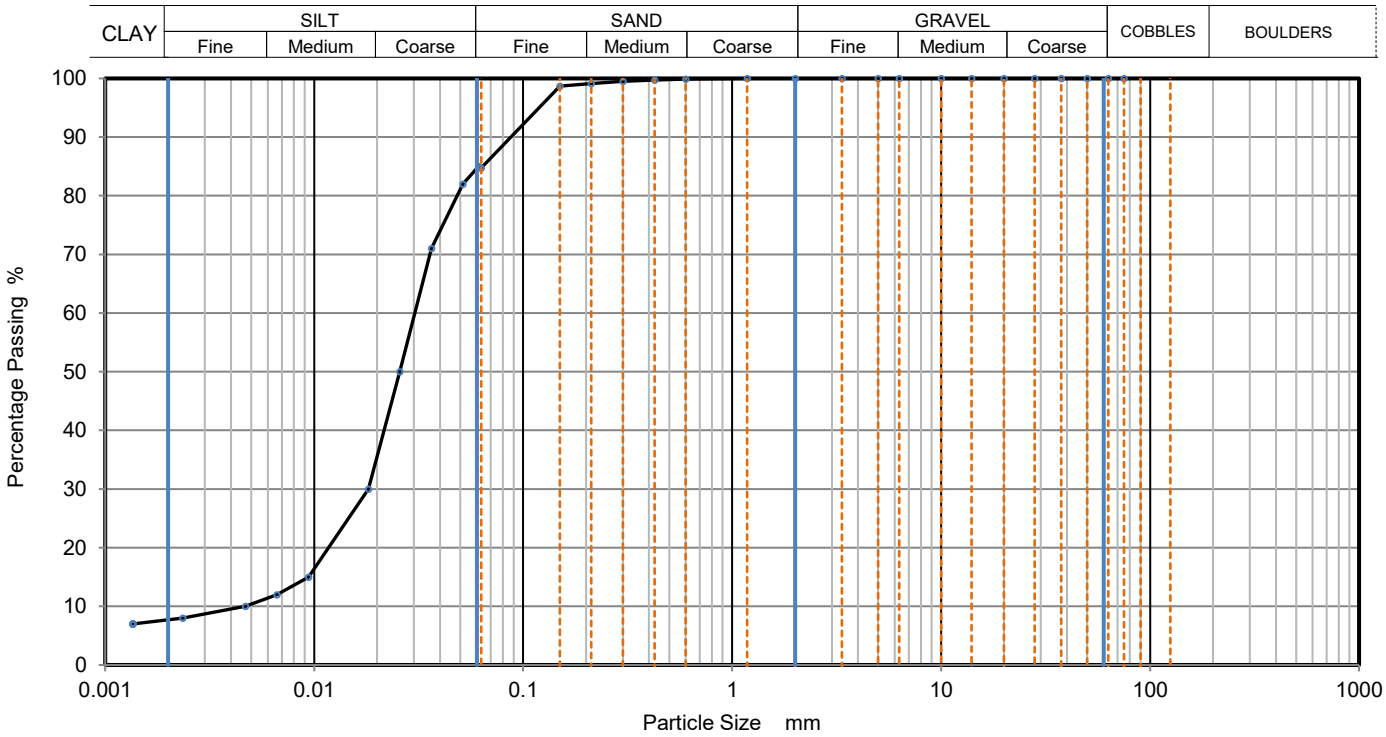
Grading Analysis		
D100	mm	
D60	mm	0.0389
D30	mm	0.0192
D10	mm	0.00767
Uniformity Coefficient		5.1
Curvature Coefficient		1.2

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	**Fig** 1
JE	DK	DK	04/05/2021 16:37	Sheet

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**PARTICLE SIZE DISTRIBUTION**	Job Ref	**CCG-C-21-12093**
		Borehole/Pit No.	CP02
Site Name	COTTAM PARKWAY STATION	Sample No.	1
Specimen Description	Brown slightly sandy clayey SILT	Depth, m	11.40
Specimen Reference	Specimen Depth: m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	KeyLAB ID	CCGL202104271



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0612	85
		0.0514	82
75	100	0.0364	71
63	100	0.0257	50
50	100	0.0182	30
37.5	100	0.0094	15
28	100	0.0066	12
20	100	0.0047	10
14	100	0.0023	8
10	100	0.0014	7
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed)	
0.425	100	2.65 Mg/m3	
0.3	100		
0.212	99		
0.15	99		
0.063	85		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	15
Silt	77
Clay	8

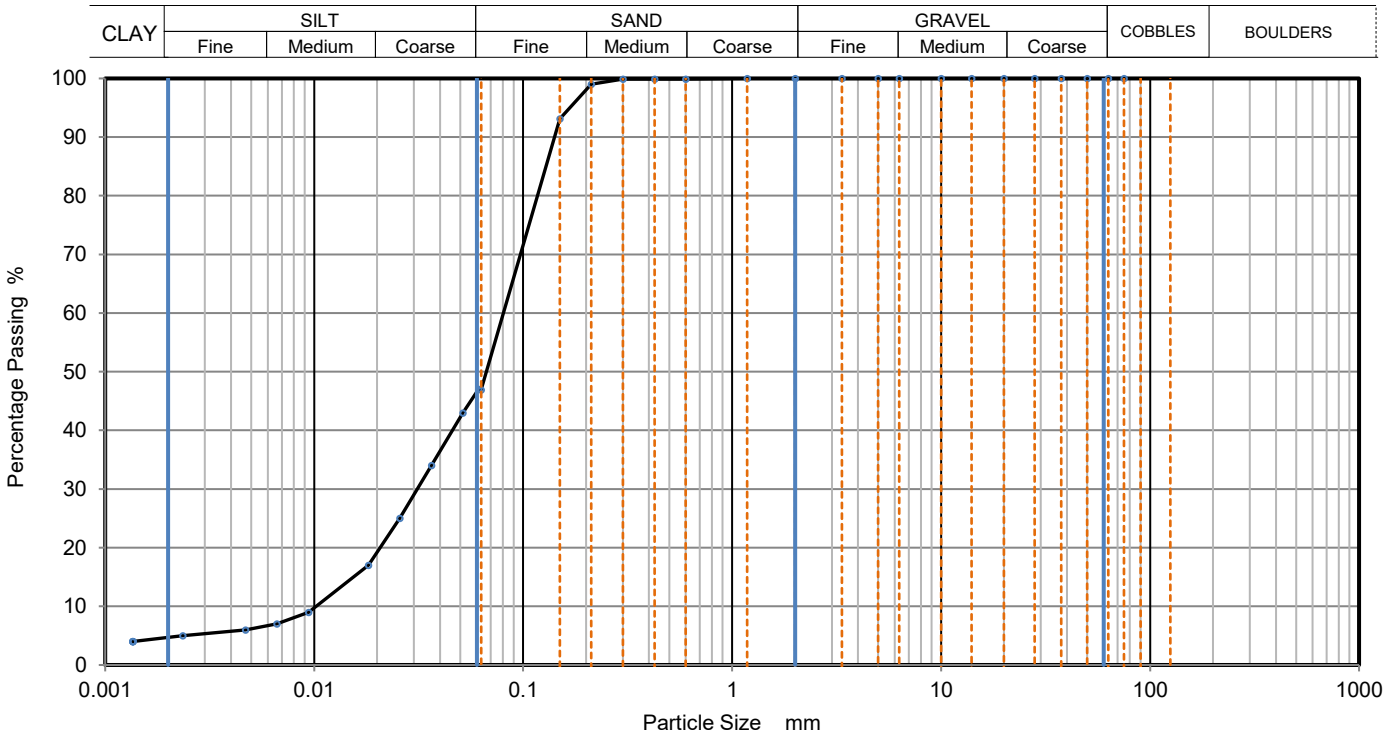
Grading Analysis		
D100	mm	
D60	mm	0.0302
D30	mm	0.0182
D10	mm	0.00439
Uniformity Coefficient		6.9
Curvature Coefficient		2.5

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig 1
JE	DK	DK	04/05/2021 16:37	Sheet

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**PARTICLE SIZE DISTRIBUTION**	Job Ref	**CCG-C-21-12093**
		Borehole/Pit No.	CP02
Site Name	COTTAM PARKWAY STATION	Sample No.	1
Specimen Description	Brown sandy slightly clayey SILT	Depth, m	12.50
Specimen Reference	Specimen Depth: m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	KeyLAB ID	CCGL202104272



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0612	47
		0.0514	43
75	100	0.0364	34
63	100	0.0257	25
50	100	0.0182	17
37.5	100	0.0094	9
28	100	0.0066	7
20	100	0.0047	6
14	100	0.0023	5
10	100	0.0014	4
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed)	
0.425	100	2.65 Mg/m3	
0.3	100		
0.212	99		
0.15	93		
0.063	47		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	53
Silt	43
Clay	4

