



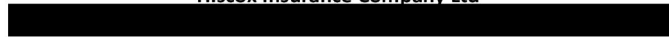
TECHNICAL REPORT ON A SUBSIDENCE CLAIM



49 & 49A Gloucester Crescent
London
NW1 7EG

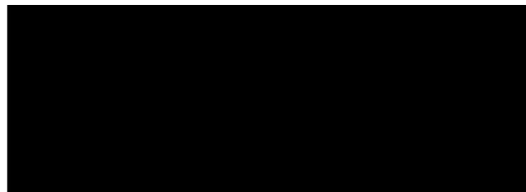
Prepared for

Hiscox Insurance Company Ltd



SUBSIDENCE CLAIM

5 March 2024

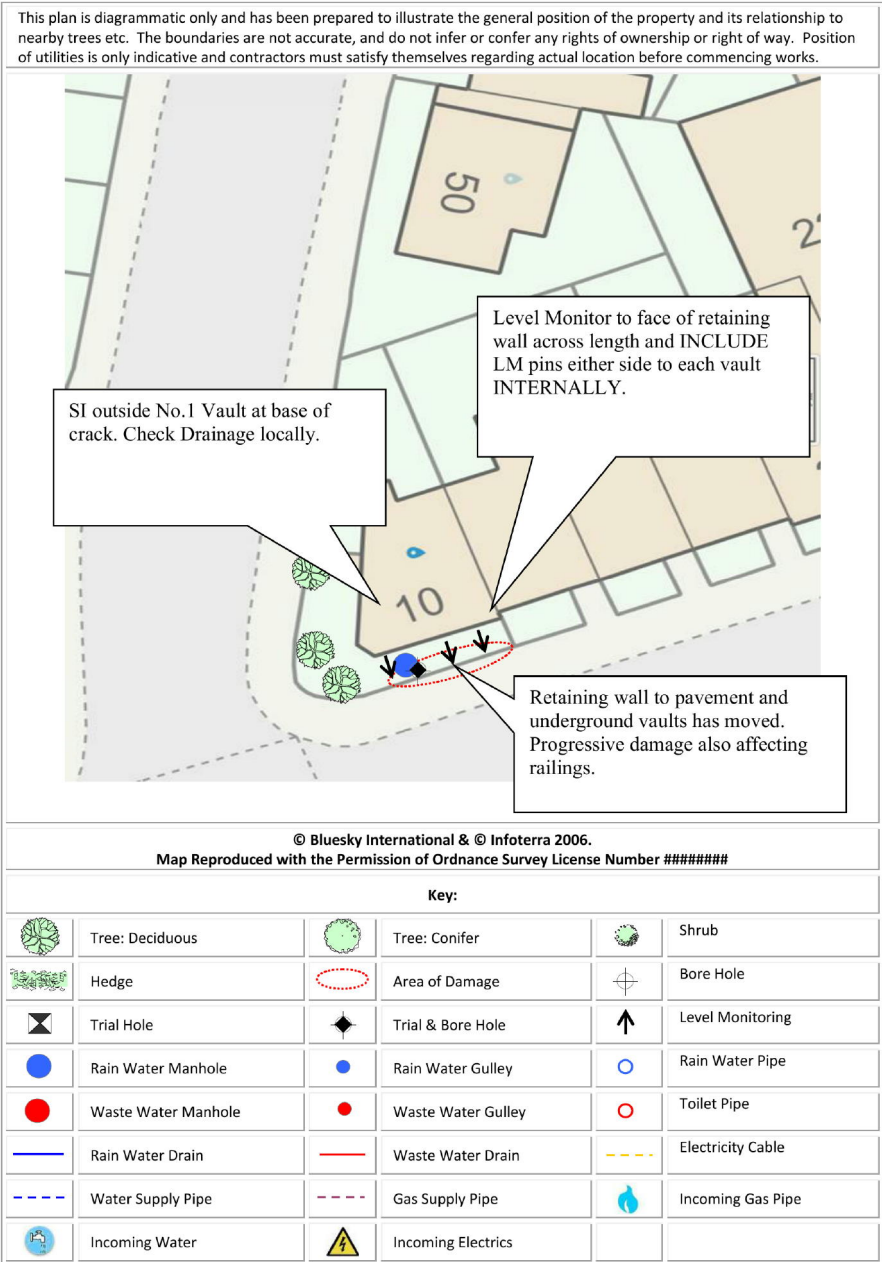


Site Plan

This plan is Not to Scale

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INTRODUCTION

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We have been asked by Hiscox Insurance Company Ltd 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

