TECHNICAL REPORT ON A SUBSIDENCE CLAIM

Crawford Reference: SU1105866

Mrs Sutton
West End Farm, Hew Lane
Winteringham
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Prepared for

Axa Insurance
Household Claims, PO Box 97, Lancaster, LA1 1WG

Claim Reference 10768300D

SUBSIDENCE CLAIM

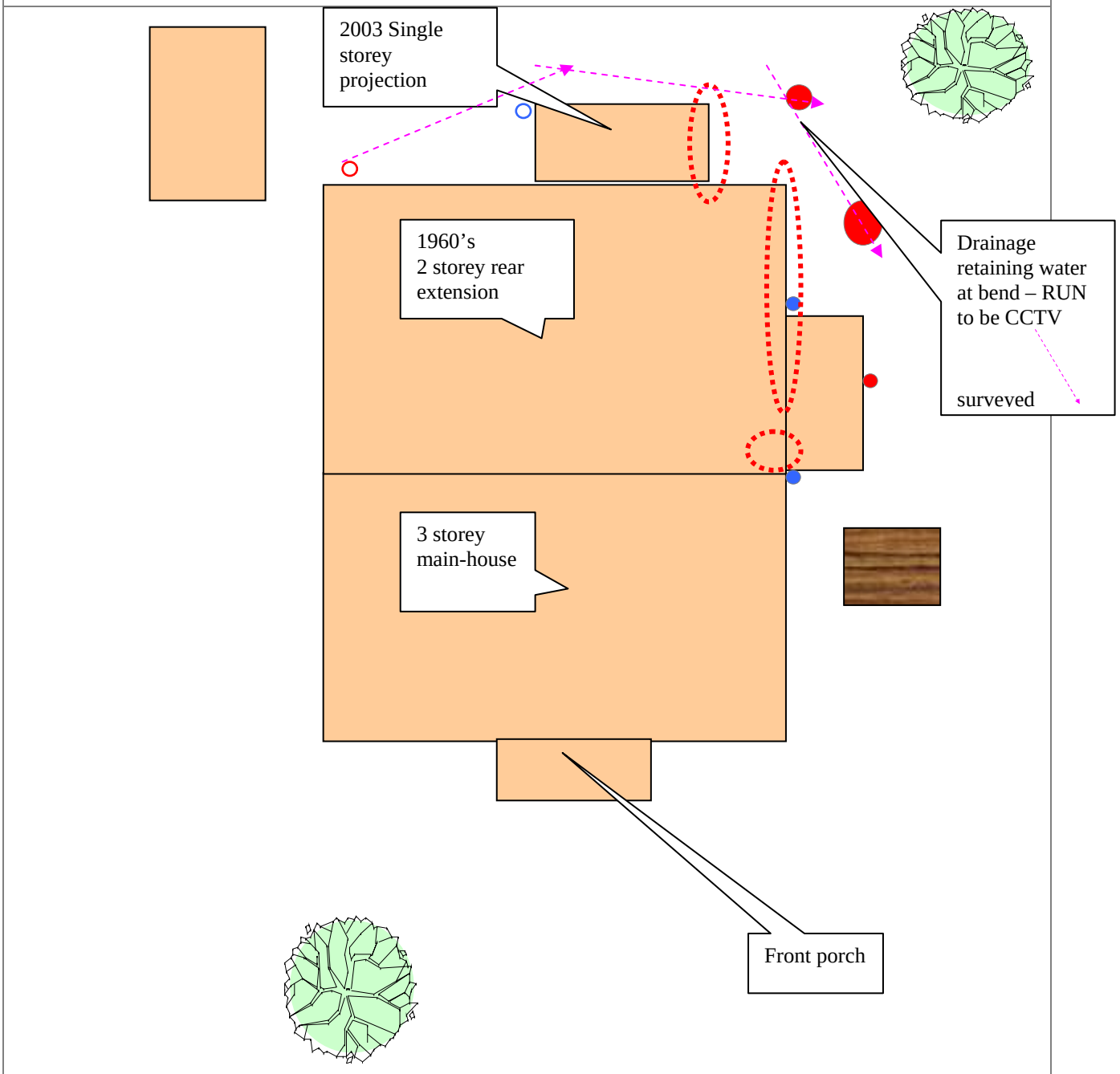
DATE 9 December 2011

Crawford Home – Subsidence (Nottingham)
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 or confer any rights of ownership or right-of-way.