Grading Analysis		
D100	mm	
D60	mm	0.0806
D30	mm	0.0307
D10	mm	0.0105
Uniformity Coefficient		7.7
Curvature Coefficient		1.1

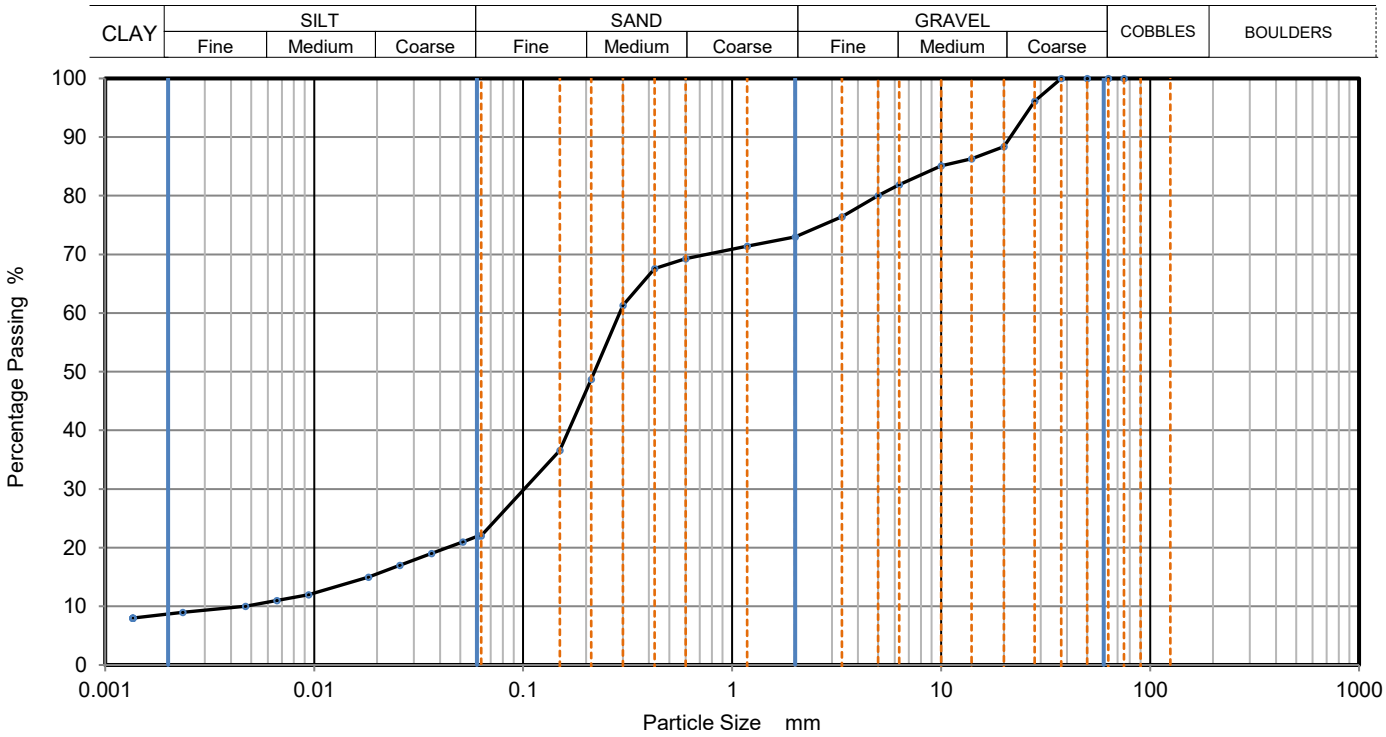
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	**Fig** 1
JE	DK	DK	04/05/2021 16:37	Sheet

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**PARTICLE SIZE DISTRIBUTION**	Job Ref	**CCG-C-21-12093**
		Borehole/Pit No.	CP02

Site Name	COTTAM PARKWAY STATION			Sample No.	1
Specimen Description	Brown very gravelly silty clayey SAND			Depth, m	16.50
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	CCGL202104273



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0612	22
		0.0514	21
75	100	0.0364	19
63	100	0.0257	17
50	100	0.0182	15
37.5	100	0.0094	12
28	96	0.0066	11
20	88	0.0047	10
14	86	0.0023	9
10	85	0.0014	8
6.3	82		
5	80		
3.35	76		
2	73		
1.18	71		
0.6	69	Particle density (assumed)	
0.425	68	2.65	Mg/m3
0.3	61		
0.212	49		
0.15	37		
0.063	22		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	27
Sand	51
Silt	13
Clay	9

Grading Analysis		
D100	mm	
D60	mm	0.289
D30	mm	0.101
D10	mm	0.00478
Uniformity Coefficient		61
Curvature Coefficient		7.4

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	**Fig** 1
JE	DK	DK	04/05/2021 16:37	Sheet

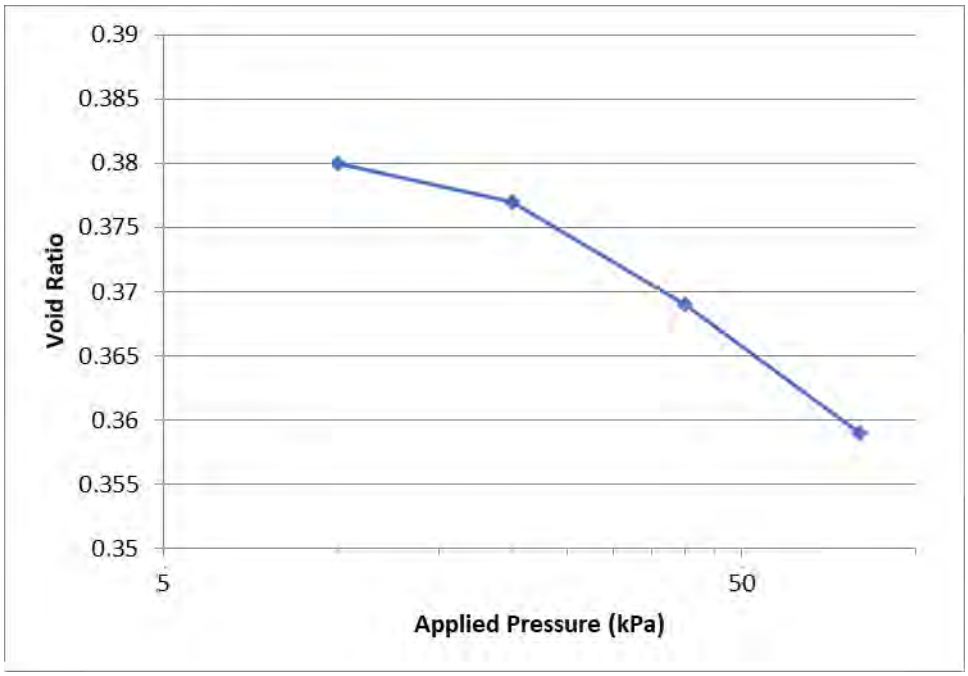
One Dimensional Consolidation Properties
(Oedometer)

Client	LCC	**Lab Ref**	
Project	COTTAM PARKWAY STATION	**Job**	CCG C 21 12093
Borehole	CP02	**Sample**	1

Test Details			
Standard	BS 1377: Part 5: 1990: Clause 3	**Particle Density (assumed)**	2.65 Mg/m3
Sample Type	Undisturbed sample - open drive	**Lab Temperature**	20.0 deg.C
Sample Depth	2.00 m		
Sample Description	Brown slightly sandy slightly gravelly silty CLAY		
Variations from Procedure	None		

Specimen Details			
Specimen Reference	A	**Description**	
Depth within Sample	0.00 mm	**Orientation within Sample**	
Specimen Mass	196.76 g	**Condition**	Natural Moisture
Specimen Height	20.22 mm	**Preparation**	
Comments			

Test Apparatus			
Ring Number	9	**Ring Diameter**	75.01 mm
Ring Height	20.22 mm	**Ring Weight**	127.43 g
Lever Ratio	9.00: 1		



Height of Solid Particles	14.65 mm	**Swelling Pressure**	

One Dimensional Consolidation Properties
(Oedometer)

Client	LCC	**Lab Ref**	
Project	COTTAM PARKWAY STATION	**Job**	CCG C 21 12093
Borehole	CP02	**Sample**	1

Initial Moisture Content*	14.7 %	**Final Moisture Content**	15.5 %
Initial Bulk Density	2.20 Mg/m^3	**Final Bulk Density**	2.25 Mg/m^3
Initial Dry Density	1.92 Mg/m^3	**Final Dry Density**	1.95 Mg/m^3
Initial Void Ratio	0.3807	**Final Void Ratio**	0.3588
Initial Degree of Saturation	102.53 %	**Final Degree of Saturation**	114.20 %

* Calculated from initial and dry weights of whole specimen

Pressure (Loading Stages)	**Coefficient of Volume Compressibility (m_v)**	**Coefficient of Consolidation (c_v)**
0.00		
10.0 kPa	Sample swelled	-------
20.0 kPa	0.27 m^2/MN	**13 m^2/ yr**
40.0 kPa	0.26 m^2/MN	**3.4 m^2/ yr**
80.0 kPa	0.19 m^2/MN	**3.0 m^2/ yr**

