Chelmer
Site Investigations
'Groundbreaking Services'

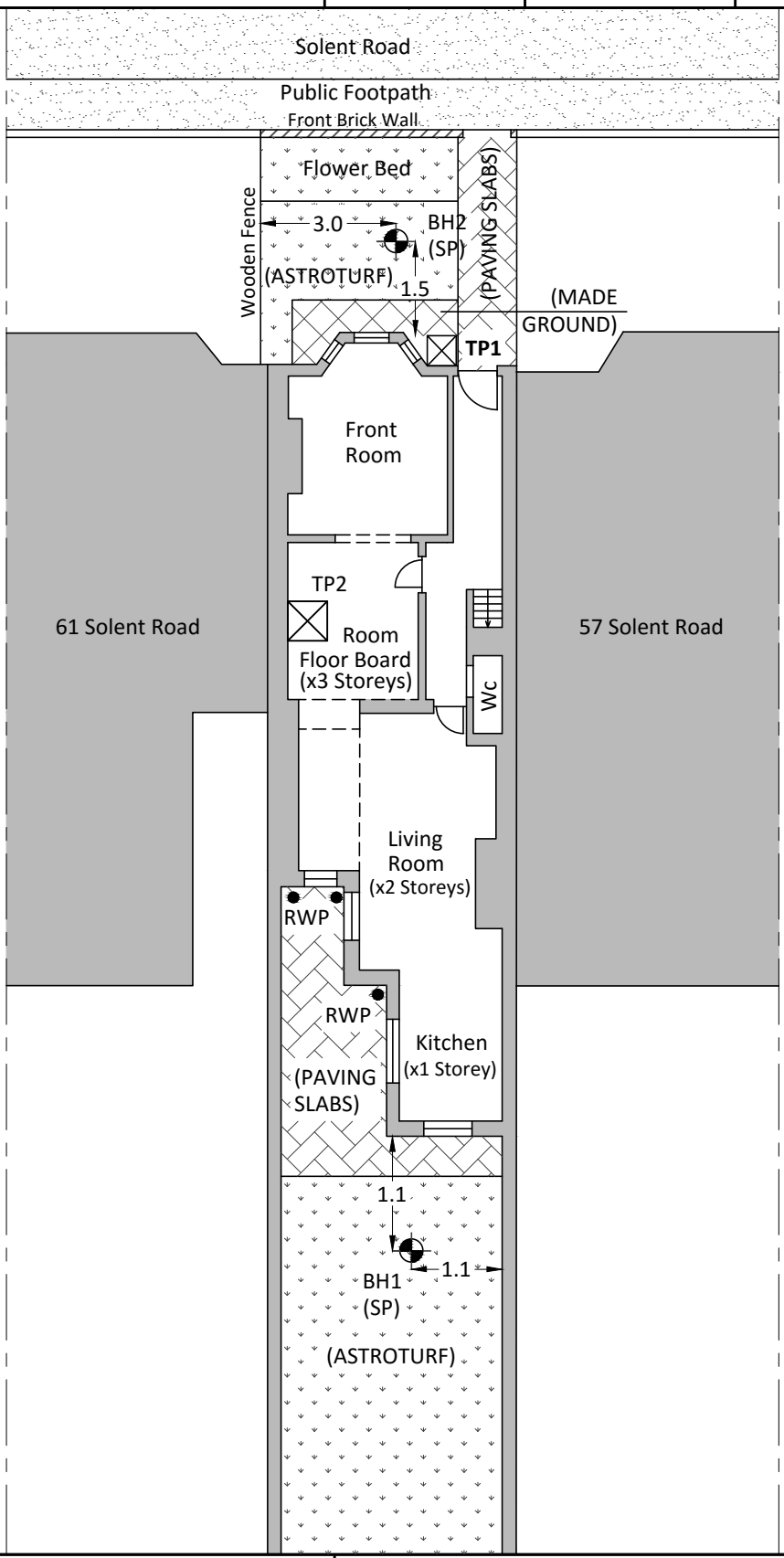
Factual Report

Site	59 Solent Road London NW6 1TY
Client	Mahesh Varia
Date	31st August 2016
Our Ref	FACT/7543

Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
Essex: 01245 400930 | London: 020 36409136 | info@siteinvestigations.co.uk | www.siteinvestigations.com

FACTUAL REPORT CONTENT

Client: Mahesh Varia	**Scale:** N.T.S.	**Sheet:** 1 of 1	**Date:** 31.08.16	
Location: 59 Solent Road, London NW6 1TY	**Job No:** 7543	**Weather:** Fine	**Drawn by:** TP	**Checked by:** JH



Notes: All dimensions in metres.

