

Cunningham Lindsey

Subsidence Scanning Centre, Woodhead House, Centre 27 Business Park, Woodhead Rd, Birstall, WF17 9TD
Telephone 01489 567700 Facsimile 01489 565816

Policyholder:



Subject Property Address:

52, Hulbert Road

Havant

Hants

PO9 3TF

INSURANCE CLAIM**CONCERNING SUBSIDENCE DAMAGE****ENGINEERING APPRAISAL REPORT**

This report is prepared on behalf of [REDACTED] for the purpose of investigating a claim for subsidence. It is not intended to cover any other aspect of structural inadequacy or building defect that may otherwise have been in existence at the time of inspection.

Date: 4/10/2010

Cunningham Lindsey Ref: SOHPC/PXL/3341081

INTRODUCTION

This report has been prepared by our Chartered Surveyor, Mark Hatchett MRICS, and is being investigated in accordance with our Project Managed Service. Customer support is provided by Penny Langley.

Unless stated otherwise all directions are referred to as looking towards the front door from the outside the property.

DESCRIPTION OF BUILDING

The subject property is a four bedroom detached two storey house of traditional construction built in 1929. The external walls are of cavity masonry with a rough cast rendered finish. The load-bearing walls support a timber framed hipped roof clad in replacement concrete interlocking tiles. Flooring throughout is in suspended timber. The property is 'L' shaped on plan with a two storey projection to the rear but limited to the left-hand half. There is a small single storey outbuilding attached to the right-hand wall of the projection.

The property is in a residential area on a plot that slopes gently down from front to back. The overall layout is as recorded on the plan incorporated within the investigation results.

The property was the subject of previous damage from clay shrinkage subsidence. This was following the dry summers of 1989 and 1990 and concerned the front section of the property. The cause of this damage was root activity from the large Ash tree located in the middle of the front garden. This tree was retained and the front, part left and part right elevations underpinned. There is no issue now at the front of the property.

There are trees within influencing distance of the property. These are a Grey Poplar and Sycamore to the rear along the left-hand site boundary with a second Grey Poplar to the rear along the right-hand boundary.

CIRCUMSTANCES OF DISCOVERY OF DAMAGE

The policyholder and homeowner, [REDACTED] first discovered the damage in August 2009. This damage worsened over the next few weeks resulting in Insurers being notified of the damage in Sept 2009.

NATURE AND EXTENT OF DAMAGE

Description and Mechanism

The principal damage takes the form of hairline – 6mm horizontal, diagonal and vertical tapering cracks to the rear, left and right elevations of the two storey projection to the rear. There is corresponding downward slope of the rear floors and an outward lean of the rear wall together with distortion of window and door openings.

In addition to the damage to the left rear projection, there was hairline – 3mm diagonal tapering cracks to the rear elevation and to the right-hand bedroom.

The damage and distortions indicate downward movement of the rear two storey projection but also to the rear right-hand corner.

Significance

Building Research Establishment Digest 251 provides a classification of damage in low-rise buildings in terms of the ease of repair. Accordingly, the level of damage is slight to moderate, category 2 – 3.

Onset and Progression

We consider that the damage occurred during the summer months of 2009. It is likely that movement will be of a cyclical nature with cracks opening in the summer and closing in the winter.

SITE INVESTIGATIONS

In view of the damage and close proximity of vegetation, a site investigation was instructed. This was carried out by CET Safehouse Ltd on 23 October 2009 and comprised the excavation of two trial pits and boreholes, one to each rear corner. We refer to the attached factual report submitted by CET.

Trial Pit 1/Borehole 1

This was located to the rear right-hand corner and revealed a 300mm thick concrete strip footing bearing 570mm below surface level. The foundation bears onto the natural silty clay. This strata was confirmed to 4.6m.

Trial Pit 2/Borehole 2

This was located to the rear left-hand corner of the projection and revealed a 250mm thick concrete strip footing bearing 800mm below ground level. The foundation bears onto the natural silty clay. This strata was confirmed to 45.0m.

Laboratory analysis of soil samples taken show the clay to be of very high shrinkage and swelling potential. Consideration of the moisture content of samples with the Atterberg limits of the soil together with the in-situ strength test results and suctions tests indicate the soil to be desiccated to a depth of 1.5m, but not at 2.0m, at both investigation points. The suction test results indicate that heave is not a potential.

Samples of root taken from beneath the foundations have been analysed. Only the ones from trial pit 2 have been clearly identified as originating from the Grey Poplar to the left-hand boundary. Other roots were too small for identification purposes. One root from the right-hand trial pit was confirmed to originate from a member of the Pomoideae family.

The site investigation results confirm the damage in both locations has been caused by clay shrinkage subsidence following root activity from adjacent vegetation.

No drainage investigations have been undertaken as the drains are a significant distance from the area of damage and the site investigation has shown the soil to be dry which suggests the drains have not adversely affected the soils.

MONITORING

Scientific level monitoring has been underway since October 2009 with 11 readings in all, the last ones in September 2010. Given that the front has been underpinned previously and there is no suggestion that there has been any further movement here, the front right-hand corner was used as a temporary benchmark. The results of the level monitoring carried out to date are attached in table/graphical format together with a plan showing the location of the pins around the property.

In summary, the results to date show soil recovery following the commencement of the levelling with a period of general stability until subsidence from June to August. The latest monitoring shows some degree of recovery again corresponding with the recent rain. The degree of both subsidence and recovery is quite consistent across the rear.

CAUSE OF DAMAGE

Taking an overview of all the site investigation and level monitoring results referred to above, it is our opinion that the cause of damage results from clay shrinkage subsidence brought about by the action of roots from the two Poplars and Sycamore.

We base this view on the fact that the foundations of the property in the area of damage have been built at a relatively shallow depth, bearing onto shrinkable clay subsoil. The soil is susceptible to movement as a result of changes in volume of the clay with variations in moisture content and analysis of the site investigation results indicates that the soil has been affected by shrinkage. Poplar tree roots are present in the clay subsoil beneath the foundations. In this case, we are satisfied that the damage has therefore been caused by clay shrinkage subsidence following moisture extraction by the Poplars and Sycamore.

