APPENDIX F

Chelmer
Site Investigations
'Groundbreaking Services'

Factual Report

Site	26 Westhill Park
	Camden
	London
	N6 6ND
Client	Tatiana Konopleva
Date	17.02.17 & 02.03.17
Our Ref	FACT/8522

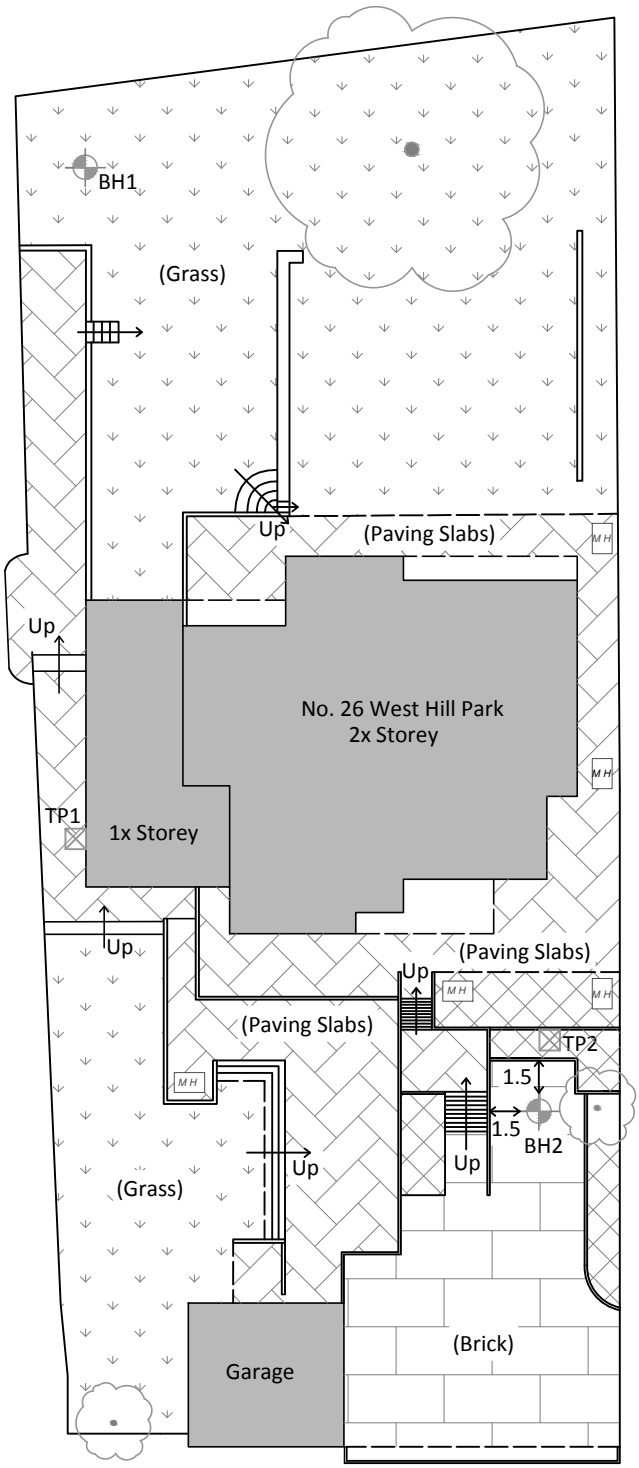
Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
Essex: 01245 400930 | London: 0203 640 9136 | info@siteinvestigations.co.uk | www.siteinvestigations.com

FACTUAL REPORT CONTENT

Chelmer Site Investigations
'Groundbreaking Services'

Site Plan

Site:		Client:			Site Plan ID:
26 West Hill Park, Highgate, London, N6 6ND		Tatiana Konopleva			SP
Contract Number:	**Date:**	**Logged By:**	**Checked by:**	**Weather:**	
8522	17/02/17	D.B.	J.H.	Dry	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Plan:**		**Scale:**
N.D.	N.D.	N.D.	N.D.		N.T.S.



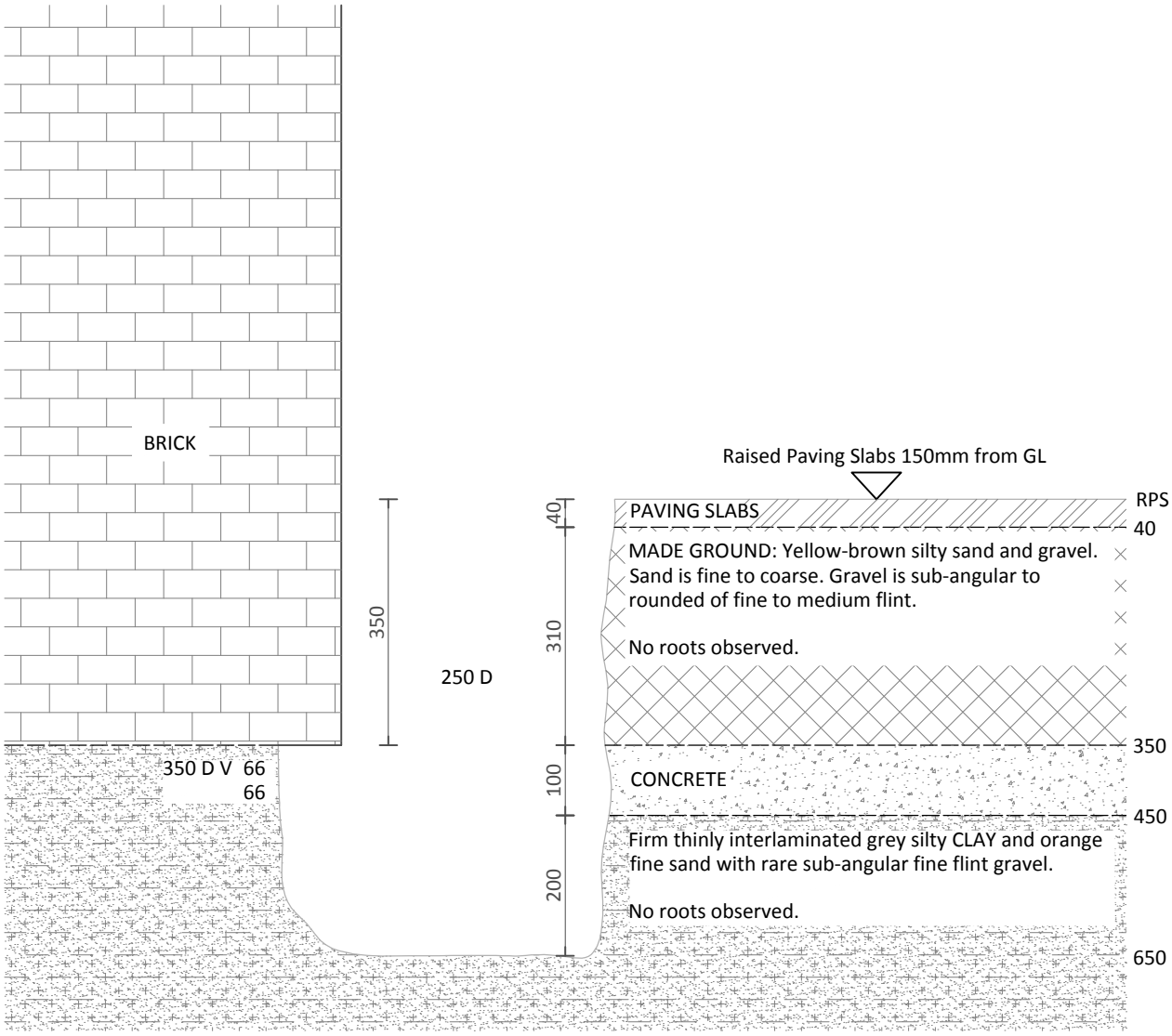
Remarks: All dimensions in metres.

Key:

Tree/shrub | Borehole | Trial pit | Manhole

Site:		Client:			Trial Pit ID:
26 West Hill Park, Highgate, London, N6 6ND		Tatiana Konopleva			TP1
Contract Number:	**Date:**	**Logged By:**	**Checked by:**	**Weather:**	
8522	17/02/17	L.J.S.	J.H.	Dry	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Excavation Method:**		**Scale:**
N.D.	N.D.	N.D.	HAND TOOLS		N.T.S.