Key:

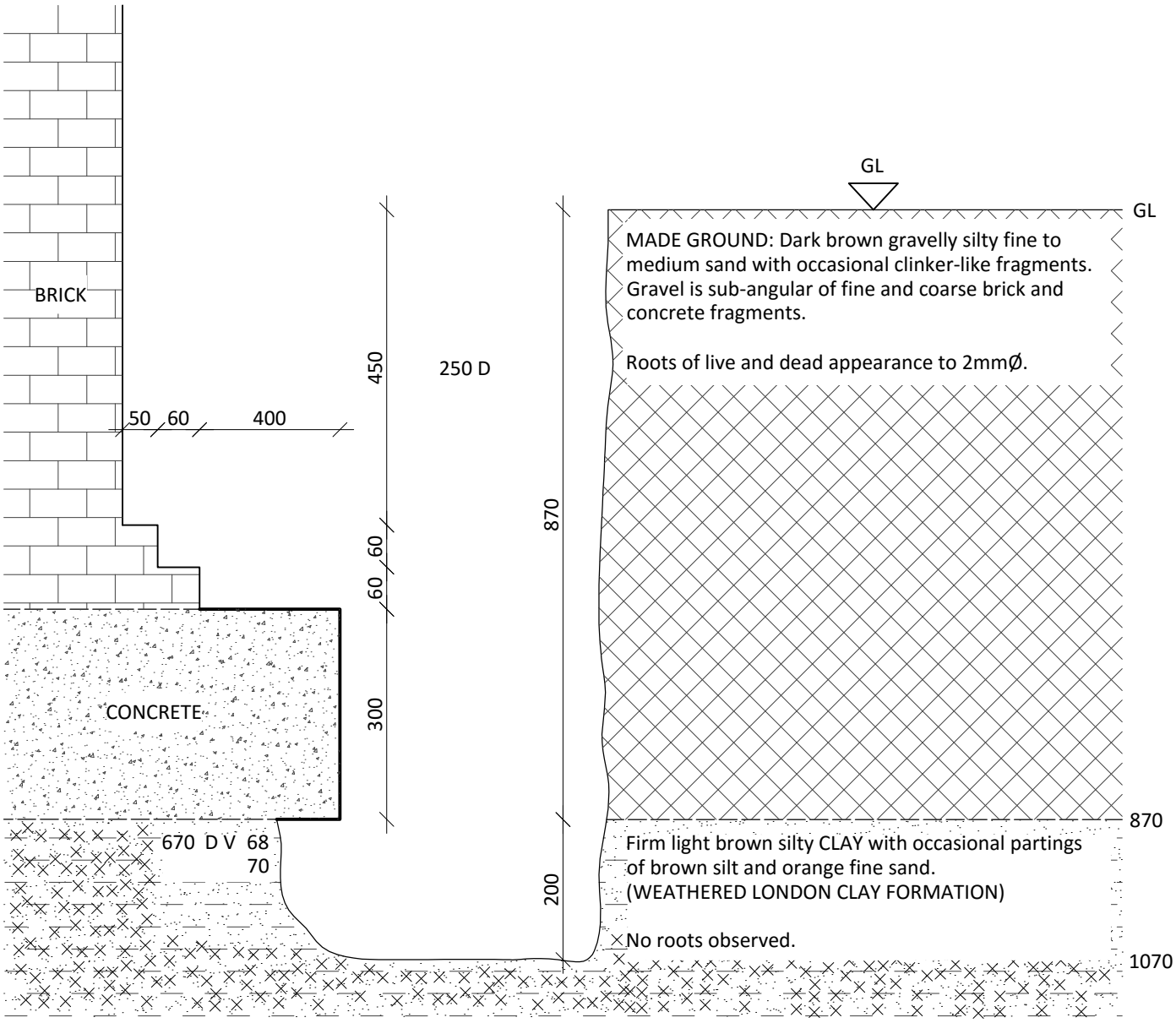
BH — Borehole

TP — Trial pit

RWP — Rainwater pipe

Chelmer Site Investigations
'Groundbreaking Services'

Client: Mahesh Varia	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Date:** 31.08.16
Location: 59 Solent Road, London NW6 1TY	**Job No:** 7541	**Trial pit No:** 1	**Weather:** Internal
Excavation method: Hand Tools		**Drawn by:** TP	**Checked by:** JH