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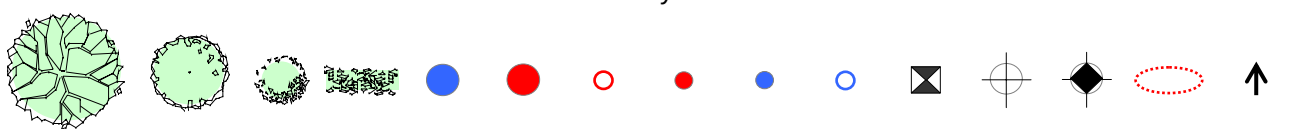


INTRODUCTION

We have been asked by Axa Insurance 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, services, 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 Engineers[1].

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

TECHNICAL CIRCUMSTANCES

We understand from discussion with the Insured and her representative (son in-law Mr Graham Clarke) that, the damage was first noticed three months ago but they were not overly concerned and therefore filled in the cracking. In the pursuing months the damage returned which led the insured to notify her insurer of a possible subsidence claim.

PROPERTY

Two storey detached house of traditional construction with brick walls surmounted by a hipped, slated roof. The property benefits from a two storey rear extension and single storey projections to the rear and right-hand flank.

HISTORY & TIMESCALE

The drainage system within the vicinity of the subsidence is to be CCTV surveyed for damage. Crack width monitoring has been established and reading will be undertaken at regular interval.

Date of Construction	1650's
Purchased	1960's
Policy Inception Date	04/05/2010
Damage First Noticed	August 2011
Claim Notified to Insurer	13/10/2011
Date of our Inspection	06/11/2011
Issue of Report	03/01/2012
Anticipated Completion of Claim	Autumn 2012

TOPOGRAPHY

The property occupies a site sloping from rear down to the front and sloping from the right down to the left.

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

GEOLOGY

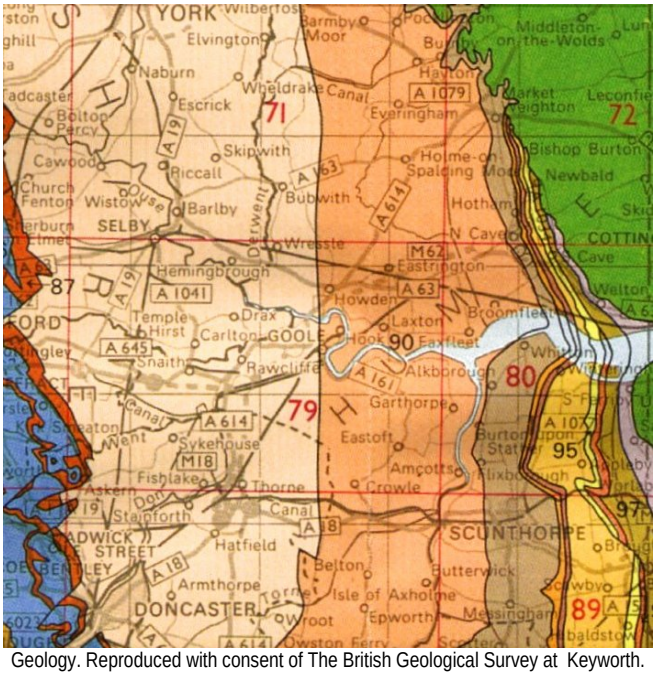
Reference to the 1:625,000 scale British Geological Survey Map (solid edition) OS Tile number SESE suggests the underlying geology to be Lias Clay.

Lias Clays form a belt crossing England extending from Yorkshire to the Dorset coast. It also extends into South Wales. Usually blue, white or grey they comprise a compact argillaceous (clayey) limestone or cementstone[2] dating back to the Jurassic era.

They have high shrink/swell potentials[3],[4] and be particularly troublesome in the presence of vegetation. Lias clays often have a Plasticity Index of 50% or over, and are particularly vulnerable to volumetric change in relation to their moisture content.

