Chelmer
Site Investigations
'Groundbreaking Services'

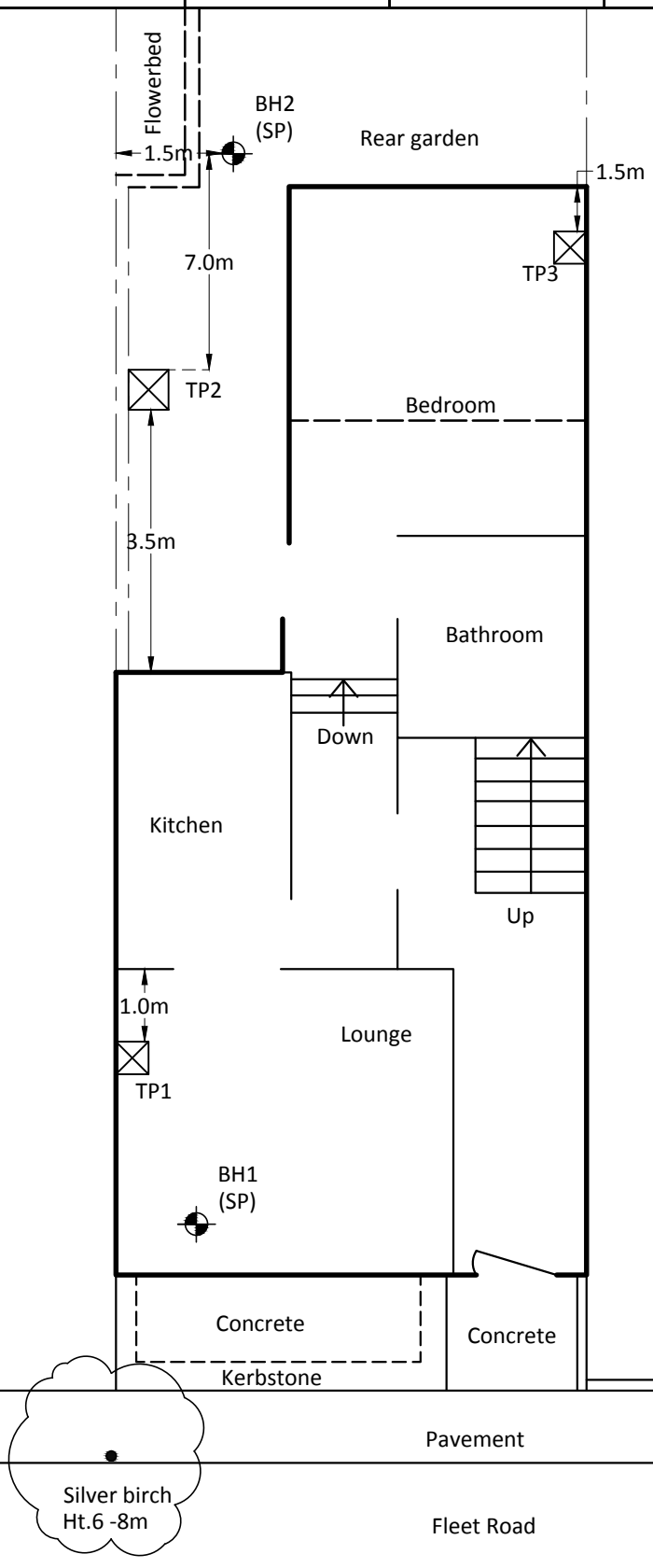
Factual Report

Site	76 Fleet Road London NW3 2QT
Client	Matt Godfrey
Date	17th/21st September 2015
Our Ref	FACT/5839 Rev 1

Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
Essex: 01245 400930 | London: 0203 67409136 | info@siteinvestigations.co.uk | www.siteinvestigations.com

Chelmer Site Investigations
'Groundbreaking Services'

Client: Matt Godfrey	**Scale:** N.T.S.	**Sheet:** 1 of 1	**Date:** 17.09.15/21.09.15	
Location: 76 Fleet Road, London, NW3 2QT	**Job No:** 5839	**Weather:** Fine	**Drawn by:** DB	**Checked by:** JH

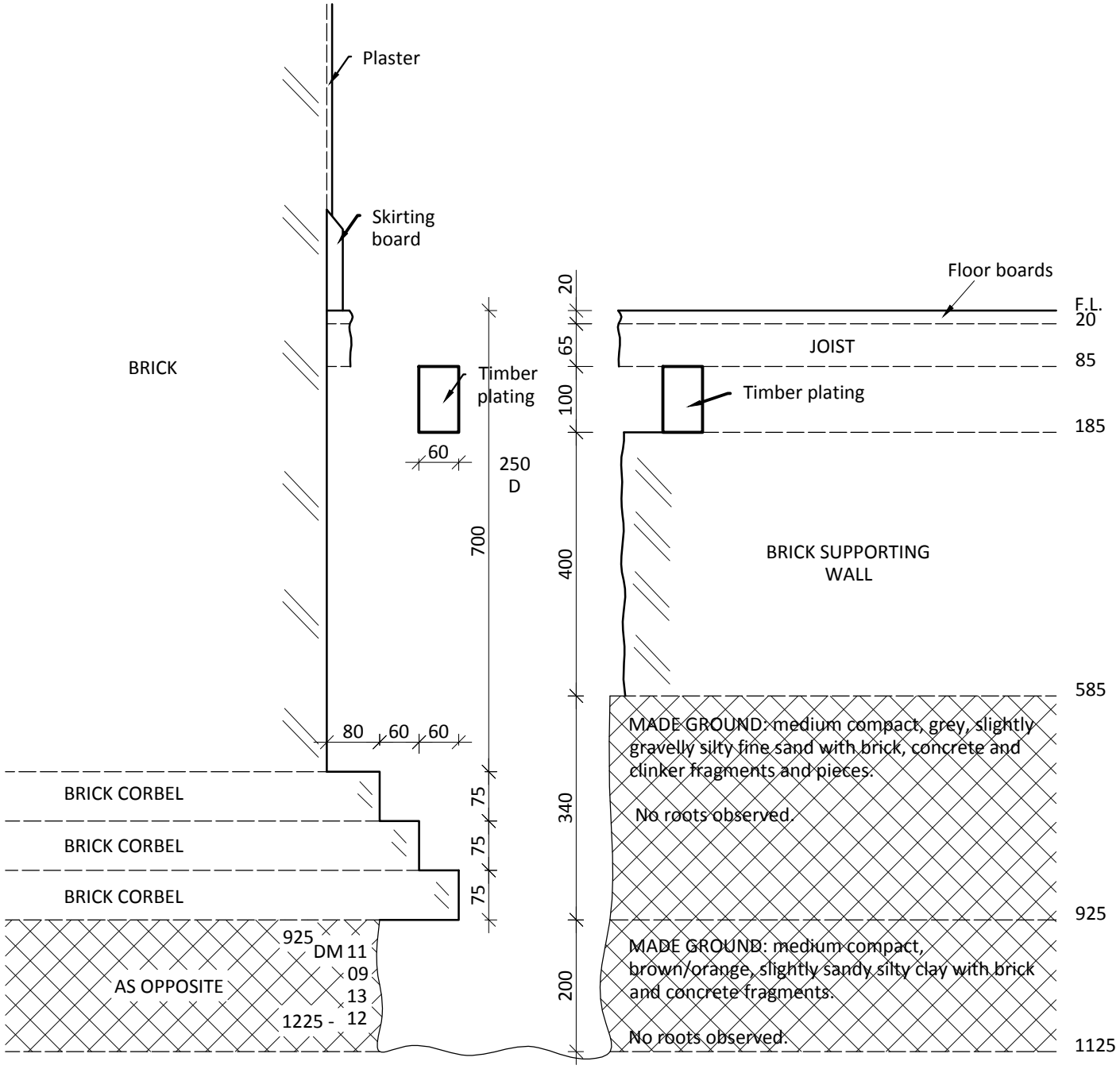


Notes: *On site tree identification for guidance only. Not authenticated.*

Key:

