

Arboricultural Appraisal Report

Subsidence Damage Investigation at:

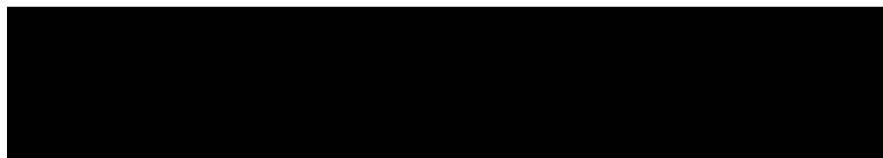
7 Holly Village
London
N6 6QJ



CLIENT:	Crawford & Company
CLIENT REF:	[REDACTED]
MWA REF:	[REDACTED]
MWA CONSULTANT:	Andy Clark
REPORT DATE:	30/06/2023

SUMMARY

Statutory Controls		Mitigation (Current claim tree works)	
TPO current claim	No	Policy Holder	Yes
TPO future risk	No	Domestic 3 rd Party	No
Cons. Area	Yes	Local Authority	No
Trusts schemes	No	Other	No
Local Authority: -	London Borough of Camden		



Introduction

Acting on instructions from Crawford & Company, the insured property was visited on 27/04/2023 to assess the potential role of vegetation in respect of subsidence damage.

We are instructed to provide opinion on whether moisture abstraction by vegetation is a causal factor in the damage to the property and give recommendations on what vegetation management, if any, may be carried out with a view to restoring stability to the property. The scope of our assessment includes opinion relating to mitigation of future risk. Vegetation not recorded is considered not to be significant to the current damage or pose a significant risk in the foreseeable future.

This is an initial appraisal report and recommendations are made with reference to the technical reports and information currently available and may be subject to review upon receipt of additional site investigation data, monitoring, engineering opinion or other information.

This report does not include a detailed assessment of tree condition or safety. Where indications of poor condition or health in accessible trees are observed, this will be indicated within the report. Assessment of the condition and safety of third-party trees is excluded and third-party owners are advised to seek their own advice on tree health and stability of trees under their control.

Property Description

The property comprises a 2 storey semi-detached house of traditional construction located within the Holly Village gated community.

External areas comprise gardens to the front and rear.

The site is generally level however the property is slightly elevated above the surrounding areas.

Damage Description & History

Damage relates to the rear right-hand sections of the dwelling, with cracking first observed during the summer of 2022. For a more detailed synopsis of the damage please refer to the building surveyor's technical report.

We have not been made aware of any previous claims.



Site Investigations

Site investigations were carried out by Auger on 28/10/2022, when 2 trial pits were hand excavated to reveal the foundations, with a borehole sunk through the base of the trial pit to determine subsoil conditions. A drains survey was also undertaken.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TP/BH1	Concrete	1400
TP/BH2	Concrete	850

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1	Brown fine to medium gravelly silty CLAY	-	
TP/BH2	Brown fine to medium gravelly silty CLAY	-	

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TP/BH1	2900	Either Laurus spp., Camelia spp. or Rhododendron spp.	Present
		Similar to Quercus spp.	Absent
TP/BH2	850	Quercus spp. and Pomoideae gp.	Present

Laurus spp. are Bay

Camelia spp. are evergreen shrubs/small trees

Rhododendron spp. are large woody shrubs

Quercus spp. are Oaks, both deciduous and evergreen

Pomoideae gp. includes Apple, Pear, Hawthorn, Rowan, Whitebeam, Service tree and Medlar, and shrubs including Pyracantha, Chaenomeles, Quince, Amelanchier and Cotoneaster

Drains:

The drains have been surveyed and defects have been identified, however leaking drains are concluded not to be a cause of the current damage.

Monitoring:

Level monitoring is in progress, with initial readings recording minor uplift at the front right hand corner of the building.



Discussion

Opinion and recommendations in this report are made on the understanding that Crawford & Company have identified clay shrinkage subsidence as a cause of building movement and damage.

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 2.9m bgl in TP/BH1 and to 0.85m bgl in TP/BH2, and recovered samples have been positively identified (using anatomical analysis) as either *Laurus* spp., *Camelia* spp. or *Rhododendron* spp., *Quercus* spp. and *Pomoideae* gp.; the origins of which will be the related shrubs of TG2 group [contains Bay, *Rhododendron*, *Camelia* and *Amelanchier* elements] and the Oaks [*Quercus* spp.] of TG1 group, with stems T2 and T3 being the closest. The retrieval of roots from below foundation depth confirms the influence of the related vegetation on the soils below the property foundations.

