TECHNICAL REPORT ON A SUBSIDENCE CLAIM

Crawford Reference: SU2004772

Dulwich College
The Orchard
Dulwich
London
SE21 7EW

Prepared for

Zurich - Commercial

Claim Reference 25200054930

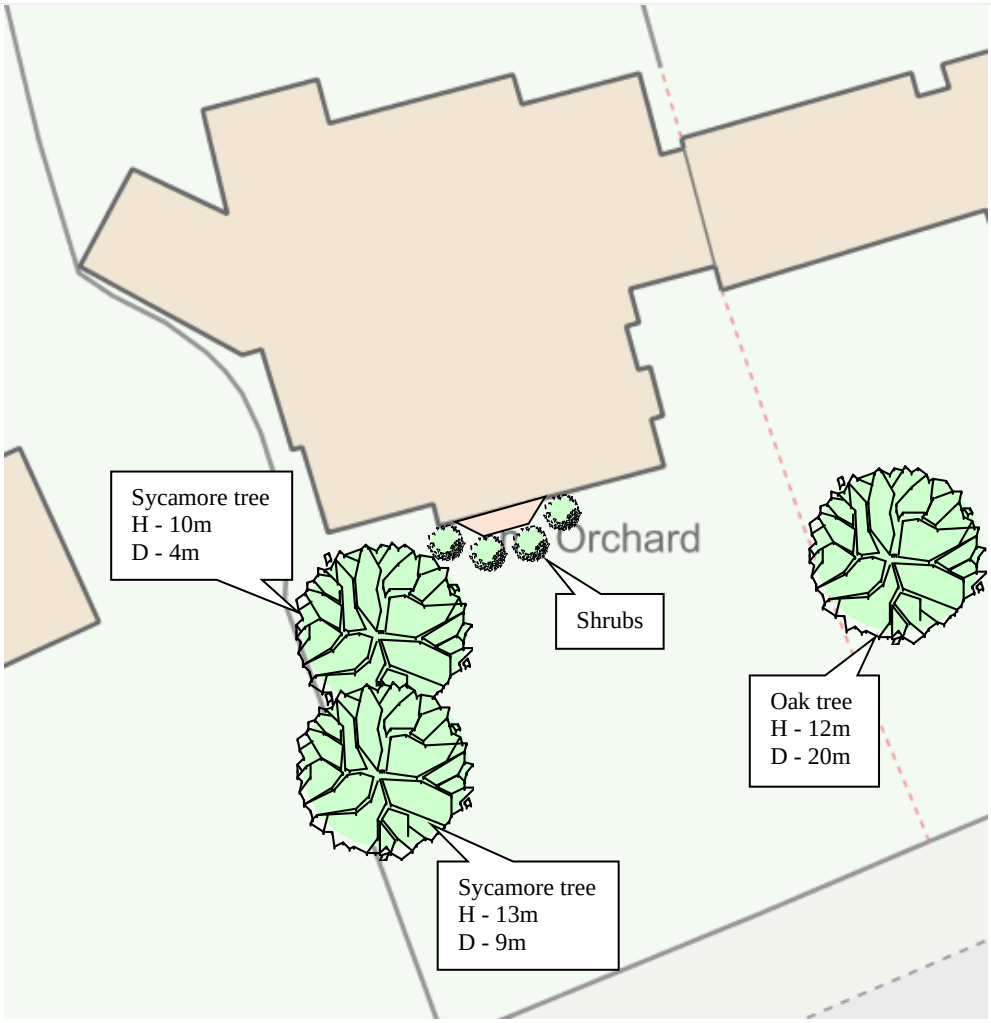
SUBSIDENCE CLAIM

20 October 2020

Crawford Claims Solutions – Subsidence
Cartwright House, Tottle Road
Riverside Business Park
Nottingham, NG2 1RT
Tel: 0115 943 8203
Fax: 0121 200 0309

Site Plan	This plan is Not to Scale

This plan is diagrammatic only and has been prepared to illustrate the general position of the property and its relationship to nearby trees etc. The boundaries are not accurate, and do not infer or confer any rights of ownership or right of way. Position of utilities is only indicative and contractors must satisfy themselves regarding actual location before commencing works.