Trial Pit Log



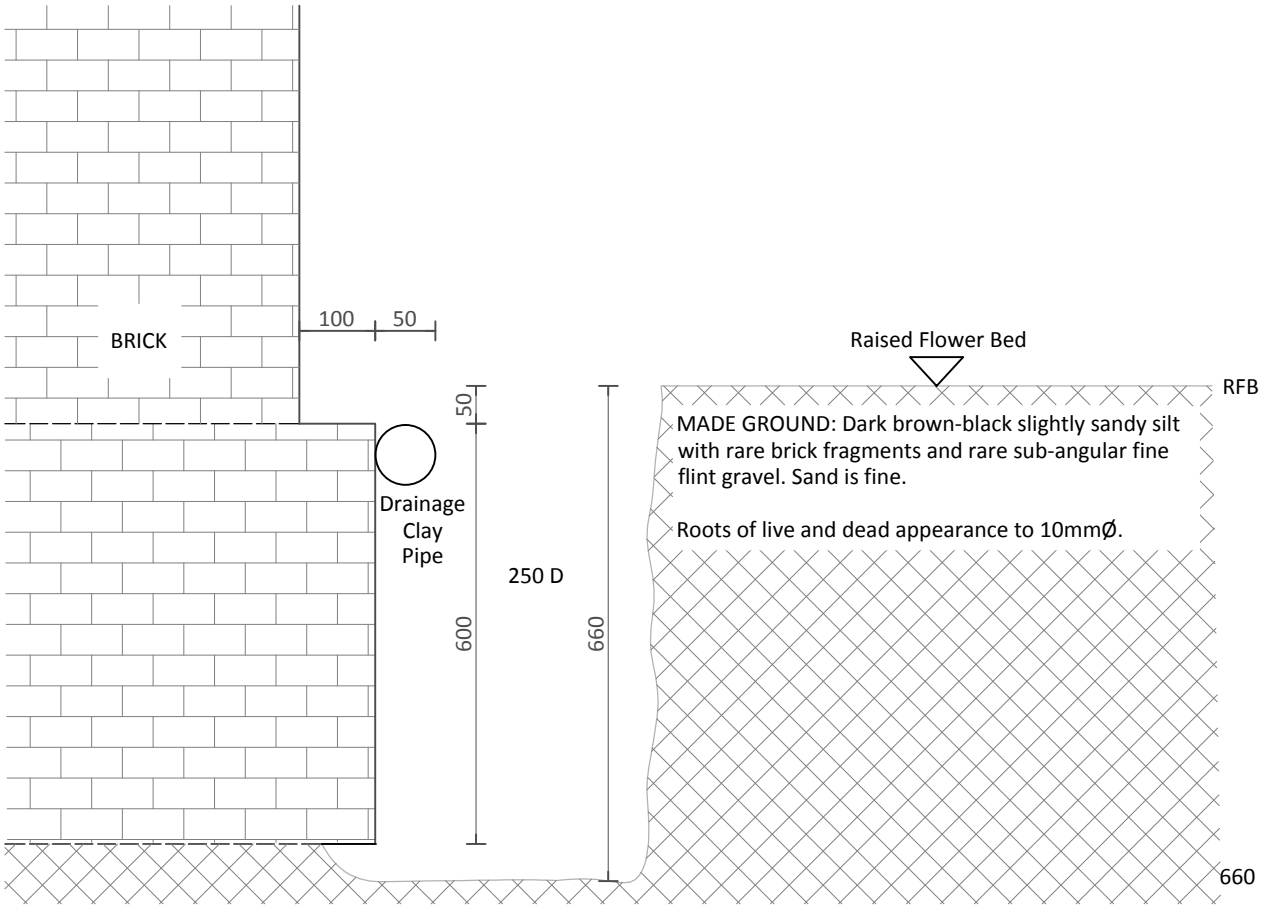
TRIAL PIT 1 TERMINATED AT 650mm

Remarks:	Key:
All dimensions in millimetres.	GL Ground Level RPS Raised Paving Slabs D Small Disturbed Sample V Pilcon Vane (kPa)

Chelmer Site Investigations
'Groundbreaking Services'

Trial Pit Log

Site:		Client:			Trial Pit ID:
26 West Hill Park, Highgate, London, N6 6ND		Tatiana Konopleva			TP2
Contract Number:	**Date:**	**Logged By:**	**Checked by:**	**Weather:**	
8522	17/02/17	L.J.S.	J.H.	Dry	Sheet 1 of 1
Easting:	**Northing:**	**Ground Level:**	**Excavation Method:**		**Scale:**
N.D.	N.D.	N.D.	HAND TOOLS		N.T.S.



TRIAL PIT 2 TERMINATED AT 660mm

Remarks:	Key:
All dimensions in millimetres.	RFB Raised Flower Bed D Small Disturbed Sample

Chelmer Site Investigations 'Groundbreaking Services'

Borehole Log

Site:	Client:	Borehole ID:
26 West Hill Park, Highgate, London, N6 6ND	Tatiana Konopleva	BH1

Contract Number:	Date:	Logged By:	Checked by:	Weather:	
8522	17/02/17	L.J.S.	J.H.	Dry	Sheet 1 of 1

Easting:	Northing:	Ground Level:	Plant Used:	Scale:
N.D.	N.D.	N.D.	100Ø CFA Secondman	N.T.S.

Samples & In Situ Testing			Strata Details				Roots and Groundwater		
Depth (m)	Sample	Test Result	Depth (m)	Thickness (m)	Legend	Strata Description	Roots Information	Gw (m)	Install
GL			GL				Roots of live and dead appearance of 1mmØ to 2.0m.		
0.25	D			0.90		MADE GROUND: Dark yellow-brown slightly sandy slightly gravelly silty clay with rare brick fragments. Sand is fine. Gravel is sub-rounded of fine chalk.			
0.50	D								
			0.90						
1.00	D	V 70 72				Firm orange brown sandy silty CLAY. Sand is fine.			
1.50	D								
2.00	D	V 94 94					No roots observed below 2.0m.		
2.50	D			3.60					
3.00	D	V 114 116				.....becoming stiff from 3.0m.			
3.50	D								
4.00	D	V 120+ 120+							
4.50	D		4.50			Stiff brown slightly sandy silty CLAY with occasional pockets of fine brown silt and orange sand.			
5.00	D	V 120+ 120+		1.50					
6.00	D	V 120+ 120+	6.00			Stiff moist dark grey slightly sandy silty CLAY with occasional pockets of brown silt and fine sand.			
7.00	D	V 120+ 120+						*7.0*	
8.00	D	V 120+ 120+		4.00		.....rare shell fragments at 8.0m.			
9.00	D	V 120+ 120+							
10.00	D	V 120+ 120+	10.10			Borehole terminated at 10.10m			

Remarks:

Groundwater 'strike' at 7.0m.
Borehole wet and open on completion.
Standpipe installed to 10.0m, slotted pipe: 9.0m, plain pipe: 1.0m, shingle and cover.

Key:

CFA Continuous Flight Auger
D Small Disturbed Sample
GL Ground Level
V Pilcon Vane (kPa)

Chelmer Site Investigations 'Groundbreaking Services'

Borehole Log

Site:	Client:	Borehole ID:
26 West Hill Park, Highgate, London N6 6ND	Tatiana Konopleva	BH2

Contract Number:	Date:	Logged By:	Checked by:	Weather:	
8522	02/03/17	L.J.S.	J.H.	Dry	Sheet 1 of 1

Easting:	Northing:	Ground Level:	Plant Used:	Scale:
N.D.	N.D.	N.D.	CFA Secondman	N.T.S.

Samples & In Situ Testing			Strata Details				Roots and Groundwater		
Depth (m)	Sample	Test Result	Depth (m)	Thickness (m)	Legend	Strata Description	Roots Information	Gw (m)	Install
GL			GL	0.10		Block paving	Roots of live and dead appearance of 1mmØ to 0.5m. No roots observed below 0.5m.		
			0.10	0.30		Concrete			
0.40	D		0.40	0.40		MADE GROUND: Brown slightly sandy gravelly silty clay with occasional brick and concrete fragments. Sand is fine to medium. Gravel is sub-angular of fine flint.			
0.50	D		0.80	1.20		Stiff orange-brown sandy silty CLAY with occasional grey veining. Sand is fine.			
1.00	D	V 78 80							
1.50	D								
2.00	D	V 92 90	2.00	2.80		Stiff brown sandy silty CLAY. Sand is fine.			
2.50	D								
3.00	D	V 120+ 120+							
3.50	D								
4.00	D	V 120+ 120+				.....becoming darker from 3.8m.			
4.50	D								
5.00	D	V 120+ 120+	4.80	5.20		Very stiff dark grey sandy silty CLAY with rare pockets of brown silt and fine sand.		6.8	
6.00	D	V 120+ 120+							
7.00	D	V 120+ 120+							
8.00	D	V 120+ 120+							
9.00	D	V 120+ 120+							
10.00	D	V 120+ 120+	10.10			Borehole terminated at 10.10m			

Remarks:

Groundwater 'seepage' at 6.8m.
Borehole moist and open on completion.
Plastic standpipe installed to 10.0m, slotted pipe: 9.0m, plain pipe: 1.0m, bentonite: 9.0m, shingle: 1.0m and gas value installed..