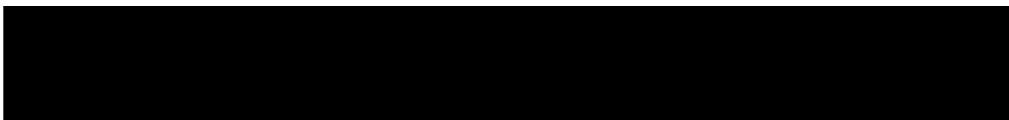
Irrespective of the identification of retrieved root samples, the T1 Lime of TG1 group will also have roots below the property foundations and will be influencing soil moisture and volumes.

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 the Bay of TG2 group is removed in the first instance, combined with hard pruning of the remaining woody shrubs of TG2 and significant crown reduction of the T1, T2 and T3 stems of TG1 group.

Other vegetation recorded presents a potential future risk to building stability and management is therefore recommended.

Recommended tree works may however be subject to change upon receipt of additional information.



Conclusions

- Conditions necessary for clay shrinkage subsidence to occur related to moisture abstraction by vegetation have been confirmed by site investigations and the testing of soil and root samples.
- Engineering opinion is that the damage is related to clay shrinkage subsidence.
- There is significant vegetation present with the potential to influence soil moisture and volumes below foundation level.
- Roots have been observed underside of foundations and identified samples correspond to vegetation identified on site.



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

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
TG1	Lime and oak group with understorey of privet, Bay, rhododendron, plum, aucuba	20.0	650	15.0	8.0	Younger than Property	Joint Policy Holder (T1, T2, T3) & 8 Holly Village & 9 Holly Village
Management history		Subject to past management/pruning - previously crown reduced.					
Recommendation		<p>Reduce height of Lime T1 and Oaks T2 and T3 to 12.0m and spread to 5.0m radius leaving balanced crown. Re-prune thereafter on a triennial cycle to maintain at broadly reduced dimensions.</p> <p>No works required to remaining stems at present – subject to review if movement persists.</p>					
TG2	Mixed spp. group of mostly Bay, Rhododendron, Holly, Camelia, Amelanchier, Viburnum and Hydrangea	5.5	350 Ms	6.5	0.0	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - appears regularly pruned.					
Recommendation		<p>Remove (fell) Bay to near ground level and treat stump to inhibit regrowth. Hard prune remainder back to individual elements no larger than 1.0m high by 1.0m spread. Re-prune thereafter on an annual cycle to maintain at broadly reduced dimensions.</p>					

Ms: multi-stemmed

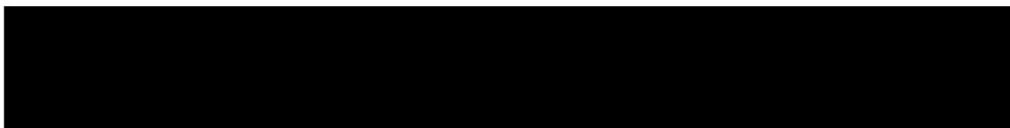
* Estimated value



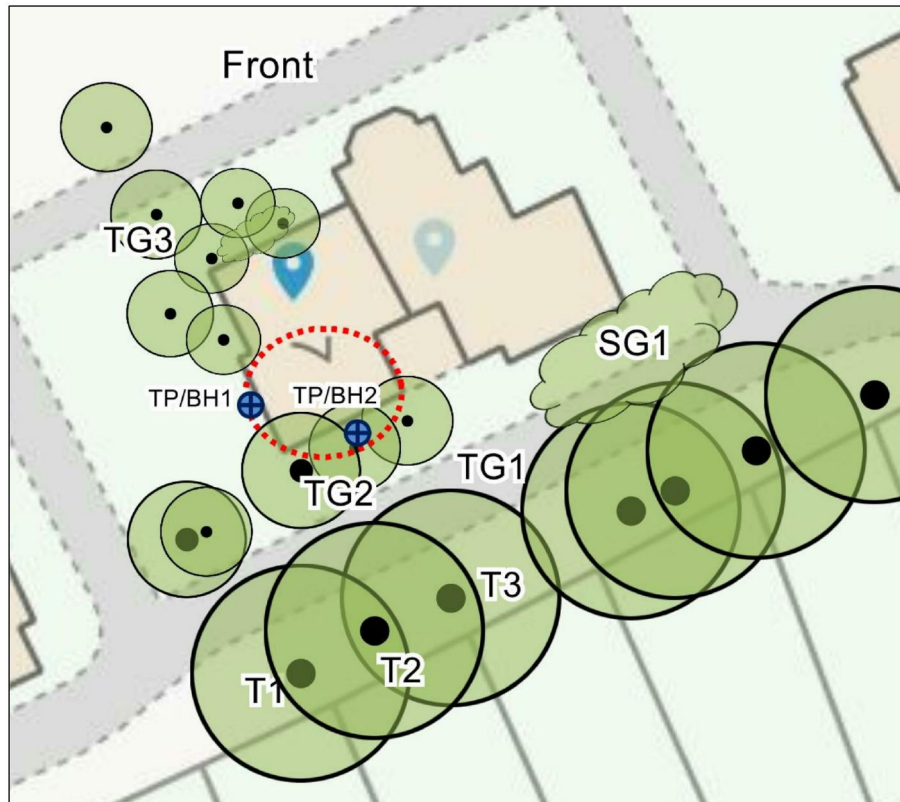
Table 2 **Future Risk - Tree Details & Recommendations**

