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TECHNICAL REPORT ON A SUBSIDENCE CLAIM

Crawford Reference: SU1903746
B A Williams Chemist Ltd
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Uxbridge, Middlesex, UB10 8AE

Prepared for
Allianz Commercial
Email to: propertyclaims@allianz.co.uk

Claim Reference BH/2/CW/103504

SUBSIDENCE CLAIM
20th September 2019

Subsidence Division
Cartwright House, Tottle Road,
Riverside Business Park, Nottingham, NG2 1RT
Tel: 0115 943 5273
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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.

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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	

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

We understand that the damage was noted recently when an inspection was introduced prior to occupation by the new tenant.

PROPERTY

The subject property comprises of a two storey detached house of traditional construction with brick with timber cladding walls surmounted by a pitched tiled roof. The property also benefits from an attached double length garage.

HISTORY & TIMESCALE

Site investigations are being organised

Date of Construction	1985
Purchased	1985
Policy Inception Date	24/01/2019
Damage First Noticed	08 August 2019
Claim Notified to Insurer	02/09/2019
Date of our Inspection	18/09/2019
Issue of Report	20/09/2019

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 British Geological Survey map indicates that he superficial deposits are thought to be Sand and Gravel.

Sand is a detrital sedimentary rock (arenaceous - sandy) with a grain size in the range of 0.06 - 2mm in diameter. Individual [particles are mainly mineral fragments, and quart grains predominate[4]. Gravels on the other hand have particles in the range of 2 - 60mm in diameter. Above this, in size, are cobbles (60 - 200mm diameter) and boulders (200mm in dia. and above).

Generally a good bearing medium, but finer grained soils can suffer erosion in flowing water, and liquify when under the water table (quicksand). They can also be troublesome in earthquakes at shallow depth, and when loosely compacted.

Sands and gravels are termed non-cohesive soils, and apart from the above problems, tend to be stable. They do not suffer the shrink/swell problems of cohesive (clay) soils, and plants and trees are rarely troublesome when near to a property - apart from root infiltration to drains and services.

Whilst the survey map indicates a sand subsoil we anticipate the presence of clay will be found.

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

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[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.
[4] B.S. 5930 (1981) *"Site Investigations"*

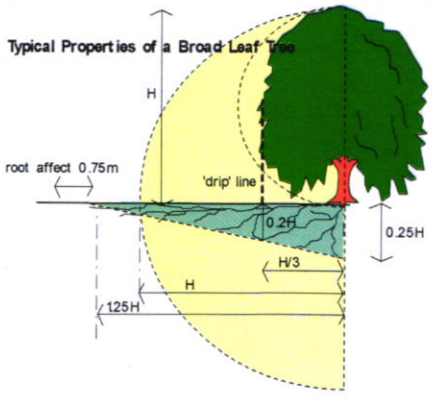
VEGETATION

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
Oak	14 m	9 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.

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[5].



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[6]. 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.

OBSERVATIONS

The focal point of concern is the garage

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

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

INTERNAL

Fracturing to garage slab

Distortion to brickwork

To the rear of the garage there is a 24 mm fracture within the slab spanning from left to right. Further, the slab drops notably to the rear right corner. The remaining areas of the slab are relatively level albeit there is a 5 mm fracture adjacent to the door.

In terms of the structure, a spirit level assessment confirmed notable downward movement to the rear right corner with movement of 20mm over 1.8 m being recorded.

Movement has occurred adjacent to the access door resulting in high-level fracturing up to 20 mm in width. The frame of the door has displaced from the reveal resulting in a tapered vertical separation gap.

EXTERNAL

30mm gap between door and frame

Lateral displacement of lower section of brickwork

The rear right corner has displaced at low-level resulting in lateral displacement in relation to the upper section of masonry. The lower section of brickwork now protrudes by 20mm. There is a stepped diagonal crack on the rear which is up to 2 mm in width and minor cracking on the damp proof course to the rear left

On the right-hand flank there is a stepped crack up to 6mm width. This is present from circa 1 m above ground continuing down through the DPC course. The brickwork has also rotated to the right-hand side resulting in this protruding from the front section of garage by 7 mm. There is 15 mm cracking on the side of the access door and the frame has displaced by circa 30 mil in this location

The patio slabs have dropped in relation to the section adjacent to the property and this has caused 20 mm gap to occur.

The boundary wall is leaning into the garden and there is clearly historic movement in this location. The cracking would appear to be related to the lateral movement in preference to vertical downward movement. Further, we understand the cracking in this location is present for extended period.

CATEGORY

In structural terms the damage falls into Category 5 of Table 1, Building Research Establishment[7] Digest 251, which describes it as "very severe".

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.

RECOMMENDATIONS

Although the cause of the movement needs to be dealt with first, we have completed a soil risk analysis (VISCAT Assessment) which suggests a potential heave risk should the vegetation be removed. We are therefore arranging site investigations to quantify this risk in relation to the specific soil type at the property.

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

PHOTOGRAPHS

Oak tree in proximity to garage