

Arboricultural Consultancy for Aviva

Note⁽¹⁾: This report is intended for use between the client, Environmental Services and any parties detailed within the report. It is based on the understanding at the time of visiting the property that Engineers are satisfied that damage is attributable to clay shrinkage subsidence exacerbated by vegetation.

1. Case Details

Insured	Haverstock Hill Limited	Address	96 Haverstock Hill, London, NW3 2BD		
Client	Subsidence Management Services	Contact	Emily Bogie	Claim No.	IFS-AVI-SUB-14-0052426
ES Ref	NL/0110140922/TP-REV1	Consultant	Thomas Peppiatt	Contact No.	0330 380 1036
Report Date	02/10/2015 Revised: 16/10/2015				

Scope of Report: To survey the property and determine significant vegetation contributing to subsidence damage, make recommendation for remedial action and assess initial mitigation and recovery prospects. The survey does not make an assessment for decay or hazard evaluation.

Please note: this is a revision of our original report due to the addition of further site investigations.

2. Property and Damage Description

The insured structure is a 4 storey semi-detached house. The property occupies a level site with no adverse topographical features.

Damage relates to the right-hand flank of the insured dwelling. Please refer to the engineers report for a full description of the claim history and damage.

3. Technical Reports (Revised)

In preparing our revised report we have had the benefit of the following technical investigations:

Soil Analysis	<input checked="" type="checkbox"/>	Drain Report	<input checked="" type="checkbox"/>	Engineers Report	<input checked="" type="checkbox"/>
Root Analysis	<input checked="" type="checkbox"/>	Foundation Detail / Borehole Log	<input checked="" type="checkbox"/>	Monitoring	<input checked="" type="checkbox"/>

4. Action Plan

Mitigation	
Insured Involved?	Yes
Local Authority involved?	No
Other third party Mitigation involved?	Yes
Recovery	
Is there a potential recovery action?	Yes

Tree Works	
Local Authority	Camden London Borough
TPO / Conservation Area / Planning Protection Searches	Insured: TPO Adjacent & Adjoining properties: TPO
Additional Comments	
Awaiting Further Instructions.	
A potential recovery action has been identified.	

5. Technical Synopsis (Revised)

This report is based upon our understanding at the time of visiting the property that Subsidence Management Services' engineers are satisfied that damage is due to clay shrinkage subsidence exacerbated by vegetation.

We have been instructed to advise on the causal vegetation and to deliver management proposals which will provide on-going and long term stability, thereby allowing repairs to be undertaken.

Site Investigations from 2014 indicate that the foundations to the front of the property extend to a depth of 500mm below ground level in TP/BH1 and 1200mm in TP/BH2.

Foundations bear onto subsoil described within the borehole log as Clay, thereby indicating the potential for the observed damage to be the result of clay shrinkage subsidence exacerbated by the influence of vegetation.

Desiccation of the underlying clay strata is demonstrated by an abnormal soil moisture content profile (BRE 412).

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Atterberg testing for soils recovered in TP/BH3 in 2015 showed the soil moisture content to be close to plastic limit at 1200mm and 2200mm in TP/BH3 and at plastic limit at 3200mm below ground level.

Moisture content comparison with plastic limit is a reliable indicator of desiccation, whilst moisture depletion at the depths identified are beyond that to which ambient soil drying can be influential and thereby indicate a vegetative influence in the movement / damage.

Soil suction testing within TP/BH3 2015 indicates the presence of moderate, desiccation in accordance with BRE digest 412 from 1200mm to 1700mm below ground level and severe desiccation between 2200mm and 3700mm.

BRE Digest 412; Desiccation in Clay Soils states that '*soil sample suctions, since they will reflect any changes in in-situ pore water pressures due to desiccation, provide the most fundamental indicator of desiccation of all of the techniques*'.

We note that drain investigations have been carried out and that damage was found in the immediate vicinity of the area of damage in drain run D, however, Atterberg / Suction tests demonstrate that the load bearing capacity of the soil has not been compromised by excessive water content due to leaking drains and is therefore capable of bearing the imposed load.

Site Investigations from 2014 revealed the presence of functionally active *Ulmus* roots in TP/BH1 to a depth of 1500mm and 1900mm in TP/BH2; this depth is in excess of foundations which extend to a depth of 500mm in TP/BH1 and 1200mm in TP/BH2.