Method of Time Fitting Used	Log time

Tested by and Date:	DK 19.04.21
Checked by and Date:	DK 19.04.21
Approved by and Date:	CB 19.04.21

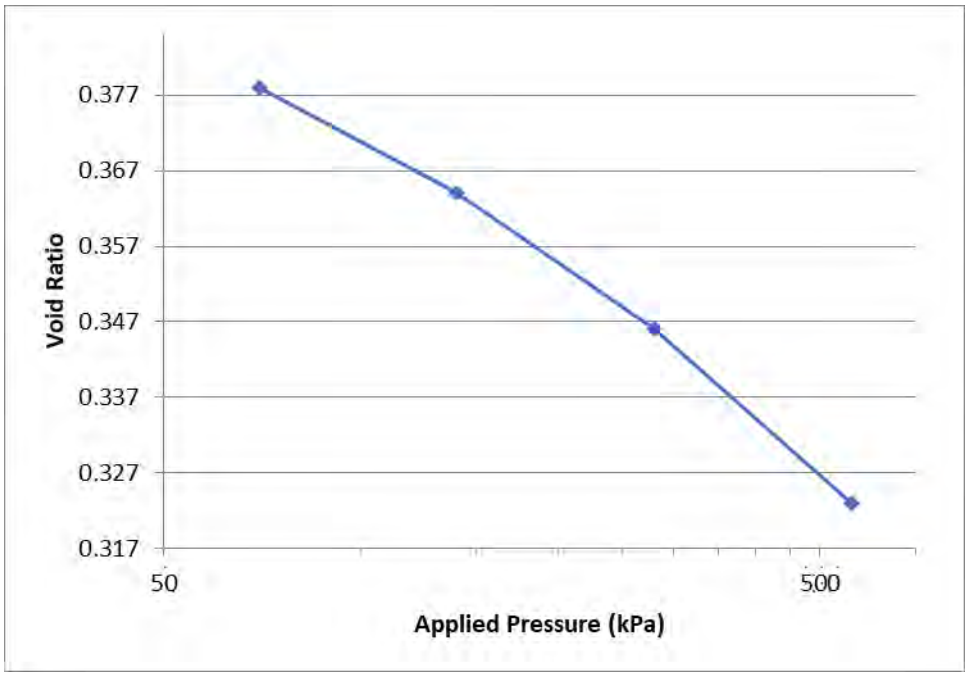
One Dimensional Consolidation Properties
(Oedometer)

Client	LCC	**Lab Ref**	
Project	COTTAM PARKWAY STATION	**Job**	CCG C 21 12093
Borehole	CP02	**Sample**	1

Test Details			
Standard	BS 1377: Part 5: 1990: Clause 3	**Particle Density (assumed)**	2.65 Mg/m3
Sample Type	Undisturbed sample - open drive	**Lab Temperature**	20.0 deg.C
Sample Depth	14.00 m		
Sample Description	Brown slightly sandy slightly gravelly silty CLAY		
Variations from Procedure	None		

Specimen Details			
Specimen Reference	A	**Description**	
Depth within Sample	0.00 mm	**Orientation within Sample**	
Specimen Mass	183.86 g	**Condition**	Natural Moisture
Specimen Height	19.08 mm	**Preparation**	
Comments			

Test Apparatus			
Ring Number	8	**Ring Diameter**	74.92 mm
Ring Height	19.08 mm	**Ring Weight**	117.39 g
Lever Ratio	9.00: 1		



Height of Solid Particles	13.54 mm	**Swelling Pressure**	

One Dimensional Consolidation Properties
(Oedometer)

Client	LCC	**Lab Ref**	
Project	COTTAM PARKWAY STATION	**Job**	CCG C 21 12093
Borehole	CP02	**Sample**	1

Initial Moisture Content*	16.3 %	**Final Moisture Content**	15.5 %
Initial Bulk Density	2.19 Mg/m^3	**Final Bulk Density**	2.31 Mg/m^3
Initial Dry Density	1.88 Mg/m^3	**Final Dry Density**	2.00 Mg/m^3
Initial Void Ratio	0.4096	**Final Void Ratio**	0.3229
Initial Degree of Saturation	105.27 %	**Final Degree of Saturation**	127.48 %

* Calculated from initial and dry weights of whole specimen

Pressure (Loading Stages)	**Coefficient of Volume Compressibility (m_v)**	**Coefficient of Consolidation (c_v)**
0.00		
70.0 kPa	0.32 m^2/MN	**1.7 m^2/ yr**
140.0 kPa	0.15 m^2/MN	**1.6 m^2/ yr**
280.0 kPa	0.10 m^2/MN	**2.0 m^2/ yr**
560.0 kPa	0.060 m^2/MN	**2.2 m^2/ yr**

Method of Time Fitting Used	Log time

Tested by and Date:	DK 19.04.21
Checked by and Date:	DK 19.04.21
Approved by and Date:	CB 19.04.21

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Shear Strength (kN/m²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
CP03	D	0.60	0.60	22	-	-	-	36	17	19	98	CI	Y	Dark brown slightly sandy silty CLAY. (BS1377Pt2:3.2,4.4,5)
CP03	U	2.00	2.45	13	-	-	>110*	-	-	-	-	-	Y	Brown slightly sandy slightly gravelly silty CLAY with occasional lamination of sand and frequent roots. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2)
CP03	B	3.50	3.50	24	-	-	-	37	17	20	99	CI	Y	Brown slightly sandy silty CLAY. (BS1377Pt2:3.2,4.4,5)
CP03	B	8.50	8.50	28	-	-	-	40	18	22	98	CI	Y	Brown slightly sandy silty CLAY. (BS1377Pt2:3.2,4.4,5)
CP03	U	10.00	10.45	22	2.12	1.74	76	-	-	-	-	-	Y	Brown slightly sandy slightly gravelly silty CLAY of high undrained shear strength. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,Pt7:9)
CP03	B	10.50	10.50	19	-	-	-	32	16	16	95	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine subrounded sandstone and mudstone. (BS1377Pt2:3.2,4.4,5)
CP03	B	12.00	12.00	28	-	-	-	-	-	-	-	-	Y	Brown slightly sandy slightly gravelly clayey SILT. Gravel is fine to medium subrounded sandstone and mudstone. (BS1377Pt2:3.2,9.2,9.5)
CP03	B	12.50	12.50	24	-	-	-	38	18	20	99	CI	Y	Brown slightly sandy silty CLAY. (BS1377Pt2:3.2,4.4,5)
CP03	D	14.00	14.00	25	-	-	-	-	-	-	-	-	Y	Brown sandy clayey SILT. (BS1377Pt2:3.2,9.2,9.5)
CP03	D	15.50	15.50	20	-	-	-	30	16	14	98	CL	Y	Brown slightly sandy silty CLAY with frequent laminations of silt and sand. (BS1377Pt2:3.2,4.4,5)

SITE: COTTAM PARKWAY STATION (CCG-C-21-12093) DATE: 04.05.21

CLIENT: LANCASHIRE COUNTY COUNCIL

UKAS TESTING 4514

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample
CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic
(* Denotes Hand Shear Vane test result)
Sample description not accredited by UKAS

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Shear Strength (kN/m²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
CP03	B	16.50	16.50	11	-	-	-	-	-	-	-	-	Y	Reddish brown very sandy silty GRAVEL. Gravel is fine to coarse subangular to subrounded sandstone. (BS1377Pt2:3.2,9.2)