Key:

CFA	Continuous Flight Auger
D	Small Disturbed Sample
GL	Ground Level
V	Pilcon Vane (kPa)

Tatiana Konopleva
26 West Hill Park, Camden, N6 6ND
02.03.17
TRIAL PIT 1 PHOTOGRAPH

No photograph

Chelmer
Site Investigations
'Groundbreaking Services'

Tatiana Konopleva
26 West Hill Park, Camden, N6 6ND
02.03.17
TRIAL PIT 2 PHOTOGRAPH

Groundwater/Ground Gas Monitoring Record Sheet

Site Ref: 8522
Site Name: 26 West Hill Park, Highgate, London N6 6ND

Well	Date	Methane Peak	Methane Steady	Methane GSV	Carbon Dioxide Peak	Carbon Dioxide Steady	Carbon Dioxide GSV	Oxygen	Atmos.	Flow	Response Zone	Depth to Water	CO	H2S	VOC
		%v/v	%v/v	l/hr	%v/v	%v/v	l/hr	%v/v	mbar	l/hr	m bgl	m bgl	ppm	ppm	ppm
BH1	15.03.17	0.2	0.2	0.0000	4.5	4.5	0.0000	16.6	1024	0.0		3.40	0	0	0.0
	22.03.17	0.2	0.2	0.0002	6.2	6.1	0.0062	15.3	994	0.1		3.40	0	0	0.1
	12.04.17	0.2	0.2	0.0000	5.6	5.6	0.0000	14.7	1009	0.0		3.44	0	0	0.1
BH2	15.03.17	0.2	0.1	0.0000	0.5	0.4	0.0000	20.0	1024	0.0		1.74	1	0	0.2
	22.03.17	0.2	0.2	0.0000	1.0	0.8	0.0000	19.9	994	0.0		1.72	0	0	0.1
	12.04.17	0.2	0.2	0.0002	1.8	1.8	0.0018	17.9	1009	0.1		1.80	0	0	0.2

Notes

NR = Not recorded
Values in Red exceed CIRIA 665 criteria (CO_2 >5.0% and CH_4 >1.0%)

UKAS TESTING
8284

Chelmer
Geotechnical Laboratories
'Groundbreaking Services'

Laboratory Report

Site	26 West Hill Park, Camden
Client	Tatiana K
Date	22-Mar-17
Our Ref	CSI8522
CGL Ref	CGL8522

Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
Essex: 01245 400930 | London: 0203 6409136 |info@siteinvestigations.co.uk | www.siteinvestigations.com

UKAS TESTING
8284

Chelmer Geotechnical Laboratories
'Groundbreaking Services'

Content Summary

This report contains all test results as indicated on the test instruction/summary.

CGL Reference : CGL8522

Client Reference : CSI8522

For the attention of : Tatiana K

This report comprises of the following :

1	Cover Page
1	Inside Cover/Contents Page
3	Pages of Results
1	Moisture/Shear Strength Chart
1	Plasticity Chart
4	Particle Size Distribution - Sieve & Sedimentation Charts
5	Pages of BRE SD1 Results
1	Limitations of Report Page

Notes :

General

Please refer to report summary notes for details pertaining to methods undertaken and their subsequent accreditations

Samples were supplied by Chelmer Site Investigations

All tests performed in-house unless otherwise stated

Deviant Samples

Samples were received in suitable containers	Yes
A date and time of sampling was provided	Yes
Arrived damaged and/or denatured	No

Laboratory Testing Results

BS 1377 : 1990

Chelmer Geotechnical Laboratories "Groundbreaking Services"

Job Number : CGL8522
Client : Tatiana K
Client Reference : CSI8522
Site Name : 26 West Hill Park, Camden

Date Received : 07/03/2017
Date Testing Started : 07/03/2017
Date Testing Completed : 22/03/2017
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref			Sample Type	*Moisture Content (%) [1]	*Soil Faction > 0.425mm (%) [2]	*Liquid Limit (%) [3]	*Plastic Limit (%) [4]	*Plasticity Index (%) [5]	*Liquidity Index (%) [5]	*Modified Plasticity Index (%) [6]	*Soil Class [7]	Filter Paper Contact Time (h) [8]	*Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	*pH Value [11]	*Sulphate Content (g/l)		
BH/TP/WS	Depth (m)	UID															SO_3 [12]	SO_4 [13]	Class [14]
BH1	1.5	86159	D	23	<5	59	18	41	0.12	39	CH								
BH1	3.0	86162	D	20	<5	54	18	36	0.06	34	CH								
BH1	3.5	86163	D	21	<5	54	17	37	0.11	35	CH								
BH1	4.5	86164	D	26	<5	52	17	35	0.27	33	CH								
BH1	8.0	86166	D	31	<5	56	19	37	0.32	35	CH								

Notes :- *UKAS Accredited Tests

[1] BS 1377 : Part 2 : 1990, Test No 3.2
[2] Estimated if <5%, otherwise measured
[3] BS 1377 : Part 2 : 1990, Test No 4.4
[4] BS 1377 : Part 2 : 1990, Test No 5.3
[5] BS 1377 : Part 2 : 1990, Test No 5.4
[6] BRE Digest 240 : 1993
[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils
[8] In-house method S9a adapted from BRE IP 4/93
[9] Values of shear strength were determined in situ by Chelmer Site Investigations using a Pilcon hand vane or Geonor vane (GV).
[10] BS 1377 : Part 3 : 1990, Test No 4
[11] BS 1377 : Part 2 : 1990, Test No 9
[12] BS 1377 : Part 3 : 1990, Test No 5.6
[13] $SO_4 = 1.2 \times SO_3$
[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D - Disturbed sample
B - Bulk sample
U - U100 (undisturbed sample)
W - Water sample
ENP - Essentially Non-Plastic
U/S - Underside Foundation

UKAS TESTING 8284

Comments :-

Technician :- JH

Checked & Authorised By:- Martyn Graham **Senior Laboratory Technician**
Chelmer Site Investigation Laboratories Ltd

Date Checked :- 27/03/2017

Laboratory Testing Results

BS 1377 : 1990

Chelmer Geotechnical Laboratories "Groundbreaking Services"

Job Number : CGL8522
Client : Tatiana K
Client Reference : CSI8522
Site Name : 26 West Hill Park, Camden

Date Received : 07/03/2017
Date Testing Started : 07/03/2017
Date Testing Completed : 22/03/2017
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref			Sample Type	*Moisture Content (%) [1]	*Soil Faction > 0.425mm (%) [2]	*Liquid Limit (%) [3]	*Plastic Limit (%) [4]	*Plasticity Index (%) [5]	*Liquidity Index (%) [5]	*Modified Plasticity Index (%) [6]	*Soil Class [7]	Filter Paper Contact Time (h) [8]	*Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	*pH Value [11]	*Sulphate Content (g/l)		
BH/TP/WS	Depth (m)	UID															SO_3 [12]	SO_4 [13]	Class [14]
BH2	1.5	86169	D	19	<5	52	17	35	0.07	33	CH			91					
BH2	2.5	86170	D	27	<5	51	16	35	0.31	33	CH			120+					
BH2	3.5	86172	D	28	<5	53	17	36	0.31	34	CH			120+					
BH2	4.5	86174	D	27	<5	53	18	35	0.27	34	CH			120+					
BH2	5.5	86175	D	28	<5	55	17	38	0.29	36	CH			120+					
BH2	10.0	86178	D	30	<5	63	20	43	0.22	41	CH			120+					

Notes :- *UKAS Accredited Tests

[1] BS 1377 : Part 2 : 1990, Test No 3.2
[2] Estimated if <5%, otherwise measured
[3] BS 1377 : Part 2 : 1990, Test No 4.4
[4] BS 1377 : Part 2 : 1990, Test No 5.3
[5] BS 1377 : Part 2 : 1990, Test No 5.4
[6] BRE Digest 240 : 1993
[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils
[8] In-house method S9a adapted from BRE IP 4/93
[9] Values of shear strength were determined in situ by Chelmer Site Investigations using a Pilcon hand vane or Geonor vane (GV).
[10] BS 1377 : Part 3 : 1990, Test No 4
[11] BS 1377 : Part 2 : 1990, Test No 9
[12] BS 1377 : Part 3 : 1990, Test No 5.6
[13] $SO_4 = 1.2 \times SO_3$
[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D - Disturbed sample
B - Bulk sample
U - U100 (undisturbed sample)
W - Water sample
ENP - Essentially Non-Plastic
U/S - Underside Foundation

UKAS TESTING 8284

Comments :-

Technician :- JH

Checked & Authorised By:- Martyn Graham **Senior Laboratory Technician**
Chelmer Site Investigation Laboratories Ltd

Date Checked :- 27/03/2017

Laboratory Testing Results

BS 1377 : 1990

Job Number : CGL8522
Client : Tatiana K
Client Reference : CSI8522
Site Name : 26 West Hill Park, Camden

Date Received : 07/03/2017
Date Testing Started : 07/03/2017
Date Testing Completed : 22/03/2017
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref			Sample Type	*Moisture Content (%) [1]	*Soil Faction > 0.425mm (%) [2]	*Liquid Limit (%) [3]	*Plastic Limit (%) [4]	*Plasticity Index (%) [5]	*Liquidity Index (%) [5]	*Modified Plasticity Index (%) [6]	*Soil Class [7]	Filter Paper Contact Time (h) [8]	*Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	*pH Value [11]	*Sulphate Content (g/l)		
BH/TP/WS	Depth (m)	UID															SO_3 [12]	SO_4 [13]	Class [14]
TP1	0.4	86179	D	34	<5	65	20	45	0.31	43	CH			66					

Notes :- *UKAS Accredited Tests

[1] BS 1377 : Part 2 : 1990, Test No 3.2
[2] Estimated if <5%, otherwise measured
[3] BS 1377 : Part 2 : 1990, Test No 4.4
[4] BS 1377 : Part 2 : 1990, Test No 5.3
[5] BS 1377 : Part 2 : 1990, Test No 5.4
[6] BRE Digest 240 : 1993
[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils
[8] In-house method S9a adapted from BRE IP 4/93
[9] Values of shear strength were determined in situ by Chelmer Site Investigations using a Pilcon hand vane or Geonor vane (GV).
[10] BS 1377 : Part 3 : 1990, Test No 4
[11] BS 1377 : Part 2 : 1990, Test No 9
[12] BS 1377 : Part 3 : 1990, Test No 5.6
[13] $SO_4 = 1.2 \times SO_3$
[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D - Disturbed sample
B - Bulk sample
U - U100 (undisturbed sample)
W - Water sample
ENP - Essentially Non-Plastic
U/S - Underside Foundation