Tree/Shrub | Borehole | Trial Pit | G Gully | Tree Stump | Rain Water/ Soil Pipe | MH Manhole

Client: Matt Godfrey	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Date:** 17.09.15
Location: 76 Fleet Road, London, NW3 2QT	**Job No:** 5839	**Trial Pit No:** 1	**Weather:** Fine
Excavation Method: Hand Tools		**Drawn by:** DB	**Checked by:** JH



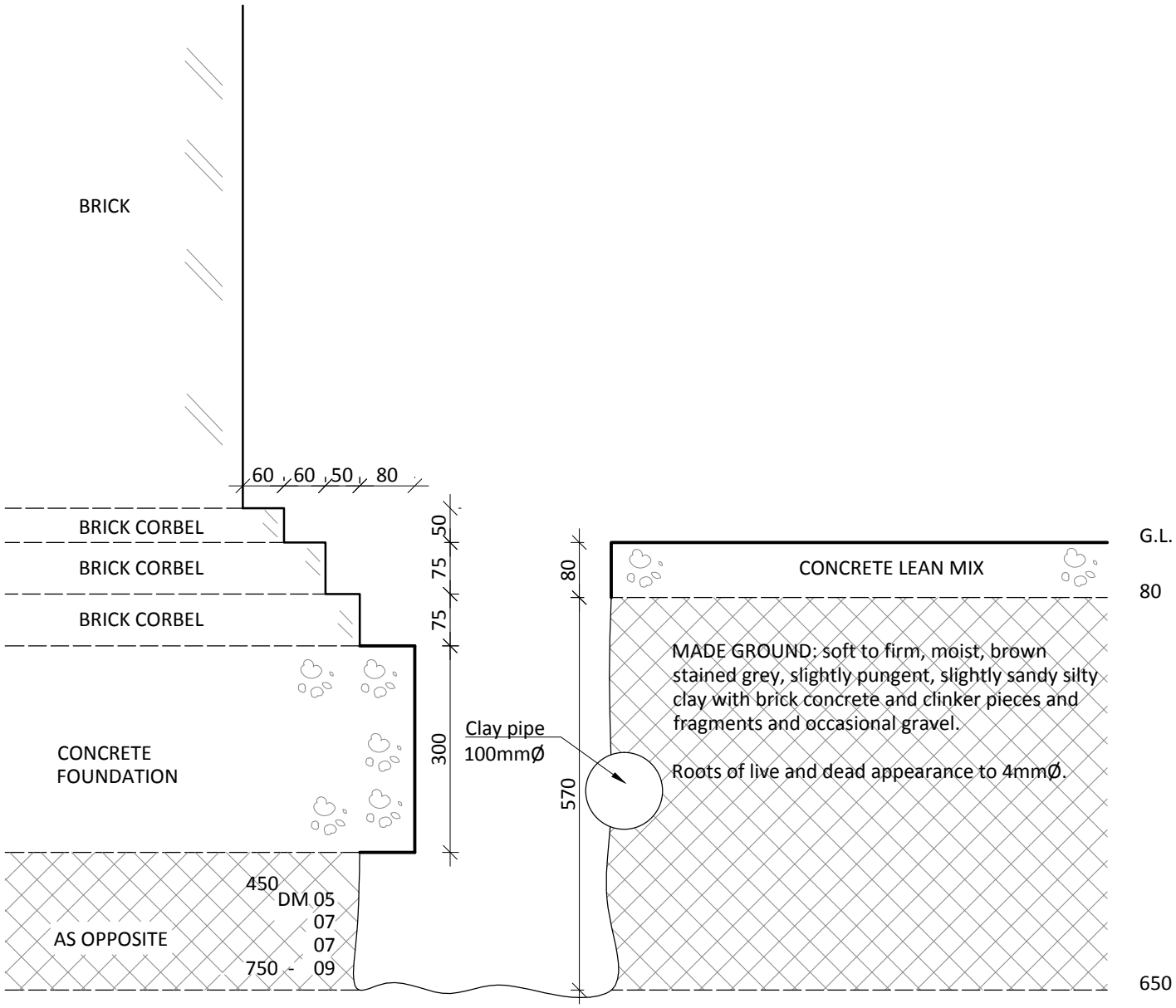
TP1 ENDS AT 1125mm

Remarks:

Key:

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample (U100)
N Standard Penetration Test Blow Count
J Jar sample
V Pilcon Vane (kPa)
M Mackintosh Probe
W Water Sample

Client: Matt Godfrey	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Date:** 17.09.15
Location: 76 Fleet Road, London, NW3 2QT	**Job No:** 5839	**Trial Pit No:** 2	**Weather:** Fine
Excavation Method: Hand Tools		**Drawn by:** DB	**Checked by:** JH