We are also satisfied that there is no factor, other than the trees, that is causing the damage.

RECOMMENDATIONS

Mitigation:

It is recommended that the Poplar and Sycamore are removed from the left-hand boundary and that the Poplar is removed from the right-hand boundary. The Mitigation Centre of Oriel Services Ltd will liaise with the Local Authority in this regard {and a copy of OCA UK Limited's report is attached herewith}.

Level monitoring will continue after removal of the tree in order to check for stability. A detailed scope of repairs will be finalised upon conclusion of the monitoring.

Repairs:

If the trees are removed then we consider that works including structural crack repair and redecoration at an approximate cost of £14,000.00 will be appropriate in order to repair the damage in this case.

If the trees are not removed then it will be necessary to underpin the foundations of the property in the area of damage, in addition to structural crack repair and redecoration needed to repair the damage. The total cost of this option is estimated at £45,000.00.

For CUNNINGHAM LINDSEY

Project Management Services
Mark Hatchett MRICS
Project Manager
Penny Langley
Customer Support
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E-mail: penny.langley@cl-uk.com

FACTUAL REPORT OF INVESTIGATION

AT:- 52 Hulbert Road, Havant

ON:- 23 October 2009

FOR:-
c/o Cunningham Lindsey - Solent

REF:- 3341081

JOB NO:- 70662

REPORT ISSUED:- 09/11/2009

SPECIALIST CONTRACTING DIVISION

CET SAFEHOUSE LIMITED

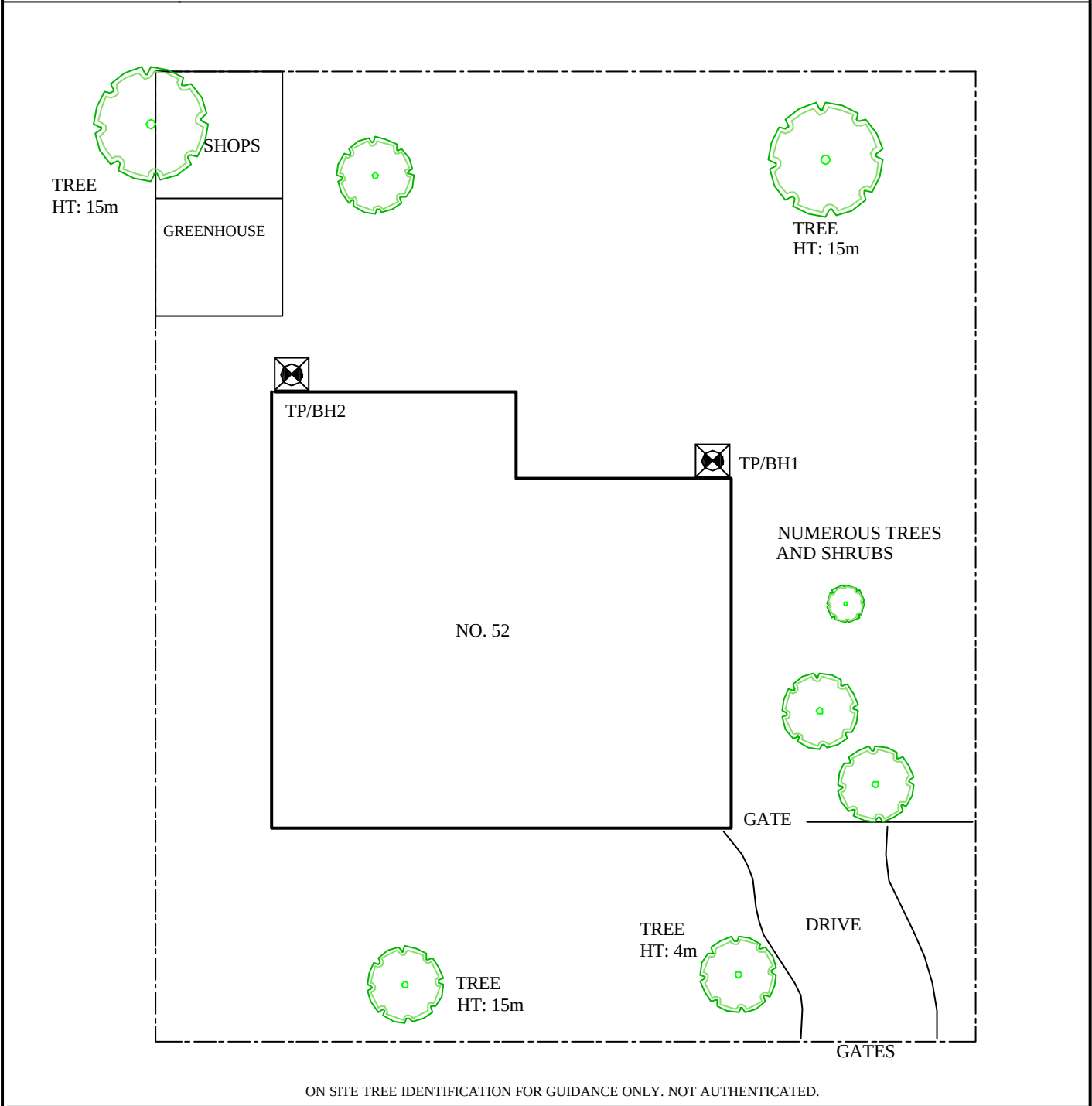
Lawness Barns, Mountnessing Road, Billericay, Essex CM12 0TS

WWW.CETSAFEHOUSE.COM

Tel: 01277 655377

Fax: 01277 655977

Investigation Layout Plan			Sheet: 1 of 1	Site: 52 Hulbert Road, Havant
			Job No: 70662E	
			Date: 23.10.09	Work carried out for: Cunningham Lindsey
AH (SI)	SE (Checked)	JT (Drawn)	Weather: Dry	



ON SITE TREE IDENTIFICATION FOR GUIDANCE ONLY. NOT AUTHENTICATED.

Remarks:	Key:			
	Combined Gulley	RWWG	Surface Water Drain	-->--
	Manhole	MH	Foul Water Drain	→
	Rain Water Pipe	RWP	Tree / Bush	
	Rain Water Gulley	RWG	(approx. ht in m)	
	Soil Vent Pipe	SVP	Trial Pit	
	Waste Gulley	WG	Borehole	
	Waste Pipe	WP		
	Scale: N.T.S.			

