



TECHNICAL REPORT ON A SUBSIDENCE CLAIM



**10 Park Village East
London
NW1 7PX**

prepared for

RSA



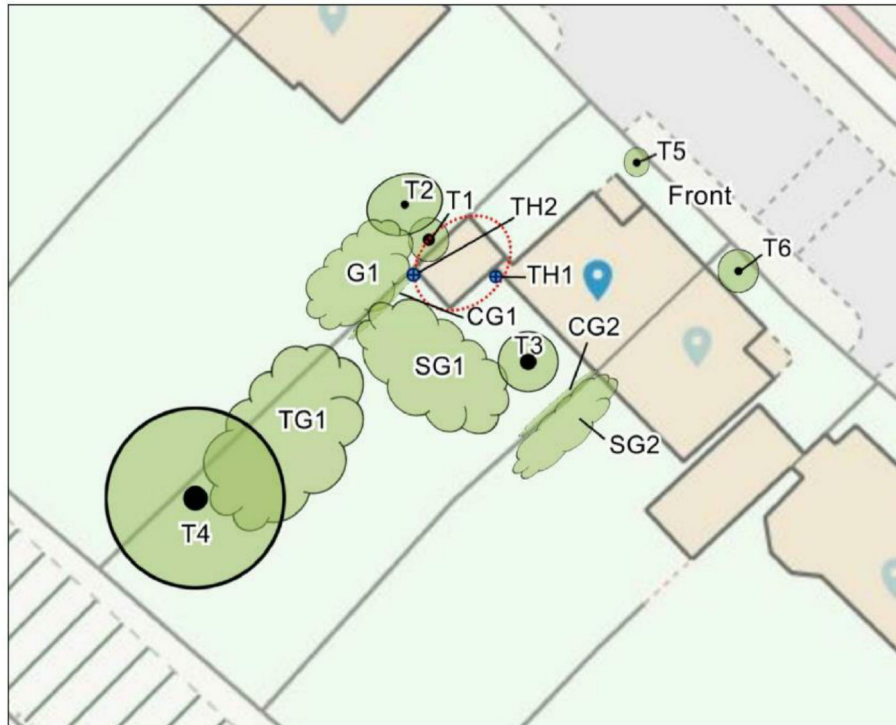
SUBSIDENCE CLAIM

DATE 24 May 2023



Chartered Loss Adjusters



Site Plan**INTRODUCTION**

We have been asked by RSA 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

Policyholder noted cracking at the property. As the damage was opposite HS2 works, HS2 representative inspected the damage. They indicated this was due to subsidence and policyholder subsequently notified the Insurer.

PROPERTY

Three storey semi-detached house of traditional construction with rendered walls surmounted by a pitched tiled roof.

HISTORY & TIMESCALE

Date of Construction	1840
Purchased	1992
Policy Inception Date.....	28/02/2021
Damage First Noticed	22/09/2022
Claim Notified to Insurer.....	22/09/2022
Date of our Inspection	14/10/2022
Issue of Report.....	21/10/2022
Anticipated Completion of Claim	Summer 2023

TOPOGRAPHY

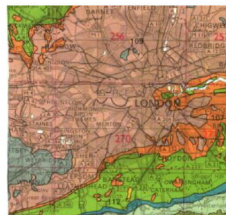
The property land is raised to the front and drops away sharply to the rear allow for a lower ground floor to the property.

GEOLOGY

Reference to the 1:625,000 scale British Geological Survey Map (solid edition) OS Tile number TQNW suggests the underlying geology 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 vegetation¹ nearby and Gypsum and selenite crystals can be encountered (particularly in the south east). Protection using ClassThere are several trees and shrubs nearby, some with roots that may extend beneath the house foundations. The following are of particular interest:-



Geology. Reproduced with consent of The British Geological Survey at Keyworth.
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¹ Driscoll R. (1983) "Influence of Vegetation on Clays" Geotechnique. Vol 33.
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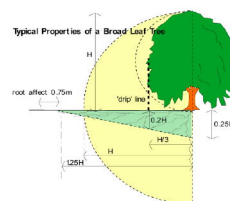
VEGETATION

Table 1 Current Claim - Tree Details & Recommendations

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T1	Cypress (Italian)	9 *	200 *	2 *	0.1 *	Older than extension(s)	Third Party 8 Park Village East NW1 7PX
Management history		Growing in elevated position level with road. No recent management noted.					
Recommendation		Remove (fell) to near ground level					
T3	Ash	16	640	4	6.2	Older than extension(s)	Policy Holder
Management history		Recently reduced/pruned.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
CG1	Ivy, rose, jasmine	2.5	30 Ms *	2	0.5	Younger than Property	Policy Holder
Management history		Subject to past management/pruning.					
Recommendation		Remove (fell) to near ground level and treat stumps to inhibit regrowth.					
G1	Photinia, cordyline, jasmine, laurel, prunus	6	200 *	4	0.6 *	Older than extension(s)	Third Party 8 Park Village East NW1 7PX
Management history		No recent management noted.					
Recommendation		Remove (fell) to near ground level and treat stumps to inhibit regrowth.					

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.

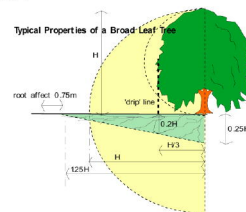
Broadleaf trees typically have wider spreading roots and higher water demands than coniferous species and many are better adapted to growing on heavy clay soils. Some are capable of sprouting from cut stumps or bare wood and most will tolerate pruning better than conifers.