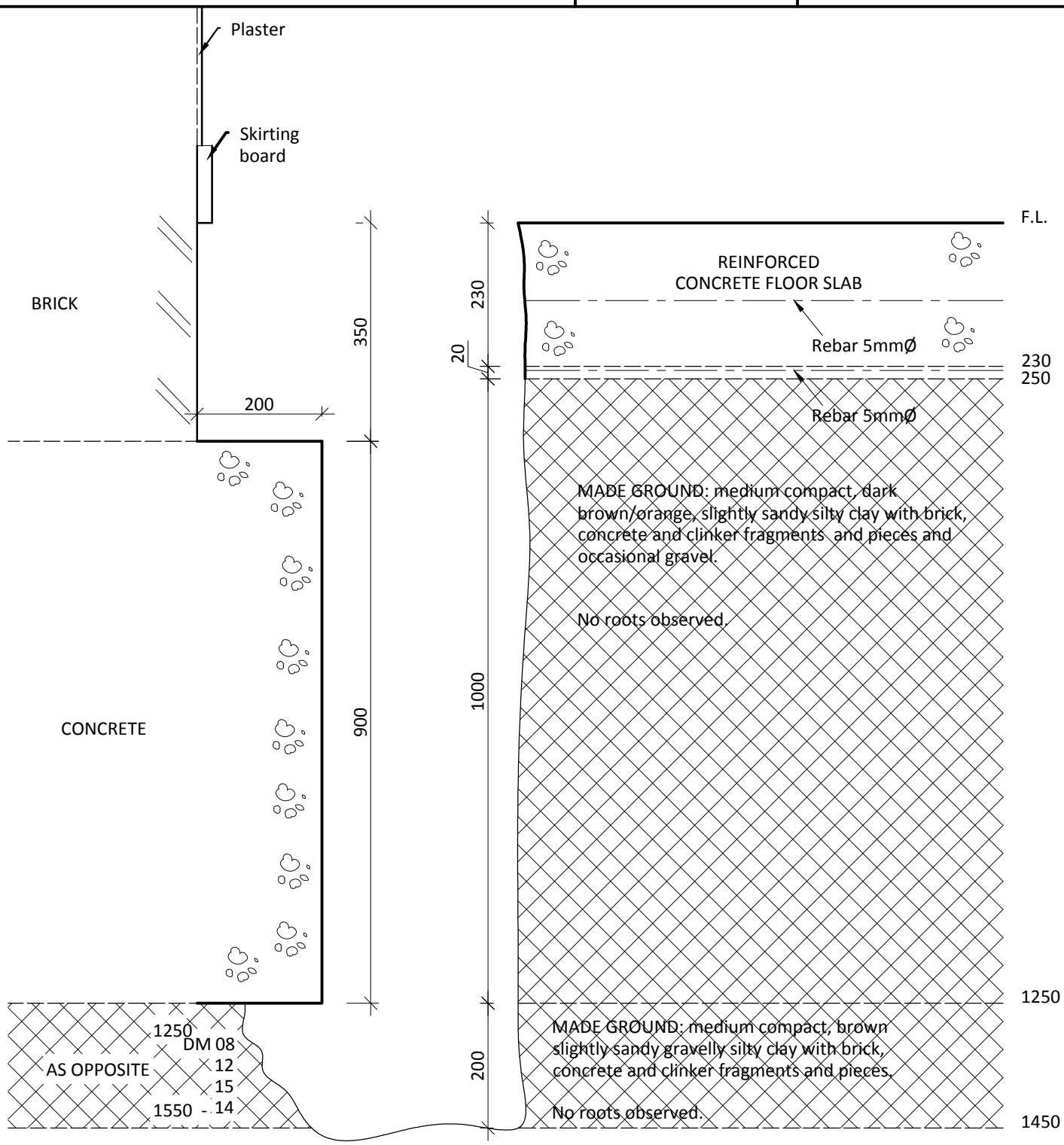
TP2 ENDS AT 650mm

Remarks: Clay pipe in poor condition.

Key:

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample (U100)
N Standard Penetration Test Blow Count
J Jar sample
V Pilcon Vane (kPa)
M Mackintosh Probe
W Water Sample

Client: Matt Godfrey	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Date:** 17.09.15
Location: 76 Fleet Road, London, NW3 2QT	**Job No:** 5839	**Trial Pit No:** 3	**Weather:** Fine
Excavation Method: Hand Tools		**Drawn by:** DB	**Checked by:** JH



TP3 ENDS AT 1450mm

Remarks: Water seepage at U/S.

Key:

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample (U100)
N Standard Penetration Test Blow Count
J Jar sample
V Pilcon Vane (kPa)
M Mackintosh Probe
W Water Sample

Chelmer Site Investigations 'Groundbreaking Services'

Client: Matt Godfrey	Scale: N.T.S.	Sheet No: 1 of 1	Weather: Internal	Date: 21.09.15
Site: 76 Fleet Road, London, NW3 2QT	Job No: 5839	Borehole No: 1	Boring method: CFA 100mmØ Secondman	

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth to Water	Depth Mtrs
F.L.	Floor boards over floor space	0.8		D			No roots observed.		0.5
0.8	MADE GROUND: medium compact, brown/grey, slightly gravelly very clayey silt with occasional brick and concrete fragments.	0.6		D	M	09 13 17 17			1.0
1.4	MADE GROUND: medium compact, brown/grey, silty sandy fine to coarse gravel with brick and concrete fragments.	0.4		D					1.5
1.8	Medium dense, brown/orange, silty very sandy fine to medium GRAVEL.	0.6		D	M	11 17 19 17			2.0
2.4	Stiff, brown/grey, slightly sandy silty CLAY.	2.7		D					2.5
				D	V	104 108			3.0
	Becoming very stiff from 3.7m.			D					3.5
				D	V	120+ 120+			4.0
				D					4.5
5.1	Borehole refused at 5.1m Too dense for drill to penetrate Suspected claystone			D	V	120+ 120+			5.0

Drawn by: DB **Approved by:** JH

Remarks: *Borehole dry and open on completion.*
Metal standpipe installed to 5.1m.

Key: T.D.T.D. Too Dense to Drive
D Small Disturbed Sample J Jar Sample
B Bulk Disturbed Sample V Pilcon Vane (kPa)
U Undisturbed Sample (U100) M Mackintosh Probe
W Water Sample N Standard Penetration Test Blow Count

Chelmer Site Investigations 'Groundbreaking Services'

Client: Matt Godfrey	Scale: N.T.S.	Sheet No: 1 of 1	Weather: Fine	Date: 17.09.15
Site: 76 Fleet Road, London, NW3 2QT	Job No: 5839	Borehole No: 2	Boring method: CFA 100mmØ Secondman	

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth to Water	Depth Mtrs
G.L.	CONCRETE	0.05							
0.05	MADE GROUND: medium compact, moist, brown/orange, sandy silty clay with gravel and numerous brick, concrete and clinker fragments and pieces.	0.95					No roots observed.		
1.0	MADE GROUND: firm, moist, brown, stained grey, slightly pungent slightly sandy very silty clay with occasional gravel, brick and clinker fragments and pieces.	1.9		D	M	12 12 13 15			1.0
				D					1.5
				D	M	15 15 17 17			2.0
				D					2.5
2.9	Stiff, brown, slightly sandy silty CLAY with occasional fine gravel.	2.3		D	V	88 90			3.0
				D					3.5
				D	V	98 100			4.0
				D					4.5
				D	V	110 112			5.0
5.2	Stiff, brown/grey, slightly sandy silty CLAY with partings of brown and orange silt and fine sand.	0.6		D					5.5
5.8	Very stiff, grey, slightly sandy silty CLAY with partings of brown and orange silt and fine sand.	2.3		D	V	120+ 120+			6.0
				D	V	120+ 120+			7.0
									7.5
8.0	Borehole ends at 8.0m			D	V	120+ 120+			8.0

Drawn by: DB **Approved by:** JH

Remarks: *Borehole dry and open on completion. Standpipe installed to 6.0m.*

Key: T.D.T.D. Too Dense to Drive
D Small Disturbed Sample J Jar Sample
B Bulk Disturbed Sample V Pilcon Vane (kPa)
U Undisturbed Sample (U100) M Mackintosh Probe
W Water Sample N Standard Penetration Test Blow Count

Groundwater/Ground Gas Monitoring Results Sheet

Site Ref: 5839
Site Name: 76 Fleet Road, London.

