CONCEPT
Unit 8, Warple Mews, Warple Way
W3 0RF
Telephone: 020 88 112 880_Fax: 020 88 112 881
E-mail: si@conceptconsultants.co.uk

Borehole No

BH102

Project

100 Avenue Road, Swiss Cottage

Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
16/2832	11/05/16	53.21	E 526715.0 N 184305.1	47.00m
	Date Completed 13/05/16			

Client

Essential Living Ltd

PROGRESS

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Remarks
11/05/16	0.00		Dry	
11/05/16	1.20		Dry	
11/05/16	20.00	3.00	Dry	
12/05/16	20.00	3.00	Dry	
12/05/16	42.45	20.10	Dry	
13/05/16	42.45	20.10	Dry	
13/05/16	47.00	20.10	Dry	

SPT DETAILS

Type	Depth (m)	N Value	Blow Count / 75mm	Casing Depth (m)	Water Depth (m)
S	3.00	N13	2, 2 / 3, 3, 3, 4	3.00	Dry
S	6.00	N16	2, 3 / 3, 4, 4, 5	3.00	Dry
S	9.00	N22	2, 3 / 3, 4, 7, 8	3.00	Dry
S	12.00	N30	3, 4 / 4, 7, 9, 10	3.00	Dry
S	15.00	N41	3, 4 / 9, 10, 10, 12	3.00	Dry
S	18.00	N43	4, 5 / 9, 11, 11, 12	3.00	Dry
S	21.00	N39	4, 5 / 7, 8, 12, 12	20.10	Dry
S	24.00	N38	5, 6 / 7, 9, 10, 12	20.10	Dry
S	27.00	N41	5, 6 / 7, 10, 11, 13	20.10	Dry
S	30.00	N43	6, 7 / 8, 10, 12, 13	20.10	Dry
S	33.00	N50	6, 7 / 10, 12, 14, 14	20.10	Dry
S	36.00	N49	7, 8 / 9, 12, 13, 15	20.10	Dry
S	39.00	N50/0.295	6, 8 / 10, 13, 14, 13	20.10	Dry
S	42.00	N50/0.275	6, 8 / 11, 13, 15, 11	20.10	Dry
S	45.00	N50/0.245	8, 10 / 13, 15, 16, 6	20.10	Dry

GENERAL REMARKS

1. Borehole carried out from basement level.
2. Ø300mm diamond coring carried out between GL and 0.50m depth.

KEY

SAMPLES

ES - Environmental Sample (Tub, Vial, Jar)
U - 100mm Diameter Undisturbed Sample
UT - 100mm Diameter Thin Wall Undisturbed Sample
U38 - 38mm Diameter Undisturbed Sample
D - Disturbed Sample, B-Bulk Sample, BLK-Block Sample
C - Core Sample, W-Water Sample, R-Root Sample

INSTALLATION DETAILS

SPIE - Standpipe Piezometer
SPGW - Groundwater Monitor Standpipe
SPG/GW - Gas / Groundwater Monitor Standpipe
VWP - Vibrating Wire Piezometer
INC - Inclinometer

HOLE TYPES

IP -Inspection Pit, TP-Trial Pit
CP -Cable Percussion, RC-Rotary Coring, R/S-Rotary/Sonic
WS -Window Sampling, WSL-Windowless Sampling
DC -Dynamic Coring

TESTS S/C-SPT / CPT, V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe VOC-Volatile Organic Compounds

Note: All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

Issue No: 02	Checked By: OS	Approved By: AN	Log Print Date & Time: 06/07/2016 15:57

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16/2832	11/05/16	53.21	E 526715.0 N 184305.1	47.00m
	Date Completed 13/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	1 of 6

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
11/05/16		Dry			(0.50)	CONCRETE.					
			52.71		0.50		0.50			... VOC 1.3ppm	
						Soft, light brown occasionally mottled light bluish grey micaceous silty CLAY with occasional pockets of orangish yellow fine to medium sand (<10mm), rare fine to coarse flint, brick and concrete fragments and occasional selenite crystals (<7mm). (MADE GROUND)	0.50	ES01			
					(0.50)		0.50	B02			
							0.70			... Rootlets of live appearance at 0.50m	
			52.21		1.00		1.00			... VOC 0.4ppm	
							1.00	ES03			
11/05/16		Dry					1.00	B04			
						Firm, extremely closely to very closely fissured light brown mottled light bluish grey slightly micaceous CLAY with occasional selenite crystals (<7mm). Fissures are randomly orientated, planar, smooth, unpolished. (THAMES GROUP : WEATHERED LONDON CLAY FORMATION)	1.50-1.95	UT05	40 blows	100% Recovery	
						... becoming light brown to brown with rare black staining below 2.00m	2.00	D06			
						... with occasional pockets of orangish brown fine sand (<12mm) below 2.50m	2.50	D07			
							3.00		N13	2, 2 / 3, 3, 3, 4	
						... with 1No pyrite nodule (10 x 15mm) at 3.00m	3.00	D08			
					(5.60)						
							4.00	D09			
						... with occasional to frequent orangish brown staining at 4.00m					
							4.50-4.95	UT10	50 blows	100% Recovery	
							5.00	D11			
						... becoming slightly sandy with greyish green flecks at 4.95m. Sand is fine and glauconitic.					
							5.50-6.00	B12			
						... becoming silty with frequent partings and pockets of orangish brown silty fine sand (<50mm) below 5.50m					
							6.00		N16	2, 3 / 3, 4, 4, 5	
							6.00	D13			
			46.61		6.60						
						Firm to stiff, very closely fissured greyish brown slightly micaceous silty CLAY with occasional pockets of of dark grey silt (<30mm), occasional selenite crystals (<20mm) and rare bioturbation. Fissures are subhorizontal, subvertical (30°- 50°), planar, smooth, unpolished. (THAMES GROUP : LONDON CLAY FORMATION - C)	7.00-7.50	B14			
							7.50-7.95	UT15	80 blows	100% Recovery	
							8.00	D16			

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16/2832	11/05/16	53.21	E 526715.0 N 184305.1	47.00m
	Date Completed 13/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	2 of 6

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
						... with 1No pyrite nodule (80 x 90 x 15mm) and occasional partings of dark grey silt at 7.95m					
						... with a band of claystone between 7.95m and 8.00m	8.50	D17			
						... becoming stiff and homogeneous clay with occasional bioturbation and with no pockets, partings and selenite crystals below 8.50m	9.00		N22	2, 3 / 3, 4, 7, 8	
							9.00	D18			
							10.00-10.50	B19			
							10.50-10.95	UT20	70 blows	100% Recovery	
						... with rare white flecks below 10.50m					
						... with a parting of yellowish brown fine sand at 10.58m	11.00	D21			
						... becoming silty and micaceous with rare pockets of dark grey silty fine sand (<10mm) below 10.95m	11.50	D22			
							12.00		N30	3, 4 / 4, 7, 9, 10	
							12.00	D23			
							13.00	D24			
							13.50-13.95	UT25	80 blows	100% Recovery	
						... with a parting of yellowish brown fine sand at 13.60m	14.00	D26			
						... with occasional partings of light brown silty fine sand at 13.95m					
						... with rare white flecks below 13.95m	14.50	D27			
						... with rare pyrite nodules (<20mm) below 14.50m					
					(16.40)		15.00		N41	3, 4 / 9, 10, 10, 12	
							15.00	D28			
							15.50-16.00	B29			
						... with rare pockets of dark grey silt (<10mm) and rare light brown coarse sand sized and fine gravel sized tubular shell fragments at 15.50m					

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	Date Completed 13/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	3 of 6

PROGRESS			STRATA				SAMPLES & TESTS			Field Records	Instrument/ Backfill
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result		
							16.50-16.95	UT30	80 blows		
							17.00	D31			
						... becoming very stiff below 16.95m					
							17.40	D32			
						... with a band of medium strong to strong grey claystone (200mm) recovered as: angular medium to coarse gravel sized claystone fragments at 17.40m					
							18.00		N43	4, 5 / 9, 11, 11, 12	
							18.00	D33			
							19.00	D34			
							19.50-19.95	UT35	80 blows	100% Recovery	
11/05/16	3.00	Dry					20.00	D36			
12/05/16	3.00	Dry				... with dark grey staining and rare fine to coarse sand sized off-white shell fragments below 19.95m					
							20.50-21.00	B37			
						... with rare pockets of dark grey silt (<20mm) below 20.50m					
							21.00		N39	4, 5 / 7, 8, 12, 12	
							21.00	D38			
							22.00	D39			
							22.50-22.95	UT40	80 blows	100% Recovery	
			30.21		23.00		23.00	D41			
						Very stiff, very closely fissured greyish brown micaceous silty CLAY with rare pockets of dark grey silty fine sand (40mm), occasional bioturbation, rare pyrite nodules (<20mm), rare off-white fine to coarse sand sized shell fragments, rare dark grey staining and rare white flecks. Fissures are subhorizontal, subvertical (30º- 50º), planar, smooth, unpolished.	23.50	D42			
							24.00		N38	5, 6 / 7, 9, 10, 12	

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	Date Completed 13/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	4 of 6

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
						(THAMES GROUP : LONDON CLAY FORMATION - B)	24.00	D43			
							25.00-25.50	B44			
							25.50-25.90	UT45	80 blows	90% Recovery	
						... with rare orangish brown discolouration below 25.66m	25.95	D46			
						... becoming extremely closely fissured and slightly micaceous below 25.95m	26.50	D47			
							27.00		N41	5, 6 / 7, 10, 11, 13	
							27.00	D48			
							28.00	D49			
							28.50-28.90	UT50	80 blows	90% Recovery	
						... with rare pockets of orangish yellow fine sand (<8mm), occasional bioturbation, reddish brown discolouration and rare shell fragments at 28.50m	28.95	D51			
							29.50-30.00	B52			
							30.00		N43	6, 7 / 8, 10, 12, 13	
							30.00	D53			
							31.00	D54			
						... with rare pockets of dark grey silty fine sand (<25mm) between 31.00m and 34.00m	31.50-31.85	UT55	80 blows	80% Recovery	
						... with reddish brown discolouration at 31.50m	31.90	D56			

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16/2832	11/05/16	53.21	E 526715.0 N 184305.1	47.00m
	Date Completed 13/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	5 of 6

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
							32.50	D57			
							33.00		N50	6, 7 / 10, 12, 14, 14	
							33.00	D58			
							34.00	D59			
							34.50-34.95	UT60	80 blows	100% Recovery	
						... becoming locally extremely closely fissured slightly sandy with occasional pockets of reddish brown fine sand (<15mm) at 34.50m					
					(24.00)		35.00	D61			
							35.50-36.00	B62			
						... with rare lenses and pockets of dark grey and light brown silty fine sand (<6mm) between 35.50m and 40.00m					
							36.00		N49	7, 8 / 9, 12, 13, 15	
							36.00	D63			
							37.00	D64			
						... with a pocket of grey silty fine sand (25mm) at 37.00m					
							37.50-37.90	UT65	80 blows	90% Recovery	
						... with rare partings of light brown fine sand, shell fragments and bioturbation at 37.50m					
							37.95	D66			
							38.50	D67			
						... with 1No pyrite nodule (10mm) at 38.50m					
							39.00		N50/ 0.295	6, 8 / 10, 13, 14, 13	
							39.00	D68			
							40.00-40.50	B69			

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	Date Completed 13/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	6 of 6

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
							40.50-40.85	UT70	80 blows	80% Recovery	
						... with rare foraminifera and bioturbation at 40.50m	40.90	D71			
							41.50	D72			
							42.00		N50/ 0.275	6, 8 / 11, 13, 15, 11	
							42.00	D73			
12/05/16	20.10	Dry									
13/05/16	20.10	Dry									
							43.00	D74			
							43.50-43.95	U75	100 blows	100% Recovery	
						... becoming extremely closely fissured with occasional pockets of light brown fine sand (<11mm) and rare white flecks at 43.50m	44.00	D76			
						... with occasional partings and pockets of dark grey and brown silty fine sand (<30mm) below 44.00m	44.50-45.00	B77			
						... with white silt flecks (<4mm) between 44.50m and 45.00m	45.00		N50/ 0.245	8, 10 / 13, 15, 16, 6	
							45.00	D78			
							46.00	D79			
							46.50-46.85	U80	100 blows	80% Recovery	
							46.90	D81			
13/05/16	20.10	Dry	6.21		47.00		47.00	D82			
						End of Borehole					

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Borehole No

BH105

Project

100 Avenue Road, Swiss Cottage

Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
16/2832	06/05/16	53.28	E 526703.5 N 184308.3	30.00m
	Date Completed 06/05/16			

Client

Essential Living Ltd

BOREHOLE SUMMARY

Top (m)	Base (m)	Type	Date Started	Date Ended	Crew	Logged By	Core Barrel (mm)	Core Bit	Plant Used/ Method	SPT Hammer Reference
0.00	0.55	DC	09/05/2016	09/05/2016	LR	FC/RB			Diamond Coring	
0.55	1.20	IP	09/05/2016	09/05/2016	LR	FC/RB			Hand Excavated	
1.20	30.00	CP	09/05/2016	10/05/2016	LR	FC/RB			Dando 100	SW68

WATER STRIKES

Strike at (m)	Rise to (m)	Time to Rise (min)	Casing Depth (m)	Sealed (m)

WATER ADDED

From (m)	To (m)

CHISELLING/SLOW PROGRESS

From (m)	To (m)	Duration (hr)	Remarks
7.90	8.05	00:30:00	Claystone
16.00	16.65	00:30:00	Claystone

HOLE

Depth (m)	Diameter (mm)
0.00	200
12.00	200
30.00	150

CASING

Depth (m)	Diameter (mm)
0.00	200
3.00	200
12.00	150

ROTARY CORE RECOVERY

From (m)	To (m)	Blows	Recovery (%)

ROTARY FLUSH DETAIL

From (m)	To (m)	Flush Type	Flush Return (%)	Flush Colour

INSTALLATION DETAILS

Type	Diameter (mm)	Depth of Installation (m)	Top of Response Zone (m)	Bottom of Response Zone (m)	Date of Installation

BACKFILL DETAILS

Top (m)	Bottom (m)	Material	Backfill Date
0.00	0.55	Concrete	10/05/2016
0.55	30.00	Cement/Bentonite Grout	10/05/2016

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Borehole No

BH105

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Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
16/2832	06/05/16	53.28	E 526703.5 N 184308.3	30.00m
	Date Completed 06/05/16			

Client

Essential Living Ltd

PROGRESS

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Remarks
09/05/16	0.00		Dry	
09/05/16	1.20		Dry	
09/05/16	15.00	12.00	Dry	
10/05/16	15.00	12.00	Dry	
10/05/16	30.00	12.00	Dry	

SPT DETAILS

Type	Depth (m)	N Value	Blow Count / 75mm	Casing Depth (m)	Water Depth (m)
S	3.00	N14	2, 2 / 3, 3, 3, 5	3.00	Dry
S	6.00	N19	3, 3 / 4, 4, 5, 6	3.00	Dry
S	9.00	N20	3, 3 / 4, 5, 5, 6	3.00	Dry
S	12.00	N29	4, 5 / 5, 6, 8, 10	12.00	Dry
S	15.00	N30	4, 5 / 5, 8, 8, 9	12.00	Dry
C	16.50	N37	10, 14 / 13, 9, 8, 7	12.00	Dry
S	18.00	N35	4, 5 / 7, 8, 10, 10	12.00	Dry
S	21.00	N33	4, 6 / 8, 7, 8, 10	12.00	Dry
S	24.00	N38	5, 6 / 8, 9, 10, 11	12.00	Dry
S	27.00	N40	5, 7 / 8, 10, 10, 12	12.00	Dry
S	30.00	N45	6, 7 / 9, 10, 12, 14	12.00	Dry

GENERAL REMARKS

1. Borehole carried out from basement level.
2. Ø300mm diamond coring carried out between GL and 0.55m depth.

KEY

SAMPLES

ES - Environmental Sample (Tub, Vial, Jar)
U - 100mm Diameter Undisturbed Sample
UT - 100mm Diameter Thin Wall Undisturbed Sample
U38 - 38mm Diameter Undisturbed Sample
D - Disturbed Sample, B-Bulk Sample, BLK-Block Sample
C - Core Sample, W-Water Sample, R-Root Sample

INSTALLATION DETAILS

SPIE - Standpipe Piezometer
SPGW - Groundwater Monitor Standpipe
SPG/GW - Gas / Groundwater Monitor Standpipe
VWP - Vibrating Wire Piezometer
INC - Inclinometer

HOLE TYPES

IP -Inspection Pit, TP-Trial Pit
CP -Cable Percussion, RC-Rotary Coring, R/S-Rotary/Sonic
WS -Window Sampling, WSL-Windowless Sampling
DC -Dynamic Coring

TESTS S/C-SPT / CPT, V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe VOC-Volatile Organic Compounds

Note: All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

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Borehole No

BH105

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	Date Completed 06/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	1 of 4

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
09/05/16		Dry			(0.55)	CONCRETE.					
			52.73		0.55		0.50			... VOC 7.4ppm	
							0.50	ES01			
						Soft to firm, extremely closely fissured light brown occasionally mottled light bluish grey micaceous CLAY with occasional selenite crystals (<5mm) and rare black flecks. Fissures are randomly orientated, planar, smooth, unpolished. (THAMES GROUP : WEATHERED LONDON CLAY FORMATION)	0.60			... Traces of rootlets at 0.55m	
							0.60	B02			
							1.00			... VOC 6.6ppm	
							1.00	ES03			
09/05/16		Dry					1.00	B04			
							1.50-1.95	UT05	40 blows	100% Recovery	
						... with rare pockets of yellowish brown fine sand (<20mm) and a pyrite nodule (10x10mm) at 1.50m					
							2.00	D06			
						... becoming firm, brown mottled orangish brown and silty below 2.00m					
							2.50	D07			
						... with rare pockets of orangish brown silt (<7mm) below 2.50m					
							3.00		N14	2, 2 / 3, 3, 3, 5	
							3.00	D08			
					(6.05)						
							4.00	D09			
							4.50-4.95	UT10	50 blows	100% Recovery	
							5.00	D11			
						... with rare pockets of orangish brown fine sand (<10mm) at 5.00m					
							5.50-6.00	B12			
						... with partings of orangish brown silt, frequent pockets of orangish brown fine sand (<30mm) and frequent selenite crystals (<15mm) at 5.50m	6.00		N19	3, 3 / 4, 4, 5, 6	
						... with frequent selenite crystals (<20mm) between 6.00m and 6.45m	6.00	D13			
			46.68		6.60		6.60-7.00	B14			
						Firm to stiff, extremely closely fissured greyish brown slightly micaceous CLAY with occasional bioturbation and rare pyrite nodules (<25mm). (THAMES GROUP : LONDON CLAY FORMATION - C) ... with occasional partings and pockets of dark grey silty fine sand (<20mm), rare pockets of orangish brown silt (<10mm) and occasional selenite crystals (<10mm) between 6.60m and 8.50m.	7.50-7.95	UT15	80 blows	100% Recovery	
							7.95	D16			

Issue No: 02	Checked By: OS	Approved By: AN	Log Print Date & Time: 06/07/2016 15:58

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Borehole No

BH105

Project

100 Avenue Road, Swiss Cottage

Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
16/2832	06/05/16	53.28	E 526703.5 N 184308.3	30.00m
	Date Completed 06/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	2 of 4

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
						... with a claystone band between 7.90m and 8.05m					
							8.50	D17			
						... with 2No pyritised wood fragments (30x5mm and 50x30mm) at 8.50m					
							9.00		N20	3, 3 / 4, 5, 5, 6	
							9.00	D18			
							10.00-10.50	B19			
						... becoming silty with rare pockets of dark grey silty fine sand (<15mm) below 10.00m					
							10.50-10.90	UT20	80 blows	90% Recovery	
						... with a pyrite nodule (20x11mm) at 10.50m					
							10.95	D21			
						... becoming stiff and very closely fissured with occasional partings and pockets of dark grey silty fine sand (<10mm) below 10.95m.					
							11.50	D22			
							12.00		N29	4, 5 / 5, 6, 8, 10	
							12.00	D23			
							13.00	D24			
						... with occasional off-white and light brown tubular shell fragments (<7mm) below 13.00m					
							13.50-13.95	UT25	70 blows	100% Recovery	
						... with rare pockets of grey fine sand (<25mm), bioturbation and pyrite nodules (<12mm) at 13.50m					
							14.00	D26			
					(15.40)						
							14.50	D27			
						... with no partings and pockets of sand below 14.50m					
09/05/16	12.00	Dry					15.00		N30	4, 5 / 5, 8, 8, 9	
10/05/16	12.00	Dry					15.00	D28			
						... with 1No pyritised wood fragment (20x20mm) at 15.00mm					
							16.00-16.50	B29			

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Borehole No

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100 Avenue Road, Swiss Cottage

Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
16/2832	06/05/16	53.28	E 526703.5 N 184308.3	30.00m
	Date Completed 06/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	3 of 4

