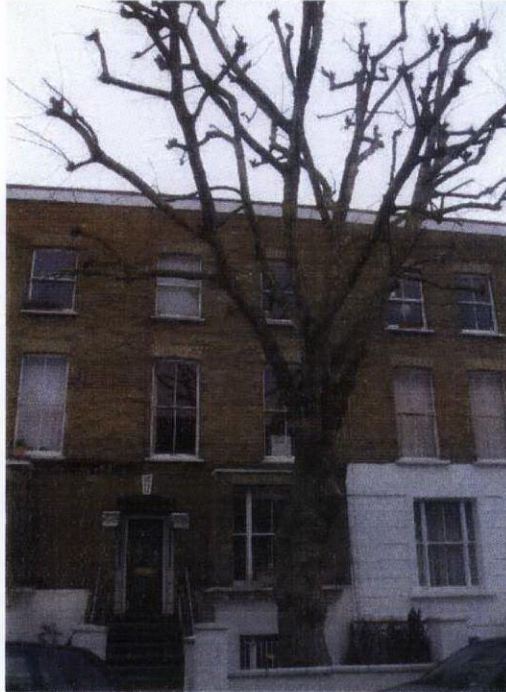


TECHNICAL REPORT ON A SUBSIDENCE CLAIM

Crawford Reference: SU1200782

**Rowrange Properties Ltd
105 Bartholomew Road
London
NW5 2AR**



Prepared for

**Aviva
Household Claims/Subsidence, Level 3 West, Perth, PH2 0NH**

Claim Reference 11T601238

SUBSIDENCE CLAIM

DATE 15 March 2012

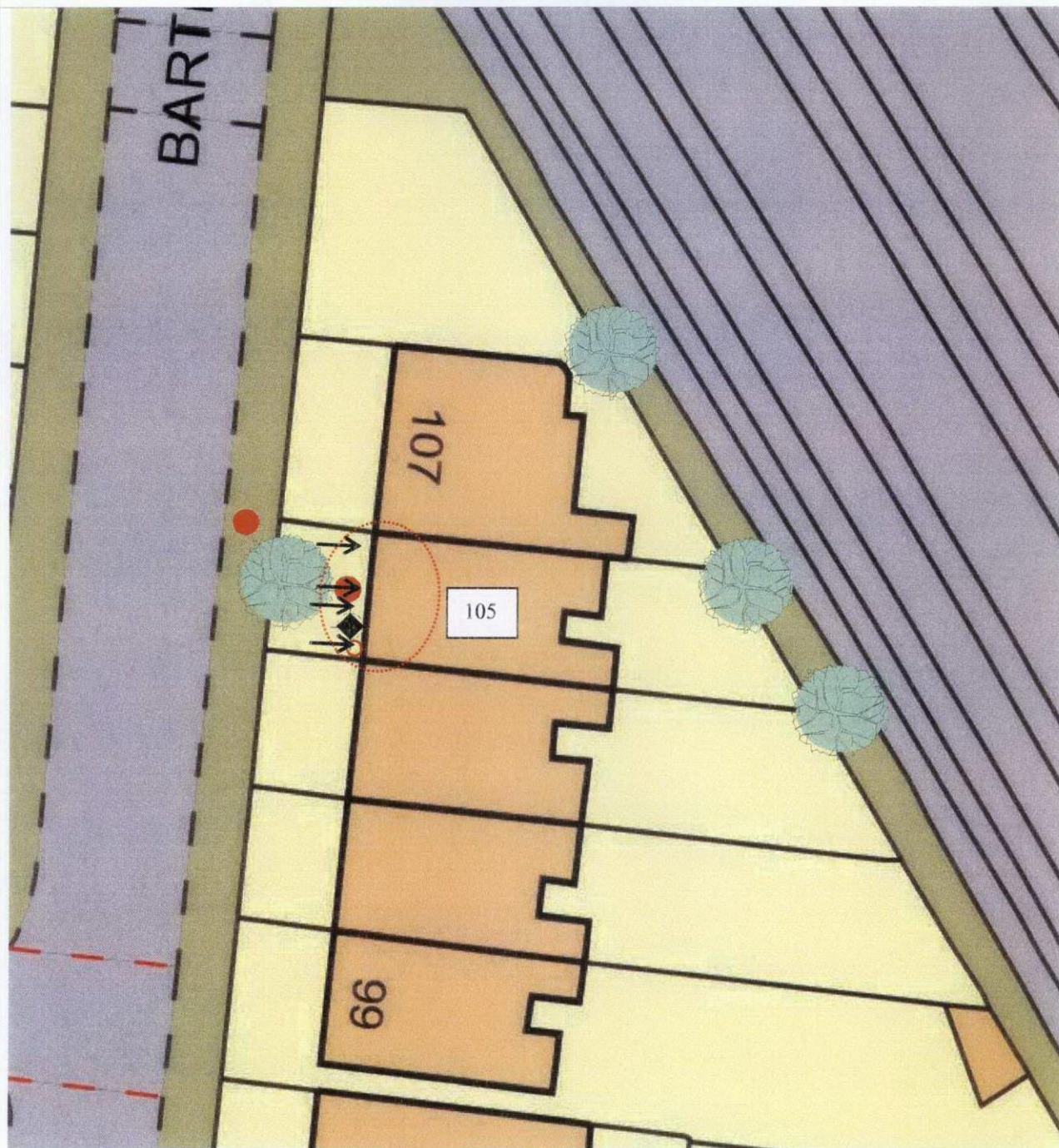


Crawford Home - Subsidence
Cartwright House,
Tottle Road,
Riverside Business Park, Nottingham, NG2 1RU
Tel: 0115 943 8260
Fax: 0121 200 0309

Site Plan

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 drains and trees etc. The boundaries are not accurate, and do not infer any rights of ownership or right-of-way.



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Key:



INTRODUCTION

We have been asked 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 2007. 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.

Investigations have been carried out in accordance with the requirements of The Institution of Structural Engineers¹.

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

This document and information provided relate to personal claim information and therefore should not be circulated or placed anywhere to make this freely available. By doing so, you will be in breach of Data Protection Act requirements

TECHNICAL CIRCUMSTANCES

Damage was first noted, predominantly to the rear of the property, in March 2009 and Crawford and Company are dealing with this claim under reference SU0901308. The owner of the ground floor flat believes that the cracking to the front was evident at that time but was not thought to be significant. Recently, the cracking to the front has progressed and insurers were contacted in order to arrange for this to be inspected.

PROPERTY

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

HISTORY & TIMESCALE