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
		%v/v	%v/v	l/hr	%v/v	%v/v	l/hr	%v/v	mbar	l/hr	m bgl	m bgl	ppm	ppm
BH1 (House)	26/10/2015	0.0	0.0	0.0000	0.2	0.1	0.0012	21.1	1008	0.6	1.0 - 5.1	3.60	0	0
	04/11/2015	0.0	0.0	0.0000	2.4	0.1	0.0120	20.6	1008	0.5		3.27	0	0
BH2 (Garden)	26/10/2015	0.0	0.0	0.0000	3.8	3.8	0.0228	17.7	1007	0.6	1.0 - 6.0	2.26	0	0
	04/11/2015	0.0	0.0	0.0000	2.8	2.8	0.0168	18.2	1008	0.6		1.45	0	0

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8284

Chelmer
Geotechnical Laboratories
'Groundbreaking Services'

Laboratory Report

Site	**76 Fleet Road**
Client	**Matt Godrey**
Date	**29-Sep-15**
Our Ref	**CSI5839**
CGL Ref	**CGL5839**

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

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Chelmer Geotechnical Laboratories
'Groundbreaking Services'

Content Summary

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

CGL Reference : CGL5839

Client Reference : CSI5839

For the attention of : Matt Godrey

This report comprises of the following :

1	Cover Page
1	Inside Cover/Contents Page
2	Pages of Results
1	Moisture/Shear Strength Chart
1	Plasticity Chart
1	Particle Size Distribution - Wet Sieving Charts
5	Pages of BRE SD1 Results
1	Limitations of Report

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 : CGL5839
Client : Matt Godrey
Client Reference : CSI5839
Site Name : 76 Fleet Road

Date Received : 24/09/2015
Date Testing Started : 24/09/2015
Date Testing Completed : 29/09/2015
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	2.5	66596	D	29	<5	75	23	52	0.12	50	CV								
BH1	3.5	66597	D	32	<5	79	25	54	0.14	52	CV								

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

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Comments :-

Technician :- SW
Checked By :- MC
Date Checked :- 29-Sep-15

Laboratory Testing Results

BS 1377 : 1990

Chelmer Geotechnical Laboratories "Groundbreaking Services"

Job Number : CGL5839
Client : Matt Godrey
Client Reference : CSI5839
Site Name : 76 Fleet Road

Date Received : 24/09/2015
Date Testing Started : 24/09/2015
Date Testing Completed : 29/09/2015
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	3.5	66599	D	35	<5	74	22	52	0.25	50	CV								
BH2	4.5	66600	D	32	<5	73	22	51	0.20	49	CV								
BH2	5.5	66601	D	31	<5	73	22	51	0.17	48	CV								
BH2	8.0	66602	D	30	<5	74	21	53	0.17	51	CV			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

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Comments :-

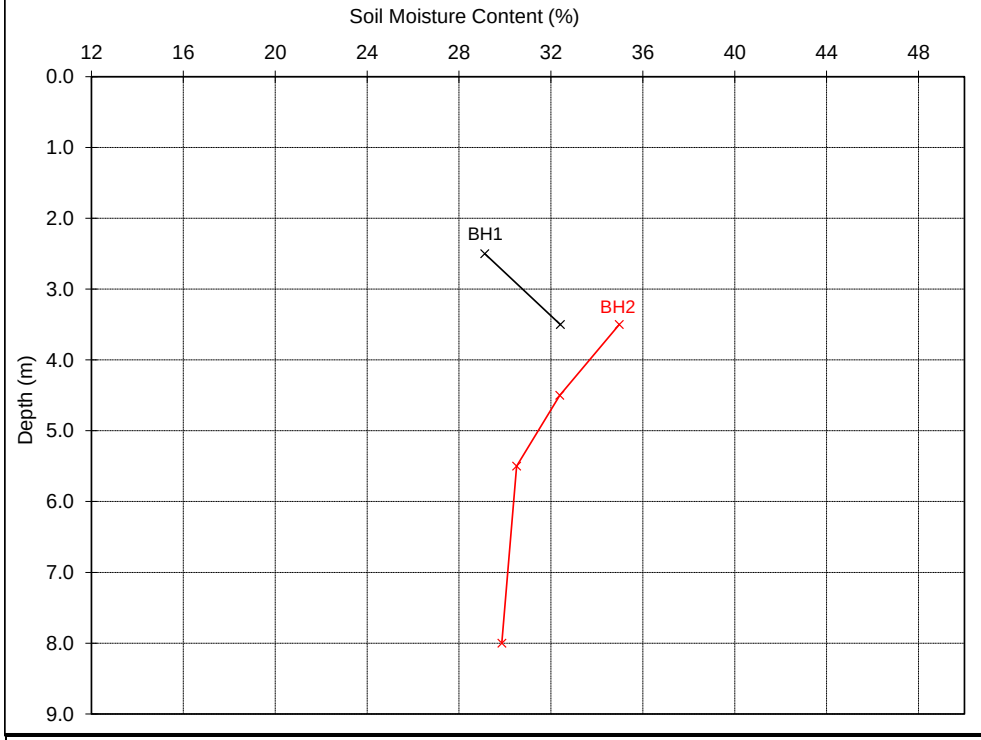
Technician :- SW
Checked By :- MC
Date Checked :- 29-Sep-15

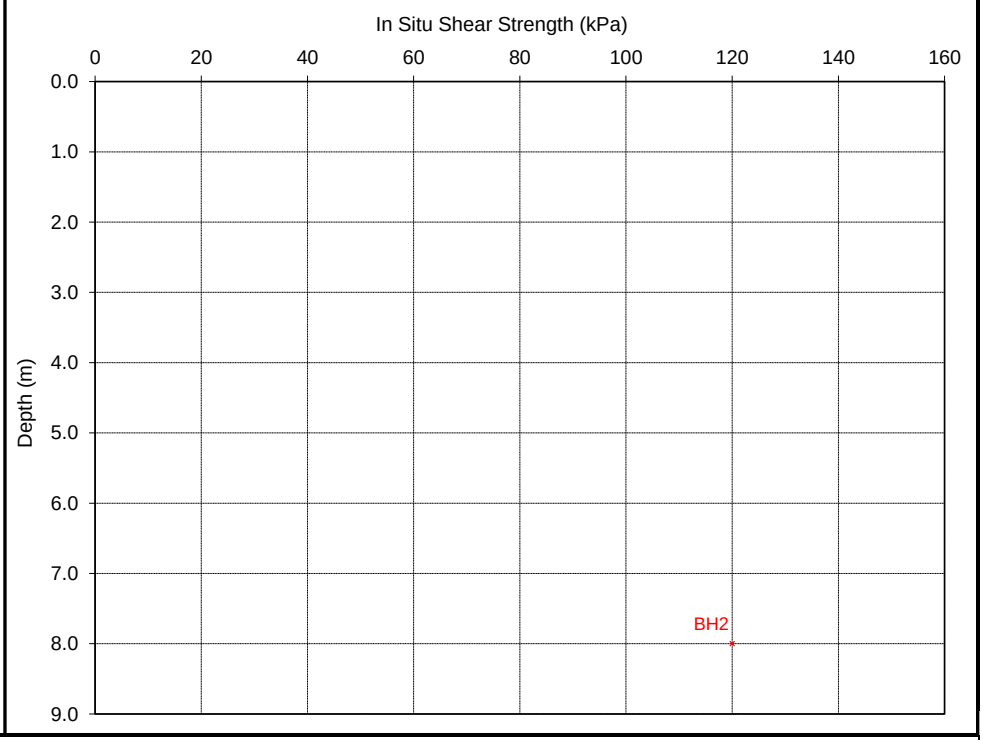
Laboratory Testing Results

Moisture Content/Shear Strength Profile

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number :	CGL5839	Date Received :	24/09/2015
Client :	Matt Godrey	Date Testing Started :	24/09/2015
Client Reference :	CSI5839	Date Testing Completed :	29/09/2015
Site Name :	76 Fleet Road	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)