Trial Pit No: 1		Sheet: 1 of 1	Site: 52 Hulbert Road, Havant Work carried out for: Cunningham Lindsey
Excavation Method: Hand Tools		Job No: 70662E	
Weather: Dry		Date: 23.10.09	
		Drawn by: JT	
		Ground Level mOD:	

The diagram shows a cross-section of a trial pit. On the left, a vertical wall is labeled 'Pebbledash render' with a width of '600 x 500'. A horizontal line indicates a '90' offset. Below the wall is a 'CONCRETE FOUNDATION' with a depth of '270'. To the right of the foundation, a vertical dimension of '300' is shown. Further right, a vertical dimension of '470' is shown. At the bottom right, a 'SLAB CONCRETE' layer is shown with a thickness of '70'. Below the slab is 'MADE GROUND: medium compact to compact, dark brown, clayey, sandy, gravelly silt with brick and concrete fragments.' Below the made ground is a layer of 'Stiff, mid brown/orange, grey veined, silty CLAY with carbon flecks and occasional claystone nodules thinly laminated with orange silt and fine sand.' Below the clay is a layer of 'Roots to 3mmØ'. A 'Ground Level' arrow points to the top of the slab. A 'DV 100 110' label is near the foundation. A note at the bottom states 'FOR STRATA BELOW 620mm SEE BH LOG 1'.

Remarks: All measurements in millimetres.		Key:	
		D Small disturbed sample	J Jar sample
		B Bulk disturbed sample	V Pilcon Vane (kPa)
		W Water sample	M Mackintosh probe
		TDTD Too dense to drive	

Logged: AH	Checked: SE	Approved:	Scale: N.T.S.
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Trial Pit No: 2		Sheet: 1 of 1	Site: 52 Hulbert Road, Havant Work carried out for: Cunningham Lindsey
		Job No: 70662E	
		Date: 23.10.09	
Excavation Method: Hand Tools		Drawn by: JT	
Weather: Dry		Ground Level mOD:	

The diagram shows a cross-section of a trial pit. On the left, a vertical wall is labeled 'Pebbledash render' with a thickness of 60mm. At the base of this wall is a 'CONCRETE FOUNDATION'. To the right of the wall, the pit is divided into horizontal layers with the following dimensions from top to bottom: 550mm, 400mm, 400mm, 250mm, and 100mm. The total depth of the pit is 1700mm. The top of the pit is at 'Ground Level'. The soil strata are described as follows: 1. 10mmØ washed gravel over MADE GROUND: medium compact, dark brown, organic, clayey, sandy, gravelly silt with brick fragments. (400mm thick) 2. Roots to 6mmØ 3. MADE GROUND: medium compact, mid brown, silty clay with occasional brick fragments, fine to medium gravel. (400mm thick) 4. Roots to 3mmØ 5. Stiff, mid brown, grey veined, silty CLAY with carbon flecks thinly laminated with orange silt and fine sand. (250mm thick) 6. Roots to 3mmØ (100mm thick) Below the 100mm layer, it is noted 'FOR STRATA BELOW 900mm SEE BH LOG 2'. On the left side of the pit, there are two depth markers: DV 76 and 80.

Remarks: All measurements in millimetres.		Key:	
		D Small disturbed sample	J Jar sample
		B Bulk disturbed sample	V Pilcon Vane (kPa)
		W Water sample	M Mackintosh probe
		TDTD Too dense to drive	

Logged: AH	Checked: SE	Approved:	Scale: N.T.S.
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Borehole No: 1			Sheet: 1 of 1			Site: 52 Hulbert Road, Havant				
Boring Method: Hand Auger			Job No: 70662E							
Diameter: 75mm			Date: 23.10.09							
Coordinates:			Ground Level mOD:			Work Carried out for: Cunningham Lindsey				
Depth (m)	Description of Strata		Thick-ness (m)	Legend	Sample	Test Type	Result	Depth (m)	Field Records/Comments	Depth to water (m)
0.62	As Trial Pit 1		0.62							
2.40	Stiff, mid brown/orange, grey veined, silty CLAY with carbon flecks and occasional claystone nodules, thinly laminated with orange silt and fine sand.		1.78						Roots to 1mm diameter to 2.0m	
				D	V	130+	1.00			
				D	V	96	1.50			
				D	V	102	2.00			
				D	V	108				
3.50	Stiff, mid brown, grey veined, silty CLAY with partings of brown and orange silt and fine sand.		1.10		D	V	130+	2.50	No roots observed below 2.0m	
				D	V	130+	3.00			
4.60	Stiff, mid brown, grey veined, silty CLAY with partings of orange silt and fine sand and claystone nodules.		1.10		D	V	130+	4.00		
				D	V	130+	4.50			
Borehole ends at 4.6m Too stiff to hand auger										
Remarks: Borehole dry and open on completion.					Key: T.D.T.D. Too Dense to Drive D Small disturbed sample J Jar sample B Bulk disturbed sample V Pilcon Vane (kPa) W Water sample M Mackintosh Probe					
Logged: AH	Checked: SE	Drawn by: JT			Scale: NTS			Weather:		

Borehole No: 2				Sheet: 1 of 1			Site: 52 Hulbert Road, Havant					
				Job No: 70662E								
Boring Method: Hand auger				Date: 23.10.09								
Diameter: 75mm		Coordinates:		Ground Level mOD:			Work Carried out for: Cunningham Lindsey					
Depth (m)	Description of Strata			Thick-ness (m)	Legend	Sample	Test Type Result		Depth (m)	Field Records/Comments		Depth to water (m)
0.90	As Trial Pit 1			0.90						Roots to 2mm diameter to 2.0m		
	1.20	Stiff, mid brown, orange, grey veined, silty CLAY with carbon flecks thinly laminated with orange silt and fine sand.			0.30	___x ___	D	V	100 112			1.00
2.80					x ___ 							