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
						... becoming very stiff and slightly micaceous below 16.00m					
							16.50		N37	10, 14 / 13, 9, 8, 7	
							16.50-17.00	B30			
						... with rare off-white coarse sand sized and fine gravel sized shell fragments and rare white specks below 16.50m					
						... with a band of claystone between 16.50m and 16.65m	17.00-17.45	UT31	80 blows	100% Recovery	
						... with rare pyrite nodules (<10mm), shell fragments, bioturbation and a pyritised wood fragment (4x3mm) at 17.00m					
							17.50	D32			
							18.00		N35	4, 5 / 7, 8, 10, 10	
						... with 1No lignite fragment (20x10mm) at 18.00m	18.00	D33			
							19.00	D34			
						... with 1No pyritised wood fragment (20x15mm) at 19.00m					
							19.50-19.95	UT35	80 blows	100% Recovery	
						... with rare pockets of grey fine sand (<35mm), bioturbation and white flecks at 19.50m					
							20.00	D36			
							20.50-21.00	B37			
						... becoming silty with rare pockets of dark grey silt (<15mm) and frequent bioturbation below 20.50m					
							21.00		N33	4, 6 / 8, 7, 8, 10	
							21.00	D38			
			31.28		22.00		22.00	D39			
						Very stiff, very closely fissured greyish brown micaceous silty CLAY with rare pockets of dark grey silt (<15mm), occasional bioturbation, occasional off-white coarse sand and fine gravel sized shell fragments, occasional pyrite nodules (<25mm) and rare white specks. Fissures are subhorizontal and subvertical (30°- 50°), planar, smooth, unpolished. (THAMES GROUP : LONDON CLAY FORMATION - B)	22.50-22.95	UT40	80 blows	100% Recovery	
							23.00	D41			
							23.50	D42			
							24.00		N38	5, 6 / 8, 9, 10, 11	

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Borehole No

BH105

Project

100 Avenue Road, Swiss Cottage

Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
16/2832	06/05/16	53.28	E 526703.5 N 184308.3	30.00m
	Date Completed 06/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	4 of 4

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
							24.00	D43			
							25.00-25.50	B44			
							25.50-25.95	UT45	80 blows	100% Recovery	
					(8.00)		26.00	D46			
							26.50	D47			
						... with 1No pyritised wood fragment (15x15mm) at 26.50m and (25x5mm) at 28.00m.	27.00	N40		5, 7 / 8, 10, 10, 12	
							27.00	D48			
							28.00	D49			
							28.50-28.90	UT50	80 blows	90% Recovery	
							28.95	D51			
						... with 2 No pockets of dark grey fine sand (30mm) at 28.95m	29.50	B52			
10/05/16	12.00	Dry	23.28		30.00		30.00	N45		6, 7 / 9, 10, 12, 14	
						End of Borehole	30.00	D53			

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Borehole No

BH106

Project

100 Avenue Road, Swiss Cottage

Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
16/2832	05/05/16	53.96	E 526697.1 N 184321.4	30.00m
	Date Completed 06/05/16			

Client

Essential Living Ltd

BOREHOLE SUMMARY

Top (m)	Base (m)	Type	Date Started	Date Ended	Crew	Logged By	Core Barrel (mm)	Core Bit	Plant Used/ Method	SPT Hammer Reference
0.00	0.52	DC	05/05/2016	05/05/2016	LR	FC/RB			Diamond Coring	
0.52	1.20	IP	05/05/2016	05/05/2016	LR	FC/RB			Hand Excavated	
1.20	30.00	CP	05/05/2016	06/05/2016	LR	FC/RB			Dando 100	SW68

WATER STRIKES

Strike at (m)	Rise to (m)	Time to Rise (min)	Casing Depth (m)	Sealed (m)
0.45				
13.10	13.10		12.10	

WATER ADDED

From (m)	To (m)

CHISELLING/SLOW PROGRESS

From (m)	To (m)	Duration (hr)	Remarks

HOLE

Depth (m)	Diameter (mm)
0.00	200
12.00	200
30.00	150

CASING

Depth (m)	Diameter (mm)
0.00	200
3.00	200
12.10	150

ROTARY CORE RECOVERY

From (m)	To (m)	Blows	Recovery (%)

ROTARY FLUSH DETAIL

From (m)	To (m)	Flush Type	Flush Return (%)	Flush Colour

INSTALLATION DETAILS

Type	Diameter (mm)	Depth of Installation (m)	Top of Response Zone (m)	Bottom of Response Zone (m)	Date of Installation

BACKFILL DETAILS

Top (m)	Bottom (m)	Material	Backfill Date
0.00	0.52	Concrete/Flush Cover	06/05/2016
0.52	30.00	Cement/Bentonite Grout	06/05/2016

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100 Avenue Road, Swiss Cottage

Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
16/2832	05/05/16	53.96	E 526697.1 N 184321.4	30.00m
	Date Completed 06/05/16			

Client

Essential Living Ltd

PROGRESS

Date	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Remarks
05/05/16	0.00		Dry	
05/05/16	0.45		0.45	... Water seepage
05/05/16	0.50		Dry	
05/05/16	17.00	12.10	Dry	
06/05/16	17.00	12.10	Dry	
06/05/16	13.10	12.10	13.10	... Water seepage
06/05/16	30.00	12.10	Dry	

SPT DETAILS

Type	Depth (m)	N Value	Blow Count / 75mm	Casing Depth (m)	Water Depth (m)
S	3.00	N11	1, 1 / 2, 2, 3, 4	3.00	Dry
S	6.00	N19	2, 3 / 4, 4, 5, 6	3.00	Dry
S	9.00	N23	2, 3 / 4, 6, 6, 7	3.00	Dry
S	12.00	N28	3, 4 / 5, 6, 8, 9	12.00	Dry
S	15.00	N29	3, 4 / 5, 7, 8, 9	12.10	Dry
S	18.00	N31	3, 4 / 5, 7, 9, 10	12.10	Dry
S	21.00	N33	4, 5 / 6, 8, 9, 10	12.10	Dry
S	24.00	N37	4, 5 / 8, 9, 10, 10	12.10	Dry
S	27.00	N39	5, 7 / 8, 9, 11, 11	12.10	Dry
S	30.00	N48	5, 6 / 11, 12, 12, 13	12.10	Dry

GENERAL REMARKS

1. Borehole carried out from basement level.
2. Ø300mm diamond coring carried out between GL and 0.52m depth.
3. Water seeping through the concrete at 0.45m depth.
4. Slight water seepage encountered at 13.10m depth.

KEY

SAMPLES

ES - Environmental Sample (Tub, Vial, Jar)
U - 100mm Diameter Undisturbed Sample
UT - 100mm Diameter Thin Wall Undisturbed Sample
U38 - 38mm Diameter Undisturbed Sample
D - Disturbed Sample, B-Bulk Sample, BLK-Block Sample
C - Core Sample, W-Water Sample, R-Root Sample

INSTALLATION DETAILS

SPIE - Standpipe Piezometer
SPGW - Groundwater Monitor Standpipe
SPG/GW - Gas / Groundwater Monitor Standpipe
VWP - Vibrating Wire Piezometer
INC - Inclinometer

HOLE TYPES

IP -Inspection Pit, TP-Trial Pit
CP -Cable Percussion, RC-Rotary Coring, R/S-Rotary/Sonic
WS -Window Sampling, WSL-Windowless Sampling
DC -Dynamic Coring

TESTS S/C-SPT / CPT, V-Shear Vane, PP-Pocket Penetrometer, MP-Mackintosh Probe VOC-Volatile Organic Compounds

Note: All depths are in metres, all diameters in millimetres, water strike rise time in minutes. For details of abbreviations see Key

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Borehole No

BH106

Project

100 Avenue Road, Swiss Cottage

Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
16/2832	05/05/16	53.96	E 526697.1 N 184321.4	30.00m
	Date Completed 06/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	1 of 4

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
05/05/16		Dry				CONCRETE.					
					(0.52)						
05/05/16		0.45									
05/05/16		Dry	53.44		0.52						
						Firm, extremely closely fissured brown mottled light bluish grey micaceous silty CLAY with occasional selenite crystals (<5mm) and rare black flecks. Fissures are randomly orientated, planar, smooth, unpolished and occasionally polished. (THAMES GROUP : WEATHERED LONDON CLAY FORMATION)	0.51			... VOC 0.7ppm	
							0.52			... Traces of rootlets at 0.52m	
							0.52	ES01			
							0.52	B02			
							1.00			... VOC 0.3ppm	
							1.00	ES03			
							1.00	B04			
							1.50-1.95	UT05	24 blows	100% Recovery	
							2.00	D06			
							2.50			... No traces of rootlets below 2.50m	
							2.50	D07			
							3.00		N11	1, 1 / 2, 2, 3, 4	
							3.00	D08			
							4.00	D09			
					(7.08)	... with occasional pockets of orangish brown fine sand (<50mm) below 4.00m					
							4.50-4.95	UT10	30 blows	100% Recovery	
							5.00	D11			
						... becoming stiff, with frequent selenite crystals below 5.00m					
							5.50-6.00	B12			
						... with frequent pockets of orangish brown fine sand (<50mm) and orangish brown staining below 5.50m ... with 1No pyrite nodule at 5.50m					
							6.00		N19	2, 3 / 4, 4, 5, 6	
							6.00	D13			
							7.00	D14			
						... becoming greyish brown below 7.00m					
							7.50-7.95	UT15	60 blows	100% Recovery	
			46.36		7.60						
						Stiff, extremely closely fissured greyish brown micaceous CLAY with occasional bioturbation, selenite crystals (<10mm) and	8.00	D16			

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Borehole No
BH106

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100 Avenue Road, Swiss Cottage

Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
16/2832	05/05/16	53.96	E 526697.1 N 184321.4	30.00m
	Date Completed 06/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	2 of 4

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
						rare dark grey staining. Fissures are randomly orientated, planar, smooth, unpolished. (THAMES GROUP : LONDON CLAY FORMATION - C)	8.00-8.50	B17			
						... with rare off-white fine gravel sized shell fragments at 8.00m	9.00		N23	2, 3 / 4, 6, 6, 7	
							9.00	D18			
							10.00	D19			
						... becoming very closely fissured and silty with rare white flecks below 10.00m	10.50-10.95	UT20	80 blows	100% Recovery	
							11.00	D21			
							11.50	D22			
						... with rare pockets of dark grey silty fine sand (<5mm) and no selenite crystals below 11.50m.	12.00		N28	3, 4 / 5, 6, 8, 9	
							12.00	D23			
							12.50-13.00	B24			
						... with rare pyrite nodules (<20mm) below 12.50m					
06/05/16	12.10	13.1									
							13.50-13.95	UT25	80 blows	100% Recovery	
							14.00	D26			
						... with rare light brown tubular shell fragments below 14.00m	14.50	D27			
							15.00		N29	3, 4 / 5, 7, 8, 9	
							15.00	D28			
					(15.35)						
							16.00	D29			

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100 Avenue Road, Swiss Cottage

Job No	Date Started	Ground Level (mOD)	Co-Ordinates	Final Depth
16/2832	05/05/16	53.96	E 526697.1 N 184321.4	30.00m
	Date Completed 06/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	3 of 4

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
							16.50-16.90	UT30	80 blows	90% Recovery	
						... with rare pockets of grey fine sand (<40mm), pyrite nodules (<18mm), bioturbation and shell fragments at 16.50m					
05/05/16	12.10	Dry					17.00	D31			
06/05/16	12.10	Dry				... becoming very stiff with rare (45°) fissures below 17.00m					
							17.50-18.00	B32			
							18.00		N31	3, 4 / 5, 7, 9, 10	
							18.00	D33			
							19.00	D34			
						... with frequent bioturbation at 19.00m					
							19.50-19.90	UT35	80 blows	90% Recovery	
							19.95	D36			
						... becoming silty at 19.95m, at 20.50m, and at 22.00m					
							20.50	D37			
							21.00		N33	4, 5 / 6, 8, 9, 10	
							21.00	D38			
							22.00	D39			
							22.50-22.90	UT40	80 blows	90% Recovery	
			31.01		22.95		22.95	D41			
						Very stiff, very closely fissured greyish brown micaceous silty CLAY with occasional partings of dark grey silty fine sand, frequent bioturbation, rare pyrite nodules (<20mm) and rare off-white fine to coarse sand sized shell fragments. Fissures are subhorizontal and subvertical (30°- 50°), planar, smooth, unpolished. (THAMES GROUP : LONDON CLAY FORMATION - B)	23.50	D42			
							24.00		N37	4, 5 / 8, 9, 10, 10	

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16/2832	05/05/16	53.96	E 526697.1 N 184321.4	30.00m
	Date Completed 06/05/16			

Client	Method/ Plant Used	Sheet
Essential Living Ltd	Cable Percussion	4 of 4

PROGRESS			STRATA				SAMPLES & TESTS				
Date	Casing	Water	Level (mOD)	Legend	Depth (Thickness)	Strata Description	Depth (m)	Type No	Test Result	Field Records	Instrument/ Backfill
							24.00	D43			
							24.50-25.00	B44			
						... with rare pyrite nodules (<20mm) and 1No weak grey claystone fragment (25mm) at 24.50m					
							25.50-25.95	UT45	80 blows	100% Recovery	
							26.00	D46			
						... with rare dark grey staining along fissure surfaces at 26.00m					
					(7.05)		26.50	D47			
							27.00		N39	5, 7 / 8, 9, 11, 11	
							27.00	D48			
							28.00	D49			
							28.50-28.90	UT50	80 blows	90% Recovery	
							28.95	D51			
							29.50-30.00	B52			
06/05/16	12.10	Dry	23.96		30.00		30.00		N48	5, 6 / 11, 12, 12, 13	
						End of Borehole	30.00	D53			

Issue No: 02	Checked By: OS	Approved By: AN	Log Print Date & Time: 06/07/2016 15:58

9. INSTRUMENTATION MONITORING RESULTS

Borehole	Depth of Installation (mbgl)	Date of Installation	Type	Top (mbgl)	Bottom (mbgl)	Date & Time	Water Level (mbgl)	Water Level (mOD)	Remarks
BH101	1.50	20/05/2016	SPG/GW	0.50	1.50	26/05/2016 11:20:00	Dry		
	1.50	20/05/2016	SPG/GW	0.50	1.50	02/06/2016 11:00:00	Dry		
	1.50	20/05/2016	SPG/GW	0.50	1.50	09/06/2016 10:00:00	1.42	52.73	
	1.50	20/05/2016	SPG/GW	0.50	1.50	16/06/2016 09:40:00	1.03	53.12	

KEY

SPIE - Standpipe Piezometer
SPGW - Groundwater Monitor Standpipe
SPG/GW - Gas / Groundwater Monitor Standpipe

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GROUNDWATER MONITORING

Project: 100 Avenue Road, Swiss Cottage

Client: Essential Living Ltd

Job No: 16/2832

CONCEPT SITE INVESTIGATIONS

Vibrating Wire Piezometer: BH101

Installed depth(m):	**12.0**		mOD		54.16
Instrument Number	336613		Range	kPa	1000
k factor kPa	-0.09518248	per digit	Date Installed:		18/05/2016

Date	Time	Microseconds	Digits (B units)	Pressure kPa	Reduced Level (mOD)	Head (m)	Remarks
18/05/2016	09:00	3391	8698.0	0.00	0.00	0.00	Base Reading (Out of water)
26/05/2016	11:30	-	8150.4	52.13	47.48	5.32	Base Reading (In water)
02/06/2016	10:00	3510	8116.8	55.32	47.80	5.64	
09/06/2016	10:20	3525	8047.9	61.88	48.47	6.31	
16/06/2016	10:00	3568	7855.1	80.24	50.34	8.18	

Note: For ease of entry, using mini readout CLP04, the reading of 0.03389 has beeen entered as 3389

GEOSENSE

GEOSENSE QUALITY FORM	
FORM No	G/QF/149
ISS.	7
DATE :	Jan-16
SIG.	GC

STANDARD VW PIEZOMETER HAE CALIBRATION

Model	VWP-3001	Cal date	29/03/2016	SN.	8233
Serial	336613	Baro	995.0	Readout No.	2108
Works ID	G4 9 3	Temp °C	20	R/O Cal. date	21/05/2015

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1 up	1 down	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	8790.2	8790.2	8790.2	1.07	0.07	0.31%	0.02%
10.007	69.000	8078.9	8078.9	8078.9	68.78	68.98	-0.06%	-0.01%
20.015	138.000	7362.8	7362.8	7362.8	136.95	137.76	-0.31%	-0.07%
30.022	207.000	6633.3	6633.3	6633.3	206.37	207.20	-0.18%	0.06%
40.029	276.000	5903.4	5903.4	5903.4	275.85	276.08	-0.04%	0.02%
50.036	345.000	5167.2	5167.2	5167.2	345.93	344.92	0.27%	-0.02%

Calibration of Fluke Pressure Controller PPC4EX S/N: 8233 valid from 9th March 2016. Certificate of Calibration No 4160291, Issued by Minerva Metrology and Calibration (ILAC RVA No K048)

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.09518248	-0.013805	-0.009706

Polynomial factors

	kPa	psi	mH_2O
A	-5.81333E-07	-8.43123E-08	-5.9280E-08
B	-0.087068182	-0.012628	-0.008878
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
-0.055101711	-0.007991546	-0.005619

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading^2) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

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GEOSENSE CERTIFIED ISO 9001:2008

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CONCEPT SITE INVESTIGATIONS

Vibrating Wire Piezometer: BH101

Installed depth(m):	**22.0**		mOD		54.16
Instrument Number	336155		Range	kPa	1000
k factor kPa	-0.123101007	per digit	Date Installed:		18/05/2016

Date	Time	Microseconds	Digits (B units)	Pressure kPa	Reduced Level (mOD)	Head (m)	Remarks
18/05/2016	09:00	3338	8975.9	0.00	0.00	0.00	Base Reading (Out of water)
26/05/2016	11:30	-	7601.6	169.18	49.42	17.26	Base Reading (In water)
02/06/2016	10:00	3639	7551.5	175.34	50.04	17.88	
09/06/2016	10:20	3640	7547.4	175.85	50.10	17.94	
16/06/2016	10:00	3640	7547.4	175.85	50.10	17.94	

Note: For ease of entry, using mini readout CLP04, the reading of 0.03389 has beeen entered as 3389

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GEOSENSE QUALITY FORM	
FORM No G/QF/149	
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DATE :	Jan-16
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STANDARD VW PIEZOMETER HAE CALIBRATION

Model	VWP-3001	Cal date	08/01/2016	SN.	8233
Serial	336155	Baro	972.0	Readout No.	2108
Works ID	G2 12 65	Temp °C	19	R/O Cal. date	21/05/2015

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1 up	1 down	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	9011.8	9011.8	9011.8	0.35	0.09	0.07%	0.02%
15.083	104.000	8170.7	8170.7	8170.7	103.89	103.94	-0.02%	-0.01%
30.167	208.000	7328.3	7328.3	7328.3	207.59	207.80	-0.08%	-0.04%
45.250	312.000	6481.6	6481.6	6481.6	311.83	312.03	-0.03%	0.01%
60.334	416.000	5633.2	5633.2	5633.2	416.26	416.31	0.05%	0.06%
75.417	520.000	4789.8	4789.8	4789.8	520.08	519.82	0.02%	-0.03%

Calibration of Fluke PPC4E valid from 27 January 2015. Certificate of calibration 1500176298 (Traceable to ANSI/NCSL Z540.1 - NVLAP Lab code 105016-0)

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.123101007	-0.017854	-0.012553

Polynomial factors

	kPa	psi	mH_2O
A	-1.09211E-07	-1.58391E-08	-1.1136E-08
B	-0.121593779	-0.017635	-0.012399
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
-0.085500126	-0.012400308	-0.008719

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading^2) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

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CONCEPT SITE INVESTIGATIONS

Vibrating Wire Piezometer: BH101

Installed depth(m):	**32.0**		mOD		54.16
Instrument Number	336160		Range	kPa	1000
k factor kPa	-0.117929303	per digit	Date Installed:		18/05/2016

Date	Time	Microseconds	Digits (B units)	Pressure kPa	Reduced Level (mOD)	Head (m)	Remarks
18/05/2016	09:00	3209	9711.5	0.00	0.00	0.00	Base Reading (Out of water)
26/05/2016	11:30	-	7777.9	228.03	45.42	23.26	Base Reading (In water)
02/06/2016	10:00	3613	7660.6	241.86	46.83	24.67	
09/06/2016	10:20	3620	7631.0	245.35	47.19	25.03	
16/06/2016	10:00	3619	7635.2	244.86	47.14	24.98	

Note: For ease of entry, using mini readout CLP04, the reading of 0.03389 has beeen entered as 3389

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STANDARD VW PIEZOMETER HAE CALIBRATION

Model	VWP-3001	Cal date	08/01/2016	SN.	8233
Serial	336160	Baro	972.0	Readout No.	2108
Works ID	G2 12 70	Temp °C	19	R/O Cal. date	21/05/2015

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1 up	1 down	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	9715.6	9715.6	9715.6	1.02	-0.05	0.20%	-0.01%
15.083	104.000	8843.3	8843.3	8843.3	103.89	104.10	-0.02%	0.02%
30.167	208.000	7968.1	7968.1	7968.1	207.11	207.97	-0.17%	-0.01%
45.250	312.000	7086.5	7086.5	7086.5	311.07	311.95	-0.18%	-0.01%
60.334	416.000	6198.5	6198.5	6198.5	415.80	416.03	-0.04%	0.01%
75.417	520.000	5305.8	5305.8	5305.8	521.07	520.00	0.21%	0.00%