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Comments :-

Checked By :- MC Date Checked :- 29-Sep-15

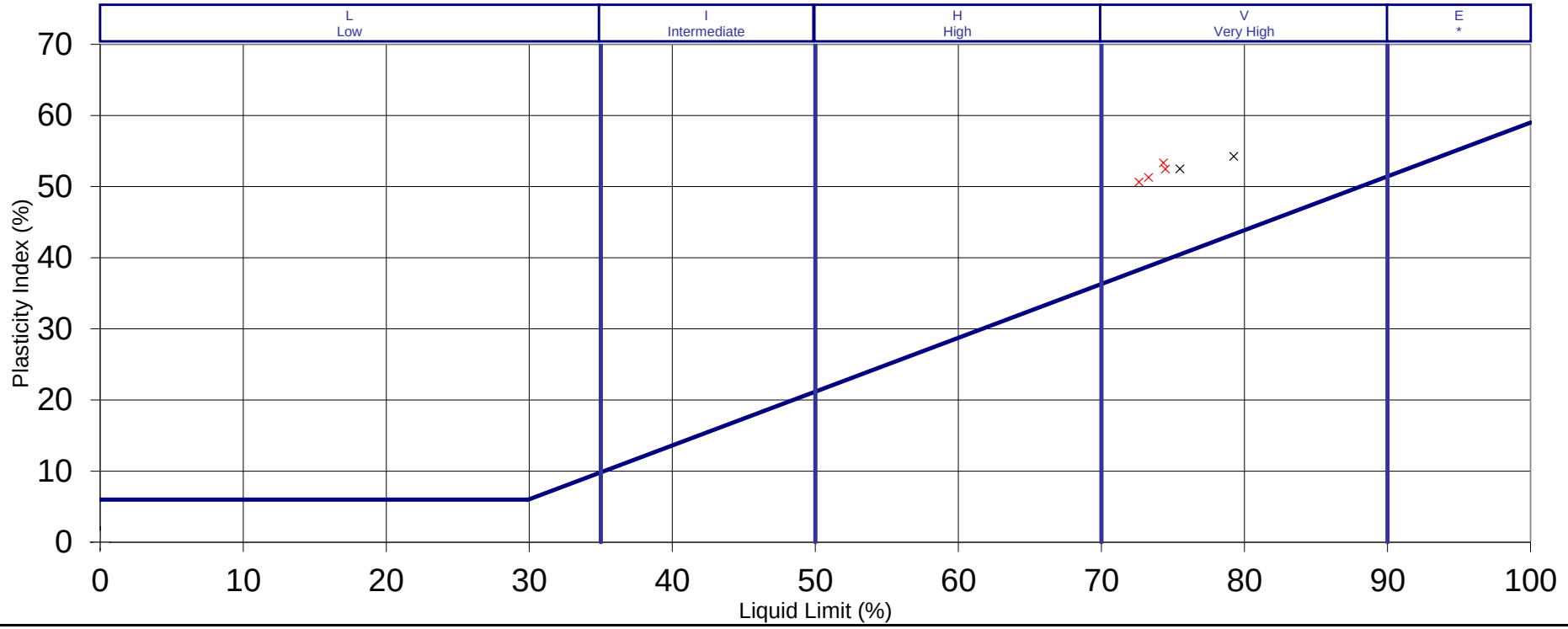
Laboratory Testing Results

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 : CGL5839
Client : Matt Godrey
Client Reference : CSI5839
Site Name : 76 Fleet Road

Date Received : 24/09/2015
Date Testing Started : 24/09/2015
Date Testing Completed : 29/09/2015
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 :- BH1
BH2

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Comments :-

Checked By :- MC

Date Checked :- 29-Sep-15

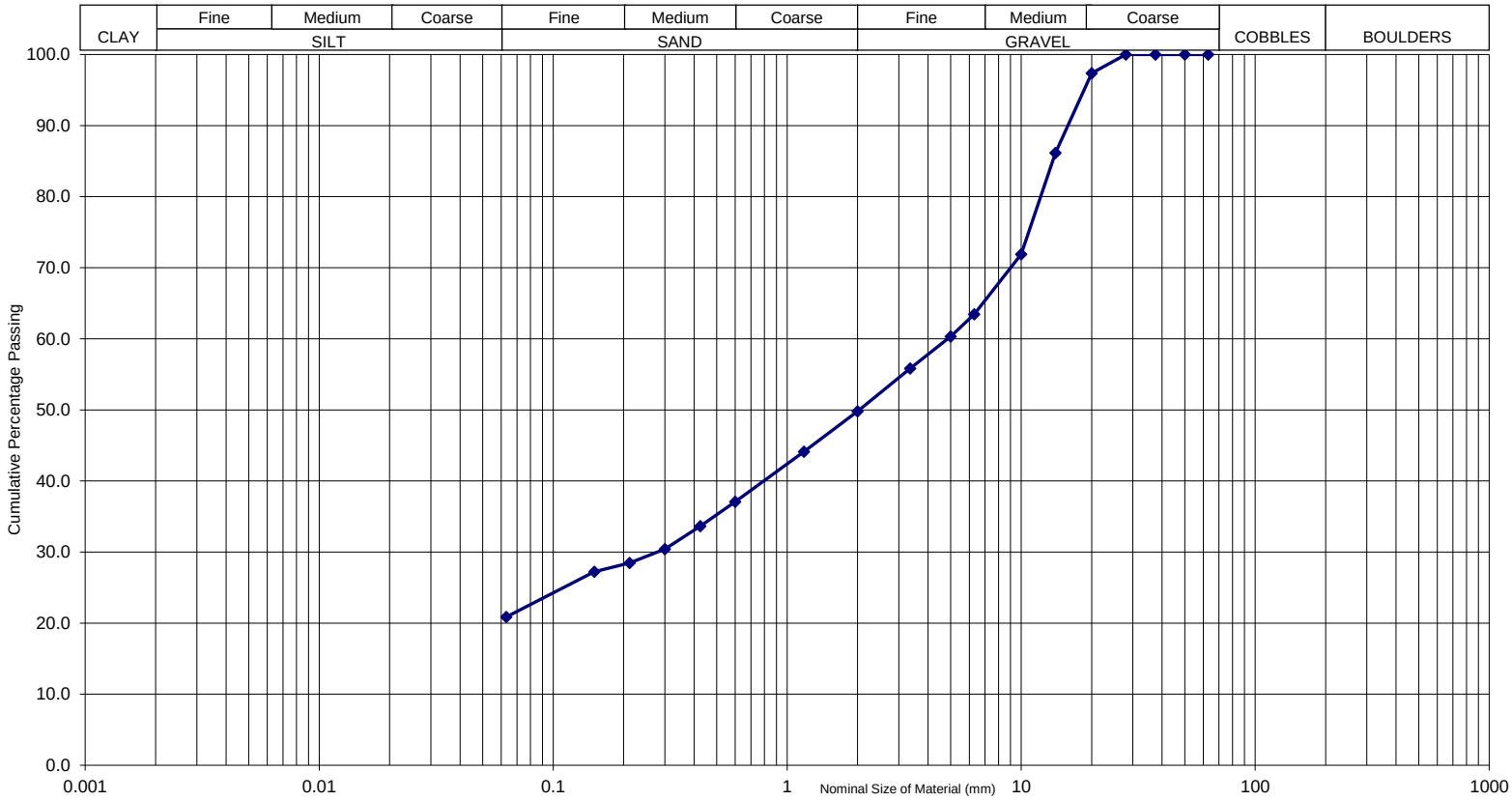
PARTICLE SIZE DISTRIBUTION

BS 1377-2:1990

Chelmer Geotechnical Laboratories
'Groundbreaking Services'