The insured's Plane tree is TPO protected therefore, site investigations are being organised and level monitoring is to be established to confirm its influence.

Date of Construction	Circa 1880
Purchased	1991
Policy Inception Date	29/06/1997
Damage First Noticed	Circa March 2009
Claim Notified to Insurer	15/02/2012
Date of our Inspection	14/03/2012
Issue of Report	21/03/2012
Anticipated Completion of Claim	Winter 2013

TOPOGRAPHY

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

¹ Institution of Structural Engineers (1994) "Subsidence of Low Rise Buildings"

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). Tomlinson² 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^{3,4} and can be troublesome in the presence of vegetation.

The superficial deposits are thought to be Clay Soils.

Clay soil superficial deposits are a cohesive soil characterised by their fine particle size and are usually derived from weathering of an underlying "solid geology" clay soil such as London Clay or Oxford Clay.

Like the solid geology sub-soil from which they are derived they shrink when dry, and swell when wet and can be troublesome when there is vegetation⁵ nearby and Gypsum and selenite crystals can be encountered (particularly in the south east). Protection using Class II Sulphate Resisting cement is therefore recommended for buried concrete.



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VEGETATION

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

Type	Height	Distance	Ownership
Plane	13 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.

² Tomlinson M.J. (1991) "Foundations Design & Construction" Longman Scientific Publishing.

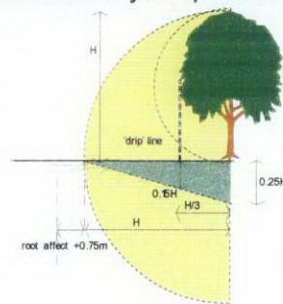
³ B.S. 5930 (1981) "Site Investigations"

⁴ Driscoll L.R. (1983) "Influence of Vegetation on Clays" Geotechnique. Vol 33.