SITE: COTTAM PARKWAY STATION (CCG-C-21-12093) DATE: 27.04.21

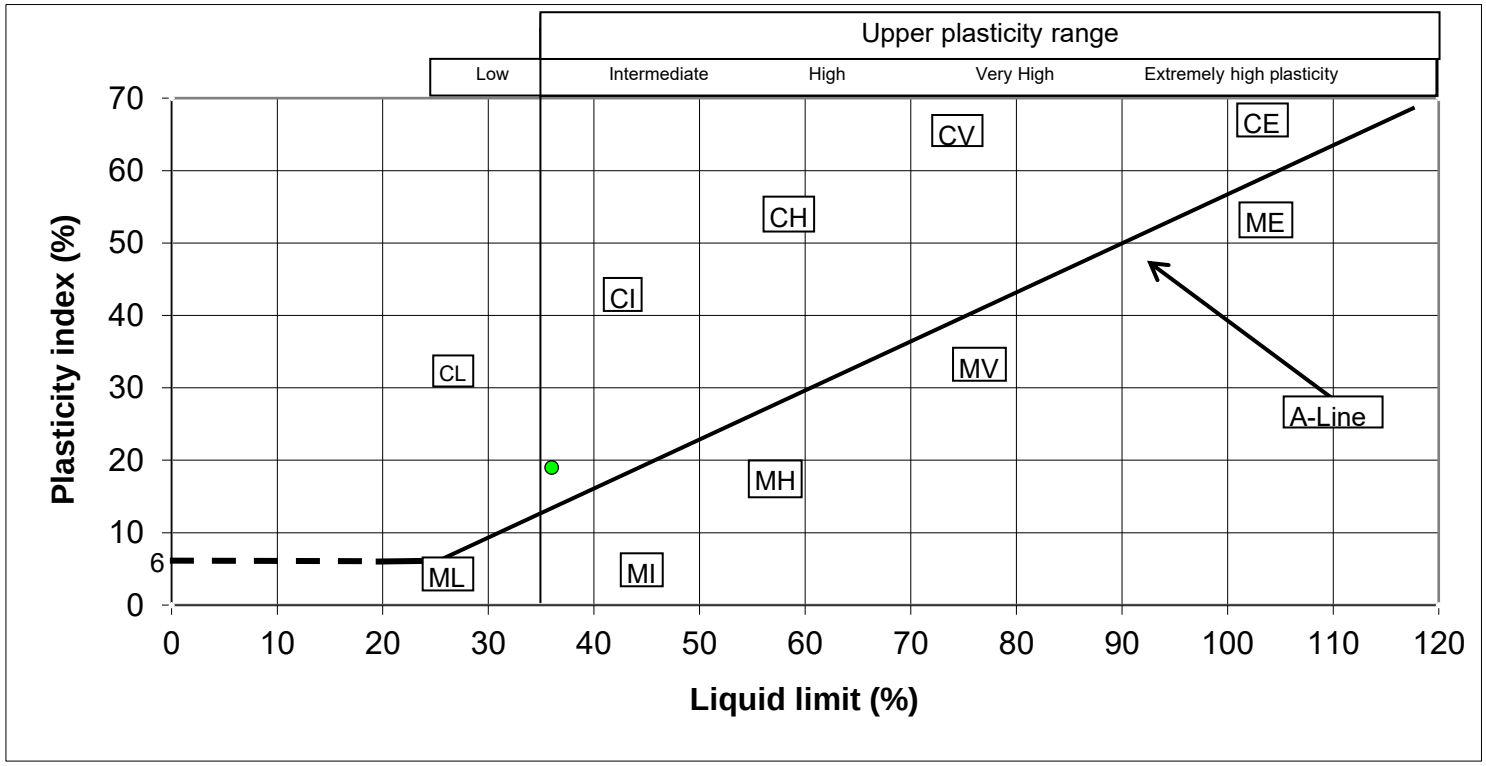
CLIENT: LANCASHIRE COUNTY COUNCIL

UKAS TESTING 4514

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample
CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic
(* Denotes Hand Shear Vane test result)
Sample description not accredited by UKAS

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP03	0.60	36.0	19.0

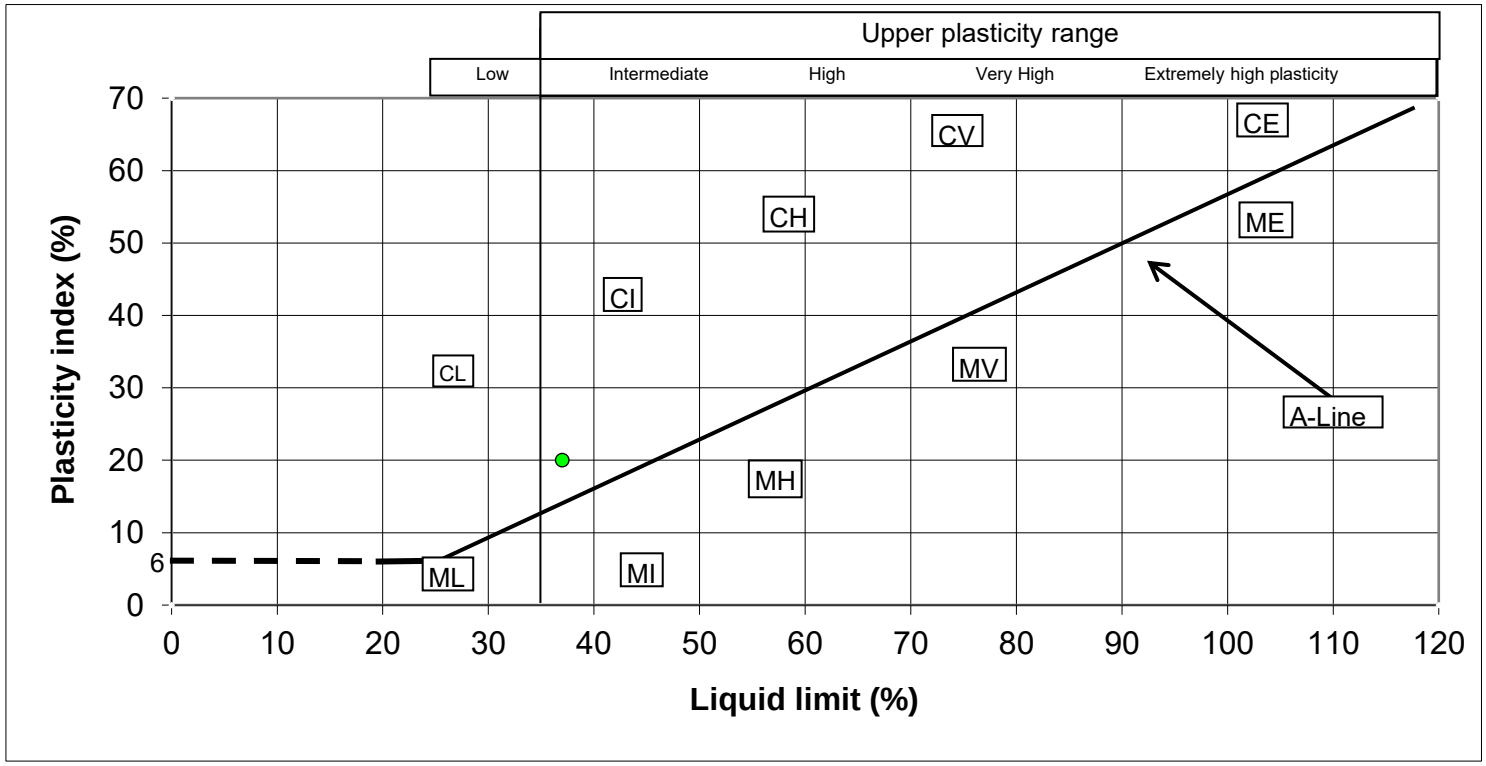
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP03	3.50	37.0	20.0

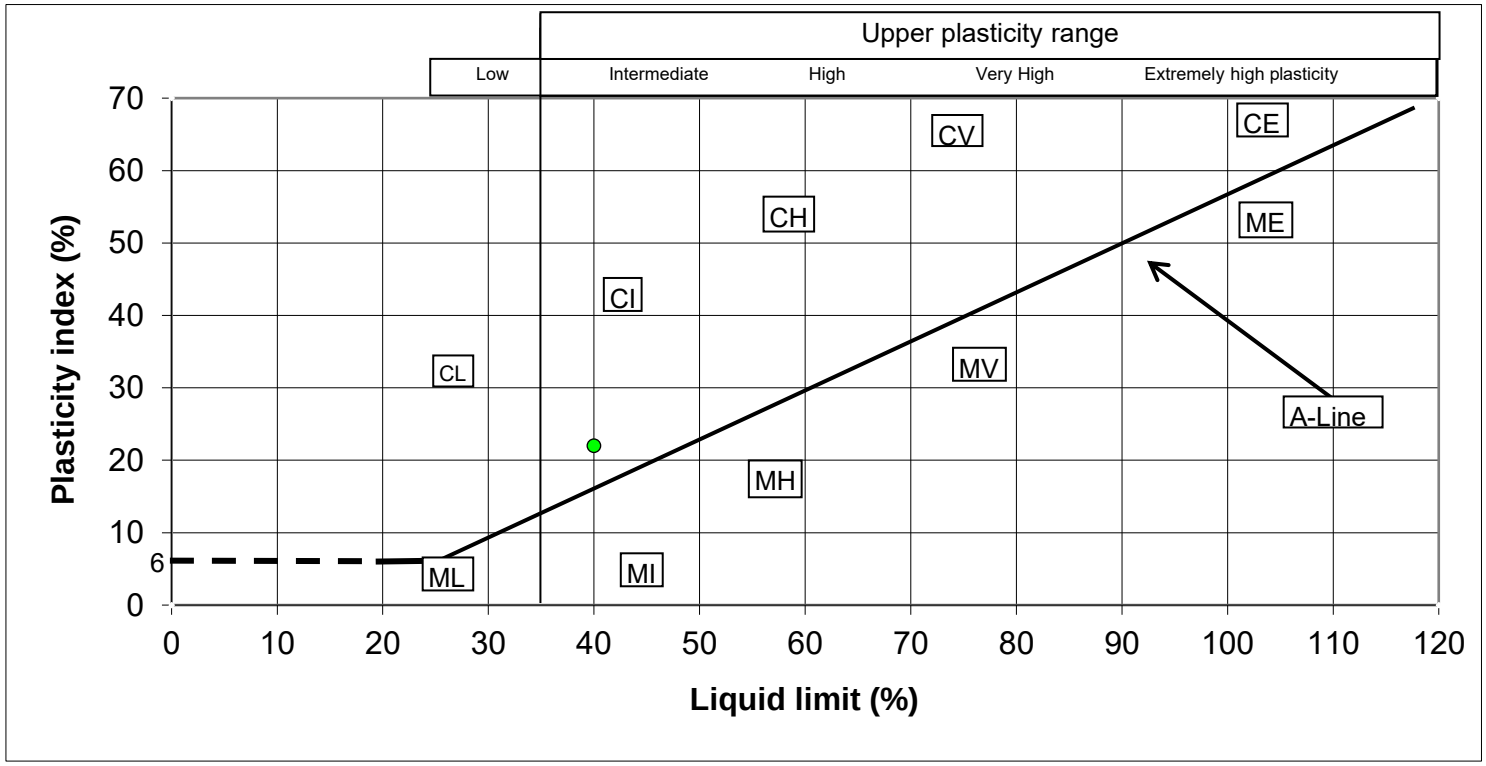
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP03	8.50	40.0	22.0