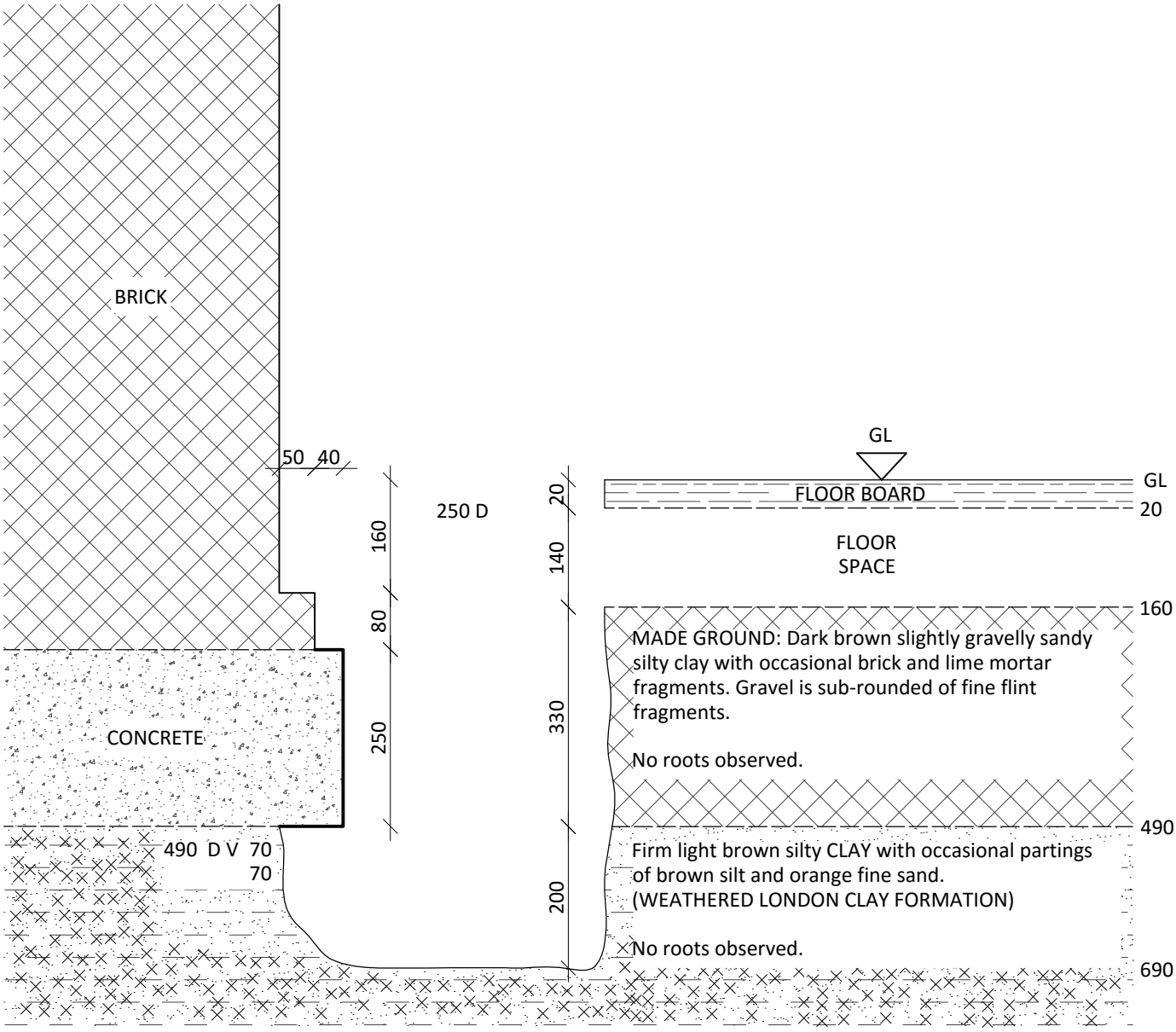


TRIAL PIT 1 TERMINATES AT 1070mm

Remarks: All dimensions in millimetres.

Key: GL Ground Level
D Small Disturbed Sample
V Pilcon Vane (kPa)

Client: Mahesh Varia	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Date:** 31.08.16
Location: 59 Solent Road, London NW6 1TY	**Job No:** 7541	**Trial pit No:** 2	**Weather:** Internal
Excavation method: Hand Tools		**Drawn by:** TP	**Checked by:** JH



TRIAL PIT 2 TERMINATES AT 690mm

Remarks: All dimensions in millimetres.
Unrepresentative sample.