UKAS TESTING 8284

Comments :-

Technician :- JH

Checked & Authorised By:- Martyn Graham **Senior Laboratory Technician**
Chelmer Site Investigation Laboratories Ltd

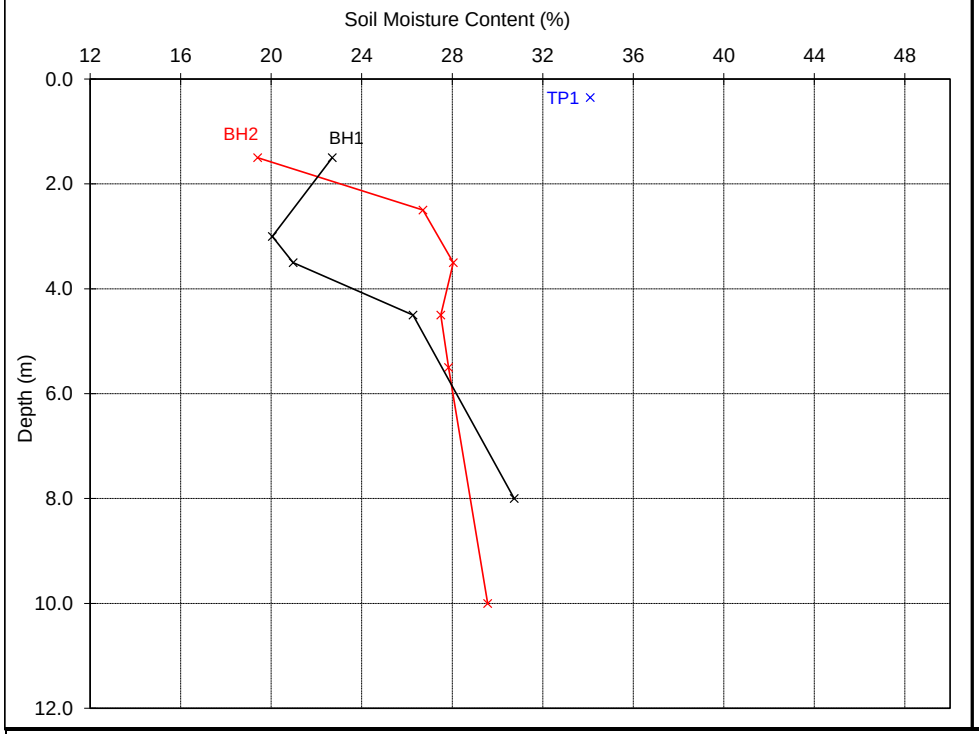
Date Checked :- 27/03/2017

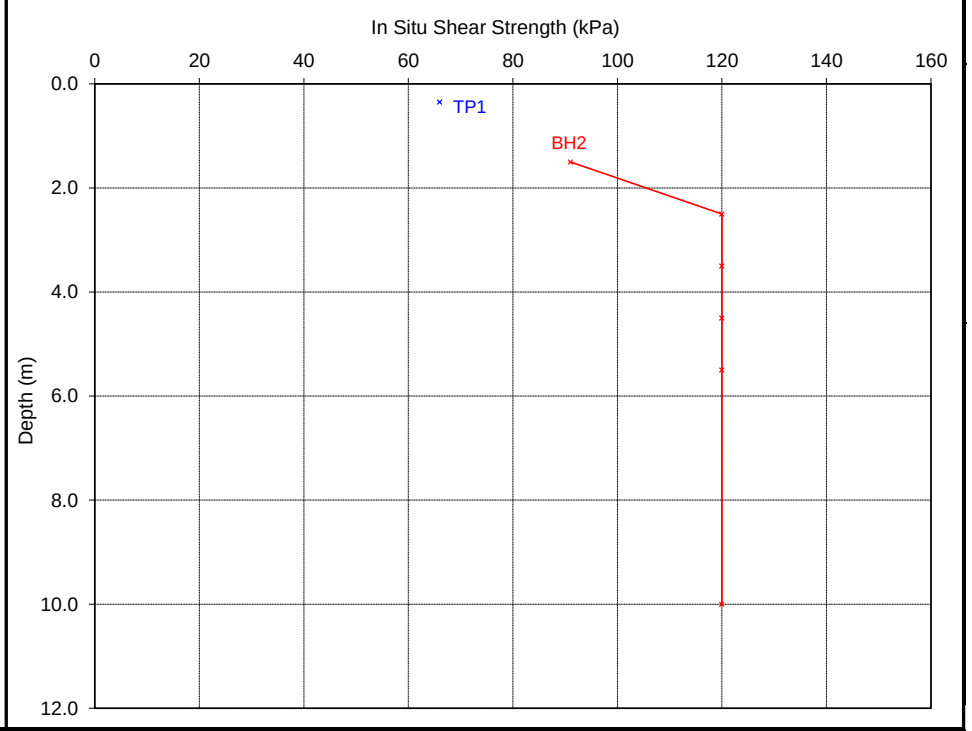
Laboratory Testing Results

Moisture Content/Shear Strength Profile

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number :	CGL8522	Date Received :	07/03/2017
Client :	Tatiana K	Date Testing Started :	07/03/2017
Client Reference :	CSI8522	Date Testing Completed :	22/03/2017
Site Name :	26 West Hill Park, Camden	Laboratory :	Chelmer Geotechnical Laboratories, CM3 8AB





Notes :-

1. If the Soil Fraction > 0.425mm exceeds 5% the Equivalent Moisture Content of the remainder (calculated in accordance with BS 1377: Part 2 : 1990, cl.3.2.4 note 1) is also plotted and the alternative profile additionally shown as an appropriately coloured broken line.
2. If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly over consolidated clays) at shallow depths.

Unless otherwise stated, values of Shear Strength were determined in situ by Chelmer Site Investigations using a Pilcon Hand Vane the calibration of which is limited to a maximum reading of 140 kPa. (Not UKAS accredited)

UKAS TESTING 8284

Comments :-

Checked & Authorised By:- Martyn Graham **Senior Laboratory Technician**
Chelmer Site Investigation Laboratories Ltd

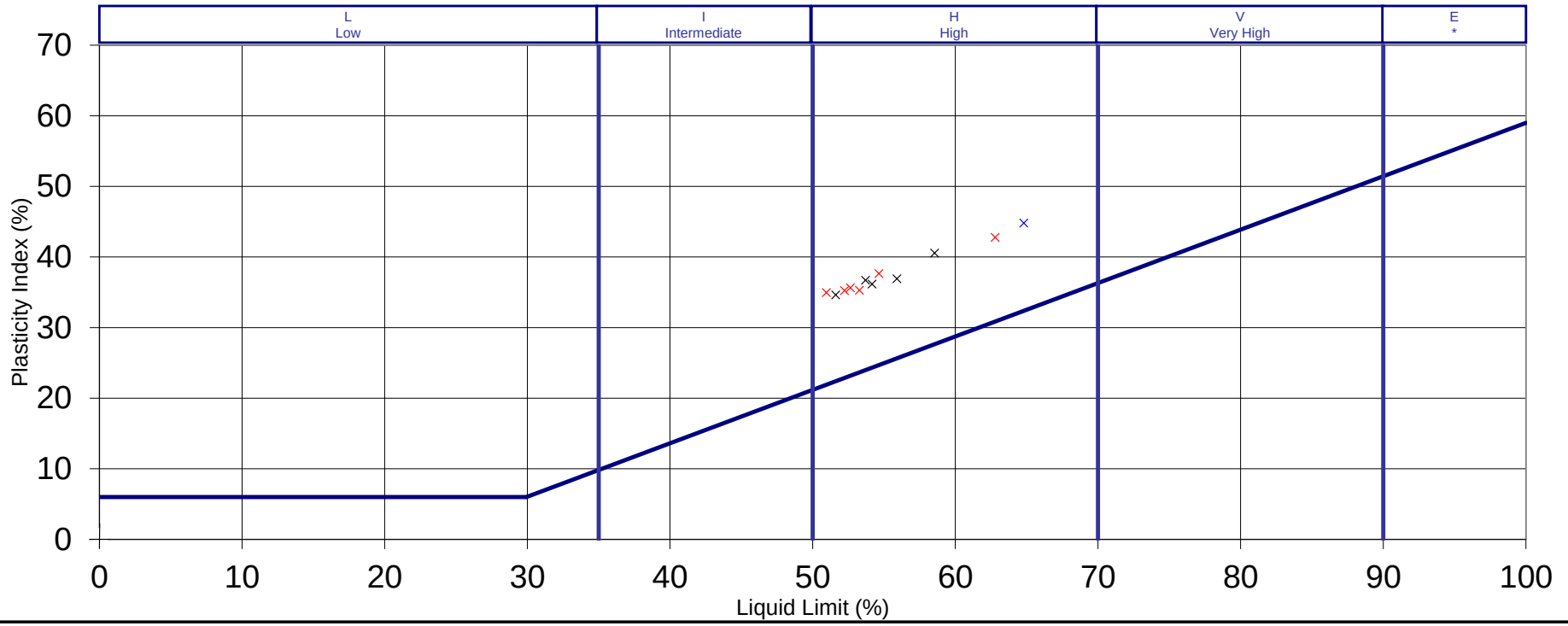
Date: 27/03/2017

Laboratory Testing Results

Plasticity Chart for the classification of fine soils and the finer part of coarse soils
In Compliance with BS5930 : 1999