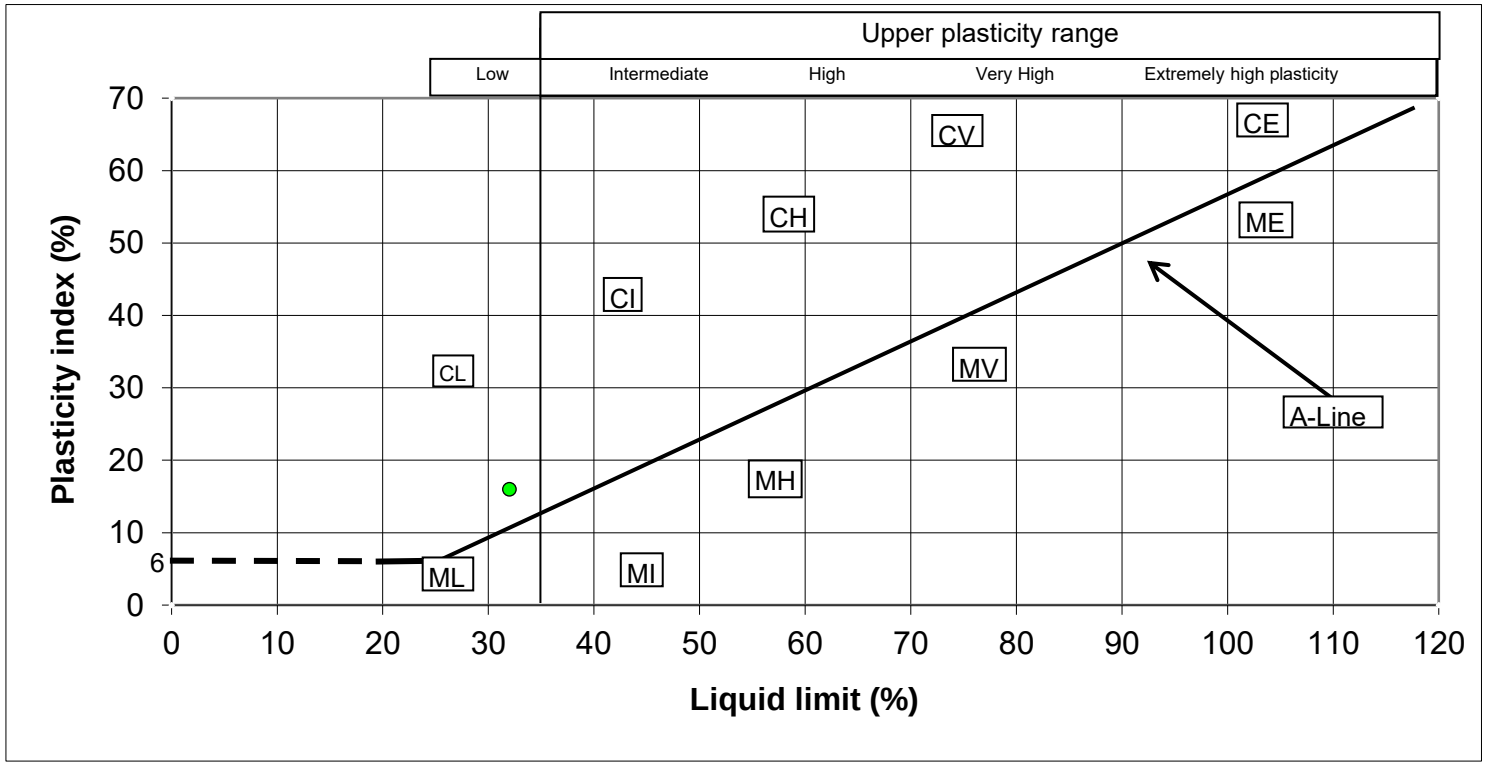
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP03	10.50	32.0	16.0

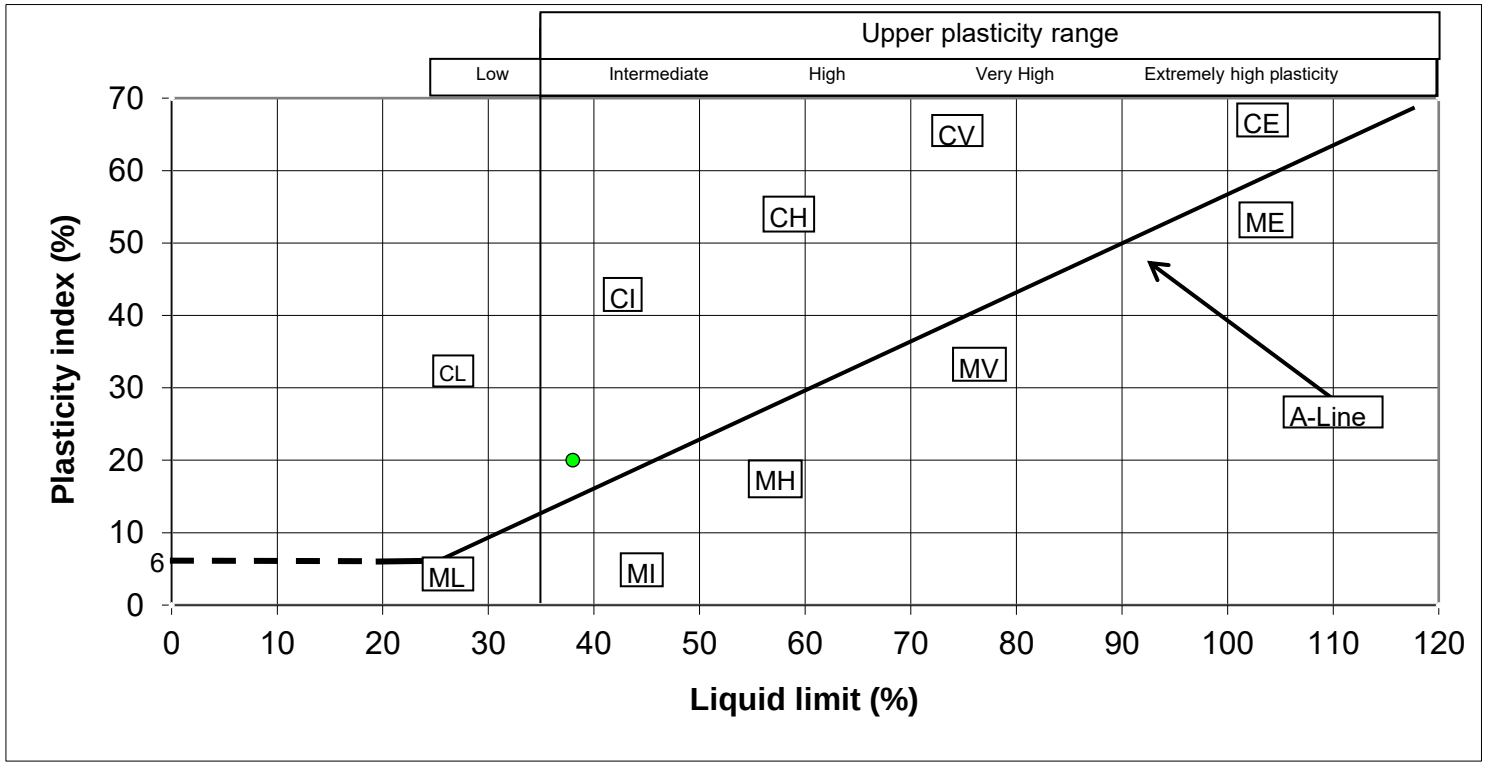
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
CP03	12.50	38.0	20.0