Tomlinson[5] describes it as'fat' clay with high load bearing characteristics due to pre-consolidation pressures in its geological history.

The drift is thought to be Tidal Flat Deposit of clay and silt formation



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

[2] Wyatt A. (1986) *Challinor's Dictionary of Geology"* University of Wales Press.

[3] Ddriscoll R. (1983) *"Influence of Vegetation on Clays"* Geotechnique. Vol. 33.

[4] Table 1, Chapter 4.2, Para. 2.3 of N.H.B.C. Standards, 1986.

[5] Tomlinson M.J. (1991) *"Foundations Design & Construction"* Longman Scientific Publishing.

VEGETATION

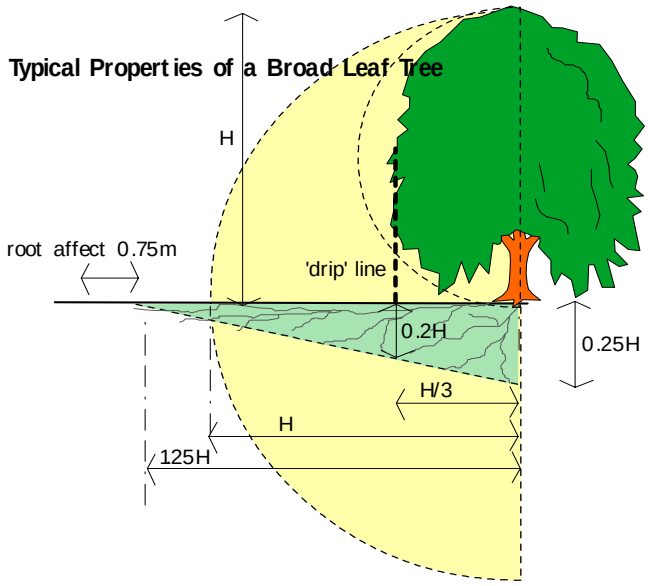
There are several trees and shrubs nearby, some with roots that may extend beneath the house foundations. The following are of particular interest:-

Type	Height	Distance	Ownership
Maple	16 m	17 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.

Maples, Acer species, include a wide range of species, including Norway maple, which is similar in size and growth to sycamore and the native field maple, which is a medium sized tree, common in lowland hedgerows. They are moderate water demanders, but the larger ones are quite often associated with subsidence.

Growth rate approximately 600mm per year, and reaching heights of around 20-30mtrs, the Maple has medium root activity and medium to low water demand[6].



Typical proportions of a Maple, showing the potential root zone.

They tolerate pruning quite well, but large cuts will decay rapidly, particularly in the larger species. Japanese maples are typically small, slow growing trees or large shrubs that are less commonly associated with damage to buildings.

[6] Richardson & Gale 1994) "Tree Recognition" Richardson's Botanical Identifications

OBSERVATIONS

The main area of damage affects the two storey rear extension

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

INTERNAL

First floor rear bedroom

First floor rear bedroom

First floor rear right-hand bedroom to 2 storey rear extension

- 2.5mm vertical crack noted below window to right-hand flank
- 2mm vertical staggered crack was observed bottom left of rear window
- Rucking observed to paper along junction of wall and ceiling

Ground floor rear right sitting room to 2 storey extension

- 2.5mm cracking noted to beam above opening to rear extension. Crack span from left to right
- 3mm vertical crack noted bottom right of window cill to right hand flank. Crack extends down to skirting board level
- 1.5mm crack noted below rear window cill

EXTERNAL

Extension right flank above ground floor window

Extension right flank below ground floor window

Right hand flank of 2 storey extension

- 8mm diagonal step crack observed to be extending bottom ground floor window
- 8mm diagonal step crack noted above ground floor window. Crack extends up towards bottom right of first floor window into a 1.5mm cracking. The brick lintel above the ground floor window has dropped by 12mm
- 11mm step crack noted top left of first floor bathroom window
- 1.5mm horizontal crack noted to be extending from ground floor window cill toward rear right corner of extension. Crack continues around onto right flank of single storey projection

CATEGORY

In structural terms the damage falls into Category 3 of Table 1, Building Research Establishment[7] 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.