Chelmer Geotechnical Laboratories
'Groundbreaking Services'

Job Number :	CGL8522	Date Received :	07/03/2017
Client :	Tatiana K	Date Testing Started :	07/03/2017
Client Reference :	CSI8522	Date Testing Completed :	22/03/2017
Site Name :	26 West Hill Park, Camden	Laboratory :	Chelmer Geotechnical Laboratories, CM3 8AB



Notes :-

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

Key :- TP1
BH1
BH2

UKAS TESTING
8284

Comments :-

Checked & Authorised By:- Martyn Graham **Senior Laboratory Technician**
Chelmer Site Investigation Laboratories Ltd

Date: 27/03/2017

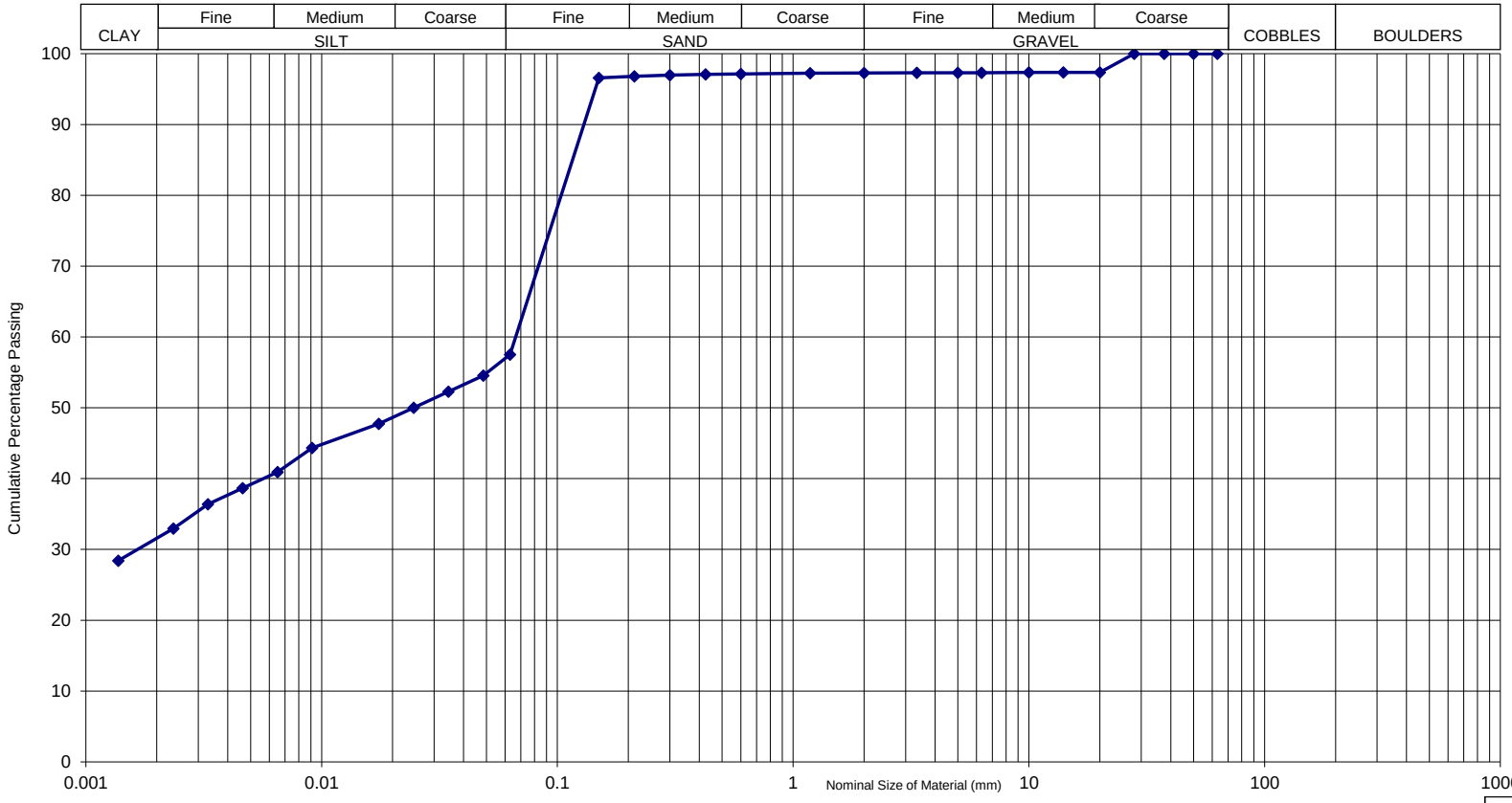
PARTICLE SIZE DISTRIBUTION

BS 1377-2:1990

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number :	CGL8522	Site Name :	26 West Hill Park, Camden
Sample Number :	BH1	Soil Description :	Sandy silty CLAY with rare coarse gravel.
Depth (m) :	2.5		
Sample UID :	86161		

Type of Sieving :	Hydrometer
Date :	10-Mar-17
Tested By :	CE
Laboratory :	Chelmer Geotechnical CM3 8AB



Sieve Size (mm)	% Passing
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	97
14.0	97
10.0	97
6.3	97
5.0	97
3.35	97
2.00	97
1.18	97
0.600	97
0.425	97
0.300	97
0.212	97
0.150	97
0.063	58
0.048	55
0.035	52
0.025	50
0.017	48
0.009	44
0.007	41
0.005	39
0.003	36
0.002	33
0.001	28

Calculations :-

$$f = \frac{(M_1 - M_2) + P}{M_1} \times 100$$

$f = 100P/M_1$ (dry sieving)

f = Percentage of fines passing 0.063mm
M_1 = Mass of dried test sample before washing (kg)
M_2 = Mass of dried residue retained on the 0.063m (kg)
P = Mass of screened material remaining in the pan (kg)

Comments :-
Results Passing 63µm Sieve NOT UKAS accredited.

UKAS TESTING 8284

Checked By :- MG Date Checked :- 27-Mar-17

PARTICLE SIZE DISTRIBUTION

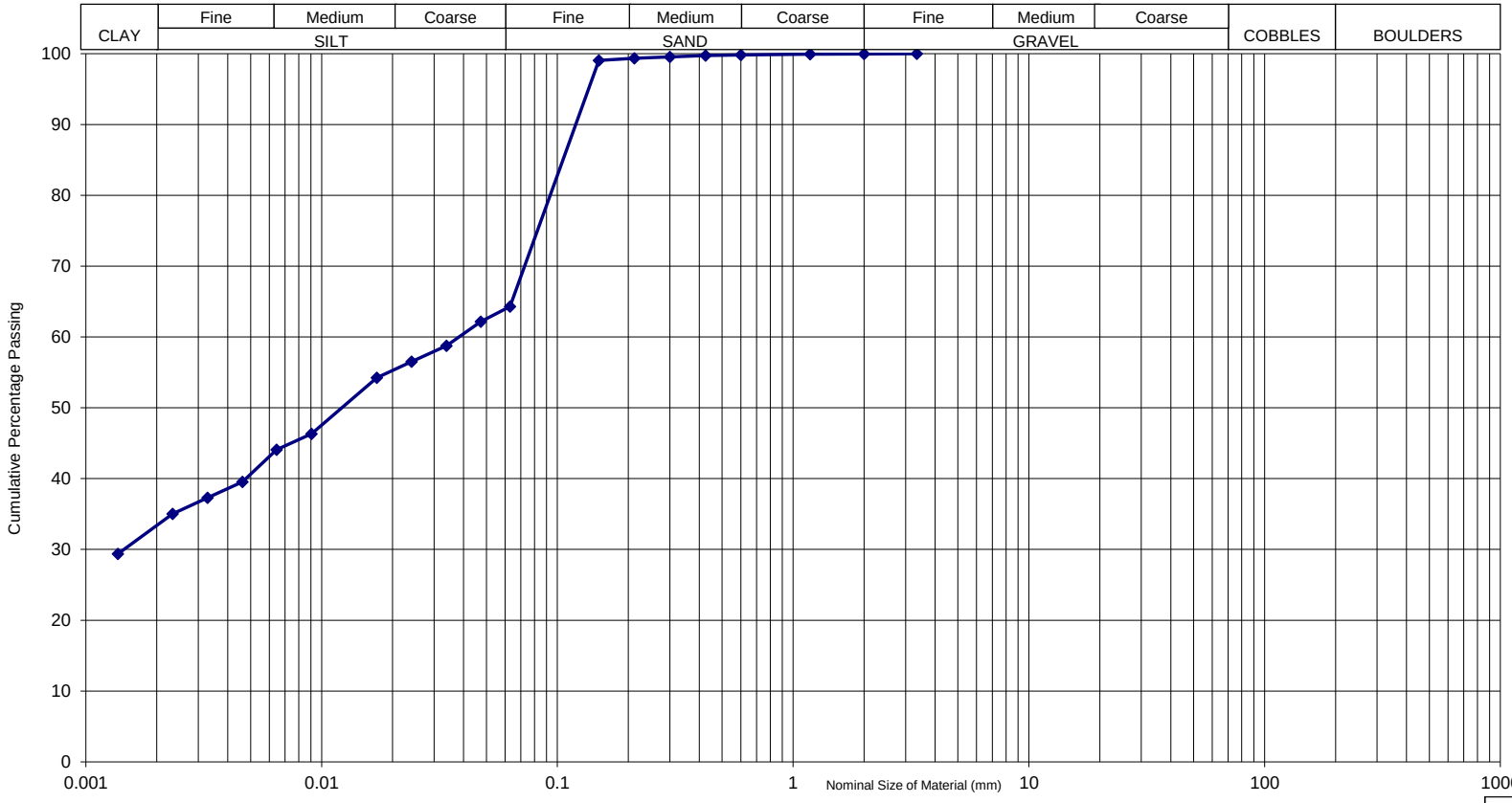
BS 1377-2:1990

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number : CGL8522
Sample Number : BH1
Depth (m) : 5.0
Sample UID : 86165

Site Name : 26 West Hill Park, Camden
Soil Description : Sandy silty CLAY.