Key:

	Tree: Deciduous		Tree: Conifer		Shrub
	Hedge		Area of Damage		Bore Hole
	Trial Hole		Trial & Bore Hole		Level Monitoring
	Rain Water Manhole		Rain Water Gulley		Rain Water Pipe
	Waste Water Manhole		Waste Water Gulley		Toilet Pipe
	Rain Water Drain		Waste Water Drain		Electricity Cable
	Water Supply Pipe		Gas Supply Pipe		Incoming Gas Pipe
	Incoming Water		Incoming Electrics		

INTRODUCTION

We have been asked by Zurich - Commercial to comment on movement that has taken place to the above property. We are required to briefly describe the damage, establish a likely cause and list any remedial measures that may be needed.

Our report should not be used in the same way as a pre-purchase survey. It has been prepared specifically in connection with the present insurance claim and should not be relied on as a statement of structural adequacy. It does not deal with the general condition of the building, decorations, timber rot or infestation etc.

The report is made on behalf of Crawford & Company and by receiving the report and acting on it, the client - or any third party relying on it - accepts that no individual is personally liable in contract, tort or breach of Statutory duty. Where works address repairs **that are not covered** by the insurance policy we recommend that you seek professional advice on the repair methodology and whether the works will involve the Construction (Design & Management) Regulations 2015. Compliance with these Regulations is compulsory; failure to do so may result in prosecution. We have not taken account of the regulations and you must take appropriate advice.

We have not commented on any part of the building that is covered or inaccessible.

TECHNICAL CIRCUMSTANCES

The occupants of the dwelling noticed cracking appearing which then got significantly worse over the summer months. The college were notified and insurers contacted for further investigation.

PROPERTY

The property is a three storey multi-occupied detached dwelling of traditional construction with brick walls surmounted by a hipped, slated roof. There is a two storey historic extension to the left side which offers accommodation for the students and a more recent/modern single storey structure to the right side which links to another accommodation dwelling.

HISTORY & TIMESCALE

We will proceed to instruct an arborist to comment on the surrounding vegetation.

Date of Construction	TBC
Purchased	Not known
Policy Inception Date	31/07/2009
Damage First Noticed	16/09/2020
Claim Notified to Insurer	29/09/2020
Date of our Inspection	14/10/2020
Issue of Report	20/10/2020
Anticipated Completion of Claim	Spring 2021

TOPOGRAPHY

The property occupies a reasonably level site with no unusual or adverse topographic features.