[7] 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 due to an escape of water.

Water escaping from drains or from other sources in non-cohesive soils can cause localised erosion as the finer particles of soil are washed away. It can also soften cohesive soils by reducing their shear strength.

Usually, the building stabilises following repairs to the damaged service.

During our visit the drainage run to the rear and rear right corner of the extension was tested and the system was noted to be retaining waste water. This would indicate the system is not to its correct gradient.

We understand from discussion with the Insured's representative that there was a blockage of the same drainage system in April/May 2011. As a result the system had to be cleared.

We have noted the presence of a mature Maple tree to the rear right of the rear extension. The maple tree approximately 16mtrs high and 17mtrs away from the area of damage. Whilst we suspect the damage is the result of water leaking into the soil causing the ground to lose its bearing capacity. We cannot totally discount the possibility of roots from the tree extending beneath the foundation of the house.

Crack width monitoring has been instigated. This will allow us to determine the efficacy of mitigation and repairs can be implemented. Crack width monitoring is a useful diagnosis tool, as cracks that opens and close is indicative of clay shrinkage. Whilst crack that opens episodically without closing is indicative of excess water (leaking drains or services) or poor ground.

If the damage is triggered by clay shrinkage we would expect to see some recovery over the winter period.

Non Insured defects

Damage noted within the first floor front right hand bedroom is not considered to be linked to the recent events. Historic distortion was noted to the floor and the damage to the dividing wall is long-standing in appearance.

The separation noted at first floor land between the cornice and the chimney breast wall appears to be related to wear and tear rather than subsidence. The damage here is also remote from area of the subsidence. Externally, historic cracking was noted above and below ground floor rear window to right flank of main house.

There is no evidence to suggest this damage are linked to recent foundation movement and therefore, will not form part of the insurance claim.

RECOMMENDATIONS

The cause of movement (in this case, water escaping into the ground from leaking drains) needs to be addressed.

An investigation will now be undertaken to establish the condition of the drains in the vicinity of the subsidence damage. This will also enable us to determine responsibility for the drainage repairs.

Once drainage repairs have been completed, due consideration may be given to superstructure repairs. A schedule of remedial works will be obtained and works may commence once the scope has been approved.

Monitoring should establish the efficacy of the prescribed works. However, a review of recommendations may be required if stability is not satisfactorily restored

09 December 2011

Martel Hawkins

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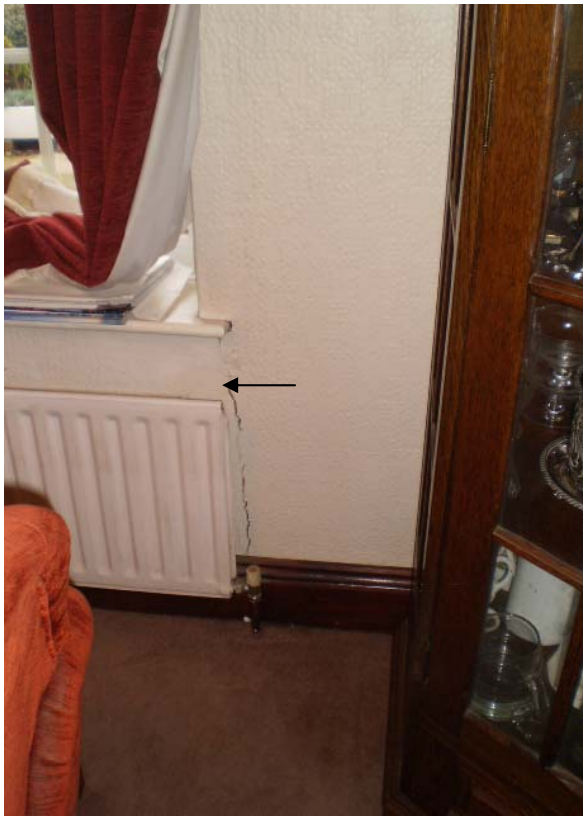
Photographs

Historic damage to first floor front right hand bedroom

Right hand flank – damage top left of bathroom window



Rear ground floor sitting room – right flank

View of extension right hand flank

Historic damage noted to left hand flank junction of extension and main house