Calibration of Fluke PPC4E valid from 27 January 2015. Certificate of calibration 1500176298 (Traceable to ANSI/NCSL Z540.1 - NVLAP Lab code 105016-0)

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.117929303	-0.017104	-0.012025

Polynomial factors

	kPa	psi	mH_2O
A	-4.14977E-07	-6.01852E-08	-4.2316E-08
B	-0.111695616	-0.016200	-0.011390
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
-0.021228586	-0.003078838	-0.002165

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading^2) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

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CONCEPT SITE INVESTIGATIONS

Vibrating Wire Piezometer: BH101

Installed depth(m):	**42.0**		mOD		54.16
Instrument Number	336179		Range	kPa	1000
k factor kPa	-0.12313397	per digit	Date Installed:		18/05/2016

Date	Time	Microseconds	Digits (B units)	Pressure kPa	Reduced Level (mOD)	Head (m)	Remarks
18/05/2016	09:00	3256	9434.3	0.00	0.00	0.00	Base Reading (Out of water)
26/05/2016	11:30	-	6827.2	321.03	44.90	32.74	Base Reading (In water)
02/06/2016	10:00	3857	6722.0	333.98	46.23	34.07	
09/06/2016	10:20	3865	6694.2	337.40	46.57	34.41	
16/06/2016	10:00	3862	6704.6	336.12	46.44	34.28	

Note: For ease of entry, using mini readout CLP04, the reading of 0.03389 has beeen entered as 3389

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STANDARD VW PIEZOMETER HAE CALIBRATION

Model	VWP-3001	Cal date	08/01/2016	SN.	8233
Serial	336179	Baro	972.0	Readout No.	2108
Works ID	G2 12 89	Temp °C	19	R/O Cal. date	21/05/2015

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1 up	1 down	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	9464.1	9464.1	9464.1	0.79	-0.06	0.15%	-0.01%
15.083	104.000	8626.3	8626.3	8626.3	103.96	104.12	-0.01%	0.02%
30.167	208.000	7787.2	7787.2	7787.2	207.27	207.95	-0.14%	-0.01%
45.250	312.000	6942.5	6942.5	6942.5	311.29	311.97	-0.14%	-0.01%
60.334	416.000	6093.5	6093.5	6093.5	415.82	416.00	-0.03%	0.00%
75.417	520.000	5240.5	5240.5	5240.5	520.86	520.01	0.16%	0.00%

Calibration of Fluke PPC4E valid from 27 January 2015. Certificate of calibration 1500176298 (Traceable to ANSI/NCSL Z540.1 - NVLAP Lab code 105016-0)

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.12313397	-0.017858	-0.012556

Polynomial factors

	kPa	psi	mH_2O
A	-3.55228E-07	-5.15197E-08	-3.6223E-08
B	-0.117910377	-0.017101	-0.012024
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
0.082131315	0.011911721	0.008375

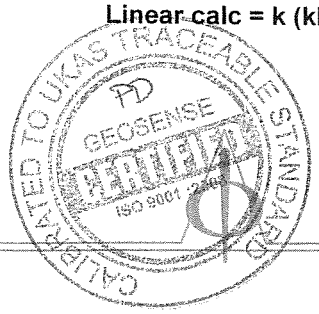
Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading^2) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)



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CONCEPT SITE INVESTIGATIONS

Vibrating Wire Piezometer: BH102

Installed depth(m):	**7.0**		MoD		54.16
Instrument Number	336611		Range	kPa	1000
k factor kPa	-0.097266155	per digit	Date Installed:		13/05/2016

Date	Time	Microseconds	Digits (B units)	Pressure kPa	Reduced Level (mOD)	Head (m)	Remarks
13/05/2016	09:00	3255	9440.1	0.00	0.00	0.00	Base Reading (Out of water)
16/05/2016	09:30	3417	8564.7	85.15	55.85	8.69	Base Reading (In water)
17/05/2016	09:00	3541	7975.3	142.48	61.69	14.53	
18/05/2016	10:00	3633	7576.5	181.27	65.65	18.49	
26/05/2016	11:00	3996	6262.5	309.07	78.69	31.53	
02/06/2016	10:20	4176	5734.3	360.45	83.93	36.77	
09/06/2016	10:30	4408	5146.6	417.62	89.76	42.60	
16/06/2016	10:15	4597	4732.1	457.94	93.87	46.71	

Note: For ease of entry, using mini readout CLP04, the reading of 0.03389 has beeen entered as 3389

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STANDARD VW PIEZOMETER HAE CALIBRATION

Model	VWP-3001	Cal date	29/03/2016	SN.	8233
Serial	336611	Baro	995.0	Readout No.	2108
Works ID	G4 9 1	Temp °C	20	R/O Cal. date	21/05/2015

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1 up	1 down	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	9482.0	9482.0	9482.0	0.98	0.04	0.28%	0.01%
10.007	69.000	8784.7	8784.7	8784.7	68.79	68.98	-0.06%	-0.01%
20.015	138.000	8081.7	8081.7	8081.7	137.17	137.93	-0.24%	-0.02%
30.022	207.000	7371.8	7371.8	7371.8	206.22	207.00	-0.23%	0.00%
40.029	276.000	6655.2	6655.2	6655.2	275.92	276.13	-0.02%	0.04%
50.036	345.000	5936.1	5936.1	5936.1	345.87	344.93	0.25%	-0.02%

Calibration of Fluke Pressure Controller PPC4EX S/N: 8233 valid from 9th March 2016. Certificate of Calibration No 4160291, Issued by Minerva Metrology and Calibration (ILAC RVA No K048)

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.097266155	-0.014107	-0.009918

Polynomial factors

	kPa	psi	mH_2O
A	-5.65631E-07	-8.2035E-08	-5.7678E-08
B	-0.088544988	-0.012842	-0.009029
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
-0.01810272	-0.002625485	-0.001846

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading^2) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

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CONCEPT SITE INVESTIGATIONS

Vibrating Wire Piezometer: BH102

Installed depth(m):	**17.0**		MoD		54.16
Instrument Number	336612		Range	kPa	1000
k factor kPa	-0.092145039	per digit	Date Installed:		13/05/2016

Date	Time	Microseconds	Digits (B units)	Pressure kPa	Reduced Level (mOD)	Head (m)	Remarks
13/05/2016	09:00	3240	9526.6	0.00	0.00	0.00	Base Reading (Out of water)
16/05/2016	09:30	3467	8319.4	111.23	48.51	11.35	Base Reading (In water)
17/05/2016	09:00	3485	8233.7	119.13	49.31	12.15	
18/05/2016	10:00	3492	8200.7	122.17	49.62	12.46	
26/05/2016	11:00	3541	7975.3	142.94	51.74	14.58	
02/06/2016	10:20	3729	7191.4	215.17	59.11	21.95	
09/06/2016	10:30	4358	5265.3	392.65	77.21	40.05	
16/06/2016	10:15	3978	6319.3	295.53	67.30	30.14	

Note: For ease of entry, using mini readout CLP04, the reading of 0.03389 has beeen entered as 3389

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STANDARD VW PIEZOMETER HAE CALIBRATION

Model	VWP-3001	Cal date	29/03/2016	SN.	8233
Serial	336612	Baro	995.0	Readout No.	2108
Works ID	G4 9 2	Temp °C	20	R/O Cal. date	21/05/2015

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1 up	1 down	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	9602.0	9602.0	9602.0	1.09	0.04	0.31%	0.01%
10.007	69.000	8867.2	8867.2	8867.2	68.79	69.00	-0.06%	0.00%
20.015	138.000	8126.1	8126.1	8126.1	137.08	137.93	-0.27%	-0.02%
30.022	207.000	7377.7	7377.7	7377.7	206.04	206.90	-0.28%	-0.03%
40.029	276.000	6618.2	6618.2	6618.2	276.02	276.26	0.01%	0.07%
50.036	345.000	5859.5	5859.5	5859.5	345.93	344.88	0.27%	-0.03%

Calibration of Fluke Pressure Controller PPC4EX S/N: 8233 valid from 9th March 2016. Certificate of Calibration No 4160291, Issued by Minerva Metrology and Calibration (ILAC RVA No K048)

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.092145039	-0.013364	-0.009396

Polynomial factors

	kPa	psi	mH_2O
A	-5.67514E-07	-8.23081E-08	-5.7870E-08
B	-0.083370407	-0.012091	-0.008501
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
-0.09054056	-0.013131336	-0.009233

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading^2) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

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CONCEPT SITE INVESTIGATIONS

Vibrating Wire Piezometer: BH102

Installed depth(m):	**27.0**		MoD		54.16
Instrument Number	336649		Range	kPa	1000
k factor kPa	-0.097179006	per digit	Date Installed:		13/05/2016

Date	Time	Microseconds	Digits (B units)	Pressure kPa	Reduced Level (mOD)	Head (m)	Remarks
13/05/2016	09:00	3232	9574.4	0.00	0.00	0.00	Base Reading (Out of water)
16/05/2016	09:30	3717	7237.9	227.05	50.32	23.16	Base Reading (In water)
17/05/2016	09:00	3933	6464.8	302.19	57.98	30.82	
18/05/2016	10:00	4037	6136.0	334.14	61.24	34.08	
26/05/2016	11:00	4895	4173.4	524.86	80.70	53.54	
02/06/2016	10:20	4234	5578.3	388.34	66.77	39.61	
09/06/2016	10:30	4641	4642.8	479.25	76.04	48.88	
16/06/2016	10:15	4789	4360.2	506.71	78.84	51.68	

Note: For ease of entry, using mini readout CLP04, the reading of 0.03389 has beeen entered as 3389

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STANDARD VW PIEZOMETER HAE CALIBRATION

Model	VWP-3001	Cal date	29/03/2016	SN.	8233
Serial	336649	Baro	995.0	Readout No.	2108
Works ID	G4 9 39	Temp °C	20	R/O Cal. date	21/05/2015

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1 up	1 down	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	9608.0	9608.0	9608.0	1.05	0.01	0.30%	0.00%
10.007	69.000	8910.8	8910.8	8910.8	68.81	69.01	-0.06%	0.00%
20.015	138.000	8207.6	8207.6	8207.6	137.14	137.98	-0.25%	-0.01%
30.022	207.000	7498.2	7498.2	7498.2	206.08	206.94	-0.27%	-0.02%
40.029	276.000	6779.9	6779.9	6779.9	275.88	276.12	-0.03%	0.03%
50.036	345.000	6058.5	6058.5	6058.5	345.99	344.95	0.29%	-0.01%

Calibration of Fluke Pressure Controller PPC4EX S/N: 8233 valid from 9th March 2016. Certificate of Calibration No 4160291, Issued by Minerva Metrology and Calibration (ILAC RVA No K048)

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.097179006	-0.014094	-0.009910

Polynomial factors

	kPa	psi	mH_2O
A	-6.24637E-07	-9.05927E-08	-6.3695E-08
B	-0.087392875	-0.012675	-0.008912
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
-0.031669156	-0.004593061	-0.003229

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading^2) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

CALIBRATED TO UKAS TRACEABLE STANDARD — GEOSENSE CERTIFIED ISO 9001:2008

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CONCEPT SITE INVESTIGATIONS

Vibrating Wire Piezometer: BH102

Installed depth(m):	**37.0**		MoD		54.16
Instrument Number	336156		Range	kPa	1000
k factor kPa	-0.123676353	per digit	Date Installed:		13/05/2016

Date	Time	Microseconds	Digits (B units)	Pressure kPa	Reduced Level (mOD)	Head (m)	Remarks
13/05/2016	09:00	3215	9672.9	0.00	0.00	0.00	Base Reading (Out of water)
16/05/2016	09:30	3571	7841.9	226.45	40.26	23.10	Base Reading (In water)
17/05/2016	09:00	3591	7754.8	237.23	41.36	24.20	
18/05/2016	10:00	3607	7686.1	245.72	42.22	25.06	
26/05/2016	11:00	3674	7408.4	280.07	45.73	28.57	
02/06/2016	10:20	3675	7404.3	280.57	45.78	28.62	
09/06/2016	10:30	3675	7404.3	280.57	45.78	28.62	
16/06/2016	10:15	3691	7340.3	288.49	46.59	29.43	

Note: For ease of entry, using mini readout CLP04, the reading of 0.03389 has beeen entered as 3389

GEOSENSE QUALITY FORM	
FORM No G/QF/149	
ISS.	7
DATE :	Jan-16
SIG.	GC

STANDARD VW PIEZOMETER HAE CALIBRATION

Model	VWP-3001	Cal date	08/01/2016	SN.	8233
Serial	336156	Baro	972.0	Readout No.	2108
Works ID	G2 12 66	Temp °C	19	R/O Cal. date	21/05/2015

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1 up	1 down	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	9714.8	9714.8	9714.8	0.57	-0.03	0.11%	-0.01%
15.083	104.000	8878.2	8878.2	8878.2	104.04	104.16	0.01%	0.03%
30.167	208.000	8042.9	8042.9	8042.9	207.34	207.82	-0.13%	-0.03%
45.250	312.000	7201.2	7201.2	7201.2	311.44	311.93	-0.11%	-0.01%
60.334	416.000	6355.0	6355.0	6355.0	416.09	416.21	0.02%	0.04%
75.417	520.000	5510.7	5510.7	5510.7	520.51	519.91	0.10%	-0.02%

Calibration of Fluke PPC4E valid from 27 January 2015. Certificate of calibration 1500176298 (Traceable to ANSI/NCSL Z540.1 - NVLAP Lab code 105016-0)

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.123676353	-0.017937	-0.012611

Polynomial factors

	kPa	psi	mH_2O
A	-2.56595E-07	-3.72147E-08	-2.6165E-08
B	-0.11976972	-0.017371	-0.012213
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
0.046248648	0.006707563	0.004716

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading^2) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

CALIBRATED TO UKAS TRACEABLE STANDARD GEOSENSE ISO 9001

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CONCEPT SITE INVESTIGATIONS

Vibrating Wire Piezometer: BH102

Installed depth(m):	**47.0**		MoD		54.16
Instrument Number	336161		Range	kPa	1000
k factor kPa	-0.11994047	per digit	Date Installed:		13/05/2016

Date	Time	Microseconds	Digits (B units)	Pressure kPa	Reduced Level (mOD)	Head (m)	Remarks
13/05/2016	09:00	3257	9426.8	0.00	0.00	0.00	Base Reading (Out of water)
26/05/2016	11:00	3920	6507.7	350.12	42.87	35.71	Base Reading (In water)
02/06/2016	10:20	3945	6425.5	359.98	43.88	36.72	
09/06/2016	10:30	3951	6406.0	362.32	44.12	36.96	
16/06/2016	10:15	3948	6415.7	361.15	44.00	36.84	

Note: For ease of entry, using mini readout CLP04, the reading of 0.03389 has beeen entered as 3389

GEOSENSE QUALITY FORM	
FORM No G/QF/149	
ISS.	7
DATE :	Jan-16
SIG.	GC

STANDARD VW PIEZOMETER HAE CALIBRATION

Model	VWP-3001	Cal date	08/01/2016	SN.	8233
Serial	336161	Baro	972.0	Readout No.	2108
Works ID	G2 12 71	Temp °C	19	R/O Cal. date	21/05/2015

Applied pressure		Readings [digit]			Calculated Pressure		Error % fso	
psi	kPa	1 up	1 down	avg.[digit]	lin.[kPa]	polyn.[kPa]	linear	polynomial
0.000	0.000	9466.6	9466.6	9466.6	1.09	-0.06	0.21%	-0.01%
15.083	104.000	8609.3	8609.3	8609.3	103.91	104.14	-0.02%	0.03%
30.167	208.000	7749.8	7749.8	7749.8	207.01	207.93	-0.19%	-0.01%
45.250	312.000	6882.4	6882.4	6882.4	311.03	311.97	-0.19%	-0.01%
60.334	416.000	6009.3	6009.3	6009.3	415.76	416.01	-0.05%	0.00%
75.417	520.000	5130.5	5130.5	5130.5	521.16	520.01	0.22%	0.00%

Calibration of Fluke PPC4E valid from 27 January 2015. Certificate of calibration 1500176298 (Traceable to ANSI/NCSL Z540.1 - NVLAP Lab code 105016-0)

CALIBRATION FACTORS

Linear factor (k)

kPa per digit	psi per digit	mH_2O per digit
-0.11994047	-0.017395	-0.012231

Polynomial factors

	kPa	psi	mH_2O
A	-4.61755E-07	-6.69695E-08	-4.7086E-08
B	-0.113200039	-0.016418	-0.011543
C			

Thermal factor (T)

kPa per °C	psi per °C	mH_2O per °C
0.026552546	0.003850986	0.002708

Note: Digits are $Hz^2 \times 10^{-3}$ units.

(please consult the User Manuals for conversion of alternative reading units)

Polynomial calculation [kPa] = A * (Reading)^2 + B * (Reading) + C + T * (Current Temp - Site Zero Temp)

C = -A*(Site Zero Reading^2) - B*(Site Zero Reading)

Linear calc = k (kPa) * (Current Reading - Site Zero Reading) + T * (Current Temp - Site Zero Temp)

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10. GEOTECHNICAL LABORATORY TEST RESULTS

CONCEPT SITE INVESTIGATIONS

Site Name:	100 Avenue Road, Swiss Cottage	**Job No.:**	16/2832
Client:	Essential Living Ltd	**Date Reported:**	06/07/2016

Summary Test Report

Determination of Moisture Content and Liquid and Plastic Limits

Borehole No.	Sample Type	Sample No.	Depth m	Description	Natural Moisture Content %	[1.] Passing 425 µm sieve %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
BH101	UT	05	1.50	Firm to stiff, brown CLAY with rare pockets of yellowish brown fine sand (<20mm), selenite crystals and a pyrite nodule (10x10mm)	31	99	79	28	51	
BH101	UT	15	7.50	Stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<25mm), reddish brown staining, a pyrite nodule (11x5mm) and a pyritised wood fragment (15x11mm)	25	99	69	28	41	
BH101	UT	25	13.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<25mm), bioturbation and pyrite nodules (<12mm)	26	99	70	26	44	
BH101	UT	35	19.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<35mm), bioturbation and white flecks	29	100	78	31	47	
BH101	UT	45	25.50	Very stiff, greyish brown slightly micaceous CLAY with occasional bioturbation, white flecks and rare shell fragments	27	99	75	29	46	
BH101	UT	55	31.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<30mm), bioturbation and white flecks	24	100	71	26	45	
BH101	UT	60	34.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<20mm), occasional bioturbation and rare shell fragments	25	99	71	29	42	
BH101	UT	70	40.50	Very stiff, greyish brown slightly micaceous CLAY with occasional bioturbation, white flecks and a pyrite nodule (8x5mm)	25	99	74	31	43	
BH101	U	80	46.50	Very stiff, locally extremely closely fissured greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<20mm), bioturbation, white flecks and a pyrite nodule (10x15mm)	23	99	71	25	46	

BS 1377: Part 2: Clause 4.3 & 4.4: 1990 Determination of the liquid limit by the cone penetrometer method

BS 1377: Part 2: Clause 5: 1990 Determination of the plastic limit and plasticity index

BS 1377: Part 2: Clause 3.2: 1990 Determination of the moisture content by the oven drying method

AGS Association of Geotechnical & Geoenvironmental Specialists

UKAS TESTING 4503

Date - samples received:	20/05/2016	Checked by:	DB
Date - samples tested:	27/06/2016	Date:	04/07/2016
Approved Signatories:	A G Bates - AGB (Quality Mngr) - D Beever - DB (Lab Mngr)	DB	

CONCEPT
47-49 Brunel Road, London W3 7XR
Tel: 02087401553 Email: lab@conceptconsultants.co.uk

CONCEPT SITE INVESTIGATIONS

Site Name:	100 Avenue Road, Swiss Cottage	**Job No.:**	16/2832
Client:	Essential Living Ltd	**Date Reported:**	06/07/2016

Summary Test Report

Determination of Moisture Content and Liquid and Plastic Limits

Borehole No.	Sample Type	Sample No.	Depth m	Description	Natural Moisture Content %	[1.] Passing 425 µm sieve %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
BH102	UT	05	1.50	Firm to stiff, extremely closely fissured brown CLAY with rare selenite crystals	31	99	76	29	47	
BH102	UT	15	7.50	Stiff, locally extremely closely fissured greyish brown slightly micaceous CLAY with rare white flecks	26	100	72	27	45	
BH102	UT	20	10.50	Very stiff, greyish brown silty CLAY with rare white flecks, bioturbation and a parting of yellowish brown fine sand at 10.58m	26	100	75	27	48	
BH102	UT	35	19.50	Very stiff, greyish brown slightly micaceous CLAY with rare bioturbation and white flecks	28	100	74	27	47	
BH102	UT	45	25.50	Very stiff, extremely closely to very closely fissured greyish brown slightly micaceous CLAY with occasional bioturbation, white flecks and rare orangish brown discolouration below 25.66m	27	100	78	28	50	
BH102	UT	55	31.50	Very stiff, greyish brown slightly micaceous CLAY with occasional pockets of yellowish brown fine sand (<8mm) and reddish brown discolouration	23	100	71	27	44	
BH102	UT	65	37.50	Very stiff, greyish brown slightly micaceous CLAY with rare partings of light brown fine sand, shell fragments and bioturbation	27	99	69	23	46	
BH102	U	75	43.50	Very stiff, extremely closely fissured greyish brown slightly micaceous CLAY with occasional pockets of light brown fine sand (<11mm) and rare white flecks	26	100	79	28	51	