Job Number :	CGL5839	Site Name :	76 Fleet Road, London, NW3
Sample Number :	BH1	Soil Description :	Brown/grey silty very sandy fine to medium GRAVEL.
Depth (m) :	2.00		
Sample UID :	66595		

Type of Sieving :	Washed
Date :	24-Sep-15
Tested By :	HS
Laboratory :	Chelmer Geotechnical CM3 8AB



Sieve Size (mm)	% Passing
90.0	100.0
75.0	100.0
63.0	100.0
50.0	100.0
37.5	100.0
28.0	100.0
20.0	97.4
14.0	86.2
10.0	71.9
6.3	63.4
5.0	60.3
3.35	55.8
2.00	49.8
1.18	44.1
0.600	37.1
0.425	33.7
0.300	30.4
0.212	28.5
0.150	27.2
0.063	20.9

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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 :-

Checked By :- MC

Date Checked :- 29-Sep-15

Mark Collyer
Chelmer Site Investigation Laboratories Ltd
Unit 15
East Hanningfield Industrial Estate
Old Church Road
East Hanningfield
Essex
CM3 8AB

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 15-35897

Site Reference:	76 Fleet Road
Project / Job Ref:	CGL5839
Order No:	5202
Sample Receipt Date:	28/09/2015
Sample Scheduled Date:	28/09/2015
Report Issue Number:	1
Reporting Date:	02/10/2015

Authorised by:

Russell Jarvis
Director
On behalf of QTS Environmental Ltd

Authorised by:

Kevin Old
Director
On behalf of QTS Environmental Ltd

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate								
QTS Environmental Report No: 15-35897	Date Sampled	15/09/15	15/09/15	15/09/15	15/09/15	15/09/15
Chelmer Site Investigation Laboratories Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: 76 Fleet Road	TP / BH No	66594	66595	66597	66598	66600
Project / Job Ref: CGL5839	Additional Refs	BH1	BH1	BH1	BH2	BH2
Order No: 5202	Depth (m)	1.00	2.00	3.50	2.00	4.50
Reporting Date: 02/10/2015	QTSE Sample No	169283	169284	169285	169286	169287

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	7.7	7.9	8.0	7.8	7.6
Total Sulphate as SO_4	mg/kg	< 200	NONE	11240	2268	1051	983	12150
Total Sulphate as SO_4	%	< 0.02	NONE	1.12	0.23	0.11	0.10	1.22
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	1580	1140	656	283	2630
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	1.58	1.14	0.66	0.28	2.63
Total Sulphur	%	< 0.02	NONE	0.39	0.10	0.04	0.07	0.63
Ammonium as NH_4	mg/kg	< 0.5	NONE	12	6.1	9	25.4	9.2
Ammonium as NH_4	mg/l	< 0.05	NONE	1.20	0.61	0.90	2.54	0.92
W/S Chloride (2:1)	mg/kg	< 1	MCERTS	263	60	33	15	44
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS	132	30.1	16.4	7.3	22
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	MCERTS	1320	173	24	7	< 3
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	MCERTS	660	86.4	12.2	3.5	< 1.5
W/S Magnesium	mg/l	< 0.1	NONE	27	17	29	9.2	130

Analytical results are expressed on a dry weight basis where samples are dried at less than 30^{O}C
Analysis carried out on the dried sample is corrected for the stone content
Subcontracted analysis $^{(S)}$

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate							
QTS Environmental Report No: 15-35897	Date Sampled	15/09/15					
Chelmer Site Investigation Laboratories Ltd	Time Sampled	None Supplied					
Site Reference: 76 Fleet Road	TP / BH No	66602					
Project / Job Ref: CGL5839	Additional Refs	BH2					
Order No: 5202	Depth (m)	8.00					
Reporting Date: 02/10/2015	QTSE Sample No	169288					

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	7.8				
Total Sulphate as SO_4	mg/kg	< 200	NONE	3037				
Total Sulphate as SO_4	%	< 0.02	NONE	0.30				
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	1410				
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	1.41				
Total Sulphur	%	< 0.02	NONE	0.34				
Ammonium as NH_4	mg/kg	< 0.5	NONE	16.1				
Ammonium as NH_4	mg/l	< 0.05	NONE	1.61				
W/S Chloride (2:1)	mg/kg	< 1	MCERTS	42				
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS	21				
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	MCERTS	< 3				
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	MCERTS	< 1.5				
W/S Magnesium	mg/l	< 0.1	NONE	63				

Analytical results are expressed on a dry weight basis where samples are dried at less than 30^{O}C
Analysis carried out on the dried sample is corrected for the stone content
Subcontracted analysis $^{(S)}$

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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 15-35897	
Chelmer Site Investigation Laboratories Ltd	
Site Reference: 76 Fleet Road	
Project / Job Ref: CGL5839	
Order No: 5202	
Reporting Date: 02/10/2015	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 169283	66594	BH1	1.00	8.7	Brown gravelly sand with rubble
$ 169284	66595	BH1	2.00	4.7	Brown gravelly clay with stones
$ 169285	66597	BH1	3.50	20.6	Brown clay
$ 169286	66598	BH2	2.00	22.8	Grey clay
$ 169287	66600	BH2	4.50	20.6	Brown clay with crystalline material
$ 169288	66602	BH2	8.00	19.5	Brown clay with crystalline material

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

$ samples exceeded recommended holding times

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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 15-35897
Chelmer Site Investigation Laboratories Ltd
Site Reference: 76 Fleet Road
Project / Job Ref: CGL5839
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Reporting Date: 02/10/2015

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

8284

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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.

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.