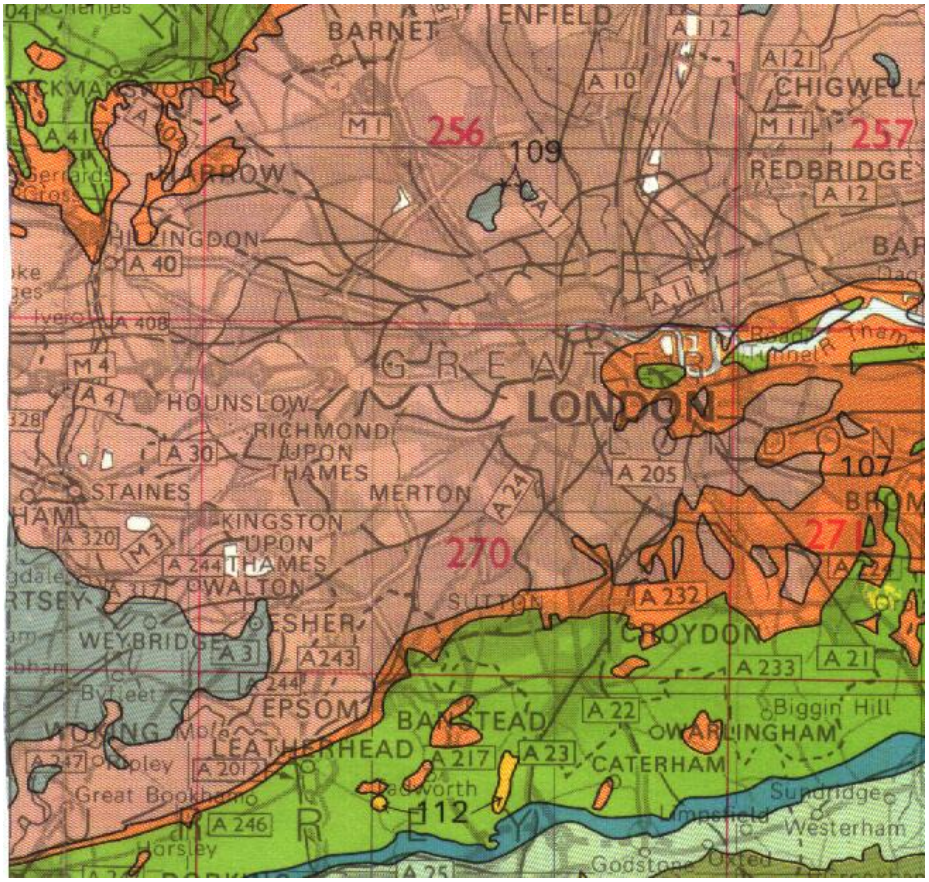
GEOLOGY

Reference to the 1:625,000 scale British Geological Survey Map (solid edition) OS Tile number TQNW suggests the underlying geology to be London Clay.

London Clays are marine deposits characterised by their silty, sandy composition. They are typically stiff, dark or bluish grey, weathered dark to mid-brown superficially with fine particle size (less than 0.002mm). Tomlinson[1] describes it as a 'fat' clay with high loadbearing characteristics due to pre-consolidation pressures in its geological history.

The upper horizon is often encountered at shallow depth, sometimes just below ground level. They have high shrink/swell potentials[2],[3] and can be troublesome in the presence of vegetation.

The solid geology appears to outcrop in this location, although we cannot rule out the presence of superficial deposits at shallow depth.



Geology. Reproduced with consent of The British Geological Survey at Keyworth.
Licence IPR/34-7C CSL British Geological Survey. ©NERC. All rights Reserved.

[1] Tomlinson M.J. (1991) *"Foundations Design & Construction"* Longman Scientific Publishing.
[1] B.S. 5930 (1981) *"Site Investigations"*
[2] DriscollL R. (1983) *"Influence of Vegetation on Clays"* Geotechnique. Vol 33.
[3] Table 1, Chapter 4.2, Para. 2.3 of N.H.B.C. Standards, 1986.

VEGETATION

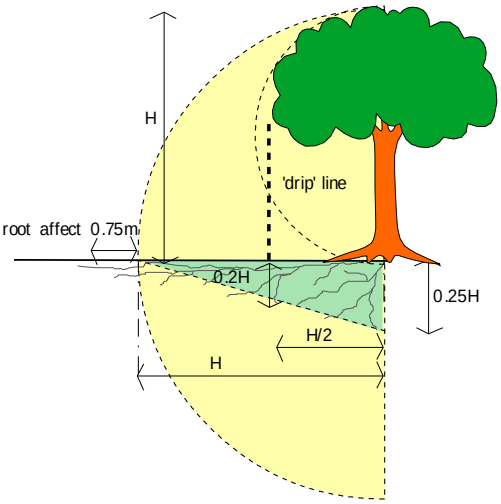
There are several trees and shrubs nearby, some with roots that may extend beneath the house foundations. The following are of particular interest:-

Type	Height	Distance	Ownership
Sycamore	10 m	4 m	Owners
Sycamore	13 m	9 m	Owners
Holly	5 m	5 m	Owners
Oak	12 m	20 m	Owners

See sketch. Tree roots can be troublesome in cohesive (clay) soils because they can induce volumetric change. They are rarely troublesome in non-cohesive soils (sands and gravels etc.) other than when they enter drains, in which case blockages can ensue.

Sycamores (Acer) are deciduous and can reach heights between 20-30m depending on health, environment and soil conditions. They have a fast growth rate of around 600mm per year and medium root activity[4].