BS 1377: Part 2: Clause 4.3 & 4.4: 1990 Determination of the liquid limit by the cone penetrometer method

BS 1377: Part 2: Clause 5: 1990 Determination of the plastic limit and plasticity index

BS 1377: Part 2: Clause 3.2: 1990 Determination of the moisture content by the oven drying method

AGS Association of Geotechnical & Geoenvironmental Specialists

UKAS TESTING 4503

Date - samples received:	16/05/2016	Checked by:	DB
Date - samples tested:	01/07/2016	Date:	05/07/2016
Approved Signatories:	A G Bates - AGB (Quality Mngr) - D Beever - DB (Lab Mngr)	DB	

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CONCEPT SITE INVESTIGATIONS

Site Name:	100 Avenue Road, Swiss Cottage	**Job No.:**	16/2832
Client:	Essential Living Ltd	**Date Reported:**	06/07/2016

Summary Test Report

Determination of Moisture Content and Liquid and Plastic Limits

Borehole No.	Sample Type	Sample No.	Depth m	Description	Natural Moisture Content %	[1.] Passing 425 µm sieve %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
BH105	UT	05	1.50	Firm to stiff, brown CLAY with rare pockets of yellowish brown fine sand (<20mm), selenite crystals and a pyrite nodule (10x10mm)	30	99	75	28	47	
BH105	UT	10	4.50	Firm to stiff, locally extremely closely fissured brown CLAY with frequent yellowish brown discolouration and occasional selenite crystals	28	99	76	28	48	
BH105	UT	15	7.50	Stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<25mm), reddish brown staining, a pyrite nodule (11x5mm) and a pyritised wood fragment (15x11mm)	26	99	73	27	46	
BH105	UT	20	10.50	Stiff, greyish brown slightly micaceous CLAY with occasional bioturbation and a pyrite nodule (20x11mm)	27	99	79	27	52	
BH105	UT	25	13.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<25mm), bioturbation and pyrite nodules (<12mm)	24	99	74	27	47	
BH105	UT	31	17.00	Very stiff, locally extremely closely fissured greyish brown slightly micaceous CLAY with rare pyrite nodules (<10mm), shell fragments, bioturbation and a pyritised wood fragment (4x3mm)	28	99	76	31	45	
BH105	UT	35	19.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<35mm), bioturbation and white flecks	25	100	76	27	49	
BH105	UT	40	22.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<45mm), occasional bioturbation and rare white flecks	26	100	74	28	46	
BH105	UT	45	25.50	Very stiff, greyish brown slightly micaceous CLAY with occasional bioturbation, white flecks and rare shell fragments	27	99	77	28	49	
BH105	UT	50	28.50	Very stiff, greyish brown slightly micaceous CLAY with rare polished surfaces, white flecks and bioturbation	26	100	75	29	46	

BS 1377: Part 2: Clause 4.3 & 4.4: 1990 Determination of the liquid limit by the cone penetrometer method

BS 1377: Part 2: Clause 5: 1990 Determination of the plastic limit and plasticity index

BS 1377: Part 2: Clause 3.2: 1990 Determination of the moisture content by the oven drying method

AGS Association of Geotechnical & Geoenvironmental Specialists

UKAS TESTING 4503

Date - samples received:	12/05/2016	Checked by:	DB
Date - samples tested:	25/06/2016	Date:	05/07/2016
Approved Signatories:	A G Bates - AGB (Quality Mngr) - D Beever - DB (Lab Mngr)	DB	

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Tel: 02087401553 Email: lab@conceptconsultants.co.uk

CONCEPT SITE INVESTIGATIONS

Site Name:	100 Avenue Road, Swiss Cottage	**Job No.:**	16/2832
Client:	Essential Living Ltd	**Date Reported:**	06/07/2016

Summary Test Report

Determination of Moisture Content and Liquid and Plastic Limits

Borehole No.	Sample Type	Sample No.	Depth m	Description	Natural Moisture Content %	[1.] Passing 425 µm sieve %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Remarks
BH106	UT	05	1.50	Firm, locally extremely closely fissured brown CLAY with occasional selenite crystals, rare bluish grey discolouration and rootlets	31	99	73	26	47	
BH106	UT	10	4.50	Firm to stiff, locally extremely closely fissured brown CLAY with frequent yellowish brown discolouration and occasional selenite crystals	29	99	75	28	47	
BH106	UT	15	7.50	Stiff to very stiff, locally extremely closely fissured greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<40mm), selenite crystals and bioturbation	27	99	72	26	46	
BH106	UT	20	10.50	Stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<20mm) and bioturbation	28	100	70	28	42	
BH106	UT	25	13.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<20mm), bioturbation and pyrite nodules (<7mm)	24	99	70	23	47	
BH106	UT	30	16.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<40mm), pyrite nodules (<18mm), bioturbation and shell fragments	28	99	73	29	44	
BH106	UT	35	19.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<40mm) and bioturbation	26	100	74	26	48	
BH106	UT	40	22.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<10mm) and bioturbation	26	100	75	28	47	
BH106	UT	45	25.50	Very stiff, locally stiff greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<45mm), pyrite nodules (<35mm), bioturbation and white flecks	27	99	74	31	43	
BH106	UT	50	28.50	Very stiff, locally very closely fissured greyish brown slightly micaceous CLAY with rare foraminifera, bioturbation and pyrite nodules (<20mm)	26	99	74	31	43	

BS 1377: Part 2: Clause 4.3 & 4.4: 1990 Determination of the liquid limit by the cone penetrometer method

BS 1377: Part 2: Clause 5: 1990 Determination of the plastic limit and plasticity index

BS 1377: Part 2: Clause 3.2: 1990 Determination of the moisture content by the oven drying method

AGS ASSOCIATION OF GEOTECHNICAL & GEOENVIRONMENTAL SPECIALISTS

UKAS TESTING
4503

Date - samples received:	09/05/2016	Checked by:	DB
Date - samples tested:	29/06/2016	Date:	05/07/2016
Approved Signatories:	A G Bates - AGB (Quality Mngr) - D Beever - DB (Lab Mngr)	DB	

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2683

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number:	16-07389
Issue:	1
Date of Issue:	28/06/2016
Contact:	Darren Beever
Customer Details:	Concept Engineering Consultants Ltd Unit 8, Warple Mews Warple Way London W3 0RF
Quotation No:	Q15-00395
Order No:	L1241
Customer Reference:	16/2832
Date Received:	22/06/2016
Date Approved:	28/06/2016
Details:	Swiss Cottage
Approved by:	

John Wilson, Operations Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683

Sample Summary

Report No.: 16-07389

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
65622	BH101 UT10 4.50 - 4.95	21/06/2016	22/06/2016	Silty clayey loam	
65623	BH101 UT30 16.50 - 16.95	21/06/2016	22/06/2016	Clay	
65624	BH101 UT60 34.50 - 34.90	21/06/2016	22/06/2016	Clay	
65625	BH101 U80 46.50 - 46.95	21/06/2016	22/06/2016	Clay	
65626	BH102 UT15 7.50 - 7.95	21/06/2016	22/06/2016	Silty clay	
65627	BH102 UT40 22.50 - 22.95	21/06/2016	22/06/2016	Clay	
65628	BH102 U75 43.50 - 43.95	21/06/2016	22/06/2016	Clay	
65629	BH105 UT10 4.50 - 4.95	21/06/2016	22/06/2016	Clay	
65630	BH105 UT31 17.00 - 17.45	21/06/2016	22/06/2016	Clay	
65631	BH105 UT50 28.50 - 28.90	21/06/2016	22/06/2016	Silty clay	

Results Summary

Report No.: 16-07389

			ELAB Reference	65622	65623	65624	65625	65626
			Customer Reference	UT10	UT30	UT60	U80	UT15
			Sample ID					
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	BH101	BH101	BH101	BH101	BH102
			Sample Depth (m)	4.50 - 4.95	16.50 - 16.95	34.50 - 34.90	46.50 - 46.95	7.50 - 7.95
			Sampling Date	21/06/2016	21/06/2016	21/06/2016	21/06/2016	21/06/2016
Determinand	**Codes**	**Units**	**LOD**					
Anions								
Water Soluble Sulphate	M	mg/l	20	3100	526	431	944	1160
Miscellaneous								
pH	M	pH units	0.1	7.8	8.5	8.6	8.1	8.0

Tests marked N are not UKAS accredited.

Results Summary

Report No.: 16-07389

			ELAB Reference	65627	65628	65629	65630	65631
			Customer Reference	UT40	U75	UT10	UT31	UT50
			Sample ID					
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
			Sample Location	BH102	BH102	BH105	BH105	BH105
			Sample Depth (m)	22.50 - 22.95	43.50 - 43.95	4.50 - 4.95	17.00 - 17.45	28.50 - 28.90
			Sampling Date	21/06/2016	21/06/2016	21/06/2016	21/06/2016	21/06/2016
Determinand	**Codes**	**Units**	**LOD**					
Anions								
Water Soluble Sulphate	M	mg/l	20	485	793	2540	693	582
Miscellaneous								
pH	M	pH units	0.1	8.6	8.4	7.8	8.4	8.5

Sample Summary

Report No.: 16-07556

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
66705	BH106 UT05 1.50 - 1.95	21/06/2016	05/07/2016	Clay	
66706	BH106 UT25 13.50 - 13.95	21/06/2016	05/07/2016	Clay	
66707	BH106 UT45 25.50 - 25.95	21/06/2016	05/07/2016	Clay	

Results Summary

Report No.: 16-07556

			ELAB Reference	66705	66706	66707
			Customer Reference	UT05	UT25	UT45
			Sample ID			
			Sample Type	SOIL	SOIL	SOIL
			Sample Location	BH106	BH106	BH106
			Sample Depth (m)	1.50 - 1.95	13.50 - 13.95	25.50 - 25.95
			Sampling Date	21/06/2016	21/06/2016	21/06/2016
Determinand	**Codes**	**Units**	**LOD**			
Anions						
Water Soluble Sulphate	M	mg/l	20	3130	937	703
Miscellaneous						
pH	M	pH units	0.1	7.6	8.1	8.2

Tests marked N are not UKAS accredited.

2683

Method Summary

Report No.: 16-07556

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
pH	M	Air dried sample	06/07/2016	113	Electromeric
Water soluble anions	M	Air dried sample	06/07/2016	172	Ion Chromatography

2683

Report Information

Report No.: 16-07556

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis
Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
PCB congener results may include any coeluting PCBs
Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage

CONCEPT SITE INVESTIGATIONS

Summary Test Report - Undrained Triaxial Compression (Single-Stage)

BS 1377 : Part 7: 1990 Clause 8

Date Reported: 06/07/2016

Job No.: 16/2832

Site Location: 100 Avenue Road, Swiss Cottage

Client: Essential Living Ltd

BH No.	Sample Type	Sample No	Depth top (m)	Description	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
BH101	UT	05	1.50	Firm, locally extremely closely fissured brown CLAY with frequent selenite crystals, rare grey discolouration and rootlets	30	4.1	1.919	1.470	31	160	80	Brittle
BH101	UT	10	4.50	Firm to stiff, extremely closely fissured brown CLAY with rare pockets of yellowish brown fine sand (<15mm), frequent yellowish brown discolouration and occasional selenite crystals	90	4.8	1.911	1.472	30	173	87	Brittle
BH101	UT	15	7.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of dark grey fine sand (<35mm), bioturbation, a pyrite nodule (19x11mm) and a claystone fragment (40x50mm) at 7.53m	150	5.2	2.025	1.622	25	374	187	Brittle (Sample tested between 7.62 and 7.80m)
BH101	UT	20	10.50	Very stiff, greyish brown slightly micaceous CLAY with rare pyrite nodules (<5mm), shell fragments, bioturbation and a claystone fragment (27x22mm) at 10.51m	210	3.8	1.989	1.557	28	308	154	Brittle (Sample tested between 10.55 and 10.75m)
BH101	UT	25	13.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<20mm), occasional pyrite nodules (<25mm), rare bioturbation and shell fragments	270	3.5	2.016	1.597	26	317	159	Brittle
BH101	UT	30	16.50	Very stiff, greyish brown slightly micaceous CLAY with occasional bioturbation and rare shell fragments	330	2.5	2.014	1.602	26	357	179	Brittle

Date - samples received: 20/05/2016

Date - samples tested: 20/06/2016

Checked by: DB Date: 04/07/2016

Approved Signatories: A G Bates AGB (Quality Mngr) - D Beever DB (Lab Mngr) **DB**

CONCEPT
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AGS ASSOCIATION OF GEOTECHNICAL & GEOENVIRONMENTAL SPECIALISTS

UKAS TESTING 4503

CONCEPT SITE INVESTIGATIONS

Summary Test Report - Undrained Triaxial Compression (Single-Stage)

BS 1377 : Part 7: 1990 Clause 8

Date Reported: 06/07/2016

Job No.: 16/2832

Site Location: 100 Avenue Road, Swiss Cottage

Client: Essential Living Ltd

BH No.	Sample Type	Sample No	Depth top (m)	Description	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
BH101	UT	35	19.50	Very stiff, greyish brown slightly micaceous CLAY with rare bioturbation and a pyritised wood fragment (25x10m)	390	2.8	1.957	1.519	29	303	152	Brittle
BH101	UT	40	22.50	Very stiff, greyish brown slightly micaceous CLAY with rare shell fragments and bioturbation	450	3.2	2.023	1.615	25	322	161	Brittle
BH101	UT	45	25.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<20mm), bioturbation and white flecks	510	3.7	1.998	1.577	27	407	204	Brittle
BH101	UT	50	28.50	Very stiff, greyish brown slightly micaceous CLAY with rare bioturbation and a pyrite nodule (21x14mm)	570	3.7	2.025	1.614	25	339	170	Brittle
BH101	UT	55	31.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<30mm), bioturbation and white flecks	630	3.0	2.048	1.649	24	464	232	Brittle
BH101	UT	60	34.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<20mm), occasional bioturbation and rare shell fragments	690	1.7	2.038	1.632	25	402	201	Brittle

Date - samples received: 20/05/2016

Date - samples tested: 21/06/2016

Checked by: DB Date: 04/07/2016

Approved Signatories: A G Bates AGB (Quality Mngr) - D Beever DB (Lab Mngr) **DB**

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CONCEPT SITE INVESTIGATIONS

Summary Test Report - Undrained Triaxial Compression (Single-Stage)

BS 1377 : Part 7: 1990 Clause 8

Date Reported: 06/07/2016

Job No.: 16/2832

Site Location: 100 Avenue Road, Swiss Cottage

Client: Essential Living Ltd

BH No.	Sample Type	Sample No	Depth top (m)	Description	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
BH101	UT	65	37.50	Very stiff, locally extremely closely fissured greyish brown slightly micaceous CLAY with occasional bioturbation and white flecks	750	1.4	2.046	1.649	24	417	209	Brittle
BH101	UT	70	40.50	Very stiff, greyish brown slightly micaceous CLAY with occasional bioturbation, white flecks and a pyrite nodule (8x5mm)	810	1.8	2.029	1.623	25	640	320	Brittle
BH101	UT	75	43.50	Very stiff, locally extremely closely fissured greyish brown slightly micaceous CLAY with frequent white flecks, rare black flecks and bioturbation	870	7.8	1.971	1.586	24	922	461	Brittle
BH101	U	80	46.50	Very stiff, locally extremely closely fissured greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<20mm), bioturbation, white flecks and a pyrite nodule (10x15mm)	930	7.6	1.978	1.614	23	1036	518	Brittle with slight plastic deformation

Date - samples received: 20/05/2016

Date - samples tested: 22/06/2016

Checked by: DB Date: 04/07/2016

Approved Signatories: A G Bates AGB (Quality Mngr) - D Beever DB (Lab Mngr) **DB**

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UKAS TESTING 4503

CONCEPT SITE INVESTIGATIONS	Summary Test Report - Undrained Triaxial Compression (Single-Stage) BS 1377 : Part 7: 1990 Clause 8	Date Reported:	06/07/2016
		Job No.:	16/2832

Site Location: 100 Avenue Road, Swiss Cottage **Client:** Essential Living Ltd

BH No.	Sample Type	Sample No	Depth top (m)	Description	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
BH102	UT	05	1.50	Firm to stiff, extremely closely fissured brown CLAY with rare selenite crystals	30	4.5	1.915	1.464	31	186	93	Brittle
BH102	UT	10	4.50	Firm, locally extremely closely fissured orangish brown CLAY with rare dark grey discolouration and selenite crystals	90	4.3	1.935	1.510	28	194	97	Brittle
BH102	UT	15	7.50	Stiff, locally extremely closely fissured greyish brown slightly micaceous CLAY with rare white flecks	150	3.6	1.998	1.585	26	275	138	Brittle
BH102	UT	20	10.50	Very stiff, greyish brown silty CLAY with rare white flecks, bioturbation and a parting of yellowish brown fine sand at 10.58m	210	3.6	2.001	1.590	26	509	255	Brittle (Sample tested between 10.53 and 10.73m)
BH102	UT	25	13.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of yellowish brown fine sand (<16mm), bioturbation and a parting of yellowish brown fine sand at 13.60m	270	3.2	2.009	1.595	26	351	176	Brittle (Sample tested between 13.54 and 13.74m)
BH102	UT	35	19.50	Very stiff, greyish brown slightly micaceous CLAY with rare bioturbation and white flecks	390	4.2	1.971	1.542	28	308	154	Brittle

Date - samples received: 16/05/2016
Date - samples tested: 21/06/2016

Checked by: DB Date: 05/07/2016

Approved Signatories: A G Bates AGB (Quality Mngr) - D Beever DB (Lab Mngr) **DB**

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CONCEPT SITE INVESTIGATIONS

Summary Test Report - Undrained Triaxial Compression (Single-Stage)

BS 1377 : Part 7: 1990 Clause 8

Date Reported: 06/07/2016

Job No.: 16/2832

Site Location: 100 Avenue Road, Swiss Cottage

Client: Essential Living Ltd

BH No.	Sample Type	Sample No	Depth top (m)	Description	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
BH102	UT	40	22.50	Stiff to very stiff, greyish brown slightly micaceous CLAY with rare white flecks and bioturbation	450	3.1	2.025	1.621	25	493	247	Brittle
BH102	UT	45	25.50	Very stiff, extremely closely to very closely fissured greyish brown slightly micaceous CLAY with occasional bioturbation, white flecks and rare orangish brown discolouration below 25.66m	510	2.7	1.932	1.522	27	438	219	Brittle (Sample tested between 25.54 and 25.74m)
BH102	UT	50	28.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of orangish yellow fine sand (<8mm), occasional bioturbation, reddish brown discolouration and rare shell fragments	570	3.6	2.001	1.589	26	530	265	Brittle
BH102	UT	55	31.50	Very stiff, greyish brown slightly micaceous CLAY with occasional pockets of yellowish brown fine sand (<8mm) and reddish brown discolouration	630	2.8	2.061	1.670	23	498	249	Brittle
BH102	UT	60	34.50	Very stiff, locally extremely closely fissured greyish brown slightly micaceous slightly sandy CLAY with occasional pockets of reddish brown fine sand (<15mm)	690	2.2	2.033	1.626	25	788	394	Brittle
BH102	UT	65	37.50	Very stiff, greyish brown slightly micaceous CLAY with rare partings of light brown fine sand, shell fragments and bioturbation	750	2.5	1.983	1.565	27	299	150	Brittle

Date - samples received: 16/05/2016

Date - samples tested: 27/06/2016

Checked by: 5/7/16 Date: 05/07/2016

Approved Signatories: A G Bates AGB (Quality Mngr) - D Beever DB (Lab Mngr) **DB**

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UKAS TESTING 4503

CONCEPT SITE INVESTIGATIONS

Summary Test Report - Undrained Triaxial Compression (Single-Stage)

BS 1377 : Part 7: 1990 Clause 8

Date Reported: 06/07/2016

Job No.: 16/2832

Site Location: 100 Avenue Road, Swiss Cottage

Client: Essential Living Ltd

BH No.	Sample Type	Sample No	Depth top (m)	Description	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
BH102	UT	70	40.50	Very stiff, greyish brown slightly micaceous CLAY with rare foraminifera and bioturbation								Sample unsuitable for testing (Sample cracked along partings before test)
BH102	U	75	43.50	Very stiff, extremely closely fissured greyish brown slightly micaceous CLAY with occasional pockets of light brown fine sand (<11mm) and rare white flecks	870	3.2	1.928	1.528	26	461	231	Brittle
BH102	U	80	46.50	Very stiff, locally extremely closely fissured greyish brown slightly micaceous slightly sandy CLAY with rare pockets of light brown fine sand (<15mm), occasional white flecks and bioturbation	930	5.9	1.889	1.512	25	585	293	Brittle

Date - samples received: 16/05/2016

Date - samples tested: 30/06/2016

Checked by: DB Date: 05/07/2016

Approved Signatories: A G Bates AGB (Quality Mngr) - D Beever DB (Lab Mngr) **DB**

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4503

CONCEPT SITE INVESTIGATIONS

Summary Test Report - Undrained Triaxial Compression (Single-Stage)