Tenant reported the damage developing to the policyholder. Policyholder noted the cracking to the wall and distortions were increasing. This was first observed 2 years ago. Insurer subsequently notified.

PROPERTY

4 storey end terrace separated into flats. The property has brick wall finish with LGF vaults under pavement. The property has a butterfly slate roof. Property is Grade 2 Listed.

HISTORY & TIMESCALE

Date of Construction	1830
Purchased	2007
Policy Inception Date.....	15/08/2007
Damage First Noticed	2020
Claim Notified to Insurer.....	15/12/2022
Date of our Inspection.....	12/01/2023
Issue of Report.....	05/03/2023
Anticipated Completion of Claim	Spring 2024

TOPOGRAPHY

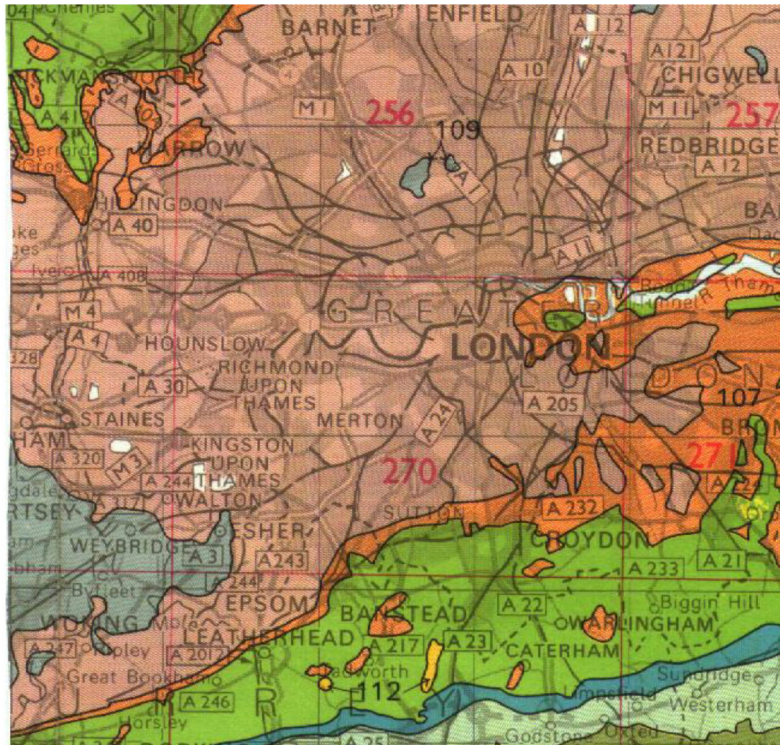
The property occupies a reasonably level site with no unusual or adverse topographic features.

GEOLOGY

Reference to the 1:625,000 scale British Geological Survey Map (solid edition) OS Tile number TQNW suggests the underlying geology to be 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 Class II Sulphate Resisting cement is therefore recommended for buried concrete.