Type of Sieving : Hydrometer
Date : 10-Mar-17
Tested By : CE
Laboratory : Chelmer Geotechnical CM3 8AB



Sieve Size (mm)	% Passing
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	100
6.3	100
5.0	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	99
0.150	99
0.063	64
0.047	62
0.034	59
0.024	57
0.017	54
0.009	46
0.006	44
0.005	40
0.003	37
0.002	35
0.001	29

Calculations :-

$$f = \frac{(M_1 - M_2) + P}{M_1} \times 100$$

$f = 100P/M_1$ (dry sieving)

f = Percentage of fines passing 0.063mm
M_1 = Mass of dried test sample before washing (kg)
M_2 = Mass of dried residue retained on the 0.063m (kg)
P = Mass of screened material remaining in the pan (kg)

Comments :-
Results Passing 63µm Sieve NOT UKAS accredited.

UKAS TESTING 8284

Checked By :- MG

Date Checked :- 27-Mar-17

PARTICLE SIZE DISTRIBUTION

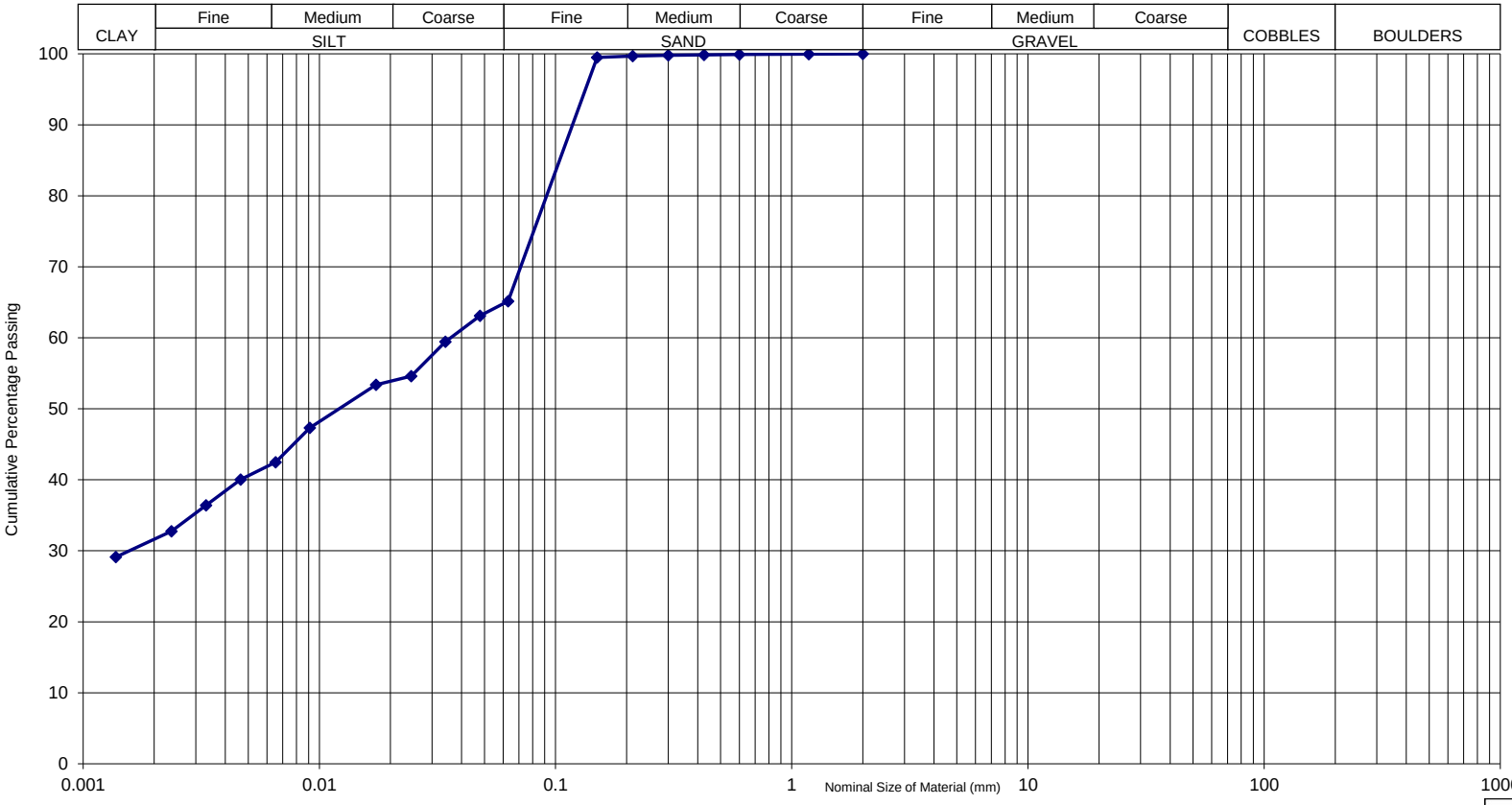
BS 1377-2:1990

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number : CGL8522
Sample Number : BH2
Depth (m) : 4.0
Sample UID : 86173

Site Name : 26 West Hill Park, Camden
Soil Description : Sandy silty CLAY.

Type of Sieving : Hydrometer
Date : 10-Mar-17
Tested By : CE
Laboratory : Chelmer Geotechnical CM3 8AB



Sieve Size (mm)	% Passing
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	100
6.3	100
5.0	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	100
0.150	99
0.063	65
0.048	63
0.034	59
0.024	55
0.017	53
0.009	47
0.007	42
0.005	40
0.003	36
0.002	33
0.001	29

Calculations :-

$$f = \frac{(M_1 - M_2) + P}{M_1} \times 100$$

$f = 100P/M_1$ (dry sieving)

f = Percentage of fines passing 0.063mm
M_1 = Mass of dried test sample before washing (kg)
M_2 = Mass of dried residue retained on the 0.063m (kg)
P = Mass of screened material remaining in the pan (kg)

Comments :-
Results Passing 63µm Sieve NOT UKAS accredited.