BS 1377 : Part 7: 1990 Clause 8

Date Reported: 06/07/2016

Job No.: 16/2832

Site Location: 100 Avenue Road, Swiss Cottage

Client: Essential Living Ltd

BH No.	Sample Type	Sample No	Depth top (m)	Description	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
BH105	UT	05	1.50	Firm to stiff, brown CLAY with rare pockets of yellowish brown fine sand (<20mm), selenite crystals and a pyrite nodule (10x10mm)	30	5.0	1.921	1.477	30	183	92	Brittle
BH105	UT	10	4.50	Firm to stiff, locally extremely closely fissured brown CLAY with frequent yellowish brown discolouration and occasional selenite crystals	90	5.9	1.962	1.531	28	201	101	Brittle
BH105	UT	15	7.50	Stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<25mm), reddish brown staining, a pyrite nodule (11x5mm) and a pyritised wood fragment (15x11mm)	150	3.7	2.031	1.608	26	272	136	Brittle
BH105	UT	20	10.50	Stiff, greyish brown slightly micaceous CLAY with occasional bioturbation and a pyrite nodule (20x11mm)	210	7.2	2.008	1.580	27	339	170	Brittle
BH105	UT	25	13.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<25mm), bioturbation and pyrite nodules (<12mm)	270	4.9	2.042	1.644	24	383	192	Brittle
BH105	UT	31	17.00	Very stiff, locally extremely closely fissured greyish brown slightly micaceous CLAY with rare pyrite nodules (<10mm), shell fragments, bioturbation and a pyritised wood fragment (4x3mm)	340	3.0	1.999	1.567	28	315	158	Brittle

Date - samples received: 12/05/2016

Date - samples tested: 22/06/2016

Checked by: DB Date: 05/07/2016

Approved Signatories: A G Bates AGB (Quality Mngr) - D Beever DB (Lab Mngr) **DB**

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CONCEPT SITE INVESTIGATIONS

Summary Test Report - Undrained Triaxial Compression (Single-Stage)

BS 1377 : Part 7: 1990 Clause 8

Date Reported: 06/07/2016

Job No.: 16/2832

Site Location: 100 Avenue Road, Swiss Cottage

Client: Essential Living Ltd

BH No.	Sample Type	Sample No	Depth top (m)	Description	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
BH105	UT	35	19.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<35mm), bioturbation and white flecks	390	3.7	2.007	1.607	25	374	187	Brittle
BH105	UT	40	22.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<45mm), occasional bioturbation and rare white flecks	450	3.1	2.007	1.592	26	356	178	Brittle
BH105	UT	45	25.50	Very stiff, greyish brown slightly micaceous CLAY with occasional bioturbation, white flecks and rare shell fragments	510	2.9	1.976	1.554	27	279	140	Brittle
BH105	UT	50	28.50	Very stiff, greyish brown slightly micaceous CLAY with rare polished surfaces, white flecks and bioturbation	570	2.1	2.012	1.602	26	768	384	Brittle

Date - samples received: 12/05/2016

Date - samples tested: 23/06/2016

Checked by: DB Date: 05/07/2016

Approved Signatories: A G Bates AGB (Quality Mngr) - D Beever DB (Lab Mngr) **DB**

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CONCEPT SITE INVESTIGATIONS

Summary Test Report - Undrained Triaxial Compression (Single-Stage)

BS 1377 : Part 7: 1990 Clause 8

Date Reported: 06/07/2016

Job No.: 16/2832

Site Location: 100 Avenue Road, Swiss Cottage

Client: Essential Living Ltd

BH No.	Sample Type	Sample No	Depth top (m)	Description	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
BH106	UT	35	19.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<40mm) and bioturbation	390	2.4	1.999	1.584	26	261	131	Brittle
BH106	UT	40	22.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<10mm) and bioturbation	450	5.0	1.992	1.575	26	386	193	Brittle
BH106	UT	45	25.50	Very stiff, locally stiff greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<45mm), pyrite nodules (<35mm), bioturbation and white flecks	510	5.8	2.003	1.577	27	402	201	Brittle with slight plastic deformation
BH106	UT	50	28.50	Very stiff, locally very closely fissured greyish brown slightly micaceous CLAY with rare foraminifera, bioturbation and pyrite nodules (<20mm)	570	1.6	2.015	1.599	26	307	154	Brittle

Date - samples received: 09/05/2016

Date - samples tested: 27/06/2016

Checked by: DB Date: 05/07/2016

Approved Signatories: A G Bates AGB (Quality Mngr) - D Beever DB (Lab Mngr) **DB**

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CONCEPT SITE INVESTIGATIONS

Summary Test Report - Undrained Triaxial Compression (Single-Stage)

BS 1377 : Part 7: 1990 Clause 8

Date Reported: 06/07/2016

Job No.: 16/2832

Site Location: 100 Avenue Road, Swiss Cottage

Client: Essential Living Ltd

BH No.	Sample Type	Sample No	Depth top (m)	Description	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
BH106	UT	05	1.50	Firm, locally extremely closely fissured brown CLAY with occasional selenite crystals, rare bluish grey discolouration and rootlets	30	6.1	1.915	1.463	31	125	63	Brittle
BH106	UT	10	4.50	Firm to stiff, locally extremely closely fissured brown CLAY with frequent yellowish brown discolouration and occasional selenite crystals	90	5.0	1.934	1.500	29	228	114	Brittle
BH106	UT	15	7.50	Stiff to very stiff, locally extremely closely fissured greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<40mm), selenite crystals and bioturbation	150	6.6	2.009	1.580	27	323	162	Brittle
BH106	UT	20	10.50	Stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<20mm) and bioturbation	210	3.2	1.973	1.542	28	245	123	Brittle
BH106	UT	25	13.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<20mm), bioturbation and pyrite nodules (<7mm)	270	5.1	2.021	1.625	24	397	199	Brittle
BH106	UT	30	16.50	Very stiff, greyish brown slightly micaceous CLAY with rare pockets of grey fine sand (<40mm), pyrite nodules (<18mm), bioturbation and shell fragments	330	4.3	1.999	1.567	28	370	185	Brittle

Date - samples received: 09/05/2016

Date - samples tested: 24/06/2016

Checked by: DB Date: 05/07/2016

Approved Signatories: A G Bates AGB (Quality Mngr) - D Beever DB (Lab Mngr) **DB**

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AGS ASSOCIATION OF GEOTECHNICAL & GEOENVIRONMENTAL SPECIALISTS

UKAS TESTING 4503

11. CHEMICAL TEST RESULTS

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Analytical Report Number : 16-18053

Project / Site name:	100 Avenue Road, Swiss Cottage	**Samples received on:**	06/05/2016
Your job number:	16-2832	**Samples instructed on:**	18/05/2016
Your order number:	CL673	**Analysis completed by:**	27/05/2016
Report Issue Number:	1	**Report issued on:**	27/05/2016
Samples Analysed:	1 soil sample		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 16-18053

Project / Site name: 100 Avenue Road, Swiss Cottage
Your Order No: CL673

Lab Sample Number				576102				
Sample Reference				BH106				
Sample Number				1				
Depth (m)				0.52				
Date Sampled				05/05/2016				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	27				
Total mass of sample received	kg	0.001	NONE	1.9				
General Inorganics								
pH	pH Units	N/A	MCERTS	9.0				
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.9				
Organic Matter	%	0.1	MCERTS	0.3				
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10				
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10				
Fluorene	mg/kg	0.1	MCERTS	< 0.10				
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10				
Anthracene	mg/kg	0.1	MCERTS	< 0.10				
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Pyrene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10				
Chrysene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10				
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10				
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05				
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60				

Analytical Report Number: 16-18053

Project / Site name: 100 Avenue Road, Swiss Cottage
Your Order No: CL673

Lab Sample Number				576102				
Sample Reference				BH106				
Sample Number				1				
Depth (m)				0.52				
Date Sampled				05/05/2016				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16				
Boron (water soluble)	mg/kg	0.2	MCERTS	4.0				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	53				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	160				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	14				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	57				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	74				
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0				
Toluene	µg/kg	1	MCERTS	< 1.0				
Ethylbenzene	µg/kg	1	MCERTS	< 1.0				
p & m-xylene	µg/kg	1	MCERTS	< 1.0				
o-xylene	µg/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0				
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	5.3				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	17				
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				

Analytical Report Number : 16-18053

Project / Site name: 100 Avenue Road, Swiss Cottage

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
576102	BH106	1	0.52	Light brown clay and sand.

Analytical Report Number : 16-18053

Project / Site name: 100 Avenue Road, Swiss Cottage

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 16-18054

Project / Site name:	100 Avenue Road, Swiss Cottage	**Samples received on:**	09/05/2016
Your job number:	16-2832	**Samples instructed on:**	18/05/2016
Your order number:	CL672	**Analysis completed by:**	27/05/2016
Report Issue Number:	1	**Report issued on:**	27/05/2016
Samples Analysed:	1 soil sample		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 16-18054

Project / Site name: 100 Avenue Road, Swiss Cottage
Your Order No: CL672

Lab Sample Number				576103				
Sample Reference				BH105				
Sample Number				1				
Depth (m)				0.50				
Date Sampled				06/05/2016				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	23				
Total mass of sample received	kg	0.001	NONE	1.9				
General Inorganics								
pH	pH Units	N/A	MCERTS	8.2				
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	2.0				
Organic Matter	%	0.1	MCERTS	0.5				
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10				
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10				
Fluorene	mg/kg	0.1	MCERTS	< 0.10				
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10				
Anthracene	mg/kg	0.1	MCERTS	< 0.10				
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Pyrene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10				
Chrysene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10				
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10				
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05				
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60				
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15				
Boron (water soluble)	mg/kg	0.2	MCERTS	2.2				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	49				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	24				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	28				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	41				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110				

Analytical Report Number: 16-18054

Project / Site name: 100 Avenue Road, Swiss Cottage
Your Order No: CL672

Lab Sample Number				576103				
Sample Reference				BH105				
Sample Number				1				
Depth (m)				0.50				
Date Sampled				06/05/2016				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0				
Toluene	µg/kg	1	MCERTS	< 1.0				
Ethylbenzene	µg/kg	1	MCERTS	< 1.0				
p & m-xylene	µg/kg	1	MCERTS	< 1.0				
o-xylene	µg/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0				
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				

Analytical Report Number : 16-18054

Project / Site name: 100 Avenue Road, Swiss Cottage

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Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
576103	BH105	1	0.50	Light brown clay and sand.

Analytical Report Number : 16-18054

Project / Site name: 100 Avenue Road, Swiss Cottage

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 16-18055

Project / Site name:	100 Avenue Road, Swiss Cottage	**Samples received on:**	12/05/2016
Your job number:	16-2832	**Samples instructed on:**	18/05/2016
Your order number:	CL671	**Analysis completed by:**	27/05/2016
Report Issue Number:	1	**Report issued on:**	27/05/2016
Samples Analysed:	2 soil samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

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soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 16-18055

Project / Site name: 100 Avenue Road, Swiss Cottage
Your Order No: CL671

Lab Sample Number				576104	576105			
Sample Reference				BH102	BH101			
Sample Number				01	01			
Depth (m)				0.50	0.50			
Date Sampled				12/05/2016	12/05/2016			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	24	25			
Total mass of sample received	kg	0.001	NONE	1.9	2.0			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-			
General Inorganics								
pH	pH Units	N/A	MCERTS	8.1	8.5			
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	2.0	1.9			
Organic Matter	%	0.1	MCERTS	0.2	0.4			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60			
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	17			
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	1.2			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	47	44			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20	70			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	37	19			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	39	44			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	68	87			

Analytical Report Number: 16-18055

Project / Site name: 100 Avenue Road, Swiss Cottage
Your Order No: CL671

Lab Sample Number				576104	576105			
Sample Reference				BH102	BH101			
Sample Number				01	01			
Depth (m)				0.50	0.50			
Date Sampled				12/05/2016	12/05/2016			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			

Analytical Report Number : 16-18055

Project / Site name: 100 Avenue Road, Swiss Cottage

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
576104	BH102	01	0.50	Light brown clay and sand.
576105	BH101	01	0.50	Light brown clay and sand.

Analytical Report Number : 16-18055

Project / Site name: 100 Avenue Road, Swiss Cottage

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

APPENDIX I GEOTECHNICAL INTERPRETIVE REPORT

Submitted to: Essential Living (Swiss Cottage) Ltd

Submitted by:
AECOM
6-8 Greencoat Place
London
SW1P 1PL
United Kingdom

100 Avenue Road, Swiss Cottage

Geotechnical Interpretive Report

Report Title: 100 Avenue Road, Swiss Cottage - Geotechnical Interpretive Report
Date Created: 13th July 2016

Prepared by: Glenn Hughes - Senior Engineering Geologist

Checked by: Clive Muir - Associate

Approved by: Clive Muir - Associate

Rev No	Comments	Checked by	Approved by	Date
0	Preliminary Issue	CM	CM	13 July 2016

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ABBREVIATION	DESCRIPTION
bgl	Below ground level
BGS	British Geological Survey
c'	Drained cohesion
c_u	Undrained shear strength (kN/m^2)
E	Stiffness (MN/m^2)
GL	Ground Level
GI	Ground Investigation
GWL	Ground Water Level
HF	Harwich Formation
kN	Kilo Newtons
kPa	Kilo Pascals
LCF	London Clay Formation
LL	Liquid Limit
LUL	London Underground Limited
MC	Moisture Content
mOD	Metres Ordnance Datum
m_v	Coefficient of compressibility (m^2/MN)
N Value	SPT penetration resistance measurement
NGR	National Grid Reference
NMC	Natural Moisture Content
NP	Non-Plastic or Not Present
PI	Plasticity Index
PL	Plastic Limit
PSD	Particle Size Distribution
RTD	River Terrace Deposits
SPT	Standard Penetration Test
TP	Trial Pit
TW	Thames Water
UU	Unconsolidated undrained (triaxial test)

1 Introduction

1.1 General Introduction

AECOM has been commissioned by Essential Living (Swiss Cottage) Ltd to undertake a geotechnical assessment of 100 Avenue Road, Swiss Cottage, London. This Geotechnical Interpretive Report (GIR) has been prepared to provide an assessment of ground conditions at the site and outline geotechnical soil parameters for the preliminary design of the proposed development and a ground impact assessment of London Underground Ltd (LUL) assets. This report assesses the geological and geotechnical characteristics of the site from existing and new ground investigation data. No separate desk study report has been completed.

1.2 Scope of Work

The following scope of work has been carried out:

- A review of British Geological Survey (BGS) geological maps, borehole logs, and literature.
- Ground Investigation and Factual Report by Concept Consultants Ltd.
- Assessment of ground conditions and geotechnical soil properties at the site.
- Assessment of potential ground related hazards.

1.3 Sources of Information

The following information and documents have been reviewed and form the basis of the assessment:

- BGS Geology of Britain online viewer 1:50,000 scale maps (Sheet 256 North London Solid and Drift) and borehole logs (www.bgs.ac.uk).
- Site Investigation Report – 100 Avenue Road, Swiss Cottage. Concept Consultants Ltd (Report 16/2832 - FR 00 issued 7th July 2016.

2 Site Information

2.1 Site Location and Description

100 Avenue Road (the Site) is located in the London borough of Camden (refer to Figure 1 in Appendix A). The nearest post code is NW3 3HF.

The Site occupies 0.38 hectares and is a rectangular shape measuring approximately 100m by 38m being longest in the southeast to northwest direction.

The Site's southwestern (main) frontage is onto Avenue Road whilst on the northeastern side there is an area of open space known as the Swiss Cottage Open Space and the Hampstead Theatre.

Ground level at the Site falls from north to south being approximately 56mOD in the north to approximately 53mOD in the south.

The site straddles the Swiss Cottage Underground Station that is on the Jubilee line which runs northwest to southeast between Finchley Road and St. John's Wood stations. The station is located at the junction of Finchley Road, Avenue Road and College Crescent. The proposed development is located on the northeastern side of the station and is parallel to the Jubilee Line southbound line (i.e. Platform 2 towards St Johns Wood). An entrance to Swiss Cottage Underground Station lies immediately adjacent to the Site frontage within Avenue Road. A further staircase entrance to the station is located on the northwestern edge of the Site. London Underground Assets are discussed further in Section 2.3.

The Site is currently occupied by an existing office building that has ground floor restaurants. The building height is staggered being 6-storeys tall at the north end of the site and reducing to 3 storeys at the south. It is founded on piles with toe levels of 30 to 34mOD and with a cap level of 51mOD.

2.2 Site History

A review of site history will be undertaken following review of an EnviroCheck© report.

The existing building dates from the mid-1980s.

Swiss Cottage Underground Station was opened on 20 November 1939 on a new section of deep-level tunnel constructed between Baker Street and Finchley Road stations when the Metropolitan line's services on its Stanmore branch were transferred to the Bakerloo line. The station initially operated as part of a combined station with the Metropolitan line's adjacent sub-surface Swiss Cottage station, but the Metropolitan line station was closed on 17 August 1940. The Bakerloo line station was transferred along with the rest of the Stanmore branch to the Jubilee line when it opened on 1 May 1979.

Archaeology has not been addressed in this report.

2.3 LUL Assets

The Site is located adjacent to the northeastern side of the southbound Jubilee Line. The tunnel crown is at approximately 45.6mOD. It is understood that the proposed building foundations will be located outside of the pile exclusion zone having a 3m lateral offset and a 6m vertical offset. A preliminary ground impact assessment has been carried out by AECOM in 2014 to assess the effect of the proposed development on track and tunnel movements which was based on desk study information.

2.4 Proposed Development

The proposed development comprises:

- Demolition of the existing office building.
- Construction of residential-led mixed use development within two linked buildings of 24 storeys (Block A) and 6 / 7 storeys (Block B), with a single level of basement that extends under both buildings linking to an existing car

park ramp access/egress point. It is understood the building is to be piled to accommodate the building loads and minimise risk to nearby underground structures.

2.5 Other Assets

The proposed route alignment for HS2 Up Line crosses the southern boundary of the site which is located within the safeguard zone. The proposed tunnel has an east to west orientation and the crown is proposed to be at approximately -2 mOD beneath the Site. The impact of HS2 should be reviewed as part of the design process. HS2 is discussion further in the Ground Related Hazards Section of this report.

3 Geology and Geomorphology

3.1 Geological Setting

British Geological Survey (BGS) Map 256 (North London solid and drift) indicates the solid geology at the site consists of London Clay Formation underlain by the Harwich Formation, then Lambeth Group, then Thanet Sand Formation, and then Chalk. Approximately 1km north of the Site the bedrock geology comprises the younger and stratigraphically higher Claygate Member of the London Clay which is exposed at higher elevations.

The London Clay Formation in Central London and elsewhere was deposited in a low energy deep water (water depths of over 100m) marine basin that was subsiding and sea level was rising. Five sea level cycles resulting in different environments are recognisable within the London Clay that are labelled division A (oldest and lowest in geological succession) to division E (youngest and highest in geological succession) by King (1981). Within each division there are up to three sub units that are prefixed 1 (oldest) through 3 (youngest). Of these divisions only division B (oldest and nearer the base of the London Clay) and division C (youngest and nearer the middle of the London Clay) are present at the Site.

A nearby existing BGS borehole log located 80m east of the Site indicates the London Clay Formation to be up to 80m thick. Therefore, the Harwich Formation, Lambeth Group, Thanet Sand Formation and Upper Chalk are likely to be too deep to affect the proposed development.

No Superficial Deposits have been mapped at or near the site by the BGS.

Made Ground may be present as a result of previous developments.

No geological faults have been mapped near the site. The site is not located near any former river channels and therefore drift filled hollows are unlikely to be present.

The site's geological setting based on BGS geological map is summarised below in Table 3.1 (from the top down).

Table 3-1: Expected Geological Sequence at the Site (from the top down)

Geological Strata	Composition	Geological Age	Depositional Environment
Made Ground	Clay or sand with fragments of brick, rubble, concrete	Generally less than 200 years	Urban
London Clay Formation	Clay and silt. Sedimentary bedrock. Informally subdivided in divisions E (base) to A (top).	Eocene Period (34 to 56 mya)	Deep marine
Harwich Formation	Sandy clay and silt. Sedimentary bedrock.	Eocene Period (34 to 56 mya)	Deep and Shallow Marine
Lambeth Group	Clay, silt and sand. Sedimentary bedrock sub-divided into Upnor, Woolwich, Reading and several informal lithological units, resulting from differing Clay and Sand proportions. Additionally some horizons consist of pebbly and shelly lenses.	Palaeocene Period (56 to 66 mya)	Swamps, estuaries and deltas.
Thanet Sand Formation	Sand. Sedimentary bedrock.	Palaeocene Period (56 to 59 mya)	Shallow marine
Chalk	Sedimentary bedrock (Likely to be at beyond the depth of interest).	Cretaceous Period (71 to 94 mya)	Warm chalk seas.

3.2 Aquifers

There are two main aquifers in Greater London. The shallow aquifer associated with the Superficial Deposits and weathered London Clay, which rests as a perched water table on the London Clay, and the deep aquifer associated with the Thanet Sand Formation and Chalk.