Our Ref : 70662

Location : 52, Hulbert Road, Havant

Work carried out for: Cunningham Lindsey

Laboratory Testing Results

Date Sampled : 23/10/2009

Date Received : 24/10/2009

Date Tested : 28/10/2009

Date of Report : 06/11/2009

Sample Ref		Type	Moisture Content (%) [1]	Soil Fraction > 0.425mm (%) [2]	Liquid Limit (%) [3]	Plastic Limit (%) [4]	Plasticity Index (%) [5]	Liquidity Index [5]	Modified Plasticity Index (%) [6]	Soil Class [7]	Filter Paper Contact Time (h) [8]	Soil Sample Suction (kPa)	In situ Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	pH Value [11]	Sulphate Content (g / l)		Class [14]
TP/BH No	Depth (m)															SO ₃ [12]	SO ₄ [13]	
1	0.57(U/S)	D	26	<5	72	23	48	0.06	48	CV	168	150	105					
	1.0	D	23	<5	70	19	52	0.09	52	CV	168	335	> 130					
	1.5	D	28	<5	76	24	52	0.07	52	CV	168	221	96					
	2.0	D	34	<5	71	23	48	0.24	48	CV	168	79	105					
	2.5	D	31	<5	75	25	50	0.12	50	CV	168	142	> 130					
	3.0	D	30	<5	75	22	53	0.15	53	CV	168	136	> 130					
	3.5	D	28	<5	71	20	51	0.17	51	CV	168	226	> 130					
	4.0	D	31	<5	74	23	50	0.15	50	CV	168	182	> 130					
	4.5	D	31	<5	73	20	53	0.20	53	CV	168	179	> 130					

Test Methods / Notes

[1] BS 1377 : Part 2 : 1990, Test No 3.2

[2] Estimated if <5%, otherwise measured

[3] BS 1377 : Part 2 : 1990, Test No 4.4

[4] BS 1377 : Part 2 : 1990, Test No 5.3

[5] BS 1377 : Part 2 : 1990, Test No 5.4

[6] BRE Digest 240 : 1993

[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils

[8] In-house method S9a adapted from BRE IP 4/93

[9] Values of shear strength were determined in situ by CET Safehouse using

a Pilcon hand vane or Geonor vane (GV).

[10] BS 1377 : Part 3 : 1990, Test No 4

[11] BS 1377 : Part 3 : 1990, Test No 9

[12] BS 1377 : Part 3 : 1990, Test No 5.6

[13] SO₄ = 1.2 x SO₃

[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO₄ content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D Disturbed sample (small)
B Disturbed sample (bulk)
U Undisturbed sample
W Groundwater sample
ENP Essentially Non-Plastic by inspection
U/S Underside of Foundation

Our Ref : 70662

Location : 52, Hulbert Road, Havant

Work carried out for: Cunningham Lindsey

Laboratory Testing Results

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Date Received : 24/10/2009

Date Tested : 28/10/2009

Date of Report : 06/11/2009

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TP/BH No	Depth (m)															SO3 [12]	SO4 [13]	

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[13] SO₄ = 1.2 x SO₃

[14] BRE Special Digest One (Concrete in Aggressive Ground) August 2001

Note that if the SO4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

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TP/BH No	Depth (m)															SO3 [12]	SO4 [13]	
2	0.80(U/S)	D	32	<5	76	26	50	0.12	50	CV	168	74	78					
	1.0	D	26	<5	79	21	57	0.08	57	CV	168	230	111					
	1.5	D	25	<5	73	20	53	0.09	53	CV	168	250	120					
	2.0	D	33	<5	72	28	44	0.12	44	CV	168	83	> 130					
	2.5	D	31	<5	69	27	42	0.12	42	CH	168	117	19					
	3.0	D	30	<5	73	21	52	0.16	52	CV	168	169	129					
	3.5	D	33	<5	74	26	48	0.14	48	CV	168	164	> 130					
	4.0	D	30	<5	75	26	49	0.08	49	CV	168	256	> 130					
	4.5	D	30	<5	72	24	47	0.11	47	CV	168	240	> 130					
	5.0	D	28	<5	73	27	47	0.03	47	CV	168	258	> 130					

Test Methods / Notes

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[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils

[8] In-house method S9a adapted from BRE IP 4/93

[9] Values of shear strength were determined in situ by CET Safehouse using a Pilcon hand vane or Geonor vane (GV).

[10] BS 1377 : Part 3 : 1990, Test No 4

[11] BS 1377 : Part 3 : 1990, Test No 9

[12] BS 1377 : Part 3 : 1990, Test No 5.6

[13] SO₄ = 1.2 x SO₃

[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO₄ content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

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TP/BH No	Depth (m)															so3 [12]	so4 [13]	

Test Methods / Notes

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TP/BH No	Depth (m)															SO3	SO4	
																[12]	[13]	
3																		

Test Methods / Notes

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[13] $SO_4 = 1.2 \times SO_3$
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Sample Ref		Type	Moisture Content (%) [1]	Soil Fraction > 0.425mm (%) [2]	Liquid Limit (%) [3]	Plastic Limit (%) [4]	Plasticity Index (%) [5]	Liquidity Index [5]	Modified Plasticity Index (%) [6]	Soil Class [7]	Filter Paper Contact Time (h) [8]	Soil Sample Suction (kPa)	In situ Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	pH Value [11]	Sulphate Content (g / l)		Class [14]
TP/BH No	Depth (m)															SO ₃ [12]	SO ₄ [13]	

Test Methods / Notes

[1] BS 1377 : Part 2 : 1990, Test No 3.2
[2] Estimated if <5%, otherwise measured
[3] BS 1377 : Part 2 : 1990, Test No 4.4
[4] BS 1377 : Part 2 : 1990, Test No 5.3
[5] BS 1377 : Part 2 : 1990, Test No 5.4
[6] BRE Digest 240 : 1993
[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils
[8] In-house method S9a adapted from BRE IP 4/93

[9] Values of shear strength were determined in situ by CET Group using a Pilcon hand vane or Geonor vane (GV).
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[11] BS 1377 : Part 3 : 1990, Test No 9
[12] BS 1377 : Part 3 : 1990, Test No 5.6
[13] SO₄ = 1.2 x SO₃
[14] BRE Special Digest One (Concrete in Aggressive Ground) August 2001