⁵ Table 1, Chapter 4.2, Para. 2.3 of N.H.B.C. Standards, 1986.

⁶ Driscoll L.R. (1983) "Influence of Vegetation on Clays" Geotechnique. Vol 33.

Maximum tree-to-damage distance recorded in the Kew survey was 15mtrs, with 50% of all cases occurring within 5.5mtrs. Planes are moderately deep rooted, and are predominantly street trees.



Life expectancy > 100 years and both young and old trees tolerant of pruning and crown thinning. Urban trees are prone to infection by anthracnose, a fungal foliage disease, which can be disfiguring, if not lethal. There is also concern about canker stain disease, which can also be lethal, spreading from Europe into Britain.

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

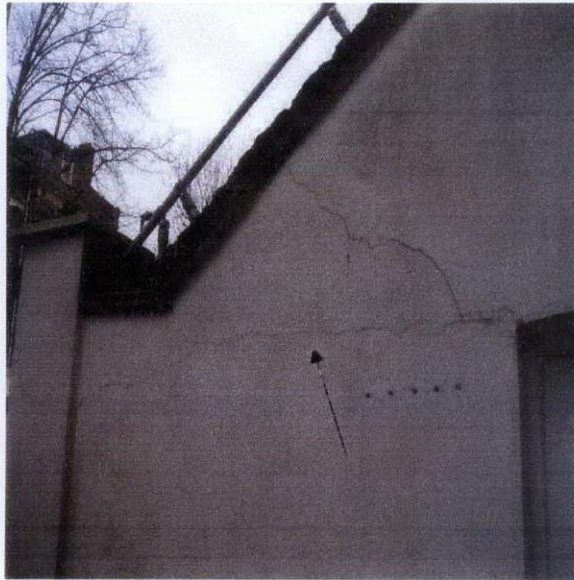
Lounge - Rucking to wallpaper in rear right hand corner and right hand side of bay.

⁷ Cutler & Richardson (1991) "Tree Roots & Buildings" Longman Scientific

First Floor Flat - Lounge / Kitchenette - Hairline diagonal cracking to right hand party wall, wall / ceiling junction cracking along front wall, cracking to ceiling parallel to left hand party wall.

Second Floor Flat - Lounge / Kitchenette - 1mm diagonal crack to left hand party wall, wall / ceiling junction cracking to left hand party wall and front wall, 1mm vertical crack to right hand party wall, cracking to ceiling.

EXTERNAL



Cracking to steps wall



Cracking to bay

Front - 1mm horizontal / diagonal cracking to right hand flank of front steps, gap between step asphalt and right hand step wall on top step area.

Boundary, Retaining Walls and Understeps Storage - The front boundary wall has been pushed outwards by the action of the tree growing against it, the lower brick retaining wall and the understeps storage area walls are bowing significantly towards the front bay due to the build up of lateral earth pressure and physical tree root presence behind it. These items of damage are not due to foundation movement.

CATEGORY

In structural terms the damage falls into Category 2 of Table 1, Building Research Establishment⁸ 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.

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

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 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.

The front boundary wall has been pushed outwards by the action of the Plane tree growing against it and the lower brick retaining wall is bowing significantly towards the front bay due to the build up of lateral earth pressure and physical tree root presence behind it. Similar bowing was also noted to the flank walls within the understeps storage area. Dampness was also noted within the music room in the ground floor flat. These items of damage are not due to foundation movement and therefore the cost of their repair will fall outside the scope of this claim

RECOMMENDATIONS

Although the cause of the movement needs to be dealt with, we note the vegetation is subject to a Preservation Order. Unfortunately, current legislation requires certain investigations to be carried out to support an application for the tree works.

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. The monitoring data provided must be sufficient to show a pattern of movement consistent with the influence of the vegetation and therefore it may be necessary to carry out the monitoring for up to a 12 month period.

It will also be necessary to obtain a specialist Arboricultural Report.

We will report further once these investigations have been completed.

Matt Deller

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15 March 2012