Between these aquifers is a sub-hydrostatic groundwater pressure profile in the relatively impermeable London Clay and various perched groundwater tables or variable sub-hydrostatic groundwater pressure profiles in the Lambeth Group. Due to its low permeability, the London Clay is expected to be fully saturated. The presence of silty or sandy lenses could result in perched water pockets. Groundwater in the Lambeth Group is expected to come in the form of perched water tables due to the sandy, pebbly beds and is likely to be variable.

The Shallow Aquifer may be present at the site within weathered London Clay. The proposed works are not expected to penetrate the Deep Aquifer due to the large (80m) thickness of relatively impervious London Clay Formation underlying the site.

4 Ground Investigation Data

4.1 Introduction

This section summarises existing and new ground investigation (GI) data.

4.2 BGS Boreholes

There are four BGS boreholes located close to the site that provide useful information which are outlined in Table 4.1. The locations of the BGS boreholes are shown on Figure 2 in Appendix A. The boreholes show London Clay with a minor cover of Made Ground.

4.3 Concept Consultants, May 2016

Concept Consultants Ltd undertook a GI at the site in May 2016 at the request of Essential Living (Swiss Cottage) Ltd. The GI comprised the following components (refer to Table 4.1):

- Two cable percussion boreholes drilled to 47m depth (BH101 and BH102).
- Two cable percussion boreholes drilled to 30m depth (BH105 and BH106).
- Standard Penetration Testing (SPTs).
- Shallow standpipe installation in BH 101 with response zone 0.5 to 1.5mbgl.
- Vibrating wire piezometer installations in BH101 at 12, 22, 32, and 42 mbgl.
- Vibrating wire piezometer installations in BH101 at 7, 17, 27, 37, and 47 mbgl.
- Monitoring.
- Geotechnical laboratory testing of London Clay for undrained shear strength (unconsolidated undrained triaxial testing), moisture content, plastic limit/liquid limit, and soil chemistry.
- Geo-environmental laboratory testing. The interpretation of these results is not included in this Geotechnical Interpretive Report.

The location of the Concept Consultant Ltd 2015 boreholes and trial pits are shown on Figure 3 in Appendix A. A copy of Concept Consultant's factual report is included as Appendix B.

Table 4-1: Relevant Borehole Records

Source	Borehole number	Location	Ground Level (mOD)	Borehole depth (m)	Installation Details
BGS	TQ28 SE1769	80m west of Site	56.0	159.0	Not available
BGS	TQ28 SE352	30m southwest of Site	54.9	10.7	Not available
BGS	TQ28 SE277	100m west of Site	Not available	15.0	Not available
BGS	TQ28 SE893	100m west of Site	46.2	12.2	Not available
Concept Consultants 2016 GI	BH101	On site (refer Fig 3 in App B)	54.2	47.0	50mm standpipe with response zone 0.5 to 1.5mbg Vibrating wire piezometers at 12, 22, 32, and 42 mbgl
Concept Consultants 2016 GI	BH102	On site (refer Fig 3 in App B)	53.2	47.0	Vibrating wire piezometers at 7, 17, 27, 37, and 47 mbgl
Concept Consultants 2016 GI	BH105	On site (refer Fig 3 in App B)	53.3	30.0	None
Concept Consultants 2016 GI	BH106	On site (refer Fig 3 in App B)	54.0	30.0	None

5 Ground Investigation Results

5.1 Ground Conditions

The ground conditions have been assessed from the ground investigation data outlined in Section 4. Table 5.1 presents a summary ground model for the site.

The GI data is generally consistent with the BGS geological map and shows minor Concrete/Made Ground directly overlying Weathered and then unweathered London Clay Formation. London Clay Formation divisions C overlying division B have been logged in the Concept Consultants 2016 boreholes. The boundary between the two units is at approximately 31mOD in the boreholes which indicates a sub-horizontal stratigraphy.

Table 5-1: Site Ground Profile

Geological Strata	Depth to top of strata (m bgl)	Elevation of top of strata (mOD)	Thickness (m)	Description
Concrete	0	54.0 (average BH level)	0.4 to 0.5	Concrete
Made Ground	0.4 to 0.5	53.5	0 to 1.0	Variable material comprising: soft to firm, brown and grey silty slightly sandy slightly gravelly clay. Gravel is angular to rounded fine to coarse flint, concrete and brick fragments and brick and concrete cobbles.
Weathered London Clay Formation (division C)	0.4 to 1.0	52.5 to 53.0	5.6 to 7.6	Firm, extremely closely fissured light brown silty micaceous clay.
London Clay Formation: (division C) (division B)	6.6 to 8.0	46.2 to 46.7 (46.2 to 46.7) (30.2 to 31.3)	80 from BGS borehole records (15.4 to 16.4) (Base not reached)	Stiff to very stiff, extremely closely fissured brown grey slightly micaceous silty clay with occasional partings or pockets of brown grey fine sand, and rare bioturbation and pyrite nodules.

5.2 Groundwater and Hydrogeology

Groundwater levels have been measured from the installation within BH101 ranging from being dry to 1.42 mbgl. The groundwater is likely to be a perched layer at the top of the Weathered London Clay Formation.

All boreholes were dry during drilling except for water seepages that were noted in BH106 at 0.4mbgl (53.6mOD) and 13.1m bgl (40.9mOD).

Vibrating wire piezometer monitoring results is included in the factual report (Appendix B).

5.3 Laboratory and In-situ Testing Results

Test results from the GI data outlined in Section 4 are summarised in the sections below and in tables and plots. The results have been used to derive geotechnical soil parameters shown in Table 5.5.

Laboratory test reports from the 2016 GI are contained in the Concept Consultants factual report (Appendix B).

5.3.1 Moisture Content and Atterberg Limits

Natural Moisture Content (NMC), Liquid Limit (LL), Plastic Limit (PL), and Plasticity Index (PI) results for London Clay Formation are presented in Figures 5.1 and 5.2 and are summarised in Table 5.2. In summary:

- The London Clay Formation has a high plasticity with a modal PI of approximately 45 and modal LL of 70 to 80% (classification CV).
- The NMC and PL of the London Clay Formation are relatively consistent with depth with a slight increase in scatter below 30mOD. This likely corresponds to the London Clay Formation division C to division B boundary of identified in the borehole logs.

Table 5-2: Natural Moisture Content and Atterberg Limit Test Results

Strata	No. of Tests	NMC (%)	Liquid Limit (LL) (%)	Plastic Limit (PL) (%)	Plasticity Index (PI) (Modal Value)
Weathered London Clay Formation (division C)	8	25 to 31	69 to 79	26 to 29	41 to 52 (45)
London Clay Formation division C	20	24 to 29	70 to 79	23 to 31	41 to 52 (45)
London Clay Formation division B	9	23 to 27	69 to 79	23 to 31	41 to 52 (45)

Figure 5-1: Moisture Content vs. Elevation

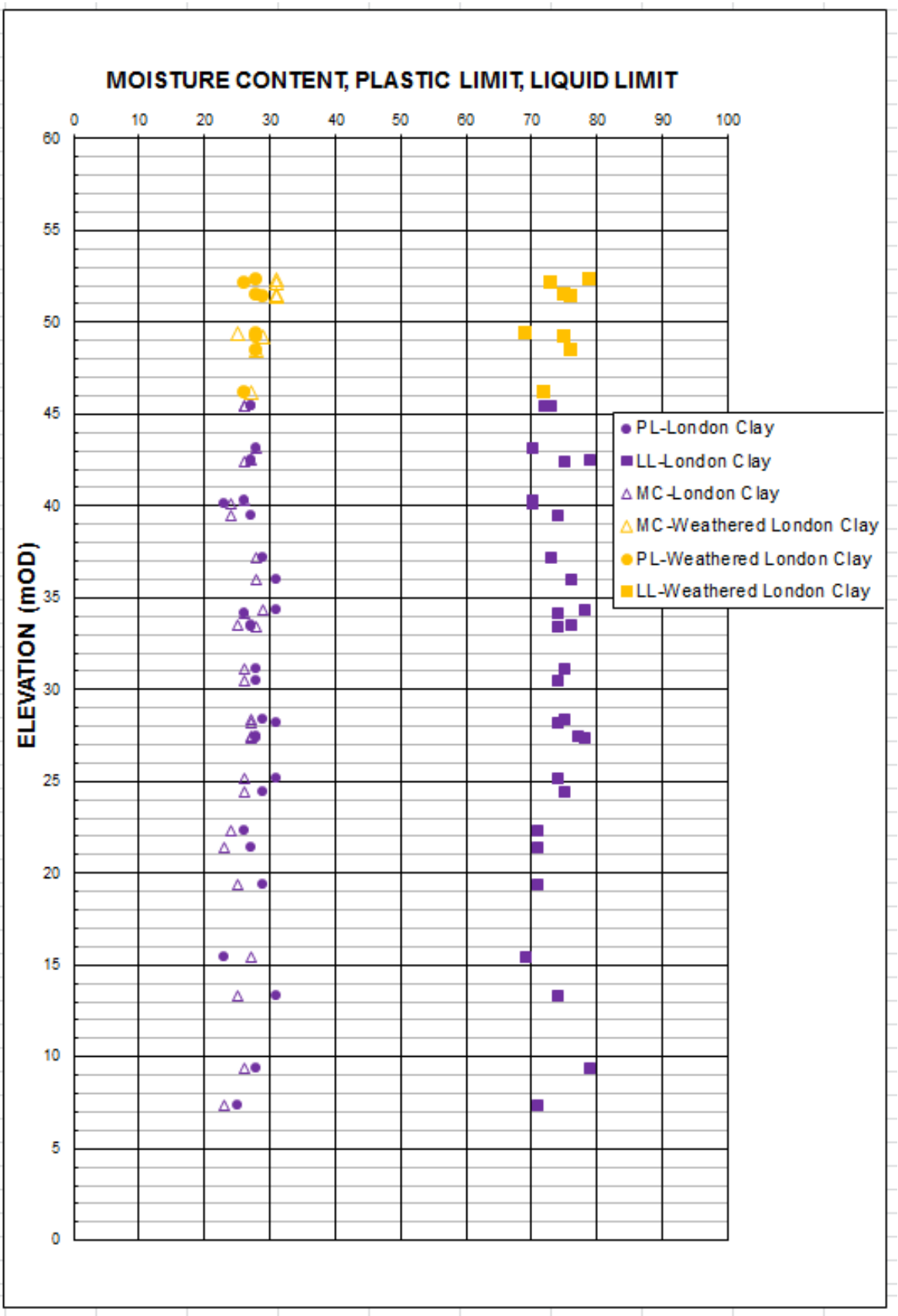
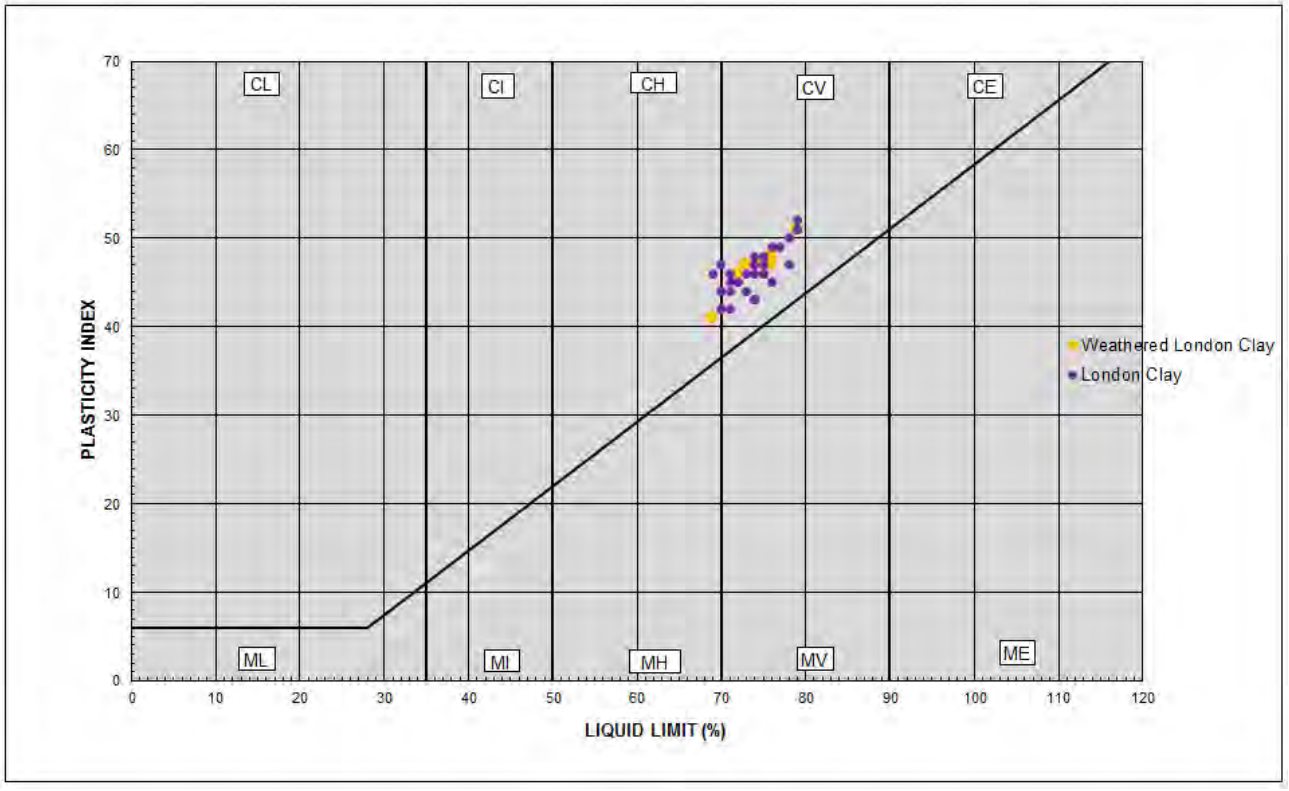


Figure 5-2: A-Line Plasticity Chart



5.3.2 Modified Plasticity Index and Volume Change Potential

Modified plasticity index is defined as the PI of the soil multiplied by the percentage of particles less than 425**µm.** The results are then compared to Table 1 in NHBC Part 4 (Foundations) Chapter 4.2 (re-produced in Table 5.3 below) to determine volume change potential. In summary:

- Weathered London Clay Formation (division C): Modified PI values range from 41 to 52 and the volume change potential should be taken as High.
- London Clay Formation division C: Modified PI values range from 41 to 52 and the volume change potential should be taken as High.
- London Clay Formation division B: Modified PI values range from 41 to 52 and the volume change potential should be taken as High.

Table 5-3: Volume change potential guide

Modified Plasticity Index	Volume change Potential
40 and greater	High
20 to less than 40	Medium
10 to less than 20	Low

5.3.3 Undrained Shear Strength

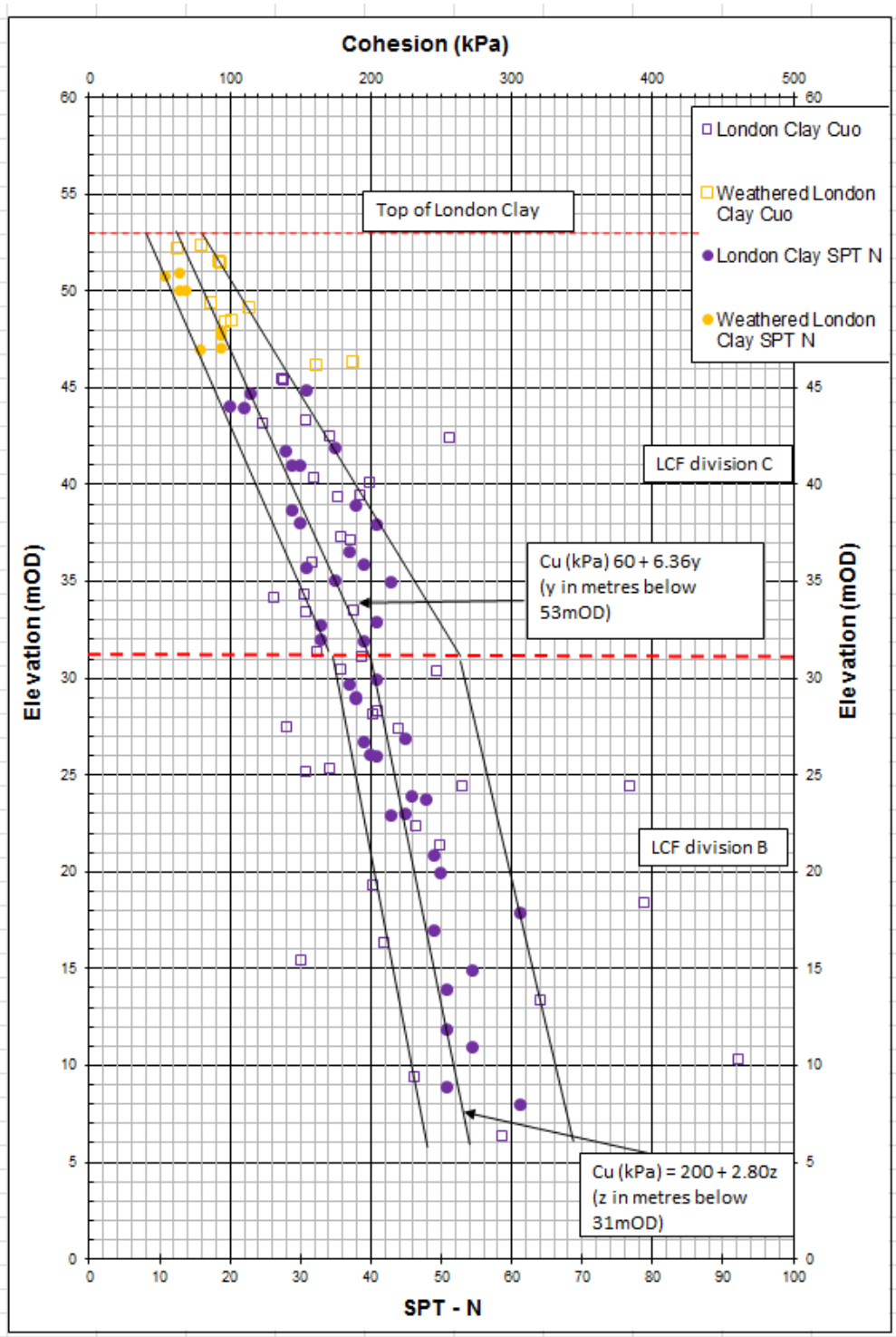
Undrained strength (C_u) of the London Clay Formation has been determined from the following methods:

1. UU (undrained unconsolidated, C_{uo}) triaxial tests: single stage method in accordance with BS1377: Part 7: 1990 Clause 8 (C_{uo}).
2. SPTs: Undrained strength determined using the correlation proposed by Stroud (1989) where C_{uSPT} = 5 x SPT N (for PI greater than 20).

Figure 5.3 presents a plot of elevation vs. C_{uo} and C_{uSPT} for Weathered and unweathered London Clay along with moderately conservative design lines. C_{uo} values are typically more scattered than C_{uSPT} values which likely reflects fissuring and fine sand partings in the London Clay Formation. Two design lines have been determined as follows which represent London Clay Formation divisions C and B:

- Weathered London Clay Formation (division C): C_u (kPa) = 60 + 6.36y (y in m below top of Weathered London Clay taken as 53mOD).
- London Clay Formation division C: C_u (kPa) = 60 + 6.36y (y in m below top of Weathered London Clay taken as 53mOD).
- London Clay Formation division B: C_u (kPa) = 200 + 2.80z (z in m below top of division B at 31mOD).