Functionally active *Acer spp* and *Ulmus spp* roots were also found in BH3 (2015) down to a depth of 3000mm below ground level.

Our survey of the site identified T2 (Acer) and T3 (Elm), which, given their position relative to the damage it is our opinion that the roots identified emanate from these trees.

Sample trial pits are generally small in size and the recovery of roots from such a small excavation leads us to conclude that these will not be isolated examples; there is significant potential for further root proliferation below the insured structure.

There is currently no positive root identification to implicate the causal elements of T5 (Pear), however, based on our assessment on site we consider that the footings of the subject property fall within the anticipated rooting zone of this vegetation.

Level monitoring has been undertaken (with 6 readings currently available); the results of this monitoring have confirmed soil recovery over the winter period; soil recovery serves to confirm that defective drainage is not a material cause of the subsidence.

Where vegetation is involved it produces a characteristic 'seasonal' pattern of foundation movement (subsidence through the summer, recovery through the winter); no other cause produces a similar pattern. If it is occurring soil drying by vegetation must be involved, unless the foundations are less than 300mm in depth, which in this case they are not.

The pattern of movement exhibited in this instance is consistent with the known influence of vegetation.

Given the above, vegetation is judged to retain the capacity to be causal to the current movement / damage.

In assessing the extent of damage and the potential drying influence of the vegetation on site, T2 (Acer) and T3 (Elm) are judged to be the dominant features and accordingly we have identified them as the principal cause of the subsidence.

T5 (Pear), cannot be discounted as contributing to the overall level of soil drying proximate to the area of damage and is therefore also considered to retain a contributory influence, albeit in a limited / secondary capacity when compared to T2 (Acer) and T3 (Elm).

Considering engineers conclusions, results of site investigations and our observations on site, vegetation management is considered appropriate with a view to restoring stability.

Please refer to Section 6 for management prescriptions.

In order to mitigate the current damage and allow soils beneath the property to recover to a position such that an effective engineering repair solution can be implemented we recommend a program of removals as listed by this report.

Whilst we have given consideration to pruning as a means of mitigating the vegetative influence of the above, this has been discounted.

Pruning is generally ineffective and in the context of the current claim we consider the above vegetation is simply too large and/or close for pruning to be effective.

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Removal of the above vegetation will offer the most certain and reliable arboricultural solution likely to restore long-term stability.

Replacement planting is considered appropriate however due consideration must be given to the ultimate size of the replacement and future management requirements. Species selection should be appropriate for the chosen site and ultimate tree height should not exceed 75% of the available distance to built structures.

We recommend the efficacy of the management recommendations be qualified by means of further monitoring to confirm stability.

Please note that the footing of the subject property fall within the likely rooting zone of a further tree identified as T1 (Lime); this tree is noted to present a theoretical future risk.

Is vegetation likely to be a contributory factor in the current damage?	Yes
Is vegetation management likely to contribute to the future stability of the property?	Yes
Is replacement planting considered appropriate?	See Above
Would DNA profiling be of assistance in this case?	No

6.0 Recommendations

6.1 Table 1 - Current Claim Requirements

These recommendations may be subject to review following additional site investigations

Tree No.	Species	Age Cat	Approx. Height (m)	Distance to Building (m)	Ownership	Action	Requirement
T2	Acer	1	17	8	F - Commercial Third Party	Remove	Remove and treat stump to inhibit regrowth.
T3	Elm	1	15	10.5	C - Insured	Remove	Remove and treat stump to inhibit regrowth.
T5	Pear	1	9	1	F - Commercial Third Party	Remove	Remove and treat stump to inhibit regrowth.