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. Ash (*Fraxinus*) are deciduous and can reach heights between 20-30m depending on health, environment and soil conditions. They have a fast growth rate of around 500mm per year, medium root activity² and medium water demand.

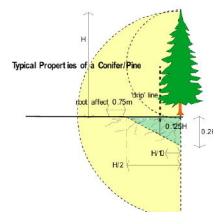
It is naturally vigorous and large growing, preferring light, fertile soils, but will grow on heavy clay. The maximum tree-to-damage distance recorded in the Kew survey was 21mtrs, and 50% of recorded cases occurred within 6mtrs³.



Typical proportions of an Ash. Note the potential root zone.

Young and old trees are tolerant of quite heavy pruning and crown reduction, but the timber is not particularly decay resistant and re-growth will need periodic cutting to keep weight and wind resistance down. Life expectancy > 100years. Root pruning can leave tree vulnerable to disease.

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.

OBSERVATIONS

The rear office building is the focal area of damage.

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

INTERNAL

Lower Ground Floor

Large Office

- Vertical cracks and horizontal cracks noted throughout the room to walls and ceiling 1-10mm wide.

² Richardson & Gale (1994) "Tree Recognition" Richardson's Botanical Identifications

³ Cutler & Richardson (1991) "Tree Roots & Buildings" Longman Scientific

- Separation of ceiling and wall at junction due to movement 3-4mm wide.

Small Office

- Vertical crack to plastered wall to right side of entrance door to room 203mm wide.

EXTERNAL

Rear

- Diagonal crack to right hand side bottom corner of blockwork, tapering 1-4mm wide. Blocks have slipped at dpc level across length of approximately 2m.

CATEGORY

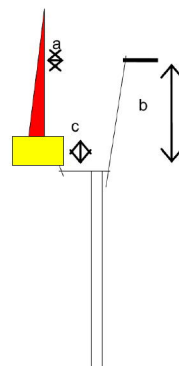
In structural terms the damage falls into Category 3 of Table 1, Building Research Establishment⁴ Digest 251, which describes it as "moderate".

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.

INVESTIGATIONS

The following investigations were undertaken to identify the cause of movement. Two trial holes were excavated to expose the foundations. Two 50mm diameter hand augers were sunk through the base of the trial holes to confirm the soil profile beneath the foundations and provide soil and root samples for laboratory testing - see site plan for location and the diagram below for details.



Foundation Details

No.	Borehole Depth	Footing (a)	Underside (b)	Thickness (c)
TH1	3.00 m.	200 mm.	500 mm.	350 mm.
TH2	3.00 m.	200 mm.	1300 mm.	300 mm.

⁴ Building Research Establishment

SOIL SAMPLES

Soil samples were retrieved from the bore, wrapped in clingfilm before being bagged and deposited with a testing laboratory the same day. The laboratory have instructions to test the samples to determine if there is evidence of root induced desiccation.

ROOTS

Roots were retrieved from the trial hole and have been submitted to a botanist for identification.

ARBORIST REPORT

We appointed MWA (Arboricultural Consultants) to provide their recommendations in relation to necessary tree management works to be undertaken in order to return long stability to the property.

It is their opinion that T1, T3, CG1 and G1 are judged to be exerting the principal vegetative influence in respect of the current damage and are, by virtue of their size and proximity, having a significant influence on soil volumes below the insured property. They have recommend removal of T1, T3, CG1 and G1. The report also includes recommendations for 'Future Risk' and the relevant parties have been informed to request these works are implemented.

MONITORING

Level monitoring has been implemented to provide further evidence to support our conclusions. Initial readings have been taken and further readings will be taken on a bi monthly basis.

DISCUSSION

The results of the site investigations confirm that the cause of subsidence is root-induced clay shrinkage. The clay is plastic and thus will shrink and swell with changes in moisture content. Roots have extracted moisture below the depth of the footings, thus causing differential foundation movement to occur. This is supported by the following investigation results:-

- The foundations are at a depth of 500 & 1300 mm which is below the level that normal seasonal movement would be expected to occur.
- Site investigations and soil test results have confirmed a plastic clay subsoil susceptible to undergoing volumetric change in relation to changes in soil moisture.
- A comparison between moisture content and the plastic and liquid limits suggests moisture depletion at the time of sampling in TH2 at depths beyond normal ambient soil drying processes such as evaporation indicative of the soil drying effects of vegetation.
- Atterberg limit testing indicates that the soil has a very high plasticity and hence will shrink and swell with changes in moisture content.
- Roots were found to the underside of the foundation. Starch was present which indicates that the roots were alive at the time of retrieval.
- An expert Arboricultural report has confirmed that nearby vegetation is the cause of the subsidence related damage to the property and identified tree management works required to stabilise the property.
- Monitoring evidence will be provided to support our conclusions and recommendations once sufficient readings have taken place.

RECOMMENDATIONS

As per the recommendations of the Arboricultural Report T1, T3, CG1 and G1 require removal to allow the property to stabilise. The trees can be felled without risk of heave related damage occurring.

Localised superstructure repairs can be implemented following completion of the required tree management works. Should consent not be granted and the trees remain partial underpinning to the property will be required to arrest the movement, with costs rising over £160k. The site constraints of the property and the proximity of the trees mean a root barrier is not considered a suitable solution in this instance.