Key: GL Ground Level
D Small Disturbed Sample
V Pilcon Vane (kPa)

Chelmer Site Investigations 'Groundbreaking Services'

Client: Mahesh Varia	Scale: N.T.S.	Sheet No: 1 of 1	Weather: Fine	Date: 26.08.16
Location: 59 Solent Road, London NW6 1TY	Job No: 7543	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
GL	ASTROTURF	0.01							
0.01	MADE GROUND: Dark brown slightly gravelly sandy silt with rare tile and clinker-like fragments. Gravel is sub-angular of fine to coarse brick and concrete fragments.	0.09		D			No roots observed.		0.25
				D					0.5
0.1	MADE GROUND: Dark brown silty clay with occasional gravel. Gravel is sub-angular of brick fragments.	0.6		D	V	68 70			1.0
0.7	Firm orange-brown silty CLAY with occasional partings of brown silt and orange fine sand. (WEATHERED LONDON CLAY FORMATION)			D					1.5
	.....becoming stiff from 2.0m.			D	V	76 76			2.0
				D					2.5
	.....becoming dark brown from 3.3m.			D	V	80 82			3.0
				D					3.5
				D	V	88 90			4.0
		7.4		D					4.5
				D	V	100 102			5.0
				D					5.5
	.....becoming very stiff from 6.0m.			D	V	120+ 120+			6.0
				D	V	120+ 120+			7.0
8.1				D	V	120+ 120+			8.0
	BOREHOLE TERMINATED at 8.1m								

Drawn by: TP **Approved by:** JH

Remarks: Borehole dry and open on completion. 75mmØ plastic standpipe installed to 8.0m (2.0m plain pipe, 6.0m slotted pipe, 2.0m bentonite sealing, 6.0m shingle surrounding, bung, valve and square plastic cover).

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

Chelmer Site Investigations 'Groundbreaking Services'

Client: Mahesh Varia	Scale: N.T.S.	Sheet No: 1 of 1	Weather: Fine	Date: 26.08.16
Location: 59 Solent Road, London NW6 1TY	Job No: 7543	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
GL	ASTROTURF	0.01							
0.01	MADE GROUND: Dark brown slightly gravelly sandy silt with occasional brick fragments. Gravel is sub-angular of fine to coarse concrete fragments.	0.09		D			No roots observed.		0.25
				D					0.5
0.1	MADE GROUND: Dark brown silty clay with occasional gravel. Gravel is sub-angular of brick fragments.	0.6		D	V	70 70			1.0
0.7	Firm dark brown silty CLAY with occasional partings of brown silt and orange fine sand. (WEATHERED LONDON CLAY FORMATION)			D					1.5
	.....becoming stiff from 2.0m.			D	V	74 76			2.0
				D					2.5
				D	V	82 80			3.0
				D					3.5
				D	V	86 86			4.0
		7.4		D					4.5
				D	V	74 78			5.0
				D					5.5
				D	V	112 120+			6.0
	.....becoming very stiff from 7.0m.			D	V	120+ 120+			7.0
8.1				D	V	120+ 120+			8.0
	BOREHOLE TERMINATED at 8.1m								

Drawn by: TP **Approved by:** JH

Remarks: 75mmØ plastic standpipe installed to 8.0m (2.0m plain pipe, 6.0m slotted pipe, 2.0m bentonite sealing, 6.0m shingle surrounding, bung, valve and square plastic cover).

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

Mahesh Varia
59 Solent Road, London NW6 1TY
31.08.16
TRIAL PIT 1 PHOTOGRAPH

Chelmer
Site Investigations
'Groundbreaking Services'

Mahesh Varia
59 Solent Road, London NW6 1TY
31.08.16
TRIAL PIT 2 PHOTOGRAPH

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

UKAS TESTING
8284

Chelmer
Geotechnical Laboratories
'Groundbreaking Services'

Laboratory Report

Site	**59 Solent Road, London. NW6 1TY**
Client	**Mahesh Varia**
Date	**20-Sep-16**
Our Ref	**CSI7543**
CGL Ref	**CGL7543**

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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 : CGL7543
Client Reference : CSI7543
For the attention of : Mahesh Varia
This report comprises of the following :

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 : CGL7543
Client : Mahesh Varia
Client Reference : CSI7543
Site Name : 59 Solent Road, London. NW6 1TY

Date Received : 08/09/2016
Date Testing Started : 15/09/2016
Date Testing Completed : 20/09/2016
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	1.50	78146	D	34	<5	74	23	51	0.22	48	CV								
BH1	3.00	78147	D	29	<5	67	23	44	0.13	42	CH			81					
BH1	4.00	78148	D	29	<5	68	24	44	0.11	42	CH			89					
BH1	8.00	78149	D	29	<5	70	25	45	0.10	43	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 :- HS/SW
Checked By :- HS
Date Checked :- 21-Sep-16

Laboratory Testing Results

BS 1377 : 1990

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number : CGL7543
Client : Mahesh Varia
Client Reference : CSI7543
Site Name : 59 Solent Road, London. NW6 1TY