Age Cat: 1 = Younger than property; 2 = Similar age to the property; 3 = Significantly older than property

6.2 Table 2 - Future Risk Recommendations

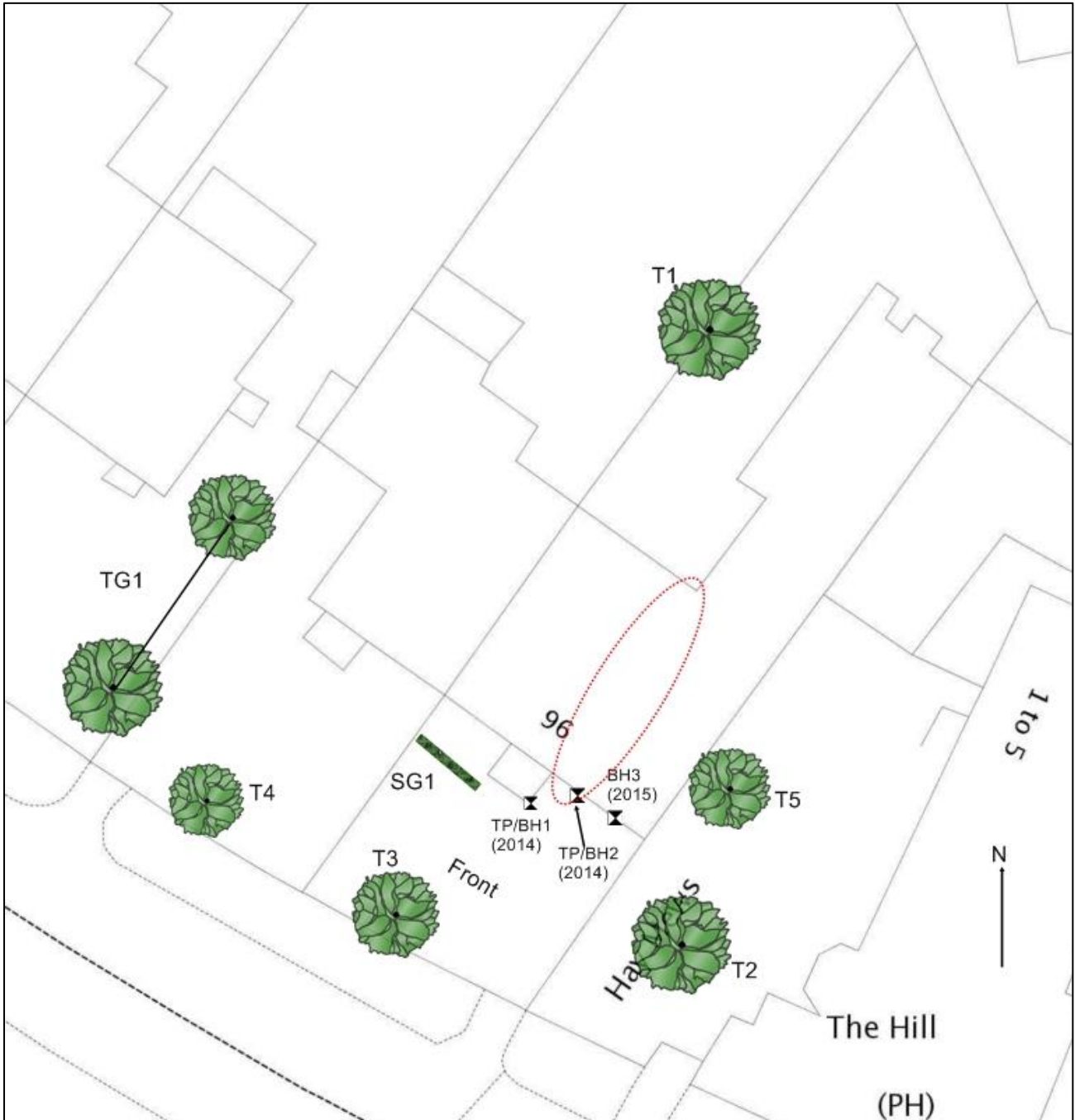
Tree No.	Species	Age Cat	Approx. Height (m)	Distance to Building (m)	Ownership	Action	Requirement
SG1	Mixed species group including Cordyline and Fern.	1	1	1	C - Insured	Action to avoid future risk	Do not allow to exceed current dimensions by way of regular pruning.
T1	Lime	1	16	10	A - Third Party 98 Haverstock Hill London NW3 2BD	Action to avoid future risk	Remove and treat stump to inhibit regrowth.
T4	Lime	1	11.5	16	A - Third Party 98 Haverstock Hill London NW3 2BD	Action to avoid future risk	Do not allow to exceed current dimensions by way of regular pruning.
TG1	Mixed species group	1	17	15	A - Third Party 100 Haverstock Hill London NW3 2BD	Action to avoid future risk	Reduce Beech to 14m in height and maintain at reduced dimensions. Do not allow Lime to exceed 12m max height current dimensions by way of regular pruning.