Note that if the SO₄ content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D Disturbed sample (small)
B Disturbed sample (bulk)
U Undisturbed sample
W Groundwater sample
ENP Essentially Non-Plastic by inspection
U/S Underside of Foundation

Our Ref : 70662
Location : 52, Hulbert Road, Havant
Work carried out for: Cunningham Lindsey

Laboratory Testing Results

Date Sampled : 23/10/2009
Date Received : 24/10/2009
Date Tested : 28/10/2009
Date of Report : 06/11/2009

Sample Ref		Type	Moisture Content (%) [1]	Soil Fraction > 0.425mm (%) [2]	Liquid Limit (%) [3]	Plastic Limit (%) [4]	Plasticity Index (%) [5]	Liquidity Index [5]	Modified Plasticity Index (%) [6]	Soil Class [7]	Filter Paper Contact Time (h) [8]	Soil Sample Suction (kPa)	In situ Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	pH Value [11]	Sulphate Content (g / l)		Class [14]
TP/BH No	Depth (m)															SO3	SO4	
																[12]	[13]	
4																		

Test Methods / Notes

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TP/BH No	Depth (m)															SO ₃ [12]	SO ₄ [13]	

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[2] Estimated if <5%, otherwise measured
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TP/BH No	Depth (m)															SO ₃ [12]	SO ₄ [13]	
5																		

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TP/BH No	Depth (m)															SO ₃ [12]	SO ₄ [13]	

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Laboratory Testing Results

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TP/BH No	Depth (m)															SO ₃ [12]	SO ₄ [13]	
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Key

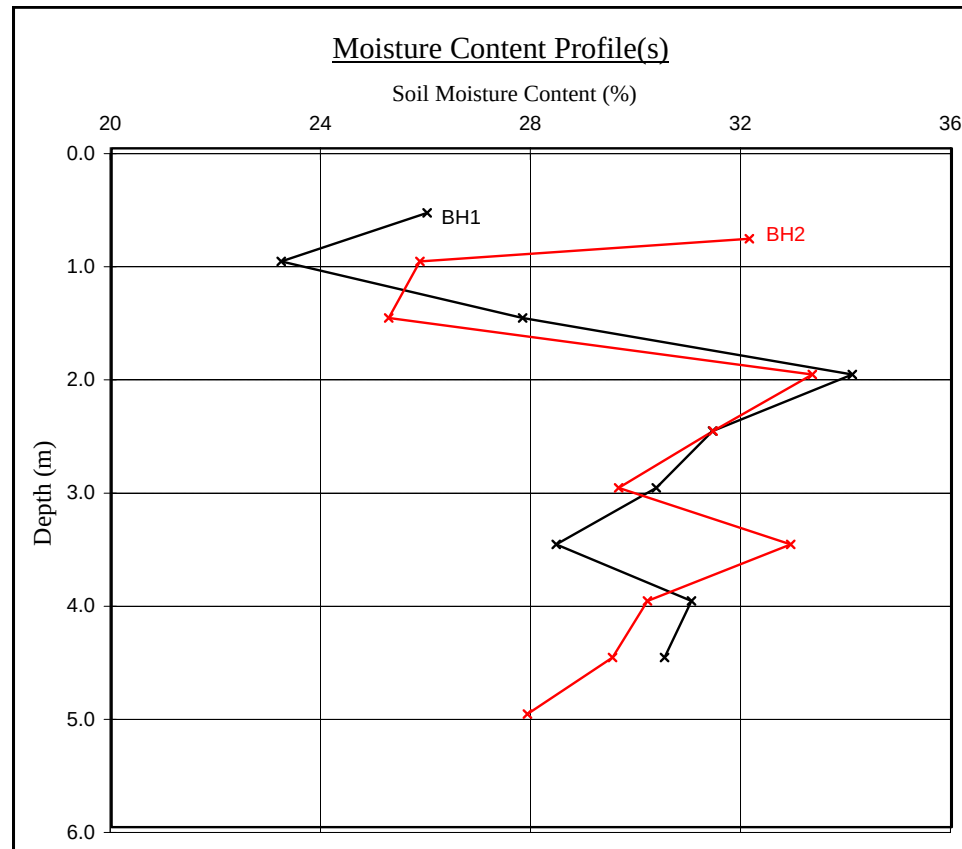
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Our Ref : 70662
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Moisture Content and Suction Profiles

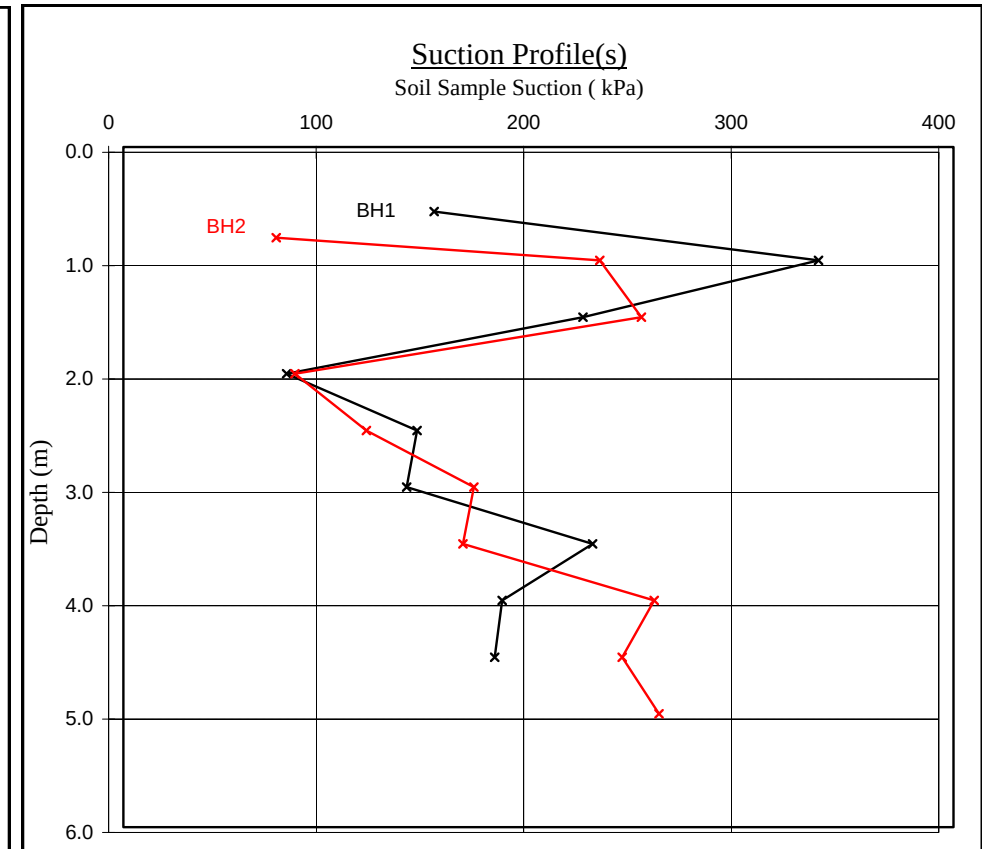
Date Sampled : 23/10/2009
 Date Received : 24/10/2009
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Note : Unless specifically noted the profiles have not been related to a site datum.