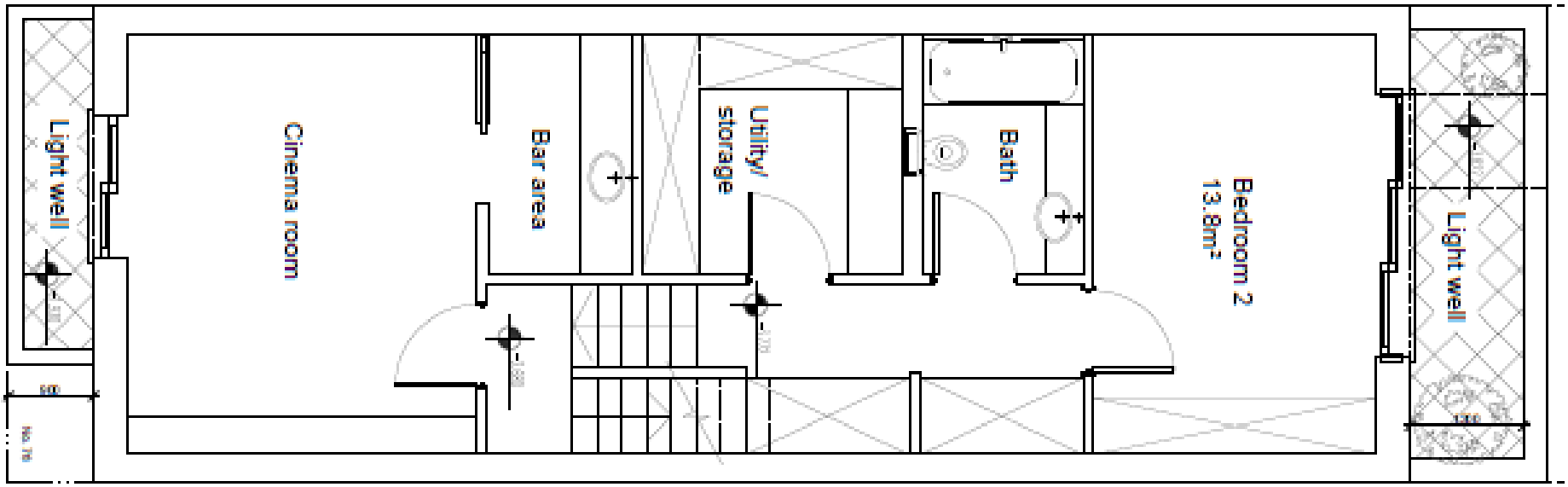

Figure D1. Layout of the proposed basement

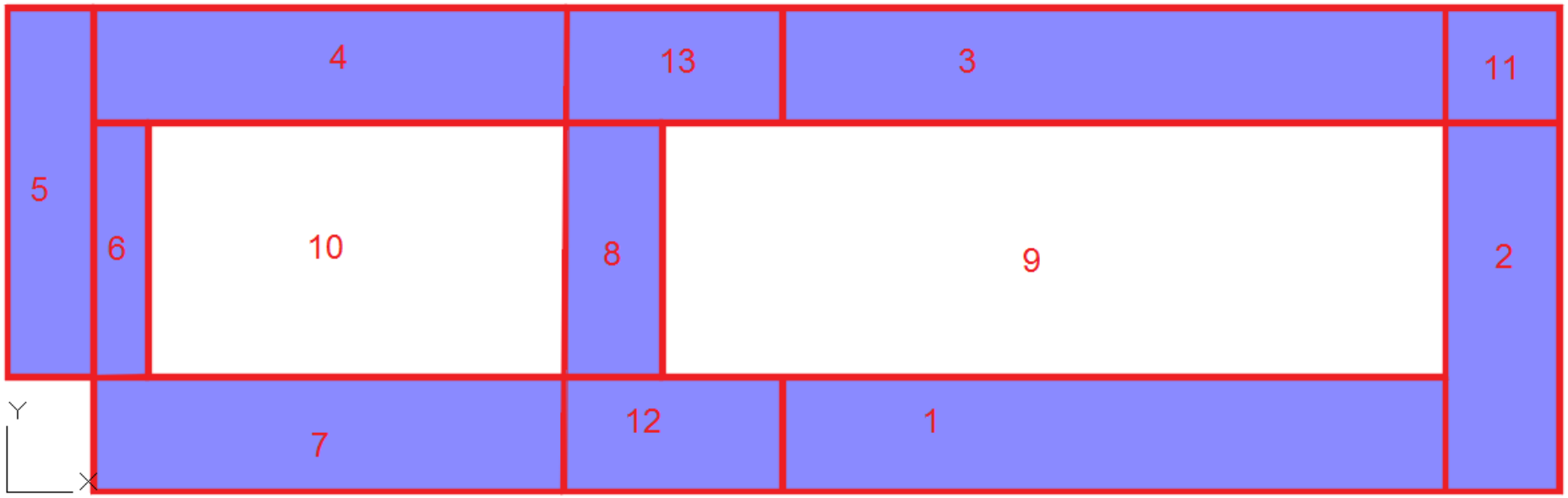

Figure D2. Detail of geometry introduced to PDISP

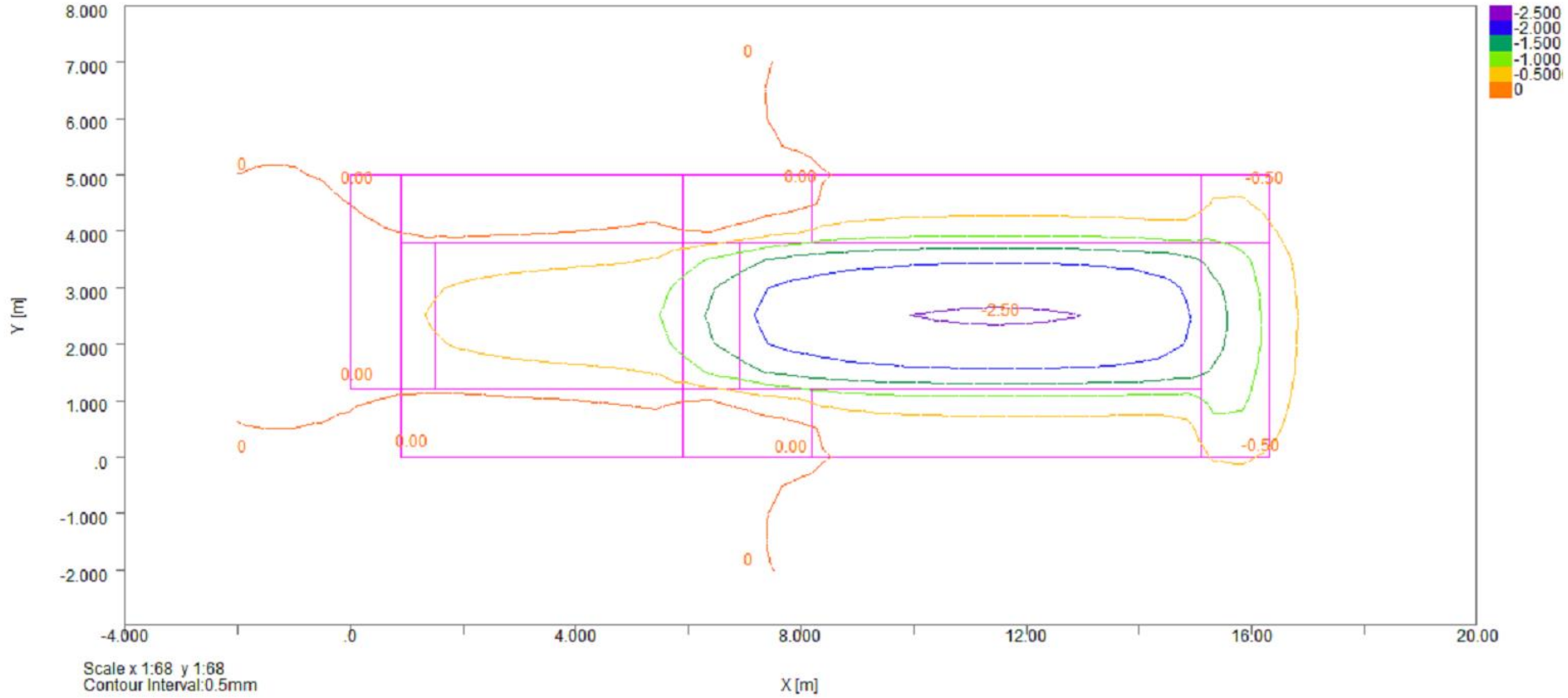

