TECHNICAL REPORT ON A SUBSIDENCE CLAIM

Crawford Reference: S[redacted]

31 Inglewood Road
London
NW6 1QT

Prepared for

[redacted]

SUBSIDENCE CLAIM

DATE 9th November 2018

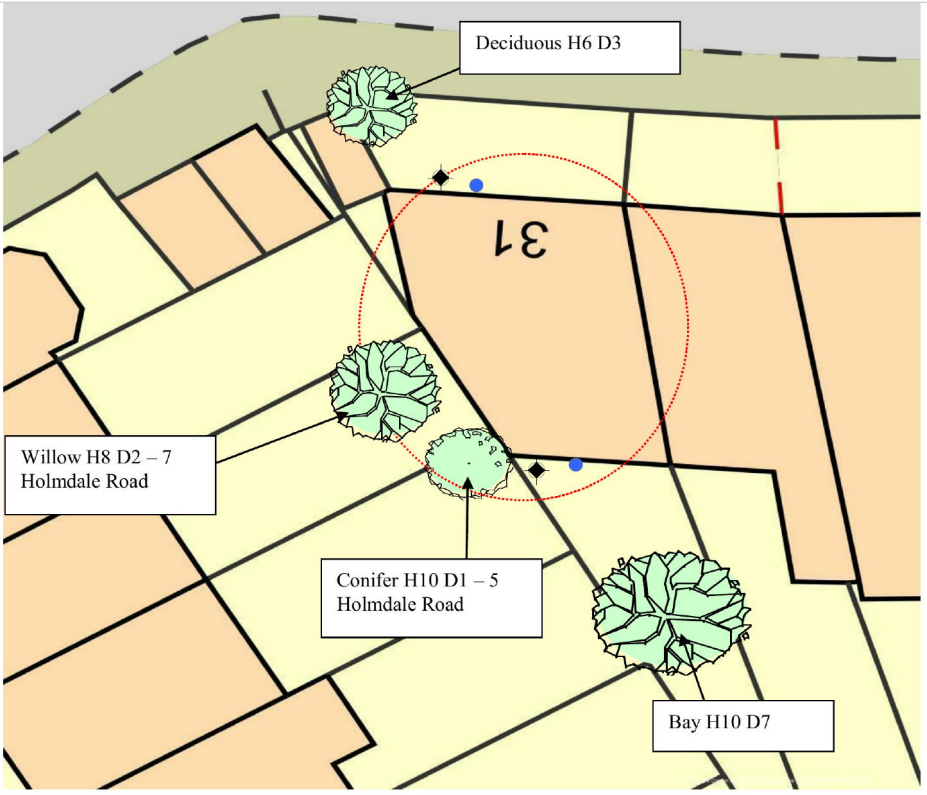
Crawford®
Subsidence Division

[redacted]

[redacted]

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		

[redacted]

INTRODUCTION

We have been asked by Allianz 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 cracking was noted around July / August 2018. The tenant of flat B notified their managing agent of the cracking and they sent someone round to inspect the damage. Cracking was then noted in the other flats. Insurers were subsequently notified.

PROPERTY

The risk address is a three storey end-terrace property of traditional construction with brick walls surmounted by a ridged slated roof. The property has been converted into three, self-contained flats.

HISTORY & TIMESCALE

As the property is located in a conservation area, site investigations are being organised and crack monitoring has been established. We have written to the third parties regarding their trees.

Date of Construction	Circa 1896
Purchased	Various
Policy Inception Date	23/07/2017
Damage First Noticed	July 2018
Claim Notified to Insurer	10/09/2018
Date of our Inspection	01/11/2018
Issue of Report	09/11/2018
Anticipated Completion of Claim	June 2020

TOPOGRAPHY

The property occupies a site slightly sloping from the left down to the right.