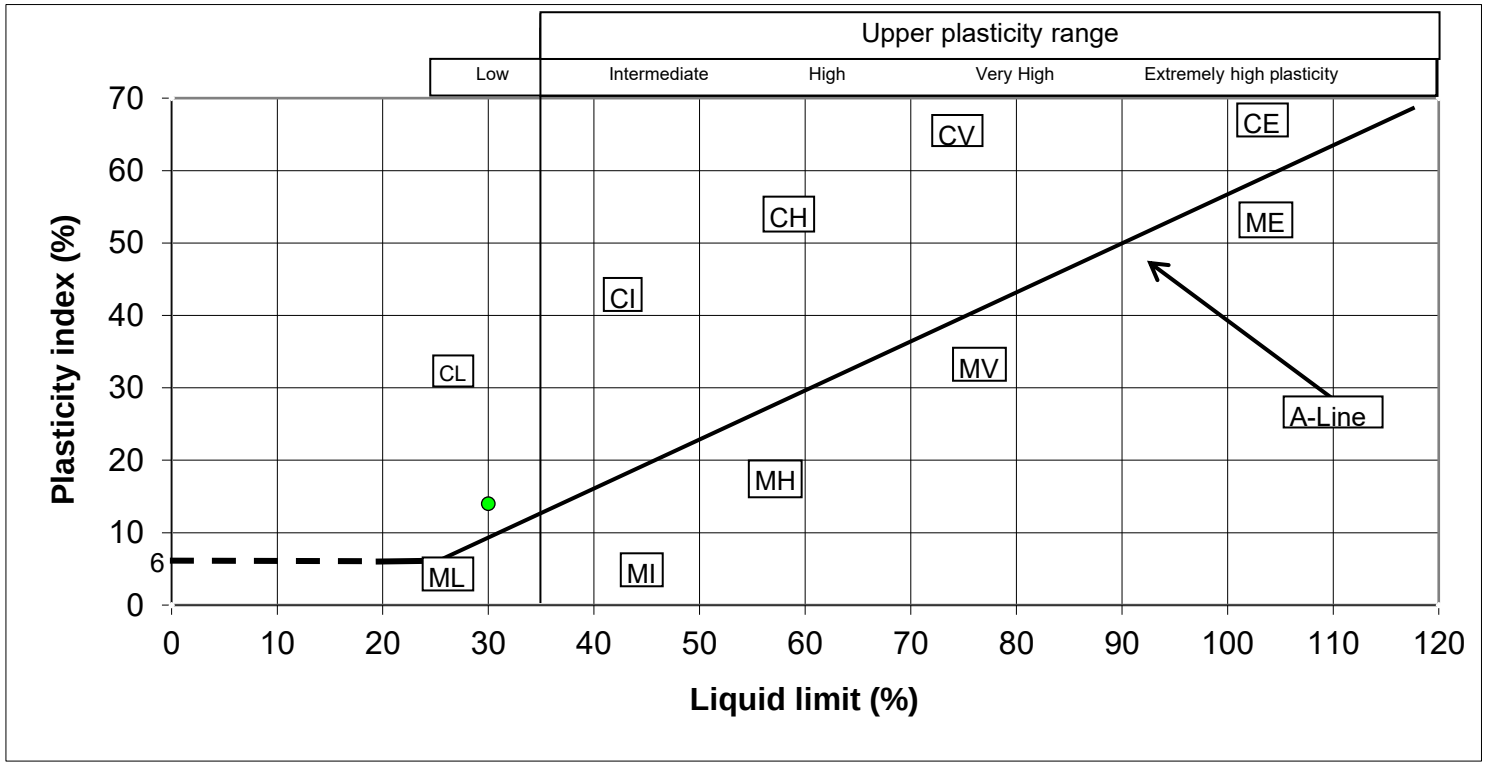
UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



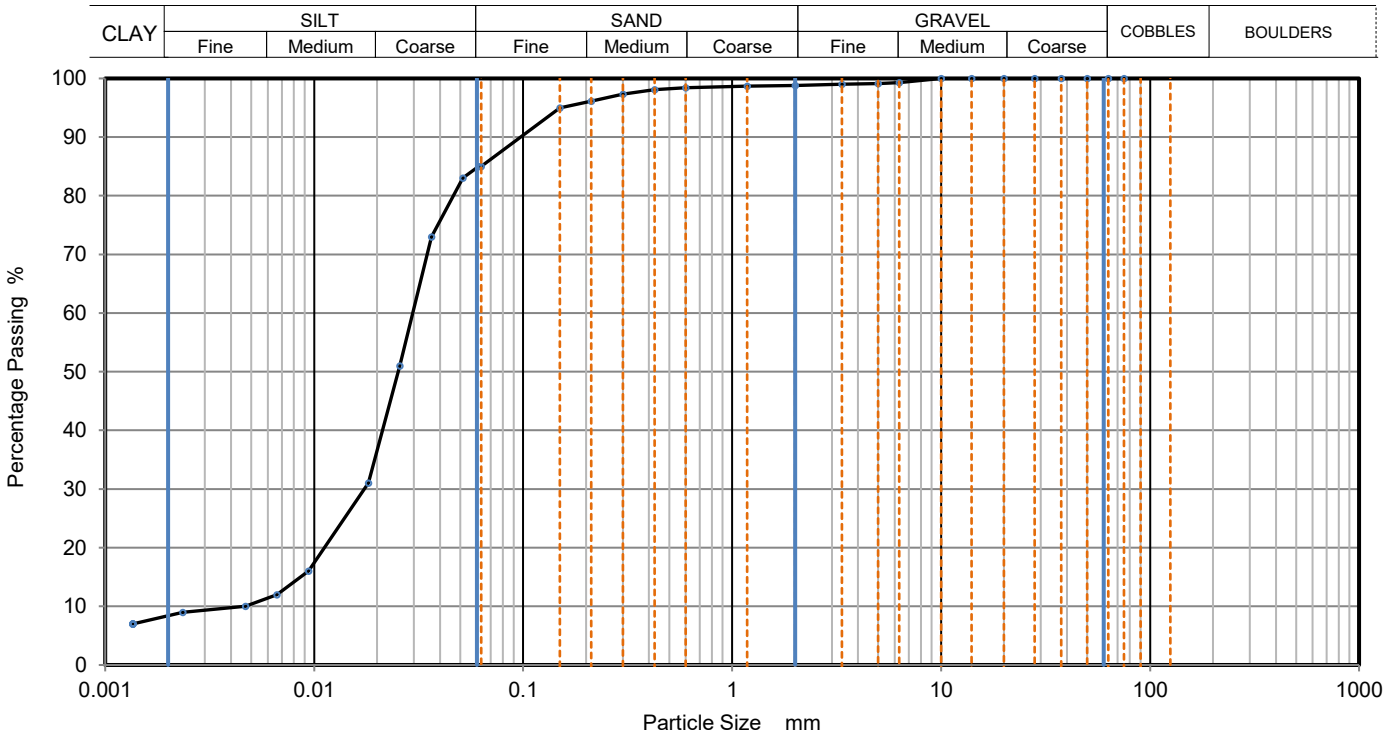
BH	Sample Depth	Liquid limit	Plasticity index
CP03	15.50	30.0	14.0

UKAS TESTING
4514

APPROVED BY	DK

CLIENT: LANCASHIRE COUNTY COUNCIL	SITE: COTTAM PARKWAY STATION (CCG-C-21-12093)

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**PARTICLE SIZE DISTRIBUTION**	Job Ref	**CCG-C-21-12093**
		Borehole/Pit No.	CP03
Site Name	COTTAM PARKWAY STATION	Sample No.	1
Specimen Description	Brown slightly sandy slightly gravelly clayey SILT	Depth, m	12.00
Specimen Reference	Specimen Depth m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5	KeyLAB ID	CCGL202104275



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0612	85
		0.0514	83
75	100	0.0364	73
63	100	0.0257	51
50	100	0.0182	31
37.5	100	0.0094	16
28	100	0.0066	12
20	100	0.0047	10
14	100	0.0023	9
10	100	0.0014	7
6.3	99		
5	99		
3.35	99		
2	99		
1.18	99		
0.6	98	Particle density (assumed)	
0.425	98	2.65 Mg/m3	
0.3	97		
0.212	96		
0.15	95		
0.063	85		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	14
Silt	77
Clay	8

Grading Analysis		
D100	mm	
D60	mm	0.0297
D30	mm	0.0172
D10	mm	0.00433
Uniformity Coefficient		6.9
Curvature Coefficient		2.3