Figure D3. Short term (Stage 2) heave assessment contour

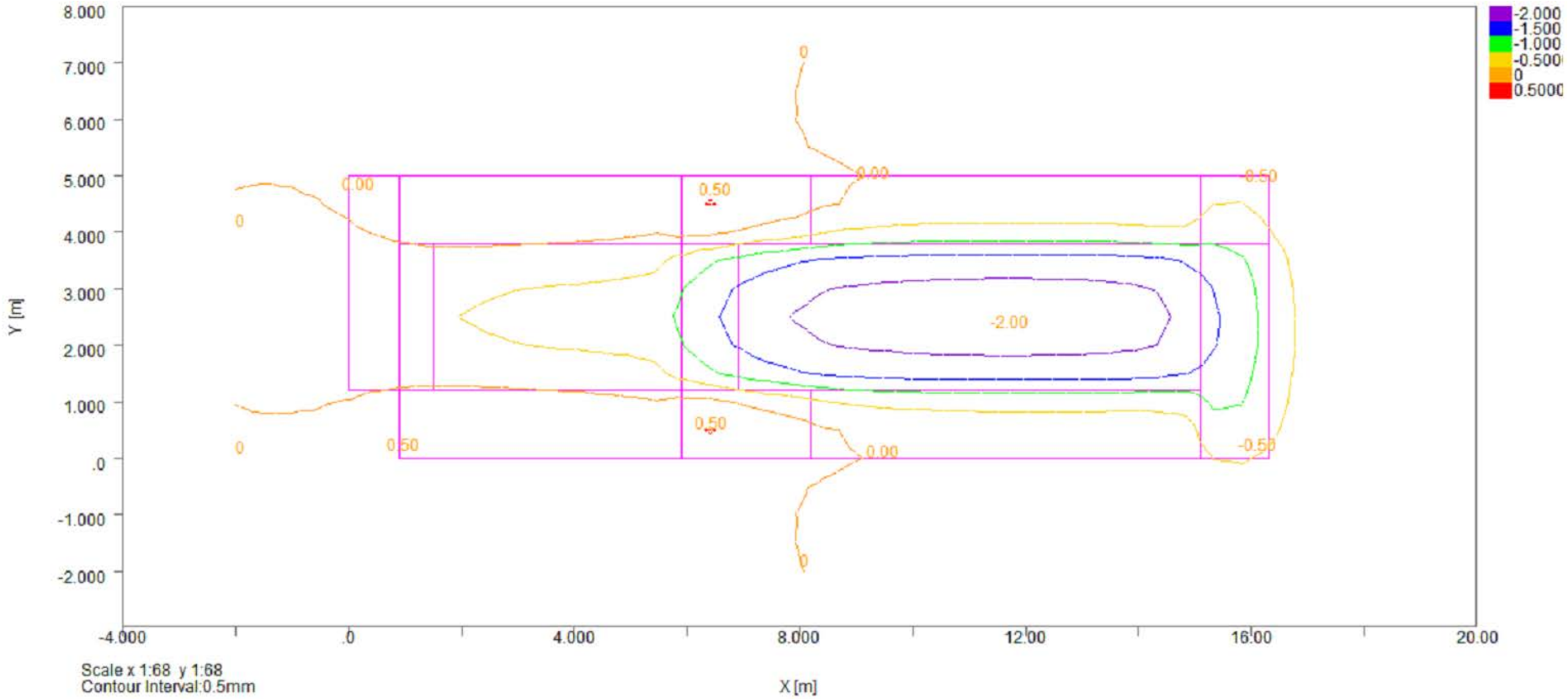

Figure D4. Short term (Stage 3) heave assessment contour

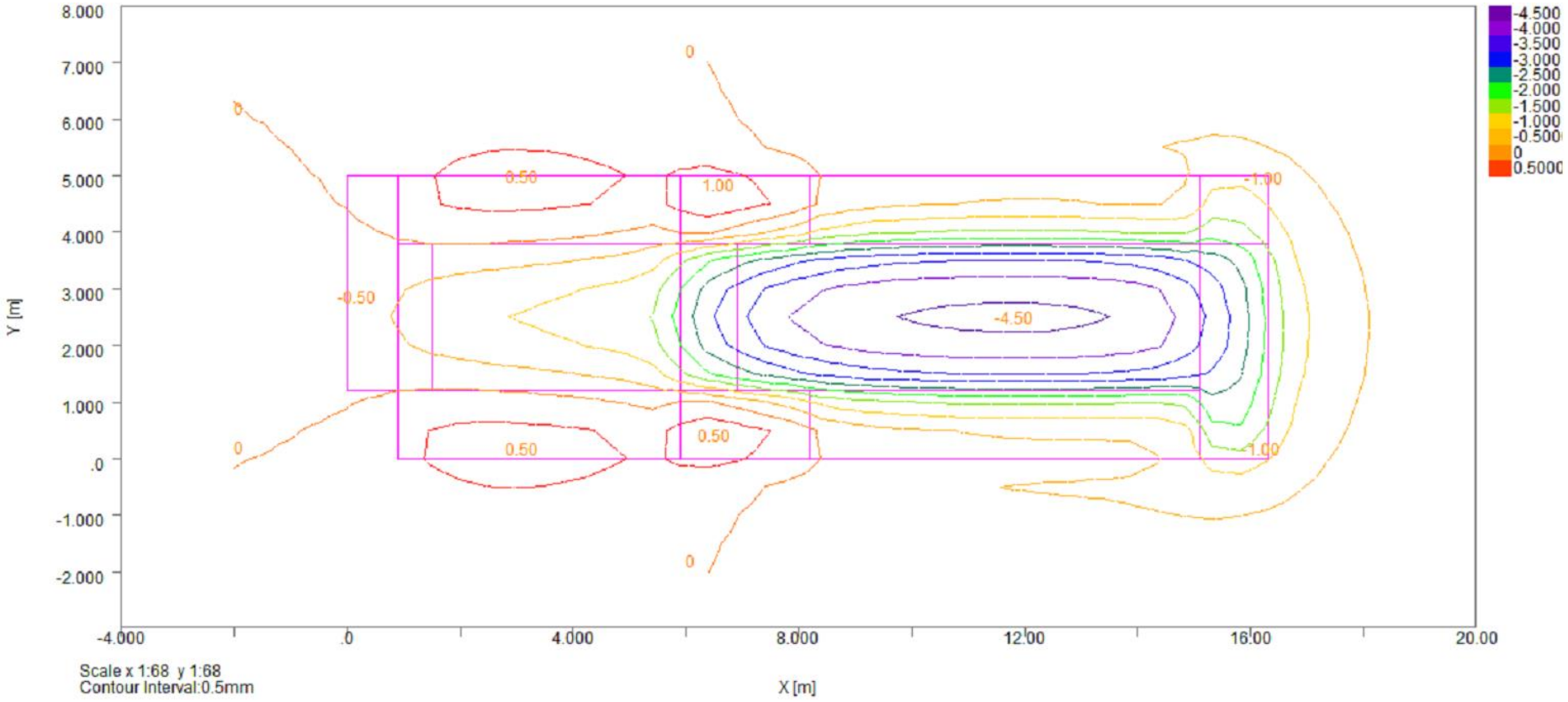

Figure D5. Long term (Stage 4) heave assessment contour