Date Received : 08/09/2016
Date Testing Started : 15/09/2016
Date Testing Completed : 20/09/2016
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	1.00	78150	D	33	<5	77	25	52	0.14	50	CV			70					
BH2	2.50	78151	D	31	<5	67	24	43	0.16	41	CH								
BH2	3.50	78153	D	33	<5	69	23	46	0.21	44	CH								
BH2	6.00	78154	D	37	<5	68	24	44	0.29	42	CH			116					

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 :- HS/SW

Checked By :- HS

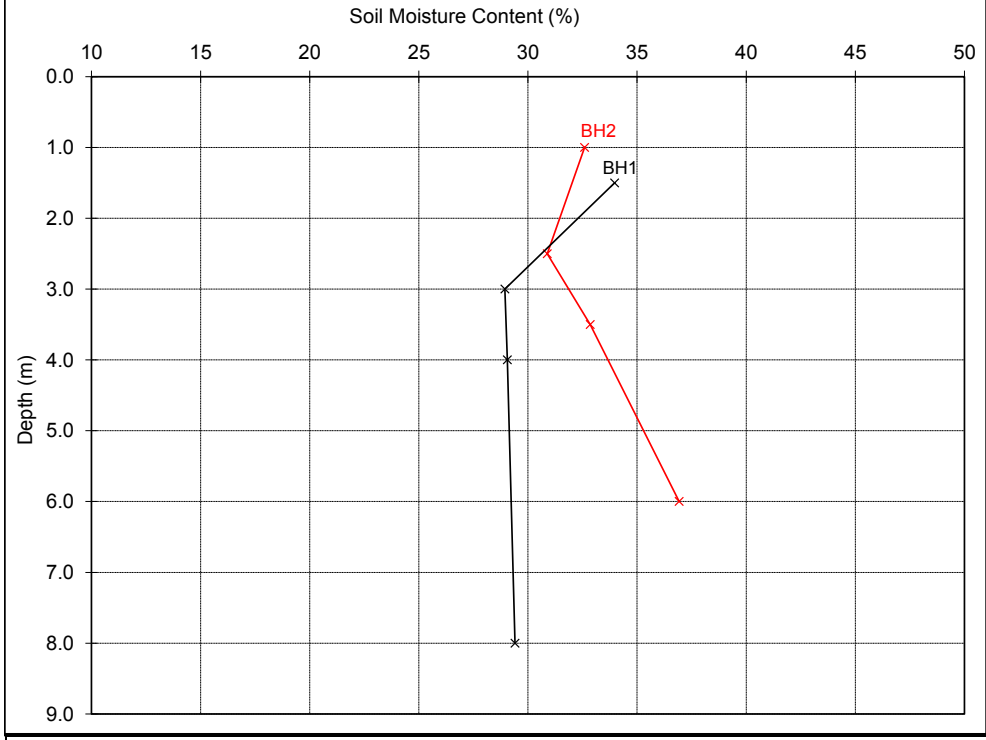
Date Checked :- 21-Sep-16

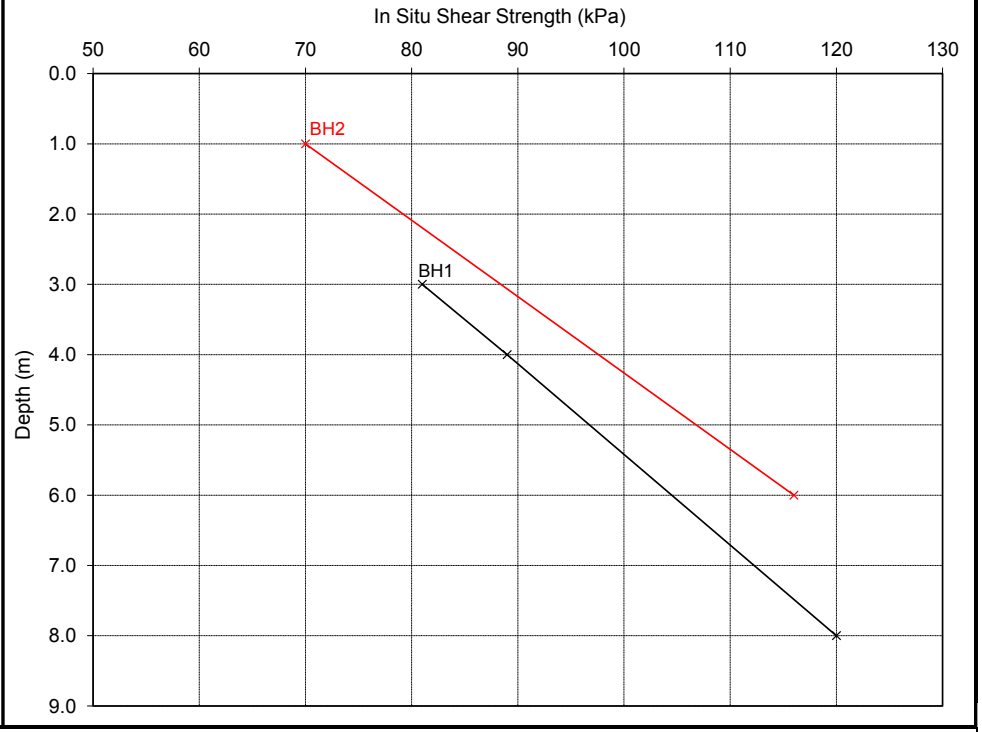
Laboratory Testing Results

Moisture Content/Shear Strength Profile