Figure 5-3: London Clay C_u vs. Elevation



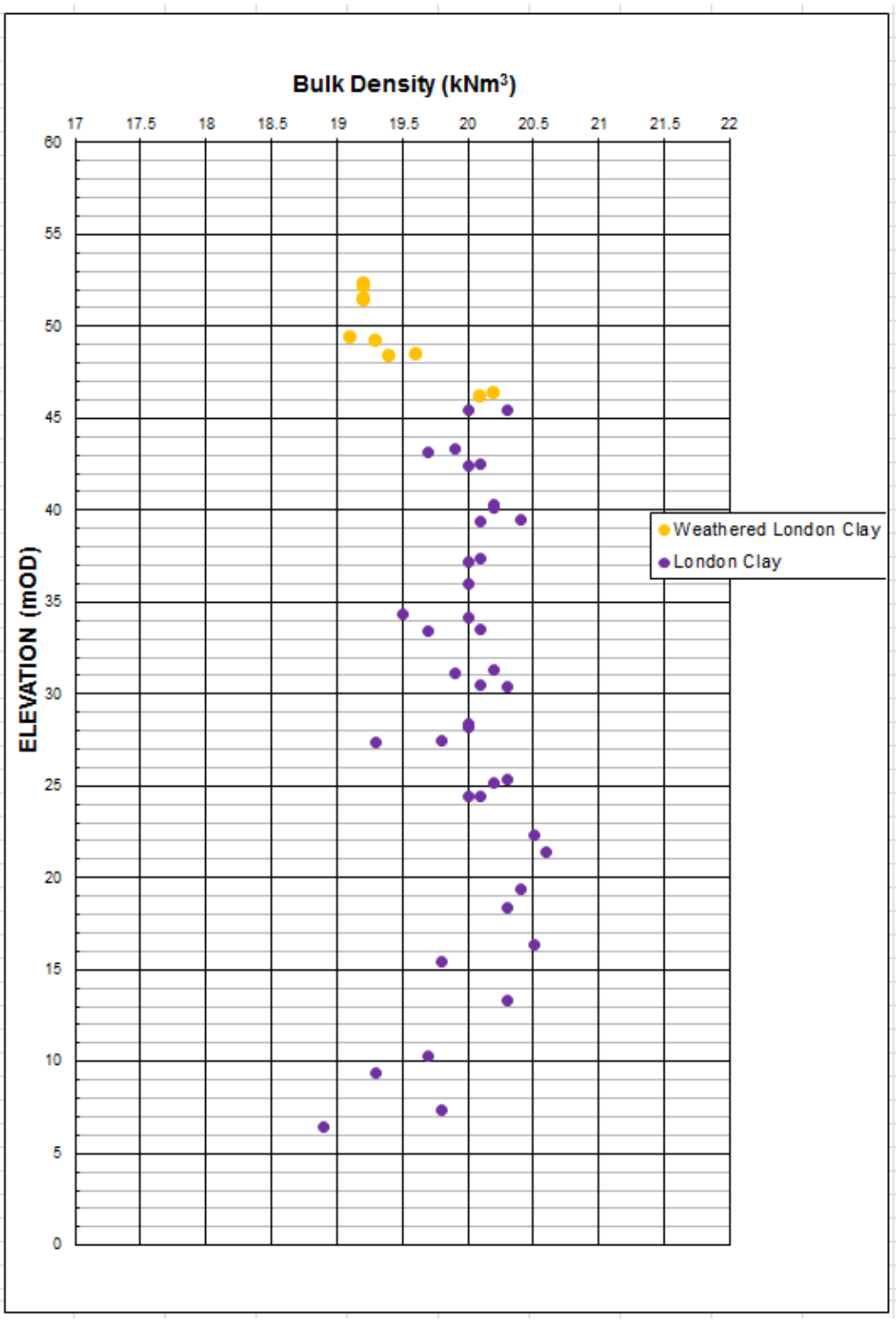
5.3.4 Bulk Density

The bulk density of the London Clay Formation has been measured during unconsolidated undrained triaxial testing to typically be:

- Weathered London Clay Formation (division C) = 19kN/m^3
- London Clay Formation division C = 20kN/m^3
- London Clay Formation division B = 20kN/m^3

There is an increase in scatter below 30mOD which likely corresponds to the London Clay Formation division C to division B boundary identified in the borehole logs (refer to Figure 5.4).

Figure 5-4: London Clay C_u vs. Elevation



5.3.5 Drained Strength

No drained strength tests have been undertaken and estimates for drained strength of Weathered and unweathered London Clay Formation have been made using the recommendations of BS8002:1994 and from known historical investigation data as follows:

- Weathered London Clay Formation (division C): φ' = 22° and c' = 5kPa
- London Clay Formation division C: φ' = 22° and c' = 5kPa
- London Clay Formation division B: φ' = 22° and c' = 5kPa

5.3.6 Drained and Undrained Young's Modulus, E'v and Eu

Drained and Undrained Young's modulus (E'v and Eu) for the Weathered and unweathered London Clay Formation can be estimated through an empirical relationship with undrained shear strength (C_u) using the design lines presneted and the following correlation:

- Weathered London Clay Formation (division C): Eu (kPa) = 500.C_u to 1000.C_u depending on strain level and E'v (kPa) = 0.75.Eu
- London Clay Formation division C: Eu (kPa) = 500.C_u to 1000.C_u depending on strain level and E'v (kPa) = 0.75.Eu
- London Clay Formation division B: Eu (kPa) = 500.C_u to 1000.C_u depending on strain level and E'v (kPa) = 0.75.Eu

Care should be taken in using the stiffness values given above, since they are linear properties derived from an assumed relationship, and do not reflect the non-linear nature of soil stiffness. The actual stiffness values will be strain dependent and non-linear, and design values should be selected accordingly.

5.3.7 Soil Chemistry

pH and water soluble sulphate tests have been undertaken on soil samples from the London Clay Formation. The Aggressive Chemical Environment for Concrete (ACEC) and Design Sulphate Class (DS) classifications has been determined using BRE Special Digest 1:2005 3rd Edition and the results are presented below.

Table 5-4: ACEC and DS Classifications for Aggressive Soils

Strata	Number of Tests	Characteristic Sulphate value (2:1 Aqueous extract as SO_4) (mg/l)	Characteristic pH value (pH)	DS Classification	ACEC Classification
Weathered London Clay Formation (division C)	3	3100	7.6	DS-4	AC-3s
London Clay Formation division C	6	1160	8.0	DS-2	AC-1s
London Clay Formation division B	3	944	8.1	DS-2	AC-1s

5.4 Geotechnical Parameters

Based on the ground investigation results described above, the following geotechnical design parameters are recommended.

Table 5-5: Geotechnical Parameters

Geological Strata	Bulk Density (kN/m^3)	C_u (kPa)	c' (kPa)	ϕ' (degrees)	Young's Modulus (kPa)
Weathered London Clay Formation (division C)	19	60 + 6.36y (y = depth below top of Weathered London Clay division C at 53.0mOD to 31.0mOD)	5	22	$E_u = 500.C_u$ to $1000.C_u$ depending on strain level $E'_v = 0.75.E_u$
London Clay Formation division C	20	60 + 6.36y (y = depth below top of Weathered London Clay division C at 53.0mOD to 31.0mOD)	5	22	$E_u = 500.C_u$ to $1000.C_u$ depending on strain level $E'_v = 0.75.E_u$
London Clay Formation division B	20	200 + 2.80z (z = depth below top of London Clay division B at 31.0mOD to 6.0mOD)	5	22	$E_u = 500.C_u$ to $1000.C_u$ depending on strain level $E'_v = 0.75.E_u$

6 Ground Related Hazards

Table 6.1 outlines potential ground related hazards that could be present at the site, and potential treatment options.

Table 6-1: Ground Related Hazards

Geotechnical Hazard	Discussion	Probability	Treatment
Drift filled hollows and Pingos	Drift filled hollows and pingos consist of circular or ovoid natural in-filled depressions generally within the London Clay Formation or Lambeth Group. These can form localised areas of soft ground which could influence settlement rates and cause instability of foundations and basement walls.	Low. None recorded near site.	Allow for contingency in design.
Discontinuities in geological strata	Faults, folds and other geological structures represent rapid changes in strata, localised zones of weak and disturbed ground, and can provide drainage paths with potentially high groundwater inflows potentially resulting in changes in pore water pressure and instability of foundations.	Low. None recorded near site.	Allow for contingency in design.
Excessive thickness of Made Ground	Due to the variable nature and thickness of Made Ground it poses risks of localised areas of high/low settlement, aggressive ground, perched water tables, and poor bearing capacity characteristics.	Low to Medium. Made Ground only present in thin layers.	Avoid using as a founding material or structural fil. Suspended floor slabs.
Excessive groundwater flow into excavations	Excessive groundwater flow resulting in dewatering or excavation instability.	Low in London Clay. High if excavating below water table.	Develop a dewatering programme if excavations need to extend below groundwater level.
Chemical attack on concrete	London Clay is identified in BRE Special Digest 1: 2005 as containing sulphates and sulphides which are principal constituents of aggressive ground and groundwater. Aggressive ground could be detrimental to concrete piles in these strata.	High.	Use appropriate concrete design requirements.
UXO	H&S risks during any further ground investigation and construction	Dependent on UXO survey findings.	Recommended UXO survey before construction if not already completed by Client.
Obstructions and old foundations	Obstructions can consist of old foundations or thick layers of rock. They can slow construction and damage foundation equipment, resulting in additional costs and programme delay.	High.	Review historical activities prior to design and construction.

Geotechnical Hazard	Discussion	Probability	Treatment
Organic or soft material in Made Ground	Potential damage from differential settlement between piled foundations and the surrounding hard standings	Low to Medium. Made Ground only present in thin layers.	Avoid raising the ground level or lowering water table. Flexible connections and services. Suspended floor slabs.
Lambeth Group at higher level than anticipated	Could require re-design of pile foundations if Lambeth Group encountered in pile excavations.	Low (London Clay is 80m thick).	Allow sufficient minimum thickness of Lambeth Group founding stratum below pile base (i.e. 5 times the pile diameter).
Ground gas	Potential hazards for construction works through the presence or build-up of noxious gases, flammable gases, and oxygen depletion. Potential sources include Made Ground and Alluvium. London Clay and Lambeth Group can also cause oxygen depletion.	Low if Made Ground is being completely excavated as pat as construction.	Undertake a ground gas monitoring regime to assess hazards. Use ground gas mitigation controls during construction.
Claystone or hard layers in London Clay	Claystone layers in London Clay could slow the rate of, or impede piling.	Low to Medium.	Allow for contingency in pile construction method.
Sand lenses in London Clay	Sand layers have the potential to impact on piling works from the following: – Causing local instability of uncased pile holes. – Producing local groundwater inflows into pile holes.	Medium to High.	Allow for contingency in pile construction method.
Cross-contamination of aquifers	Piling creates connection between upper and lower aquifers. Potentially contaminants in lower aquifer EA approval required delays works.	Low.	Design toe levels sufficiently above Lambeth Group and Thanet Sand to minimise risk.
Ground heave	Ground heave can cause damage to foundations and floor slabs.	London Clay Formation has a High volume change potential.	Ground heave protection may be required if structures found directly on London Clay Formation. Use suspended floor slabs.
LUL Tunnels	Site lies adjacent to Jubilee Line southbound tunnel. Potential for excessive movement to tunnel and track from demolition, construction, and long term.	Medium.	Preliminary impact assessment for LUL shows negligible movement. Update assessment using results from this GIR.

Geotechnical Hazard	Discussion	Probability	Treatment
HS2	Southern boundary of Site is within HS2 safeguard zone. Potential for damage to new building from future HS2 tunnel construction.	High.	Discuss with HS2 the implications on design and construction Undertake ground impact assessment to meet HS2 requirements.
Unknown Services	Service strike during construction causing delays and H&S issues.	High.	Establish location of services during design stage.

7 Conclusions

The following conclusions are provided:

The site straddles the Swiss Cottage Underground Station and lies adjacent and parallel to the northeastern side of the southbound tunnel of the Jubilee Line.

A site specific ground investigation (GI) has been carried out by Concept Consultants Ltd in May 2016. The GI comprised two cable percussion boreholes drilled to 47m depth and two cable percussion boreholes drilled to 30m depth. It also included standard penetration testing, sampling, geotechnical and geo-environmental testing, and monitoring.

The GI shows the site to be underlain by a thin layer of concrete/Made Ground which directly overlies London Clay Formation.

Informal London Clay division C overlying division B of King (1981) have been logged in the Concept Consultants boreholes. The upper part of the London Clay Formation has been weathered.

The London Clay Formation is likely to be in the order of 80m thick at the site.

Design lines of undrained shear strength vs. elevation for the London Clay Formation have been provided for preliminary design purposes.

The main ground related hazards that are likely to affect the proposed development include: chemical attack of concrete, obstructions and old foundations, sand and claystone layers in the London Clay Formation, ground heave, unknown buried services, and the nearby proximity of underground structures (including proposed HS2 tunnel).

Ground movement assessments would be required to assess the effect of the proposed development on underground structures and the effect from the proposed HS2 tunnel on the building.

8 References

British Standard 8002 : 1994 – Code of practice for Earth retaining structures.

British Geological Survey Geological Map Sheet 256 (North London) 1:50,000 scale (Solid and Drift).

BRE Special Digest 1: 2005 Concrete in Aggressive Ground.

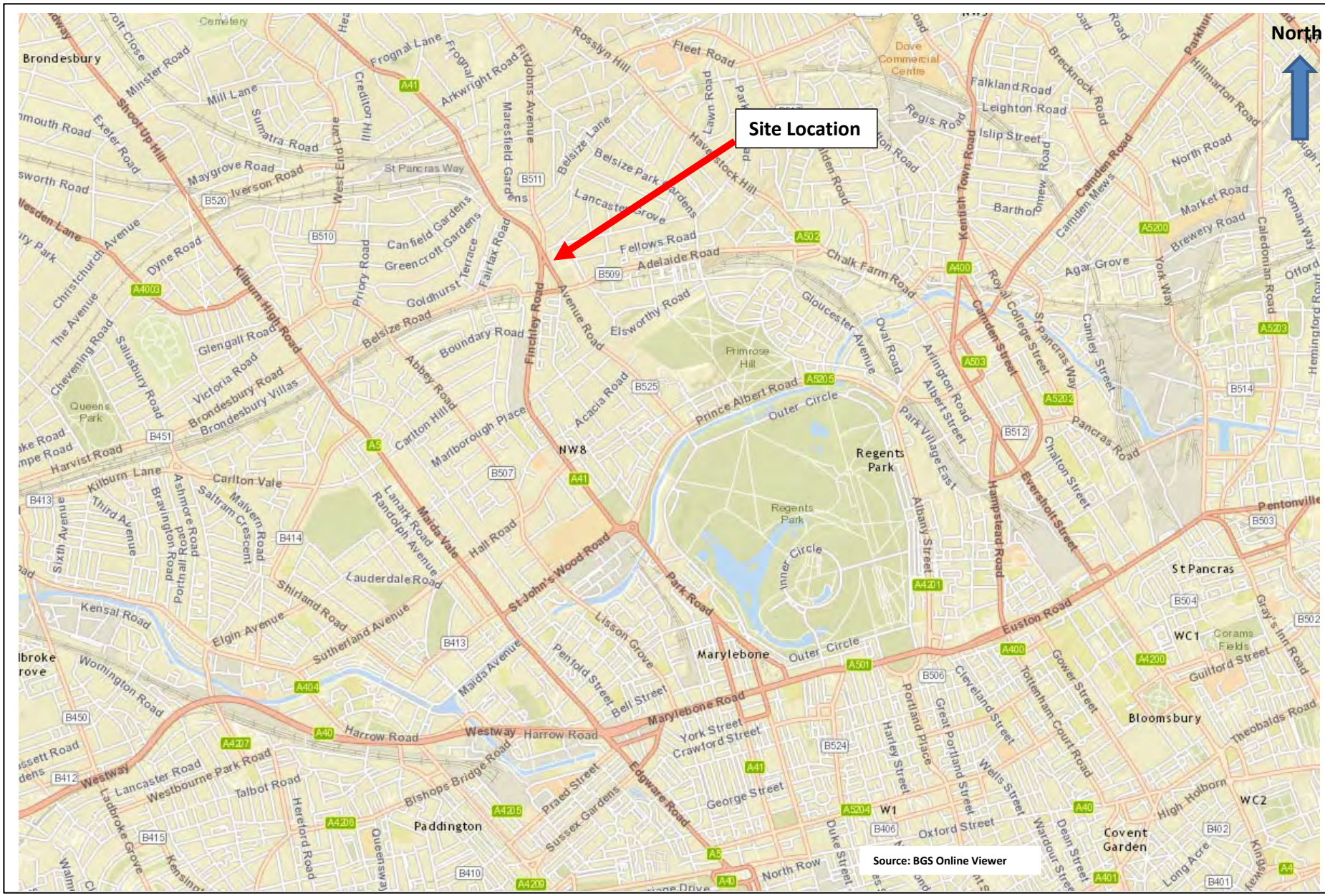
BS EN 1997-1: 2004 Eurocode 7: Geotechnical design.

BS EN 1997-2: 2007 Ground investigation and testing.

King, C. 1981. The Stratigraphy of the London Clay and Associated Deposits. Tertiary Research Special Paper No. 6, Backhuys (publ). 158pp.

Stroud, M.A. 1989. The Standard Penetration Test – Its Application and Interpretation. Penetration Testing in the UK, Thomas Telford, London.

Appendix A. Site Location and Ground Investigation Figures



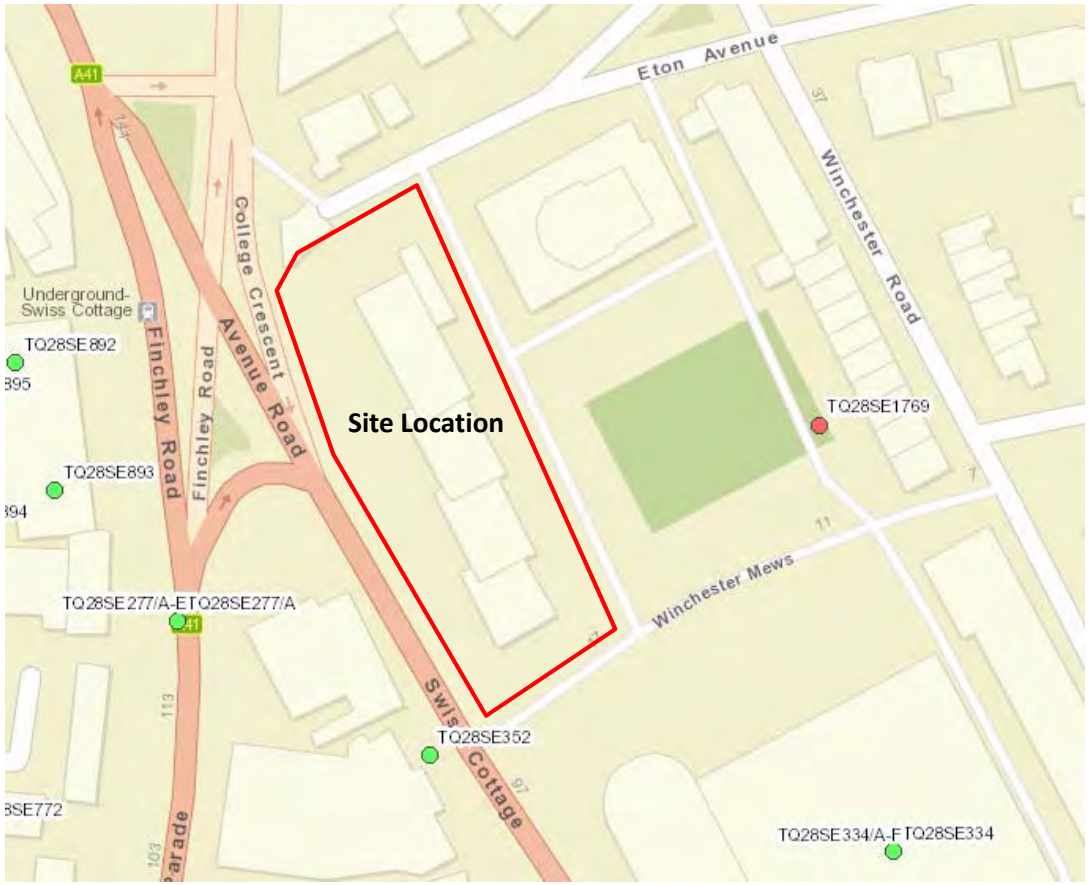
AECOM

100 Avenue Road, Swiss Cottage

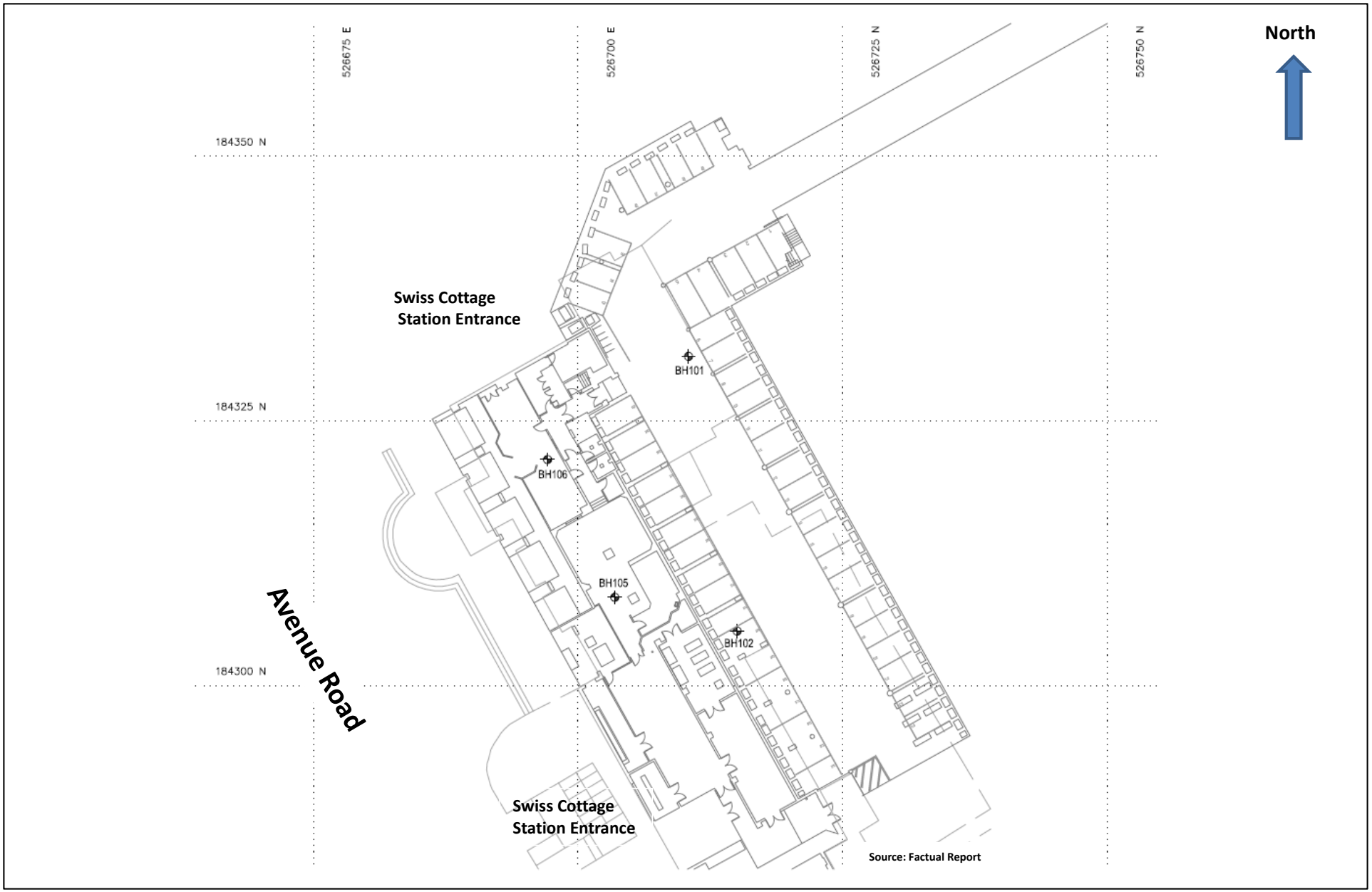
Figure 1: Site Location Plan

July 2016

North



Source: BGS Online Viewer



100 Avenue Road, Swiss Cottage

Figure 3: Concept Consultants Borehole Location Plan

July 2016

Appendix B. Ground Investigation Factual Report

About AECOM

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 100,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has annual revenue in excess of $6 billion.