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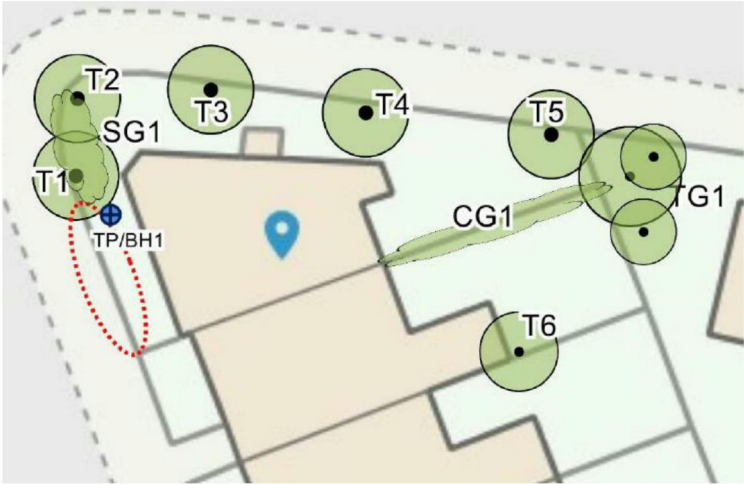
VEGETATION

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

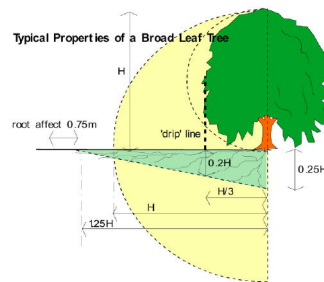
Table 1 **Current Claim - Tree Details & Recommendations**

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T1	Lime	12.0	440	5.0	1.4	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - previously pollarded at approx. 3.0m and since crown reduced.					
Recommendation		Re-pollard to original points at approx. 3.0m and thereafter re-pollard on a triennial cycle to maintain at broadly reduced dimensions. Subject to review if movement persist.					
T2	Lime	10.5	440	4.5	3.1	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - previously pollarded at approx. 3.0m and since crown reduced.					
Recommendation		Re-pollard to original points at approx. 3.0m and thereafter re-pollard on a triennial cycle to maintain at broadly reduced dimensions. Subject to review if movement persist.					

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.

OBSERVATIONS

The external retaining wall of the pavement and facing brickwork wall of the vaults under the pavement is the focal area of damage in this Claim. Principal home is not affected.

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

INTERNAL

No Internal Damages - Principal Home is NOT affected.

EXTERNAL

Retaining wall to public path and under path vaults.

Retaining brickwork wall has separated from the vaults. There is clear evidence this has been progressive for at least 7 years considering the misalignment of the wall which can be evidenced dating back 7 years to when the wall was last decorated.

No weep holes in retaining wall noted.

CATEGORY

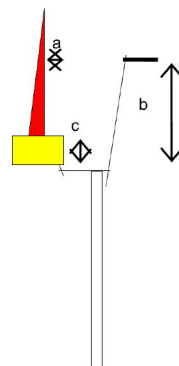
In structural terms the damage falls into Category 5 of Table 1, Building Research Establishment² Digest 251, which describes it as "very severe".

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.

INVESTIGATIONS

The following investigations were undertaken to identify the cause of movement. One trial hole was excavated to expose the foundations. A 50mm diameter hand augers were sunk through the base of the trial hole 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.	0 mm.	150 mm.	150 mm.

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.

² Building Research Establishment, [REDACTED]

49 & 49A Gloucester Crescent NW1 7EG

The samples you sent in relation to the above on 27/10/2023 have been examined. Their structures were referable as follows:

BH1, 650-800mm	
2 no.	Examined root: TILIA (Lime). A POOR sample.
2 no.	Examined root: could be the family Rosaceae, EITHER the subfamily POMOIDEAE (a group of closely related trees: Malus (Apple), Pyrus (Pear), Crataegus (Hawthorn), Sorbus (Rowan, Whitebeam, Service tree), Mespilus (Medlar), and some shrubs (Pyracantha (Firethorn), Chaenomeles (Japonica), Cydonia (Quince), Amelanchier, Cotoneaster)) OR [the related] PRUNUS (Cherries, Plums and Damsons, Almonds, Peaches and Apricots, Blackthorn/Sloe, as well as the shrubby Cherry-laurel and Portugal-laurel). A POOR sample, with NO BARK.
4 no.	All pieces of BARK only - not enough material for identification.
4 no.	Unfortunately all with insufficient cells for identification.
BH1, 1000-1200mm	
3 no.	Examined root: another POOR sample, without any BARK. Referable to TILIA (Lime).
3 no.	Examined root: again POOR in condition, and with NO BARK. Could be family Rosaceae, EITHER the subfamily POMOIDEAE - or - PRUNUS (see lists above).