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number :	CGL7543	Date Received :	08/09/2016
Client :	Mahesh Varia	Date Testing Started :	15/09/2016
Client Reference :	CSI7543	Date Testing Completed :	20/09/2016
Site Name :	59 Solent Road, London. NW6 1TY	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 By :- HS Date Checked :- 21-Sep-16

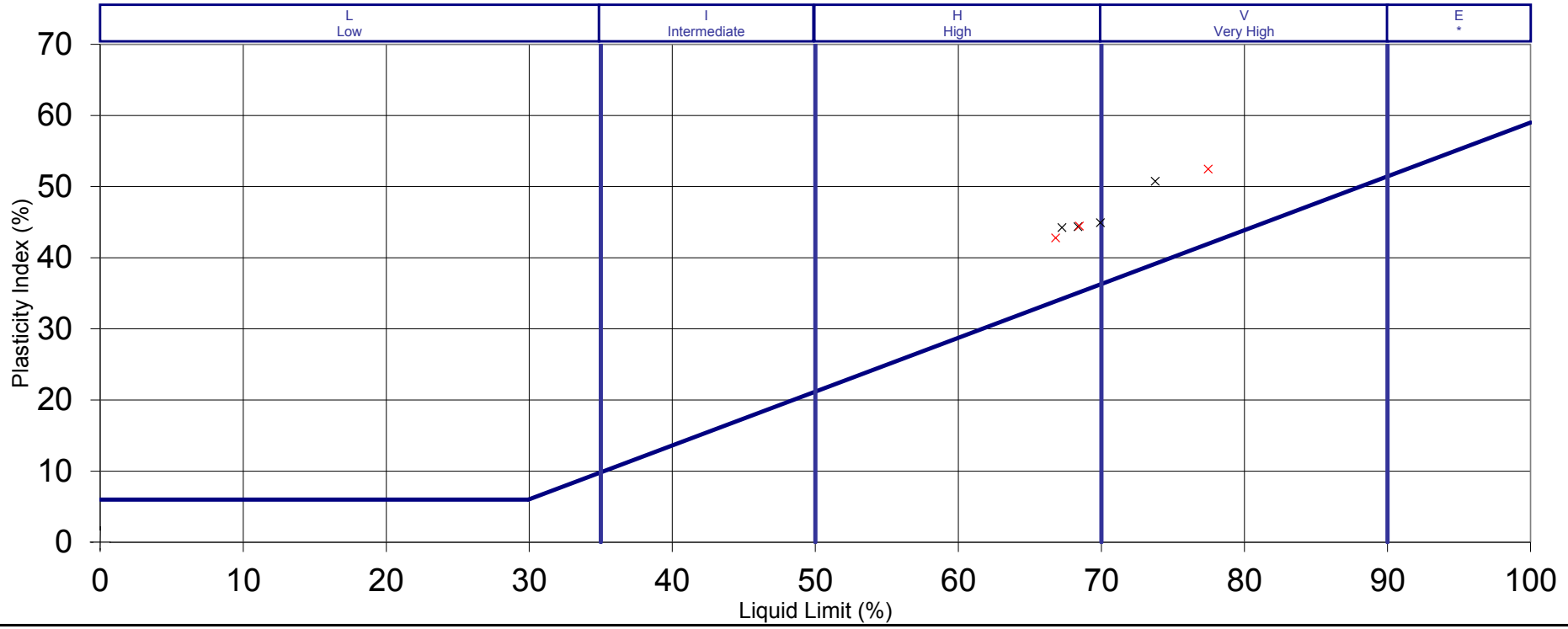
Laboratory Testing Results

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 : CGL7543
Client : Mahesh Varia
Client Reference : CSI7543
Site Name : 59 Solent Road, London. NW6 1TY