UKAS TESTING 8284

Checked By :- MG

Date Checked :- 27-Mar-17

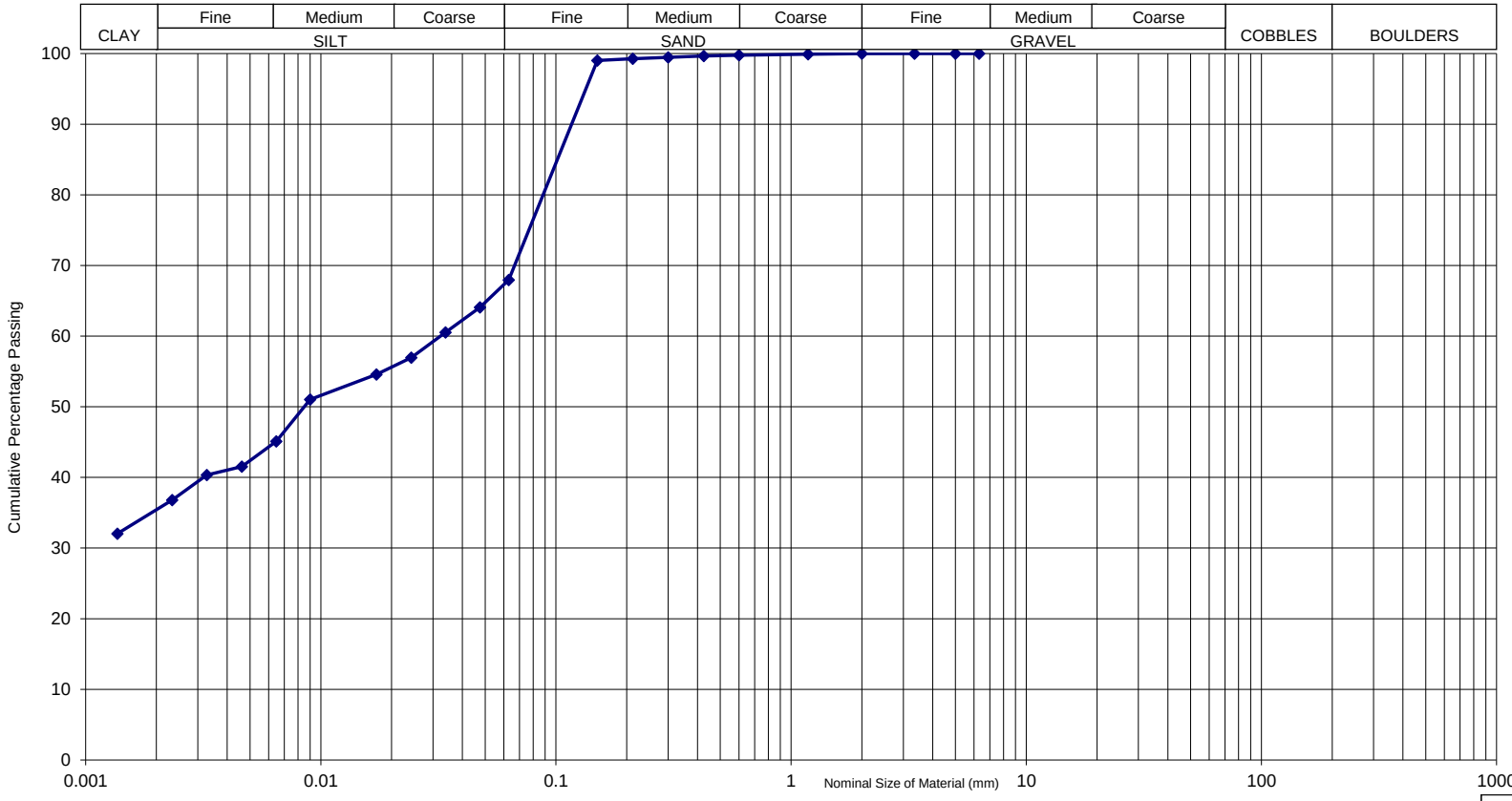
PARTICLE SIZE DISTRIBUTION

BS 1377-2:1990

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number :	CGL8522	Site Name :	26 West Hill Park, Camden
Sample Number :	BH2	Soil Description :	Sandy silty CLAY.
Depth (m) :	6.0		
Sample UID :	86176		

Type of Sieving :	Hydrometer
Date :	10-Mar-17
Tested By :	CE
Laboratory :	Chelmer Geotechnical CM3 8AB



Sieve Size (mm)	% Passing
90.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	100
6.3	100
5.0	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	99
0.212	99
0.150	99
0.063	68
0.048	64
0.034	61
0.024	57
0.017	55
0.009	51
0.006	45
0.005	42
0.003	40
0.002	37
0.001	32

Calculations :-

$$f = \frac{(M_1 - M_2) + P}{M_1} \times 100$$

$f = 100P/M_1$ (dry sieving)

f = Percentage of fines passing 0.063mm
M_1 = Mass of dried test sample before washing (kg)
M_2 = Mass of dried residue retained on the 0.063m (kg)
P = Mass of screened material remaining in the pan (kg)

Comments :-
Results Passing 63µm Sieve NOT UKAS accredited.

UKAS TESTING 8284

Checked By :- MG Date Checked :- 27-Mar-17

Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

Chelmer Site Investigations
Unit 15
East Hanningfield Industrial Estate
CM3 8AB

Analytical Test Report: L17/0622/CSI/001

Your Project Reference:	**CGL8522**	Samples Received on:	13.03.2017
Your Order Number:	7801	Testing Instruction Received:	13.03.2017
Report Issue Number:	1	Sample Tested:	13 to 17.03.2017
Samples Analysed:	7 Soils	Report issued:	17.03.2017

Signed

James Gane
Commercial Manager
Nicholls Colton Group

Notes:

General

Please refer to Methodologies tab for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Samples were supplied by customer, results are representative of the material provided

Deviating Samples

Samples were received in suitable containers	**Yes**
A date and time of sampling was provided	**Yes**
Sample holding times were exceeded prior to analysis of determinants	**No**

Where samples do not meet one or more of the above criteria they will be classed as deviating, this means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

Date of Issue 24.01.2017
Owned by Emily Blissett - Customer Services Supervisor
Authorised by James Gane - Commercial Manager
G:\LE1 Production\Commercial\Current Reports\2017\L17\CSI - Chelmer\L17-0622-CSI\[L17-0622-CSI 001.xlsx]Sample Descriptions

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L17/0622/CSI/001

Project Reference - CGL8522

Analytical Test Results - BRE Suite

NC Reference			17-8216	17-8217	17-8218	17-8219	17-8220	17-8221
Client Sample Reference			86158	86160	86164	86167	86168	86171
Client Sample Location			BH1	BH1	BH1	BH1	BH2	BH2
Depth (m)			0.50	2.00	4.50	10.0	0.50	3.00
Date of Sampling			06.03.2017	06.03.2017	06.03.2017	06.03.2017	06.03.2017	06.03.2017
Time of Sampling			AM	AM	AM	AM	AM	AM
Sample Matrix			Clay	Clay	Clay	Clay	Clay	Clay
Determinant	**Units**	**Accreditation**						
Water soluble sulphate	(mg/l)	u	93	150	160	990	190	83
Acid Soluble Sulphate	(%)	u	0.04	0.05	0.14	0.33	0.09	0.04
Total Sulphur	(%)	u	0.02	0.02	0.05	0.78	0.04	0.01
pH Value	pH Units	MCERTS	8.4	7.7	7.6	7.6	10.8	9.6

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L17/0622/CSI/001

Project Reference - CGL8522

Analytical Test Results - BRE Suite

NC Reference			17-8222
Client Sample Reference			86177
Client Sample Location			BH2
Depth (m)			8.00
Date of Sampling			06.03.2017
Time of Sampling			AM
Sample Matrix			Clay
Determinant	**Units**	**Accreditation**	
Water soluble sulphate	(mg/l)	u	390
Acid Soluble Sulphate	(%)	u	0.18
Total Sulphur	(%)	u	0.42
pH Value	pH Units	MCERTS	8.6

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L17/0622/CSI/001

Project Reference - CGL8522

Sample Descriptions

NC Reference	Client Sample Reference	Sample Location	Description	% Passing 2mm BS test sieve
17-8216	86158	BH1	Brown/orange silty sandy clay.	100
17-8217	86160	BH1	Brown/orange silty sandy clay.	100
17-8218	86164	BH1	Brown silty sandy clay.	100
17-8219	86167	BH1	Grey silty sandy clay.	100
17-8220	86168	BH2	Brown/orange silty sandy clay.	100
17-8221	86171	BH2	Brown/orange silty sandy gravelly clay.	100
17-8222	86177	BH2	Grey silty sandy clay.	100

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L17/0622/CSI/001

Project Reference - CGL8522

Analysis Methodologies

Matrix	Determinant	Sample condition for analysis	Test Method used
Soil	pH	As Received	In house method statement - MS - CL - pH in soils (using a 1:3 soil to water extraction)
Soil	Sulphate (w/s)	Oven Dried	In house method statement - MS - CL - Anions by Aquakem
Soil	Acid Sulphate	Oven Dried	In house method statement - MS - CL - BRE Analysis
Soil	Total Sulphur	Oven Dried	In house method statement - MS - CL - BRE Analysis

8284

This report is personal to the client, confidential and non assignable. It is issued with no admission of liability to any third party.

This report shall not be reproduced, except in full, without the written approval of Chelmer Site Investigations Laboratories Ltd.

Where our involvement consists exclusively of testing samples, the results and comments (if provided) relate only to the samples tested.

Any samples that are deemed to be subject to deviation will be recorded as such within the test summary.

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7 - 11 Harding Street
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Chelmer Site Investigations
Unit 15
Hanningfield Industrial Estate
CM3 8AB

Analytical Test Report: L17/0620/CSI/001

Your Project Reference:	**CGL8522-C**	Samples Received on:	13.03.2017
Your Order Number:	7799	Testing Instruction Received:	13.03.2017
Report Issue Number:	1	Sample Tested:	13 to 21.03.2017
Samples Analysed:	3 Soils	Report issued:	21.03.2017

Signed

James Gane
Commercial Manager
Nicholls Colton Group

Notes:

General

Please refer to Methodologies tab for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Moisture Content was determined in accordance with NC method statement MS - CL - Sample Prep, oven dried at <30˚C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Stone Content was determined in accordance with NC method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

With the exception of Sulphate, Sulphur and LoI which are crushed over the 2mm test sieve, concentrations are reported as a percentage mass of the dry soil passing the 10mm BS test sieve. As received samples have been corrected for moisture content but not stone content.

Samples were supplied by customer, results are representative of the material provided

Deviating Samples

Samples were received in suitable containers	**Yes**
A date and time of sampling was provided	**Yes**
Sample holding times were exceeded prior to analysis of determinants	**Yes**

Where samples do not meet one or more of the above criteria they will be classed as deviating, this means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

WAC Testing

Samples were leached in accordance with BS EN 12457-2: 2002.

Eluate Results are reported as L/S 10. These results have been calculated in accordance with BS EN 12457-2:2002.

Comparative values are taken from the Environment Agency document “Guidance for waste destined for disposal in landfills”, Version 2, June 2006.