The Sycamore is a hardy tree, and can withstand quite aggressive environments. Maximum tree-to-damage distance recorded in the Kew survey was 20mtrs, with 50% of cases occurring within 6mtrs[5]. They are deep rooting on clay soils and have a life expectancy > 100 years.

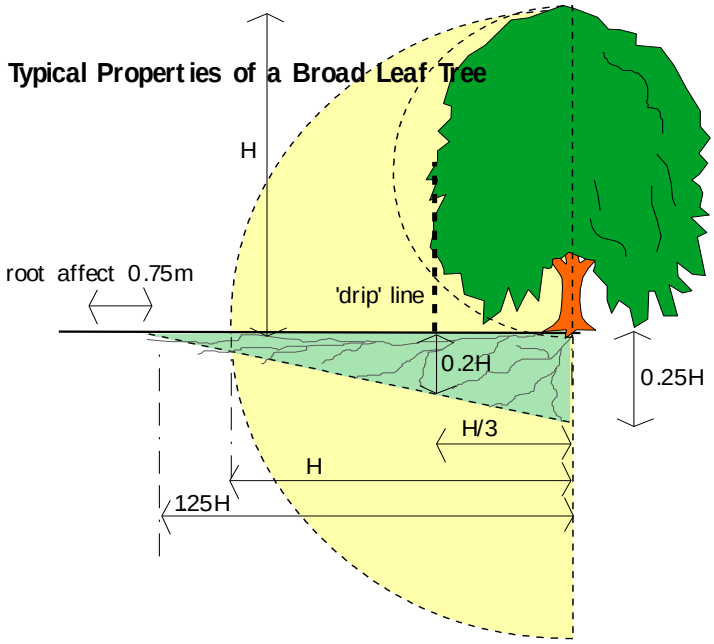


They can usually tolerate quite heavy pruning or crown thinning, although this can create large wounds which decay rapidly.

Holly (*Ilex)* is an evergreen that reaches a height of up to 20mtrs or so with a slow growth rate and weak root activity.

[4] Richardson & Gale (1994) "*Tree Recognition*" Richardson's Botanical Identifications
[5] Cutler & Richardson (1991) *"Tree Roots & Buildings"* Longman Scientific

Oak trees (Quercus) are deciduous and native to Europe. They can reach heights in excess of 35m, but more typically grow to between 18 - 25m, depending on health, environment and soil conditions. They have a medium growth rate of around 250mm per year and strong root activity[6].



Typical proportions of an Oak showing the potential root zone. They have by far the most aggressive of root systems, often spreading considerable distances (1.5 x height or more).

Maximum tree-to-damage distance recorded in the Kew survey was 30mtrs, with 50% of all cases occurring within 9.5mtrs[7]. Life expectancy > 100 years, although they are vulnerable to insect and fungal attack. Old and young trees are tolerant of quite heavy pruning and crown reduction, although re-growth can be an ongoing problem.

Oaks are, in my experience, worthy of considerable respect when dealing with subsidence claims. Their root system extends for surprising distances and can be associated with particularly high soil suctions.

Because of difficulties in controlling the oak, and its vigorous root system, I regard it as being far more significant (in terms of a subsidence league table) than either the willow or poplar tree.

[6] Richardson & Gale (1994) "*Tree Recognition*" Richardson's Botanical Identifications
[7] Cutler & Richardson (1991) *"Tree Roots & Buildings"* Longman Scientific

OBSERVATIONS

The damage affects the front bay and adjacent internal walls.

The following is an abbreviated description. Photographs accompanying this report illustrate the nature and extent of the problem.

INTERNAL

Front bedroom

Lounge (front)

Kitchen (GF front)

Cracking along top of windows <2mm width.
Cracking generally to wall above lounge door, extending onto cornice <1mm width.

Lounge (GF front)

Cracking to ceiling across bay <1mm width.
Cracking generally to wall and ceiling above kitchen door <1mm width.
Vertical cracking to wall where bay meets front elevation <1mm width.