Note

If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly overconsolidated clays) at shallow depths.



Note

When shown, the theoretical equilibrium suction profiles are based on conventional assumptions associated with London Clay (and similarly overconsolidated clays) at shallow depths. Note that the sample disturbance component is dependant on the method of sampling and any subsequent recompaction. The above plots show this to be 100kPa which is the value suggested by the BRE on the basis of their limited number of tests on recompacted samples. This may or may not be appropriate in this instance and judgement should be exercised.

Our Ref : 70662

Location : 52, Hulbert Road, Havant

Work carried out for: Cunningham Lindsey

Moisture Content and Shear Strength Profiles

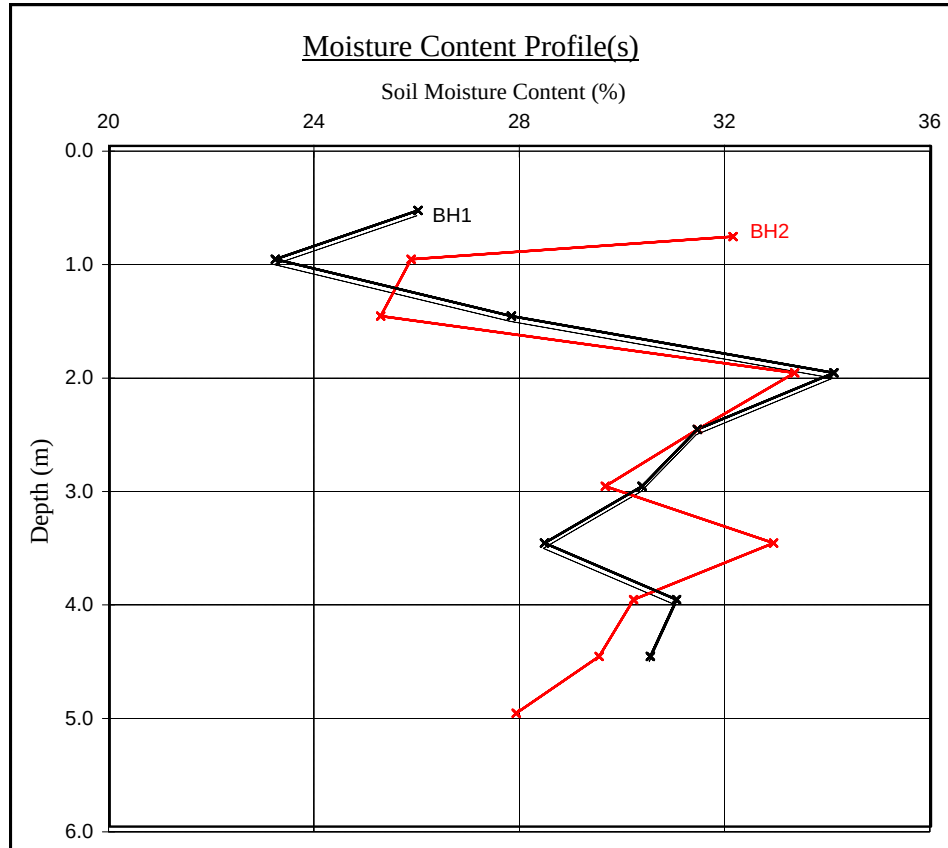
Date Sampled : 23/10/2009

Date Received : 24/10/2009

Date Tested : 28/10/2009

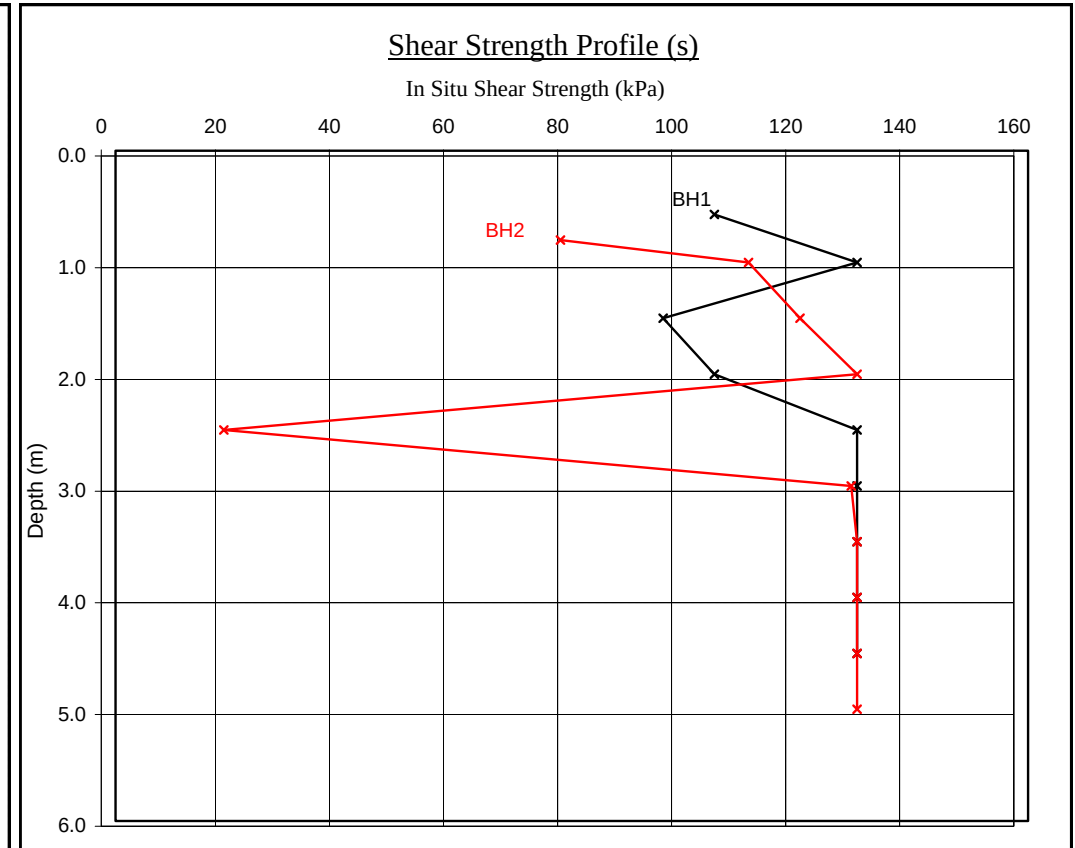
Date of Report : 06/11/2009

Note : Unless specifically noted the profiles have not been related to a site datum.



Note

If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly overconsolidated clays) at shallow depths.



Note

Unless otherwise stated, values of Shear Strength were determined in situ by CET Safehouse using a Pilcon Hand Vane the calibration of which is limited to a maximum reading of 150 kPa.

Tree Root Identification Ltd

Sheet: 1 of 1

Job No: 70662
Date: 27/10/2009
Order No: 275359/E3
Our Ref: CET271009a

Site: 52 Hulbert Road,
Hants, PO9 3TF.
Work carried
out for: Cunningham Lindsey.