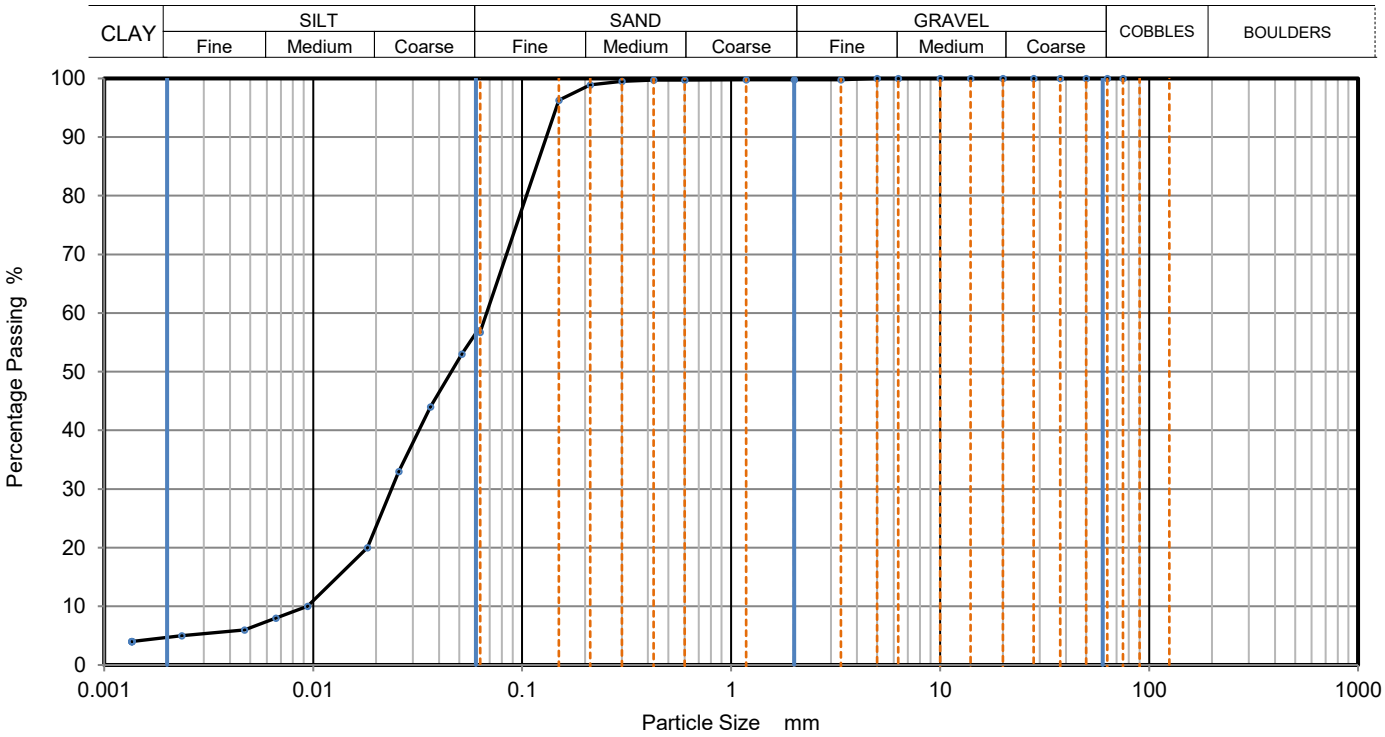
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig 1
JE	DK	DK	04/05/2021 16:48	Sheet

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**PARTICLE SIZE DISTRIBUTION**	Job Ref	**CCG-C-21-12093**
		Borehole/Pit No.	CP03

Site Name	COTTAM PARKWAY STATION			Sample No.	1
Specimen Description	Brown sandy clayey SILT			Depth, m	14.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	CCGL202104276



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0612	57
		0.0514	53
75	100	0.0364	44
63	100	0.0257	33
50	100	0.0182	20
37.5	100	0.0094	10
28	100	0.0066	8
20	100	0.0047	6
14	100	0.0023	5
10	100	0.0014	4
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed)	
0.425	100	2.65 Mg/m3	
0.3	100		
0.212	99		
0.15	96		
0.063	57		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	43
Silt	52
Clay	5

Grading Analysis		
D100	mm	
D60	mm	0.0678
D30	mm	0.0234
D10	mm	0.00964
Uniformity Coefficient		7
Curvature Coefficient		0.84

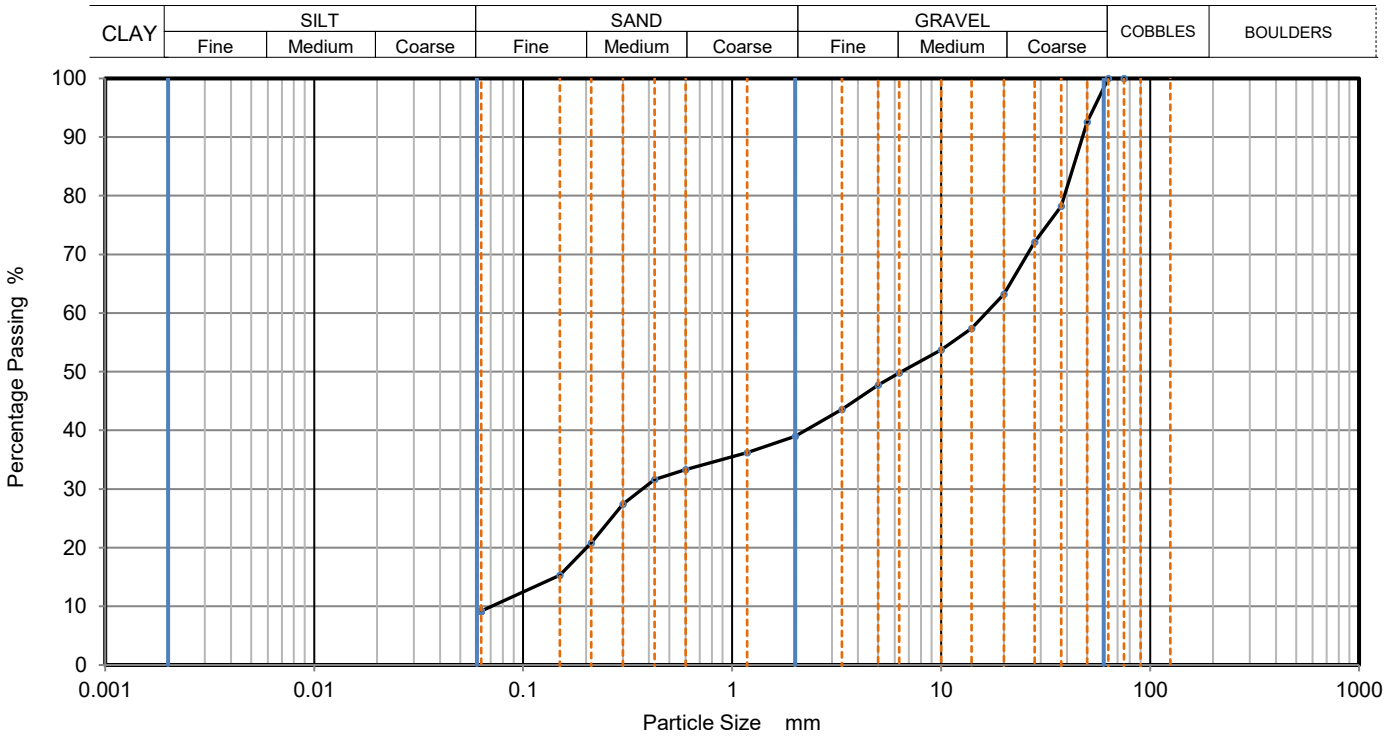
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig 1
JE	DK	DK	04/05/2021 16:48	Sheet

CC Geotechnical Ltd Tel: 0151 545 2750 e: lab@ccgeotechnical.com	**PARTICLE SIZE DISTRIBUTION**	Job Ref	**CCG-C-21-12093**
		Borehole/Pit No.	CP03

Site Name	COTTAM PARKWAY STATION			Sample No.	1
Specimen Description	Reddish brown very sandy silty GRAVEL			Depth, m	16.50
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	CCGL202104277



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	93		
37.5	78		
28	72		
20	63		
14	57		
10	54		
6.3	50		
5	48		
3.35	44		
2	39		
1.18	36		
0.6	33		
0.425	32		
0.3	27		
0.212	21		
0.15	15		
0.063	9		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	61
Sand	30
Fines <0.063mm	9

Grading Analysis		
D100	mm	
D60	mm	16.5
D30	mm	0.373
D10	mm	0.071
Uniformity Coefficient		230
Curvature Coefficient		0.12