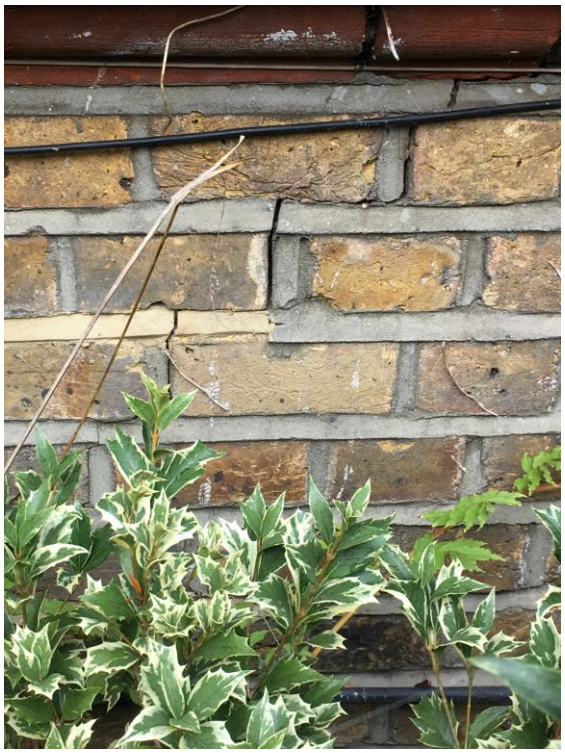
Middle bedroom (FF front)

Diagonal cracking at high level to partition wall near window, extending onto cornice <5mm width.
Crack at junction of wall and window frame <2mm width.
Cracking at low level to partition wall near window <1mm width.
Cracking to ceiling generally <1mm width.

Room 16 (FF front)

Cracking at high level to partition wall near window, extending onto cornice <5mm width.
Crack to cornice above windows <3mm width.
Cracking at junction of wall and middle window <1mm width.

EXTERNAL



Bay brickwork

Bay brickwork

Front elevation

Sloping stone cills to bay window.
Bowing/leaning brickwork pillars to RHS of bay window.
Missing mortar to brick arch over RHS window in bay.
Stepped cracking to brickwork at centre of bay window <3mm width.
Missing mortar fillets to bay window.
Cracked brickwork top LHS of front bedroom window <4mm width.

CATEGORY

In structural terms the damage falls into Category 2 of Table 1, Building Research Establishment[8] Digest 251, which describes it as “slight”.

Category 0	"negligible"	< 0.1mm
Category 1	"very slight"	0.1 - 1mm
Category 2	"slight"	>1 but < 5mm
Category 3	"moderate"	>5 but < 15mm
Category 4	"severe"	>15 but < 25mm
Category 5	"very severe"	>25 mm

Extract from Table 1, B.R.E. Digest 251
Classification of damage based on crack widths.

DISCUSSION

The pattern and nature of the cracks is indicative of an episode of subsidence. The cause of movement appears to be clay shrinkage.

[8] Building Research Establishment, Garston, Watford. Tel: 01923.674040

The timing of the event, the presence of shrinkable clay beneath the foundations and the proximity of vegetation where there is damage indicates the shrinkage to be root induced. This is a commonly encountered problem and probably accounts for around 70% of subsidence claims notified to insurers.

Fortunately, the cause of the problem (dehydration) is reversible. Clay soils will re-hydrate in the winter months, causing the clays to swell and the cracks to close. Provided the cause of movement is dealt with (in this case, vegetation) there should not be a recurrence of movement.

No structural changes to the building have been carried out which has contributed to the current subsidence related damage under investigation. Furthermore we are not aware of any previous underpinning.

RECOMMENDATIONS

The cause of the movement needs to be dealt with first. We have completed a Soil Risk Analysis (VISCAT Assessment) and we are satisfied that your sycamore trees can be removed.

We will obtain a quotation for the recommended tree works and undertake statutory checks for Preservation Orders or whether the trees are in a Conservation Area.

Provided the tree management works are completed expeditiously, consideration may then be given to carrying out the appropriate repairs to the property.

David Knight BSc (Hons) MRICS
Crawford Claims Solutions – Subsidence
Tel: 0115 943 8260
subsidence@crawco.co.uk

PHOTOGRAPHS

Affected front bay structure

Missing mortar to brick arch

Kitchen (lounge doorway)

Adjoining student accommodation