Certificate of Analysis

The following work was commissioned by CET Safehouse Limited on behalf of their client. Root samples were obtained in sealed packets from the above site with no reference given as to the types of tree or shrub from which they may have originated.

The results were as follows -

<u>Trial pit/ Borehole number</u>	<u>Root diameter (mm)</u>	<u>Tree, shrub or climber from which root originates</u>	<u>Result of starch test#</u>
TP1 (underside)	1.0	a member of the group Pomoideae* (2 roots)	positive
BH1 (depth: 2.0m)	thread-like	too immature to analyse (1 root)	—
TP2 (underside)	0.5	<u>Salix</u> (willow) or <u>Populus</u> (poplar)** (1 root)	positive
BH2 (depth: 2.0m)	0.5-1.0	<u>Salix</u> (willow) or <u>Populus</u> (poplar)** (1 root)	positive

The presence of starch indicates that the root was alive in the recent past.

* Tree members of the Pomoideae include apple (Malus), pear (Pyrus), hawthorn (Crataegus), rowan and whitebeam (both Sorbus). A number of shrubs also belong to this group including quince (Cydonia), Cotoneaster and Pyracantha.

** Roots of willows and poplars are indistinguishable.



DR RONALD D MACLEOD
Principal Scientist

Address for correspondence: 3 Langley Drive, Kinnoull Hill, Perth, PH2 7XA.

Telephone: 01738 630873

e-mail: rdmmacleod@btconnect.com

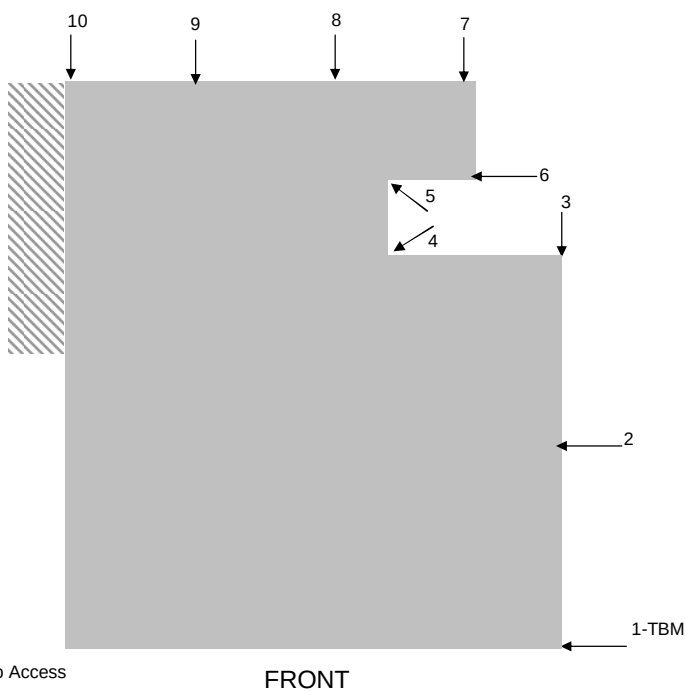
Principal Scientist: R.D. MacLeod, B.Sc., Ph.D.,

Accounts/Quality Manager: Fiona M. Sinclair, H.N.C. (Management)

Registered in Scotland, No. 358068. Registered Office: "Mandaya", Highfield Place, Bankfoot, PH1 4AX.