Remarks

Preparation and testing in accordance with BS1377 unless noted below

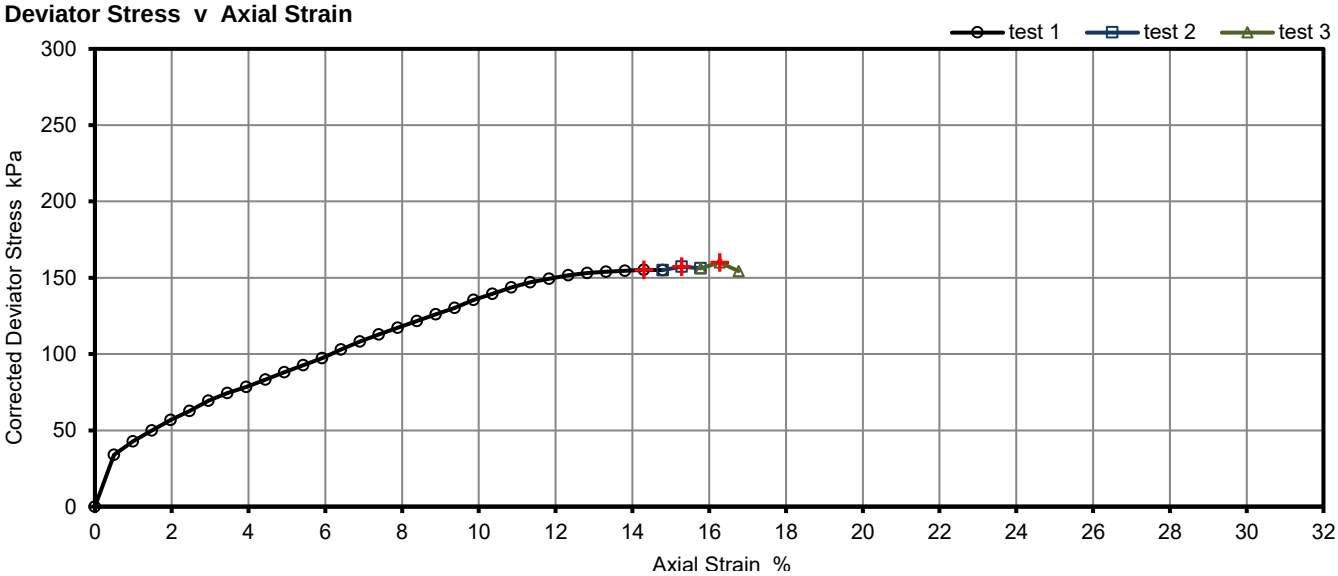
Operator	Checked	Approved	Sheet printed	**Fig** 1
JE	DK	DK	04/05/2021 16:48	Sheet

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - Multistage test			Job Ref	CCG-C-21-12093
				Borehole/Pit No.	CP03
Site Name	COTTAM PARKWAY STATION			Sample No.	1
Soil Description				Depth	10.00
Specimen Reference		Specimen Depth	m	Sample Type	U
Specimen Description	Brown slightly sandy slightly gravelly silty CLAY			KeyLAB ID	CCGL202104274
Test Method	BS1377:Part 7:1990, clause 9, multistage test on a single specir			Date of test	14/04/2021

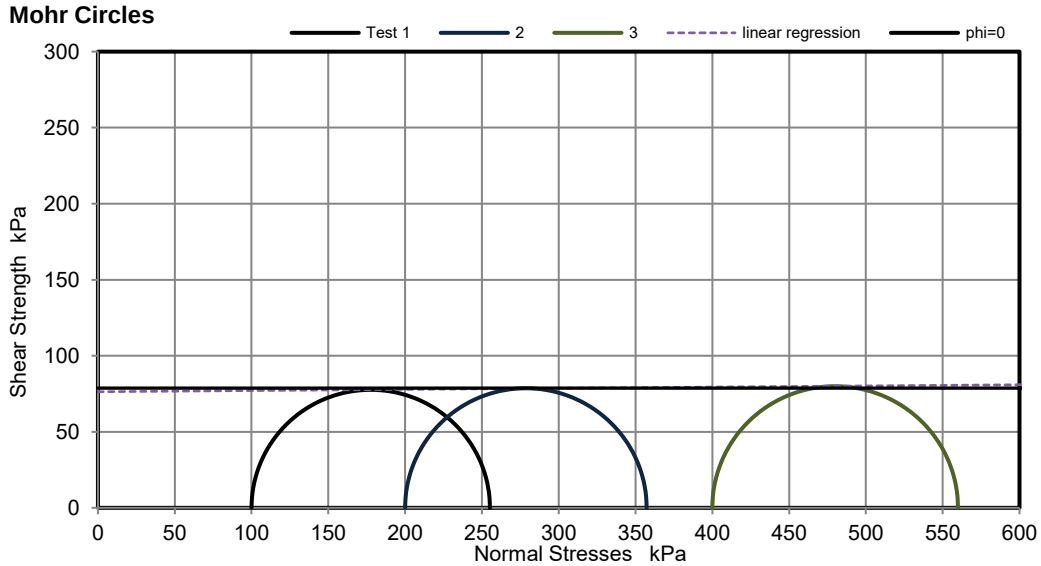
Length	mm	202.8
Diameter	mm	103.4
Bulk Density	Mg/m3	2.12
Moisture Content	%	21.7
Dry Density	Mg/m3	1.74

Rate of Strain		%/min	2.00		
Stage Number			1	2	3
Cell Pressure		kPa	100	200	400
End of stage	Axial Strain	%	14.3	15.3	16.3
	Deviator Stress, (σ1 - σ3) corrected for area and membrane	kPa	155.2	157.2	160.0
	Shear strength, cu	kPa	77.6	78.6	80.0
	Mode of failure		Plastic		

Deviator Stress v Axial Strain



Mohr Circles



ϕu = 0

Average cu 79 kPa

Linear Regression

ϕu 0.4 °

cu 76 kPa

Mohr circles and their interpretation is not covered by BS1377. These are provided for information only.

Remarks

Approved: DanielKerfoot

Printed: 27/04/2021 14:52

Fig. No. 1

Sheet 1

Lab Sheet Reference :

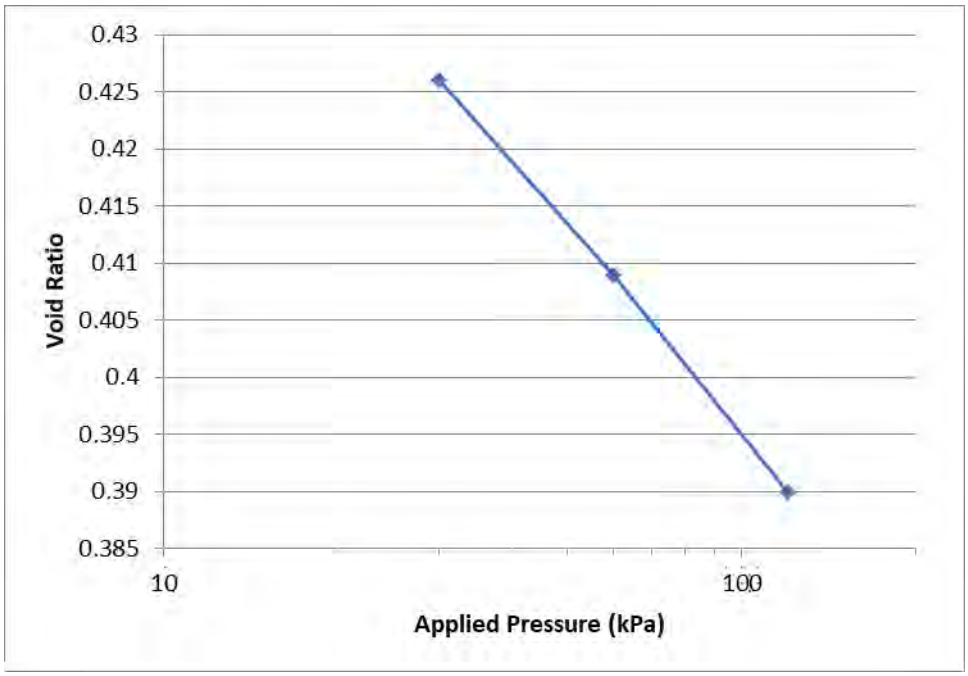
One Dimensional Consolidation Properties
(Oedometer)

Client	LCC	**Lab Ref**	
Project	COTTAM PARKWAY STATION	**Job**	CCG C 21 12093
Borehole	CP03	**Sample**	1

Test Details			
Standard	BS 1377: Part 5: 1990: Clause 3	**Particle Density (assumed)**	2.65 Mg/m3
Sample Type	Undisturbed sample - open drive	**Lab Temperature**	20.0 deg.C
Sample Depth	6.00 m		
Sample Description	Brown slightly sandy slightly gravelly silty CLAY		
Variations from Procedure	None		

Specimen Details			
Specimen Reference	A	**Description**	
Depth within Sample	0.00 mm	**Orientation within Sample**	
Specimen Mass	193.04 g	**Condition**	Natural Moisture
Specimen Height	20.20 mm	**Preparation**	
Comments			

Test Apparatus			
Ring Number	10	**Ring Diameter**	75.08 mm
Ring Height	20.20 mm	**Ring Weight**	126.76 g
Lever Ratio	9.00: 1		



Height of Solid Particles	13.91 mm	**Swelling Pressure**	