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.

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 at depths beyond normal ambient soil drying processes, such as evaporation, which is indicative of the soil drying effects of vegetation.

Roots were observed to a depth of 1.2m bgl in TP/BH1, and recovered samples have been positively identified (using anatomical analysis) as Tilia spp., and possibly either Pomoideae gp. or Prunus spp. [Poor sample]; the most significant of which are the Tilia spp. roots which will originate from the nearby Lime trees [T1 and T2 being the closest].

The origin of the possibly Pomoideae gp. or Prunus spp. [Poor sample] roots is undetermined, as no significant related vegetation was observed within influencing distance of the area of damage at the time of our survey.

Based on the technical reports currently available, engineering opinion and our own site assessment we conclude the damage is consistent with shrinkage of the clay subsoil related to moisture abstraction by vegetation.

If an arboricultural solution is to be implemented to mitigate the influence of the implicated trees/vegetation we recommend that T1 and T2 Limes are pollarded at smaller dimensions.

Other vegetation recorded presents a potential future risk to building stability and management is therefore recommended in accordance with Table 2 below.

Table 2 **Future Risk - Tree Details & Recommendations**

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T3	Lime	12.0	390	5.0	1.7	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - previously pollarded at approx. 3.0m and since crown reduced.					
Recommendation		Re-pollard to original points at approx. 3.0m and thereafter re-pollard on a triennial cycle to maintain at broadly reduced dimensions.					
T4	Lime	12.0	560	5.0	1.9	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - previously pollarded at approx. 3.0m and since crown reduced.					
Recommendation		Re-pollard to original points at approx. 3.0m and thereafter re-pollard on a triennial cycle to maintain at broadly reduced dimensions.					
T5	Lime	12.0	460	5.0	6.2	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - previously pollarded at approx. 3.0m and since crown reduced.					
Recommendation		Re-pollard to original points at approx. 3.0m and thereafter re-pollard on a triennial cycle to maintain at broadly reduced dimensions.					
T6	Bay	5.0	150 Ms *	5.0	8.5 *	Younger than Property	Third Party 8 Oval Road NW1 7EB
Management history		Subject to past management/pruning - previously crown reduced.					
Recommendation		Maintain broadly at no larger than current dimensions by periodic pruning.					
TG1	Magnolia with Cotoneaster and Pyracantha understorey	6.5	220 *	6.0	9.5	Younger than Property	Third Party 50 Gloucester Crescent NW1 7EG
Management history		No significant past management noted.					
Recommendation		Maintain broadly at no larger than current dimensions by periodic pruning.					

Consideration has been given to pruning alone as a means of mitigating the vegetative influence, however in this case, this is not considered to offer a viable long-term solution due to the proximity of the responsible vegetation.

DRAINAGE

MONITORING

Figure 10 displays two line graphs showing the difference in reading for two different shapes. The left graph shows a shape with 10 segments, and the right graph shows a shape with 12 segments. Both graphs plot 'Difference in reading' on the y-axis (from -6.0 to 6.0) against five points (Point 1 to Point 5) on the x-axis. The data points are connected by lines, and the shapes are shown in a purple outline.

Left Graph (Shape with 10 segments):

Point	Difference in reading
Point 1	0.0
Point 2	0.0
Point 3	0.0
Point 4	0.0
Point 5	0.0

Right Graph (Shape with 12 segments):

Point	Difference in reading
Point 1	0.0
Point 2	0.0
Point 3	0.0
Point 4	0.0
Point 5	0.0

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:-

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RECOMMENDATIONS

As per the recommendations of the Arboricultural Report the T1 and T2 Limes are to be pollarded at smaller dimensions to allow the property to stabilise.

Localised superstructure repairs can be implemented following completion of the required tree management works. Should underpinning be required, we anticipate a cost exceeding £80k.