Provider Details			Client Details			Risk Address			
Name:	CETSafehouse		Insurance Co.: Client Name: Technical Mgr: Email: Client Ref: Address: Address: Town: County: Post Code: Tel Day: Tel Eve: Mobile: Other: Other:	Cunningham Lindsey		Occupier:	52 Hulbert Road		
Our Ref:	00/23785			Mark Hatchett		Address:			
Date of Issue:	11/9/10			pmssolent@cl-uk.com		Town:	Havant		
				3341081		County:	Hants		
				1460 Solent Business Park		Post Code:	PO9 3TF		
Monitoring Details			Address: Town: County: Post Code: Other Email:	Whiteley					
Instruction Date:	07/10/09			Fareham					
First Reading Date:	28/10/09			Hants					
Maximum No Visits:	TBC			PO15 7AF					
Anticipated Expiry Date:	TBC			Mark.Hatchett@cl-uk.com					
Monitoring Int (Wks):	4								

Target Date:				25/11/09				20/3/10							
Reading Date:				28/10/09	21/11/09	21/12/09	18/1/10	20/2/10	22/3/10	22/4/10	25/5/10	29/6/10	2/8/10	6/9/10	
Issue Date:				2/11/09	30/11/09	3/1/10	27/1/10	28/2/10	28/3/10	28/4/10	3/6/10	7/7/10	6/8/10	11/9/10	
Row No.	Point Name	X Co-ordinate	Y Co-ordinate	1	2	3	4	5	6	7	8	9	10	11	12
1		0.00	0.00												
2	1-TBM	7.00	0.00	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	
3	2	7.00	3.50	9.8962	9.8984	9.8992	9.8992	9.8980	9.8978	9.8987	9.8982	9.8983	9.8942	9.8979	
4	3	7.00	5.50	9.9063	9.9111	9.9124	9.9133	9.9121	9.9104	9.9114	9.9106	9.9115	9.9071	9.9102	
5	4	4.50	5.50	10.2123	10.2160	10.2168	10.2178	10.2158	10.2146	10.2166	10.2160	10.2164	10.2116	10.2156	
6	5	4.50	6.75	10.1276	10.1317	10.1328	10.1332	10.1319	10.1310	10.1320	10.1312	10.1324	10.1268	10.1307	
7	6	5.50	6.75	10.0310	10.0345	10.0360	10.0364	10.0347	10.0337	10.0347	10.0342	10.0352	10.0301	10.0344	
8	7	5.50	7.75	10.0107	10.0149	10.0157	10.0167	10.0157	10.0128	10.0146	10.0138	10.0140	10.0078	10.0140	
9	8	3.50	7.75	10.1139	10.1192	10.1197	10.1198	10.1193	10.1173	10.1189	10.1181	10.1185	10.1112	10.1182	
10	9	0.85	7.75	10.1984	10.2024	10.2028	10.2030	10.2025	10.2000	10.2011	10.2015	10.1958	10.2014		
11	10	0.00	7.75	10.1071	10.1108	10.1157	10.1107	10.1105	10.1087	10.1100	10.1091	10.1089	10.1055	10.1092	
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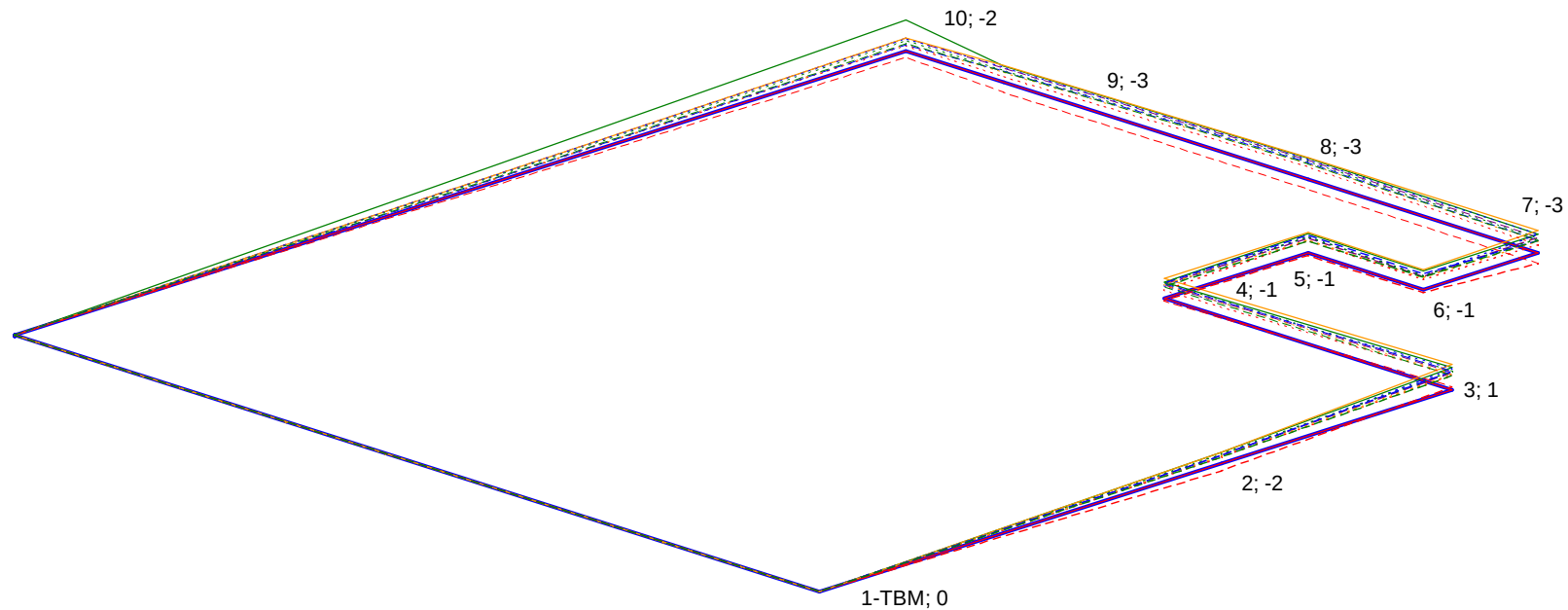
Sketch Plan

Comments

- Not same brick course
- 14/09/2010 Probable datum error occurred on 2/8/10. See other file for corrected results.
-
-

Client: Cunningham Lindsey

Client Ref: 3341081

CETSafehouse Ref: 00/23785



— Datum Reading	— Reading 1 (28/10/09)	- - - Reading 2 (21/11/09)	— Reading 3 (21/12/09)	— Reading 4 (18/1/10)
⋯ Reading 5 (20/2/10)	⋯ Reading 6 (22/3/10)	⋯ Reading 7 (22/4/10)	⋯ Reading 8 (25/5/10)	- - - Reading 9 (29/6/10)
- - - Reading 10 (2/8/10)	- - - Reading 11 (6/9/10)	- - - Reading 12 (0/1/00)		

Notes:

Vertical distorted scale 1: 50

Chart is displaying Subsidence

Point labels give level difference of last reading from original datum in mm.