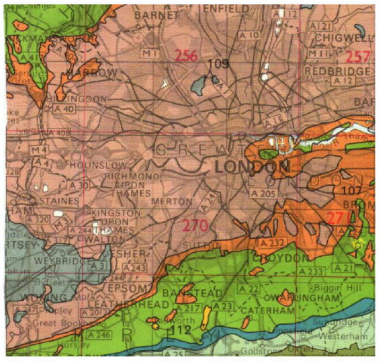
GEOLOGY

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.
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VEGETATION

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

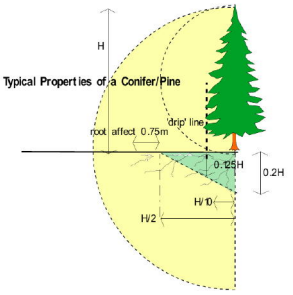
Type	Height	Distance	Ownership
Bay	10 m	7 m	Owners
Conifers	10 m	1 m	Neighbour 4
Willow	8 m	2 m	Neighbour 5
Deciduous	6 m	3 m	Owners

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.

[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.

The Bay (Laurus) is an evergreen that can reach heights of between 10 – 14mtrs. It's a slow growing tree (150mm p.a.) with weak root activity.

Conifers ~ The term is usually used to refer to cypresses and close relatives, but in the broader sense includes any trees that bear cones and nearly all of them have simple needle or scale like leaves, sometimes arranged into fronds as in the cypresses.

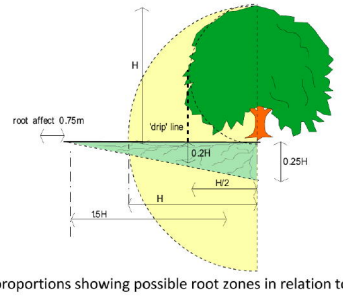


Typical tree proportions showing the root zone. This is a conservative estimate, as the zone can equal the height of the tree.

Generally they have less invasive roots and lower water demands than broadleaved species, but cypresses are often associated with subsidence as they are very fast growing, popular hedge plants that are frequently planted near houses.

Willows (Salix) are deciduous and can reach heights in excess of 25m depending on health, environment and soil conditions. They have a fast growth rate of around 500mm per year and strong root activity[4].

Maximum tree-to-damage distance recorded in the Kew survey was 40mtrs, with 50% of all cases occurring within 7mtrs[5]. They root moderately deeply in clay soils and have a life expectancy of between 50 and 100 years.

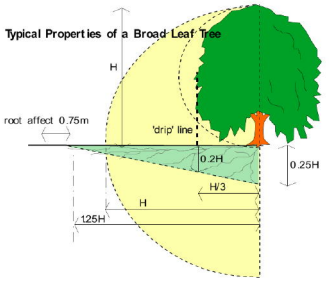


Typical proportions showing possible root zones in relation to height.

Both old and young trees are tolerant of quite heavy pruning and crown thinning.

Broadleaf trees typically have wider spreading roots and higher water demands than coniferous species and many are better adapted to growing on heavy clay soils. Some are capable of sprouting from cut stumps or bare wood and most will tolerate pruning better than conifers.

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



Typical proportions of a broadleaf tree. Note the potential root zone. It must be noted that every tree is different, and the root zone will vary with soil type, health of the tree and climatic conditions.

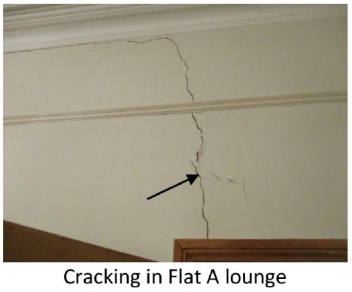
However heavy pruning of any tree should be avoided if possible, as it stimulates the formation of dense masses of weakly attached new branches which can become dangerous if not re-cut periodically to keep their weight down.

OBSERVATIONS

The damage noted throughout the property is the focal point of the Insured's concerns.

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

INTERNAL



Cracking in Flat A lounge

Cracking in Flat A kitchen

Flat A - Lounge - 6mm vertical tapering crack above door to hall continues along wall / ceiling junction on piano room partition, various cracks to ceiling and coving, 3mm vertical crack down front bedroom partition junction, French doors are sticking however significant historic distortions noted to frame.

Hallway - 4mm diagonal tapering crack to kitchen partition, 2mm vertical crack above door to lounge, various cracks to ceiling.