Date Received : 08/09/2016
Date Testing Started : 15/09/2016
Date Testing Completed : 20/09/2016
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 :- HS

Date Checked :- 21-Sep-16

Steve Green
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: 16-49034

Site Reference:	Solent Road
Project / Job Ref:	CGL7543
Order No:	7113
Sample Receipt Date:	09/09/2016
Sample Scheduled Date:	12/09/2016
Report Issue Number:	1
Reporting Date:	19/09/2016

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

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: 16-49034	**Date Sampled**	08/09/16	08/09/16	08/09/16	08/09/16	
Chelmer Site Investigation Laboratories Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Solent Road	**TP / BH No**	78146	78149	78152	78155	
Project / Job Ref: CGL7543	**Additional Refs**	BH1	BH1	BH2	TP2	
Order No: 7113	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	
Reporting Date: 19/09/2016	**QTSE Sample No**	227082	227083	227084	227085	

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	7.7	7.8	7.3	7.0	
Total Sulphate as SO_4	mg/kg	< 200	NONE	393	5879	558	10200	
Total Sulphate as SO_4	%	< 0.02	NONE	0.04	0.59	0.06	1.02	
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	140	1870	1230	1590	
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.14	1.87	1.23	1.59	
Total Sulphur	%	< 0.02	NONE	< 0.02	0.28	< 0.02	0.53	
Ammonium as NH_4	mg/kg	< 0.5	NONE	3	6.5	3.4	18.1	
Ammonium as NH_4	mg/l	< 0.05	NONE	0.30	0.65	0.34	1.81	
W/S Chloride (2:1)	mg/kg	< 1	MCERTS	17	58	349	600	
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS	8.3	28.8	175	300	
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	MCERTS	4	< 3	5280	7570	
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	MCERTS	2.1	< 1.5	2640	3790	
W/S Magnesium	mg/l	< 0.1	NONE	9.1	140	120	140	

Analytical results are expressed on a dry weight basis where samples are assisted-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

Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 16-49034	
Chelmer Site Investigation Laboratories Ltd	
Site Reference: Solent Road	
Project / Job Ref: CGL7543	
Order No: 7113	
Reporting Date: 19/09/2016	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
227082	78146	BH1	None Supplied	22.4	Light brown clay
227083	78149	BH1	None Supplied	20.2	Light brown clay
227084	78152	BH2	None Supplied	21.9	Light brown gravelly clay
227085	78155	TP2	None Supplied	10.1	Light brown gravelly clay with rubble and stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/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 - Methodology & Miscellaneous Information
QTS Environmental Report No: 16-49034
Chelmer Site Investigation Laboratories Ltd
Site Reference: Solent Road
Project / Job Ref: CGL7543
Order No: 7113
Reporting Date: 19/09/2016

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

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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.

Steve Green
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: 16-49035

Site Reference:	59 Solent Road, London, NW6 1TY
Project / Job Ref:	CGL7543-C
Order No:	7114
Sample Receipt Date:	09/09/2016
Sample Scheduled Date:	12/09/2016
Report Issue Number:	1
Reporting Date:	19/09/2016

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

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

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Soil Analysis Certificate						
QTS Environmental Report No: 16-49035	**Date Sampled**	08/09/16	08/09/16	08/09/16		
Chelmer Site Investigation Laboratories Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: 59 Solent Road, London, NW6 1TY	**TP / BH No**	78156	78158	78159		
Project / Job Ref: CGL7543-C	**Additional Refs**	BH1	TP1	TP2		
Order No: 7114	**Depth (m)**	0.25	0.25	0.25		
Reporting Date: 19/09/2016	**QTSE Sample No**	227086	227088	227089		

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	8.0	7.6	7.9		
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
Total Sulphate as SO_4	mg/kg	< 200	NONE	2001	1859	20810		
Total Sulphate as SO_4	%	< 0.02	NONE	0.20	0.19	2.08		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	330	132	1140		
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.33	0.13	1.14		
Elemental Sulphur	mg/kg	< 10	NONE	< 10	< 10	< 10		
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5		
Arsenic (As)	mg/kg	< 2	MCERTS	17	19	13		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	0.7	< 0.2		
Chromium (Cr)	mg/kg	< 2	MCERTS	25	36	20		
Copper (Cu)	mg/kg	< 4	MCERTS	54	54	35		
Lead (Pb)	mg/kg	< 3	MCERTS	482	1900	260		
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS	15	17	12		
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3		
Zinc (Zn)	mg/kg	< 3	MCERTS	96	678	97		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2		