Age Cat: 1 = Younger than property; 2 = Similar age to the property; 3 = Significantly older than property

* Estimated

Third party property addresses should be treated as indicative only, should precise detail be required then Environmental Services can undertake Land Registry Searches

7. Site Plan



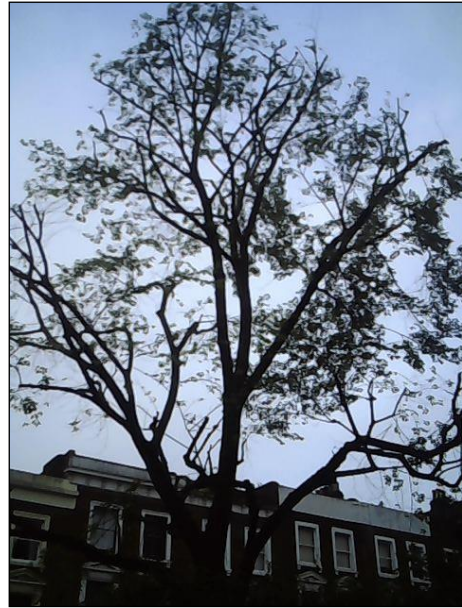
Please note that this plan is not to scale. OS Licence No. 100043218

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8. Photographs



T2 - Acer



T3 - Elm



T4 - Lime



SG1 - Mixed species group

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T5 - Pear

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Date: 16/10/2015

Property: 96 Haverstock Hill, London, NW3 2BD

9. Tree Works Reserve - Does not include recommendations for future risk.

Insured Property Tree Works	£1130
Third Party Tree Works	£2250
Provisional Sum	£0

- The above prices are based on works being performed as separate operations.
- The above is a reserve estimate only.
- Ownerships are assumed to be correct and as per Section 6.
- A fixed charge is made for Tree Preservation Order/Conservation Area searches unless charged by the Local Authority in which case it is cost plus 25%.
- Should treeworks be prevented due to statutory protection then we will automatically proceed to seek consent for the works and Appeal to the Secretary of State if appropriate.
- All prices will be subject to V.A.T., which will be charged at the rate applying when the invoice is raised.
- Trees are removed as near as possible to ground level, stump and associated roots are not removed or included in the price.
- Where chemical application is made to stumps it cannot always be guaranteed that this will prevent future re-growth. Should this occur we would be pleased to provide advice to the insured on the best course of action available to them at that time. Where there is a risk to other trees of the same species due to root fusion, chemical control may not be appropriate.

10. Limitations

This report is an appraisal of vegetation influence on the property and is made on the understanding that that engineers suspect or have confirmed that vegetation is contributing to clay shrinkage subsidence, which is impacting upon the building. Recommendations for remedial tree works and future management are made to meet the primary objective of assisting in the restoration of stability to the property. In achieving this, it should be appreciated that recommendations may in some cases be contrary to best Arboricultural practice for tree pruning/management and is a necessary compromise between competing objectives.

Following tree surgery we recommended that the building be monitored to establish the effectiveness of the works in restoring stability.

The influence of trees on soils and building is dynamic and vegetation in close proximity to vulnerable structure should be inspected annually.

The statutory tree protection status as notified by the Local Authority was correct at the time of reporting. It should be noted however that this may be subject to change and we therefore advise that further checks with the Local Authority MUST be carried out prior to implementation of any tree works. Failure to do so can result in fines in excess of £20,000.

Our flagging of a possible recovery action is based on a broad approach that assume all third parties with vegetation contributing to the current claim have the potential for a recovery action (including domestic third parties). This way opportunities do not "fall through the net"; it is understood that domestic third parties with no prior knowledge may be difficult to recover against but that decision will be fully determined by the client.

A legal Duty of Care requires that all works specified in this report should be performed by qualified, arboricultural contractors who have been competency tested to determine their suitability for such works in line with Health & Safety Executive Guidelines. Additionally all works should be carried out according to British Standard 3998:2010 "Tree Work. Recommendations".