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APPENDIX J EMC STATEMENT

EMC Statement

AECOM has spoken with UK Power Networks (UKPN), and they have advised us of the following requirements for the sub-station:

- Design dictates that cross ventilation cannot be achieved as indicated on the UKPN design plan 07-0102.07 sheet 1 (Single Transformer sub-station) or the 07-0102.08 sheet 1 (single transformer substation with ACB and LV board). It is noted that the depth would need to be increased to roughly 5000mm deep from 4040mm (external) 4570mm from 3610mm internal. The room height would also need to increase to 3200mm minimum. Room width would not differ from the standard UKPN drawings.
- If the single transformer sub-station detail is required, then the trench detail on 07-0102.07 would need to extend to the rear of the room in-line with the above requirements.
- If single transformer substation with ACB and LV board is required, then the trench detail would be as per the detail on 07-0102.08 (not extended to the rear of the room)
- The slab is to be constructed into the trough detail and not a drop slab across the whole substation; 1050mm depth as per the drawing.
- Earth requirements – mesh to be installed as per drawing 07-0102.07 sheet 2 or 07-0102.08 sheet 2 within screed as indicated on the drawings.
- Two earth pits to be provided within the basement as standard, any deviation of this would need to be discussed on a project specific basis (i.e. external to the sub-station outside the basement footprint)
- Switchroom position in relation to the sub-station. It is UKPN policy to locate the switchroom within 10 metres from the substation. Ideally located to the rear of the sub-station as indicated on the UKPN drawings.
- EMF position –UKPN do not have any restrictions for apartments above substations, only adjacent apartments would require a 'Faraday cage' to the side wall in this instance. If the decision by the client was to install EMF measures to the apartment above this would need to be outside the substation demise (within the floor makeup).

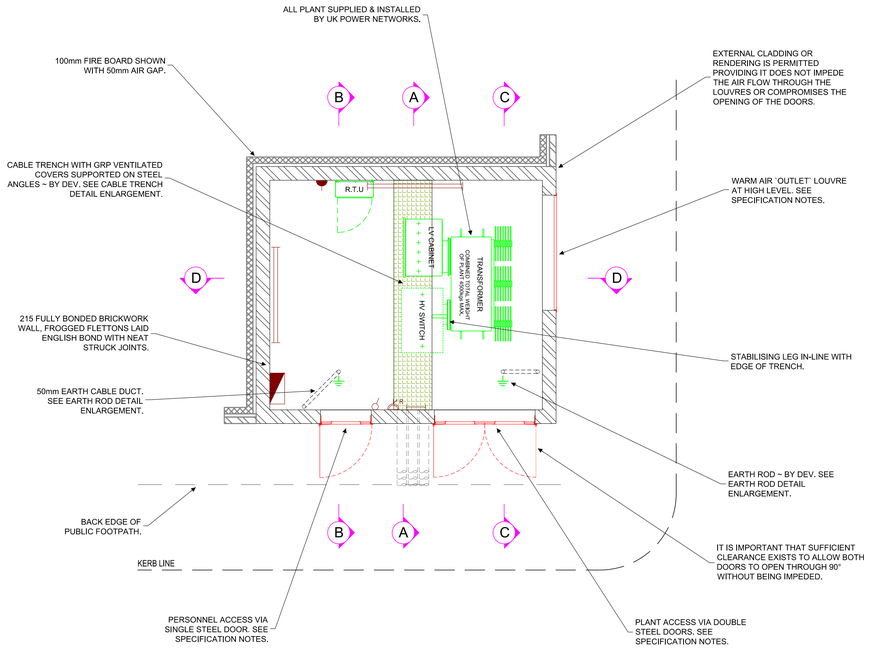
The Government has recently introduced new Legislation which came into force on the 1st July 2016, 'The Control of Electromagnetic Fields at Work Regulations 2016'. The Legislation requires risk assessments to be carried out to demonstrate the control of electromagnetic fields; however specifically relating to sub-stations we can advise as follows:

- The UKPN standard is not to incorporate any form of EMF protection measures to apartments located above a sub-station. Only apartments located adjacent to a sub-station complete with a UKPN LV distribution panel located on the opposing side of the wall shall have EMF protection provided by UKPN.
- UKPN refers to Energy Networks Association (ENA) electric and magnetic fields information sheet (2016) which states: The electricity industry assesses all operational activities and ensures they comply with these exposure limits. As the exposure is always below the exposure limits, no harmful effects of EMFs on nerves can occur, and there are no known harmful effects of EMFs at levels below the exposure limits.
- The above Legislation requires risk assessment documentation to be in place; however as new sub-stations are almost always more compact and therefore produce lower fields, it is unlikely that the existing maximum values would ever be exceeded in the future*.

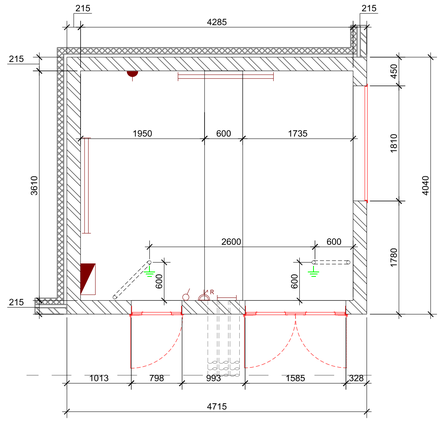
* As identified on page 51 of the 'Compliance of the UK Transmission and Distribution Networks and generating Equipment with Occupational Exposure Limits' issue 1, 30th June 2016

Despite the foregoing information which identifies that the effects of EMF / EMC are low we would recommend that a Faraday cage be installed within the construction detail of the walls, floor and ceiling of the sub-station to nullify any EMF / EMC issues created by the installation of the sub-station.

Please note that at the time of preparing this statement we are not aware of any LUL equipment within the Swiss Cottage station that may be generating EMF / EMC issues that may impact on the proposed Swiss Cottage development. We would recommend that a specialist be employed to liaise with LUL in this regard and consider any further mitigating measures that may be required above the proposed Faraday cage around the ground floor sub-station.



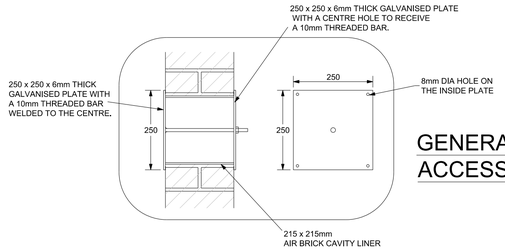
SUBSTATION ~ GENERAL ARRANGEMENT PLAN



SETTING OUT DIMENSIONS

PROPOSED SUBSTATION LOCATION TO BE ADVISED BY DEVELOPER AND AGREED WITH UK POWER NETWORKS PRIOR TO CONSTRUCTION

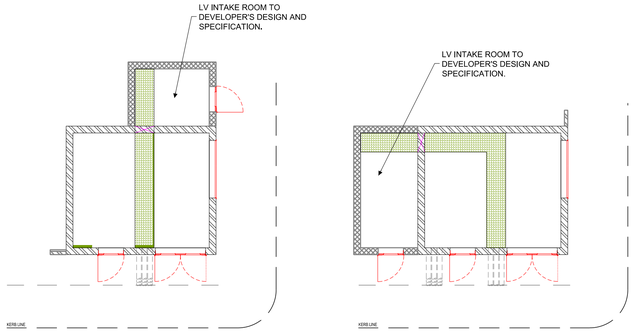
LOCATION PLAN



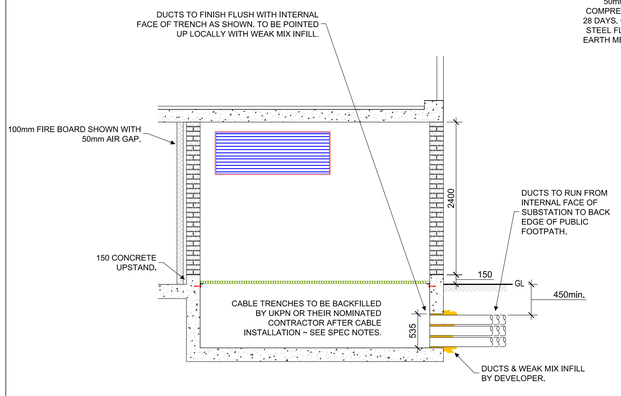
GENERATOR CABLE ACCESS DETAILS

CABLE TRENCH DETAIL

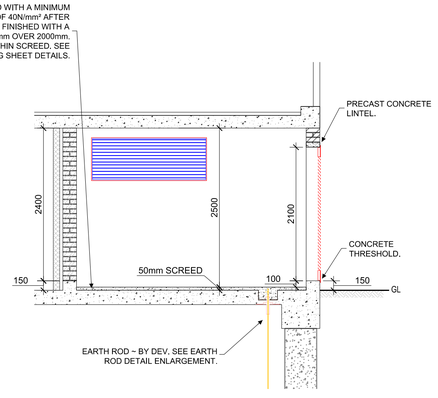
EARTH ROD DETAIL



ALTERNATIVE SERVICE INTAKE POSITIONS



SECTION A~A



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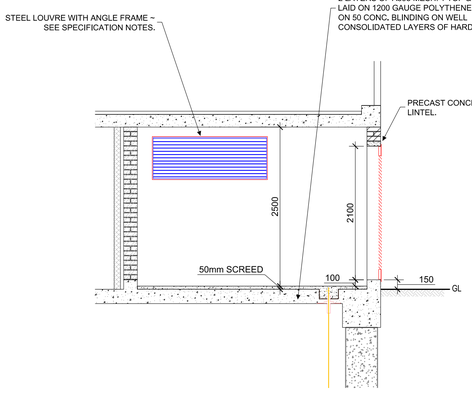

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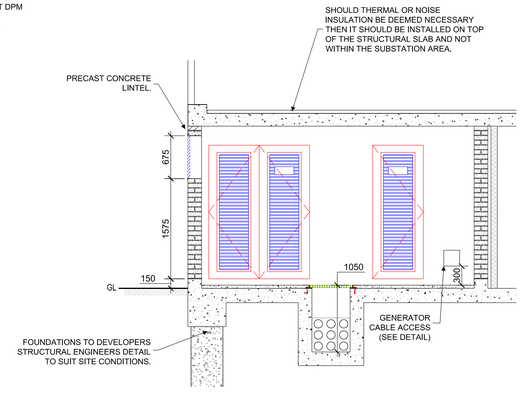

SECTION D~D

SPECIFICATION NOTES:

GENERAL NOTES
- THIS DRAWING IS NOT TO BE SCALED AND NO VARIATION TO THE STATED DIMENSIONS OR MATERIALS SPECIFIED WILL BE PERMITTED WITHOUT PRIOR WRITTEN CONSENT FROM UK POWER NETWORKS.
- ALL DIMENSIONS ARE IN MILLIMETRES.
- THE RUNNING OF HEATING, GAS, TELECOMS, WATER AND OTHER SERVICES THROUGH OR UNDER THE SUBSTATION AREA WILL BE NOT PERMITTED.
- THE DEVELOPER WILL BE RESPONSIBLE FOR OBTAINING ALL PLANNING CONSENTS AND BUILDING REGULATION APPROVALS BEFORE CONSTRUCTION WORK BEGINS.

SUBSTATION LOCATION
- IT IS IMPORTANT THAT THE POSITION AND ORIENTATION OF THE SUBSTATION IS DISCUSSED AND AGREED WITH THE UK POWER NETWORKS PRIOR TO THE COMMENCEMENT OF ANY BUILDING WORKS ON SITE.
- INTEGRAL SUBSTATIONS SHOULD ALWAYS BE INCORPORATED INTO THE CORNER OF A SITE IF POSSIBLE TO ALLOW VENTILATION TO FREE AIR ON TWO ELEVATIONS SO AS TO PROMOTE GOOD CROSS VENTILATION.
- SUBSTATIONS SHOULD BE LOCATED ADJACENT TO A PUBLIC HIGHWAY OR REACHED BY A PRIVATE DEDICATED ACCESS WAY WITH FULL CONTROL AND ASSOCIATED LEGAL RIGHTS.
- 24 HOUR UNIMPEDED UK POWER NETWORKS PERSONNEL ACCESS IS REQUIRED AT ALL TIMES, 365 DAYS OF THE YEAR. ANY DOORS OR GATES ON THE ACCESS ROUTE ARE TO BE LOCKED IN STANDARD UK POWER NETWORKS LOCKING SUITE.
- ACCESS VIA 24HR SECURITY IS UNACCEPTABLE.
- CONSIDERATION IS TO BE GIVEN AT THE DESIGN STAGE IF ADJACENT SOFT LANDSCAPING IS PROPOSED ~ PLANTING SCHEMES MUST ALLOW ADEQUATE PROVISION FOR FUTURE PLANT GROWTH WITHOUT COMPROMISING ACCESS OR VENTILATION THROUGH DOORS AND LOUVRES.

FOUNDATIONS, CONCRETE & REINFORCEMENT
- TO DEVS STRUCTURAL ENGINEER DETAIL TO SUSTAIN THE PLANT LOADINGS SHOWN.

FLOOR SLAB
- 50mm TOPPING SCREED WITH A MINIMUM COMPRESSIVE STRENGTH OF 40N/mm² AFTER 28 DAYS. CONCRETE WORKS FINISHED WITH A STEEL FLOAT TO WITHIN ±2mm OVER 2000mm. EARTH MESH TO BE RUN WITHIN SCREED. SEE EARTHING SHEET DETAILS.~ NOTE THAT A HIGH STANDARD OF WORKMANSHIP IS REQUIRED.
- REINFORCEMENT TO STRUCTURAL ENGINEERS REQUIREMENTS, TO SUSTAIN WEIGHT OF PLANT (4500kgs max.) IN ANY POSITION.
- KERB SUPPORTS INSTALLED FOR GRATING. ~ SEE CABLE TRENCH DETAIL.

ROOF SLAB
- TO DEVS STRUCTURAL ENGINEER DETAIL.
- ALL REINFORCEMENT TO HAVE SUFFICIENT MINIMUM COVER TO REINFORCEMENT SO AS TO PROVIDE A 4 HR FIRE RATING. HOLLOW POT BEAMS, PRECAST PLANKS OR LIGHTWEIGHT CONCRETE ON METAL DECKING ARE NOT PERMITTED.
- NO SERVICES, DRAINAGE FROM ABOVE WILL BE PERMITTED TO PASS THROUGH THE SLAB AND INTO THE SUBSTATION AREA.

STRUCTURAL STEELWORK
- THE PRESENCE OF ANY STRUCTURAL STEELWORK WITHIN THE SUBSTATION IS TO BE ADVISED TO AND AGREED UPON BY UKPN.
- TO BE FIREPROOFED TO A 4 HR STANDARD BY ENCASING IN CONCRETE OR CLAD IN FIREPROOFING MATERIAL MEETING UKPN SPECIFICATIONS AS ADVISED IN EAS-07-0011.

WALLS
- TO BE CONSTRUCTED OF 215 FULLY BONDED BRICKWORK TO BS EN 771-1 LAID ENGLISH BOND, BRICKS TO BE FROGGED AND HAVE A MINIMUM COMPRESSIVE STRENGTH OF >20N/mm² (DURABILITY MN) WITH NEAT STRUCK JOINTS, WALLS TO PROVIDE FLUSH FINISH INTERNALLY. ENGINEERING BRICK IS NOT PERMITTED.

OR
- 2 SKINS OF BRICKWORK LAID STRETCHER BOND WITH E.M.L. HORIZONTAL BED JOINT REINFORCEMENT EVERY 3rd COURSE WITH NO CAVITY. INNER SKIN TO BE OF COMMON FLETTONS ~ EXTERNAL SKIN TO HARMONISE WITH ADJACENT BRICKWORK.

DOORS
- VENTADOOR STEEL LOUVRED DOORS BY SUNRAY ENGINEERING (01233 639 039) WITH POWDER COATED FINISH. STANDARD COLOUR GREEN 14-C-39.
  - ~ SINGLE DOOR (798 X 2100 S/O) AS PER SUNRAY DRAWING No. V-SL-006
  - ~ DOUBLE DOORS (1585 X 2100 S/O) AS PER SUNRAY DRAWING No. V-DL-005
- SINGLE DOOR FITTED WITH PANIC BAR, DOUBLE DOORS SECURED INTERNALLY WITH UKPN STANDARD PADLOCK, PADLOCK SUPPLIED FREE OF CHARGE BY UKPN.
- MASTIC POINTING TO FRAME SURROUNDS EXTERNALLY.

VENTILATION LOUVRES
- COLD AIR INLET VIA LOUVRED DOORS ON FRONTAGE WITH HOT AIR OUTLET VIA HIGH LEVEL LOUVRED PANEL TO REAR OF TRANSFORMER COOLING FINS SO AS TO PROMOTE NATURAL CROSS VENTILATION OF SUBSTATION.
- LOUVRES TO BE OF STEEL CONSTRUCTION IN ANGLE FRAME BY SUNRAY ENGINEERING WITH POWDER COATED FINISH. STANDARD COLOUR GREEN 14-C-39.
- MASTIC POINTING TO FRAME SURROUNDS EXTERNALLY.

DUCTS
- THE EXACT NUMBER OF DUCTS AND DUCT ENTRY POSITIONS ARE TO BE VERIFIED BY UK POWER NETWORKS TO SUIT THE PROJECT ~ 8 DUCT ENTRIES IS TYPICAL.
- 125mm INTERNAL DIAMETER TWIN WALLED HIGH DENSITY POLYETHYLENE DUCTING TO ESI 12-24 (BS EN 50086-2-4) LAID FLAT & LEVEL. eg. RIDGIDUCT.

FINISHES
- FLOOR TO RECEIVE 2 COATS OF GREY CONCRETE FLOOR PAINT.
- WALLS & CEILING TO RECEIVE 2 COATS OF WHITE EMULSION FOR DUST SEALING.
- DOORS & LOUVRES TO BE POWDER COATED, EXACT COLOUR TO BE DETERMINED.

EARTHING - SHEET 2 FOR FULL DETAILS **SMALL POWER -** SHEET 3 FOR FULL DETAILS.

INFILL TO CABLE TRENCHES
- AFTER CABLE INSTALLATION SEAL ALL CABLE DUCTS, FILL TRENCHES WITH SAND 100mm ABOVE HIGHEST DUCT AND FINISH LEVEL TO A MINIMUM OF 500mm BELOW THE TOP OF GRATING ~ GRATINGS TO BE LEFT IN POSITION. CUT AROUND GRP GRATING AS REQUIRED FOR CABLE PENETRATIONS ENSURING THEY CAN STILL BE REMOVED WITH CABLES IN-SITU.

PLANT INSTALLATION
- REMOVE LOWER DEMOUNTABLE STEEL DOOR THRESHOLD TO DOUBLE DOORS WHEN INSTALLING PLANT.
- USE ACOUSTIC MOUNTS BETWEEN PLANT AND FLOOR SLAB.

Version	Date	Description		
D	17-01-14	Re-design, re-drawn.	M Dunk	HA
			M Dunk	HA
C	29-05-12	Earthing references removed from Sht 1. Notes amended.	H Amare	RDH
			M Dunk	HA
B	22-10-10	.	PL	WM
			PL	GD
A	22-03-10	ORIGINAL	MD	GD
			PL	GD
			Checked	Drn.
			Approved	Designed

UK Power Networks

TITLE

INTEGRAL SUBSTATION FOR SINGLE TRANSFORMER

SCALE NTS @A1 APPROVED

Version D

DRAWING NO. EDS 07-0102.07 SHEET 1 OF 3

SITE SECONDARY SITES