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

Date of Issue 24.01.2017
Owned by Emily Blissett - Customer Services Supervisor
Authorised by James Gane - Commercial Manager
G:\LE1 Production\Commercial\Current Reports\2017\L17\CSI - Chelmer\L17-0620-CSI\[L17-0620-CSI 001.xlsx]Cover Sheet

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L17/0620/CSI/001

Project Reference - CGL8522-C

Analytical Test Results - Env Suite 1

NC Reference			17-8198	17-8200
Client Sample Reference			86144	86146
Client Sample Location			BH1	BH2
Depth (m)			0.25	0.50
Date of Sampling			06.03.2017	06.03.2017
Time of Sampling			AM	AM
Sample Matrix			Clay	Clay
Determinant	**Units**	**Accreditation**		
Arsenic	(mg/kg)	MCERTS	32.3	< 10
Cadmium	(mg/kg)	MCERTS	1.2	0.7
Chromium (Total)	(mg/kg)	UKAS	30.8	28.6
Copper	(mg/kg)	MCERTS	22.5	11.2
Lead	(mg/kg)	MCERTS	66.9	29.4
Mercury	(mg/kg)	UKAS	< 2.5	< 2.5
Nickel	(mg/kg)	MCERTS	13.1	18.1
Selenium	(mg/kg)	u	< 8	< 8
Zinc	(mg/kg)	MCERTS	67.2	44.9
Total Phenols	(mg/kg)	MCERTS	< 1	< 1
Cyanide (Total)	(mg/kg)	MCERTS	< 1	< 1
pH	pH Units	MCERTS	8.5	10.3
Sulphate	(mg/l)	u	61	110
Sulphur	(%)	u	0.02	0.02
Sulphide	(mg/kg)	u	4.0	4.0
Acenaphthene	(mg/kg)	MCERTS	<0.02	0.05
Acenaphthylene	(mg/kg)	UKAS	0.03	<0.02
Anthracene	(mg/kg)	UKAS	0.07	0.10
Benzo (a) anthracene	(mg/kg)	MCERTS	0.25	0.27
Benzo (a) pyrene	(mg/kg)	MCERTS	0.24	0.22
Benzo (b) fluoranthene	(mg/kg)	MCERTS	0.29	0.26
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	0.15	0.13
Benzo (k) fluoranthene	(mg/kg)	MCERTS	0.12	0.12
Chrysene	(mg/kg)	MCERTS	0.29	0.30
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	0.04	0.03
Fluoranthene	(mg/kg)	MCERTS	0.50	0.50
Fluorene	(mg/kg)	MCERTS	<0.02	0.04
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	0.16	0.14
Naphthalene	(mg/kg)	MCERTS	<0.02	0.03
Phenanthrene	(mg/kg)	MCERTS	0.15	0.31
Pyrene	(mg/kg)	MCERTS	0.43	0.43
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	2.76	2.93

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L17/0620/CSI/001

Project Reference - CGL8522-C

Analytical Test Results - TPH CWG

NC Reference			17-8198	17-8200
Client Sample Reference			86144	86146
Client Sample Location			BH1	BH2
Depth (m)			0.25	0.50
Date of Sampling			06.03.2017	06.03.2017
Time of Sampling			AM	AM
Sample Matrix			Clay	Clay
Determinant	**Units**	**Accreditation**		
Aliphatics				
>C_5 to C_6	(mg/kg)	u	<0.03	<0.03
>C_6 to C_8	(mg/kg)	u	0.09	0.03
>C_8 to C_{10}	(mg/kg)	u	<0.03	<0.03
>C_{10} to C_{12}	(mg/kg)	u	<12	<12
>C_{12} to C_{16}	(mg/kg)	u	<12	<12
>C_{16} to C_{21}	(mg/kg)	u	<12	<12
>C_{21} to C_{35}	(mg/kg)	u	12	13
Aromatics				
>C_5 to C_7	(mg/kg)	u	<0.03	<0.03
>C_7 to C_8	(mg/kg)	u	<0.03	<0.03
>C_8 to C_{10}	(mg/kg)	u	<0.03	<0.03
>C_{10} to C_{12}	(mg/kg)	u	<12	<12
>C_{12} to C_{16}	(mg/kg)	u	<12	<12
>C_{16} to C_{21}	(mg/kg)	u	<12	<12
>C_{21} to C_{35}	(mg/kg)	u	12	<12

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L17/0620/CSI/001

Project Reference - CGL8522-C

Certificate Of Analysis - WAC Suite

NC Reference	17-8199
Client Sample Reference	86145, BH1
Sample Description	Brown/orange silty sandy clay with calcerous matter and root fragments.
Depth (m)	0.5
Date of Sampling	06.03.2017
Time of Sampling	AM
Sample Matrix	Clay
Moisture Content (%)	22
Stone content (%)	0

			Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
Solid Analysis						
Total Organic Carbon	%	MCERTS	<1.0	3.0	5.0	6.0
Loss on Ignition	%	UKAS	4.4	-	-	10.0
BTEX	mg/kg	MCERTS	<0.4	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	<0.03	1.00	-	-
Mineral Oil ($>C_{10}$ to C_{40})	mg/kg	u	39	500	-	-
PAH	mg/kg	u	1.3	100	-	-
pH	units	MCERTS	8.3	-	> 6	-
Eluate Analysis						
Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	< 0.05	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	0.04	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.01	0.06	0.7	5
Selenium	mg/kg	u	0.01	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	12	800	15000	25000
Fluoride	mg/kg	u	6.4	10	150	500
Sulphate (as SO_4)	mg/kg	u	120	1000	20000	50000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	210	500	800	1000

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L17/0620/CSI/001

Project Reference - CGL8522-C

Sample Descriptions

NC Reference	Client Sample Reference	Sample Location	Description	Moisture Content (%)	Stone Content (%)
17-8198	86144	BH1	Brown/orange silty sandy gravelly clay with calcerous matter.	22	0.9
17-8200	86146	BH2	Brown/orange silty sandy clay.	25	1.4

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L17/0620/CSI/001

Project Reference - CGL8522-C

Analysis Methodologies

Matrix	Determinant	Sample condition for analysis	Test Method used
Soil	Metals	Air Dried	In house method statement - MS - CL - ICP metals
Soil	PAH	As Received	In house method statement - MS - CL - PAH (As received)
Soil	Phenols	As Received	In house method statement - MS - CL - Phenols by Skalar
Soil	Cyanide	As Received	In house method statement - MS - CL - Cyanide by Skalar
Soil	pH	As Received	In house method statement - MS - CL - pH in soils (using a 1:3 soil to water extraction)
Soil	Sulphate (w/s)	Oven Dried	In house method statement - MS - CL - Anions by Aquakem
Soil	Total Sulphur	Oven Dried	In house method statement - MS - CL - BRE Analysis
Soil	Sulphide	Air Dried	In house method statement - MS - CL - Sulphide
Soil	CWG	As Received	In house method statements - MS - CL - EPH in soil and MS - CL - VPH

Chelmer
Site Investigations
'Groundbreaking Services'

REPORT NOTES

Equipment Used

Hand tools, Mechanical Concrete Breaker and Spade, Hand Augers, 100mm/150mm diameter Mechanical Flight Auger Rig, GEO205 Flight Auger Rig, Window Sampling Rig, and Large or Limited Access Shell & Auger Rig upon request and/or access permitting.

On Site Tests

By Pilcon Shear-Vane Tester (kN/m^2) in clay soils, and/or Mackintosh Probe in granular soils or made ground and/or upon request Continuous Dynamic Probe Testing and Standard Penetration Testing.

Note:

Details reported in trial-pits and boreholes relate to positions investigated only as instructed by the client or engineer on the date shown.

We are therefore unable to accept any responsibility for changes in soil conditions not investigated i.e. variations due to climate, season, vegetation and varying ground water levels.

Full terms and conditions are available upon request.

APPENDIX G

Net bearing pressure for PDISP		
ZONE	Net change in vertical pressure (kPa)	
#	Stage 1	Stages 2 and 3
U1	-2.70	7.30
U2	11.30	16.30
U3	-22.20	-2.20
U4	-7.20	17.80
U5	46.30	56.30
U6	26.30	36.30
U7	7.30	17.30
U8	-3.70	6.30
U9	-3.70	6.30
U10	-32.20	12.80
U11	-47.20	-32.20
U12	7.30	22.30
U13	-7.70	2.30
U14	7.30	22.30
U15	-7.70	2.30
S1	0.00	-43.70
S2	0.00	-62.70
S3	0.00	-62.70
S4	0.00	-72.20
S5	0.00	-43.70
S6	0.00	-43.70
S7	0.00	-62.70

APPENDIX H

Classification of visible damage to walls (after Burland et al, 1977, Boscardin and Cording, 1989; and Burland, 2001)

Category of damage	Description of typical damage (ease of repair is underlined)	Approximate crack width (mm)	Limiting tensile strain ε_{lim} (per cent)
0 Negligible	Hairline cracks of less than about 0.1 mm are classed as negligible.	< 0.1	0.0–0.05
1 Very slight	Fine cracks that can easily be treated during normal decoration. Perhaps isolated slight fracture in building. Cracks in external brickwork visible on inspection.	< 1	0.05–0.075
2 Slight	Cracks easily filled. Redecoration probably required. Several slight fractures showing inside of building. Cracks are visible externally and some repointing may be required externally to ensure weathertightness. Doors and windows may stick slightly.	< 5	0.075–0.15
3 Moderate	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable linings. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking. Service pipes may fracture. Weathertightness often impaired.	5–15 or a number of cracks > 3	0.15–0.3
4 Severe	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Windows and frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Service pipes disrupted.	15–25 but also depends on number of cracks	> 0.3
5 Very severe	This requires a major repair involving partial or complete rebuilding. Beams lose bearings, walls lean badly and require shoring. Windows broken with distortion. Danger of instability.	usually > 25 but depends on number of cracks.	