Analytical results are expressed on a dry weight basis where samples are assisted-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

Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 16-49035	Date Sampled	08/09/16	08/09/16	08/09/16		
Chelmer Site Investigation Laboratories Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: 59 Solent Road, London, NW6 1TY	TP / BH No	78156	78158	78159		
Project / Job Ref: CGL7543-C	Additional Refs	BH1	TP1	TP2		
Order No: 7114	Depth (m)	0.25	0.25	0.25		
Reporting Date: 19/09/2016	QTSE Sample No	227086	227088	227089		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	1.17	0.16		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.27	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	3.85	0.37		
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	3.24	0.34		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	1.59	0.18		
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	1.62	0.25		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	2.44	0.36		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.91	0.17		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	1.64	0.14		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	1.28	0.16		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.71	< 0.1		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	18.7	2.1		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

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

Soil Analysis Certificate - TPH CWG Banded						
QTS Environmental Report No: 16-49035	**Date Sampled**	08/09/16	08/09/16	08/09/16		
Chelmer Site Investigation Laboratories Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: 59 Solent Road, London, NW6 1TY	**TP / BH No**	78156	78158	78159		
Project / Job Ref: CGL7543-C	**Additional Refs**	BH1	TP1	TP2		
Order No: 7114	**Depth (m)**	0.25	0.25	0.25		
Reporting Date: 19/09/2016	**QTSE Sample No**	227086	227088	227089		

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3		
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10		
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21		
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05		
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2		
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	8	< 3		
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	28	15		
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	35	< 21		
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Unit 1, Rose Lane Industrial Estate
Rose Lane
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Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - BTEX / MTBE						
QTS Environmental Report No: 16-49035	Date Sampled	08/09/16	08/09/16	08/09/16		
Chelmer Site Investigation Laboratories Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: 59 Solent Road, London, NW6 1TY	TP / BH No	78156	78158	78159		
Project / Job Ref: CGL7543-C	Additional Refs	BH1	TP1	TP2		
Order No: 7114	Depth (m)	0.25	0.25	0.25		
Reporting Date: 19/09/2016	QTSE Sample No	227086	227088	227089		

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5		
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

					Landfill Waste Acceptance Criteria Limits		
QTS Environmental Report No: 16-49035	**Date Sampled**	08/09/16					
Chelmer Site Investigation Laboratories Ltd	**Time Sampled**	None Supplied			**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: 59 Solent Road, London, NW6 1TY	**TP / BH No**	78157					
Project / Job Ref: CGL7543-C	**Additional Refs**	BH2					
Order No: 7114	**Depth (m)**	0.50					
Reporting Date: 19/09/2016	**QTSE Sample No**	227087					

Determinand	**Unit**	**MDL**					
TOC[MU]	%	< 0.1	1.7			3%	5%	6%
Loss on Ignition	%	< 0.01	7			--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10			500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7			100	--	--
pH[MU]	pH Units	N/a	7.9			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1			--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	0.05	< 0.02		0.2	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]	< 0.01	< 0.01		< 0.5	2	50	100
Mercury[U]	< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]	0.025	0.007		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	0.049	0.024		0.25	**0.06**	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]	< 0.005	< 0.005		< 0.2	4	50	200
Chloride[U]	4	2		16	800	15000	25000
Fluoride[U]	0.8	0.6		6	10	150	500
Sulphate[U]	13	2		24	1000	20000	50000
TDS	148	73		775	4000	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	15.1	9.8		101	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.22						
Dry Matter (%)	79.7						
Moisture (%)	25.6						
Stage 1							
Volume Eluate L2 (litres)	0.31						
Filtered Eluate VE1 (litres)	0.11						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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

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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 16-49035	
Chelmer Site Investigation Laboratories Ltd	
Site Reference: 59 Solent Road, London, NW6 1TY	
Project / Job Ref: CGL7543-C	
Order No: 7114	
Reporting Date: 19/09/2016	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
227086	78156	BH1	0.25	22.1	Light brown gravelly clay
227087	78157	BH2	0.50	20.3	Light brown gravelly clay
227088	78158	TP1	0.25	13.3	Brown gravelly clay
227089	78159	TP2	0.25	8.4	Light brown gravelly clay with rubble and stones

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

Insufficient Sample I/S

Unsuitable Sample U/S

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

Soil Analysis Certificate - Methodology & Miscellaneous Information

QTS Environmental Report No: 16-49035
Chelmer Site Investigation Laboratories Ltd
Site Reference: 59 Solent Road, London, NW6 1TY
Project / Job Ref: CGL7543-C
Order No: 7114
Reporting Date: 19/09/2016

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

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.