Front Bedroom - Cracking to coving along left hand party wall, 3mm diagonal crack above left hand side of bay, cracking to ceiling in bay, 3mm vertical crack down front right hand corner junction.

Kitchen - 4mm diagonal crack to hall partition, 3mm vertical tapering crack down left hand side of flank window frame.

[redacted]

Bathroom - Works in progress to raise ceiling, hairline vertical crack noted to left hand wall.

Piano Room - 1mm vertical crack above door to kitchen, cracking to ceiling.

Flat B - Rear Left Hand Bedroom - 3mm diagonal crack above door to hall continues along wall / ceiling junction on rear bedroom partition, 2mm diagonal crack above left hand side of rear window, 2mm vertical crack down front left hand corner junction.

Rear Right Hand Bedroom - Movement down right hand side of window frame, cracking to coving, hairline vertical crack above alcove.

Hall - 2mm vertical crack above rear left hand bedroom door, cracking to ceiling and coving.

Kitchen - 2mm diagonal crack to bedroom partition.

Bathroom - 1mm diagonal crack above flank window, various cracks to ceiling.

Lounge - Mirrored 2mm vertical crack down rear left hand corner junction.

Bathroom - Hairline vertical crack to rear partition.

Flat C - Lounge - 2mm diagonal crack above door to hall, door is sticking, cracking to ceiling, hairline diagonal cracking to rear bedroom partition towards rear, 1mm vertical cracking below both sides of rear window, 5mm gap in skirting in rear right hand corner.

Hall - 1mm diagonal crack above lounge door.

Rear Bedroom - 1mm vertical crack below left hand side of window, cracking to ceiling on dormer.

Kitchen - Hairline vertical crack above window, 1mm crack in head of window reveal.

Front Bedroom - Cracking to ceiling.

Communal Hallway - 1mm diagonal crack to right hand partition by front door, cracking to coving and ceiling.

[redacted]

EXTERNAL

Cracking to rear elevation

Cracking to rear bay

Rear Elevation - 3mm vertical cracking below both sides of piano room window, 5mm vertical cracking above both sides of piano room window, 10mm separation down side of French door frame, 4mm vertical crack to right hand side of bay, slabs have dropped around left hand corner.

Porch - 5mm vertical tapering crack at high level above right hand side of front door, 1mm crack in lintel to porch.

Front Elevation - 1mm vertical crack below left hand side of ground floor bathroom window.

CATEGORY

In structural terms the damage falls into Category 3 of Table 1, Building Research Establishment[6] Digest 251, which describes it as "**moderate**".

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.

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.

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

[redacted]

RECOMMENDATIONS

Although the cause of the movement needs to be dealt with, we note that the property is located within a conservation area. Unfortunately, certain investigations will need to be carried out to demonstrate the influence of the vegetation.

Typically, these investigations would involve trial pit(s) to determine the depth and type of footings, boreholes to determine the nature of the subsoil/influence of any roots and monitoring to establish the rate and pattern of movement. It may also be necessary to obtain a specialist Arboricultural Report.

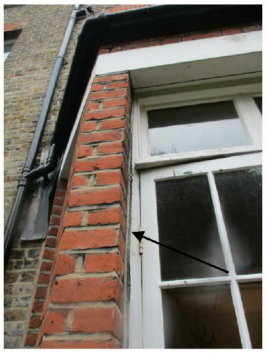
We will report further once these investigations have been completed.

Matt Deller BSc (Hons) MCIOB Dip CII
Subsidence Division
[redacted]

9th November 2018

PHOTOGRAPHS

Cracking in Flat A hall

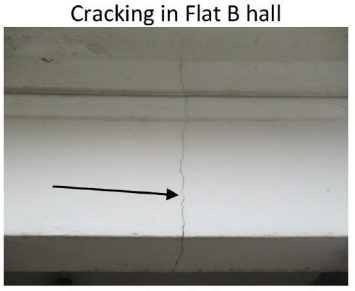


Movement to rear bay

Cracking in Flat B rear left hand bedroom

Cracking in Flat B hall

Cracking in Flat C lounge



Cracking to lintel above porch

View of insured's bay tree to rear

View of third party conifer to rear

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