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
TG3	Mixed spp. group of mostly Yew, Amelanchier, Choisya, Beech, Lonicera, Sumac and Wisteria	5.0	110 Ms	4.5	0.3	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - appears regularly pruned.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
SG1	Mixed spp. group of mostly Japanese Maple, Camelia and Cotoneaster	3.5	40 Ms *	4.0	4.0	Younger than Property	Third Party 8 Holly Village N6 6QJ
Management history		No significant recent management noted.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					


Ms: multi-stemmed * Estimated value



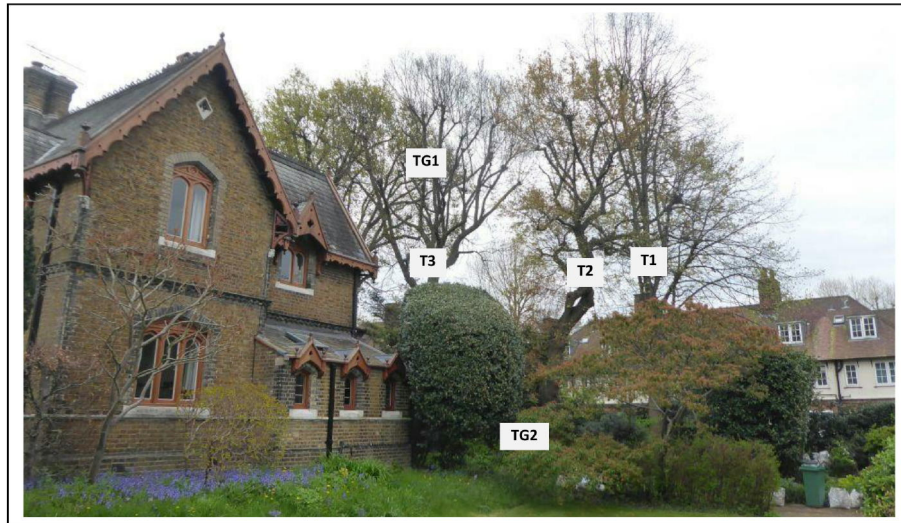
Site Plan



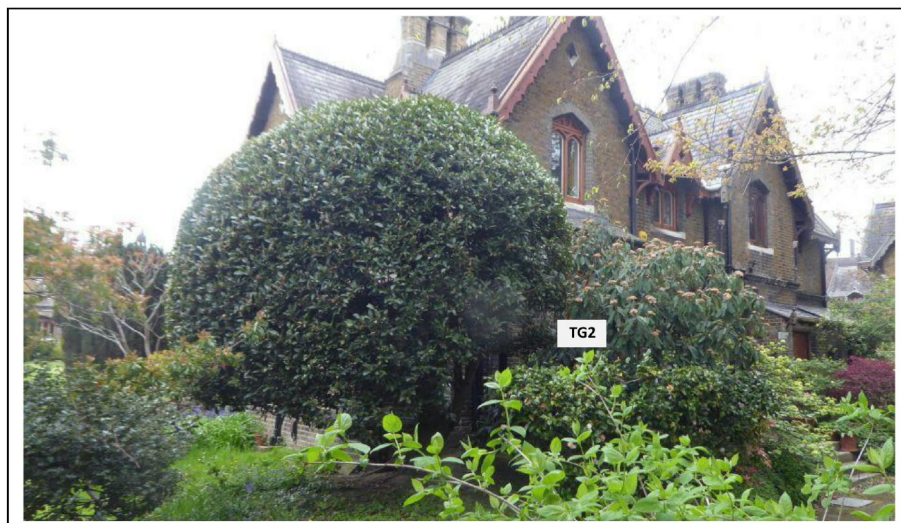
Plan not to scale – indicative only

 Approximate areas of damage

Images



View of TG1 group with TG2 to foreground



View of TG2 group

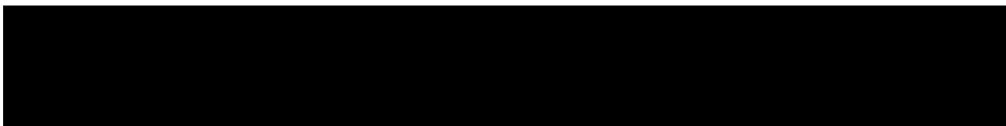




View of SG1 group



View of TG3 group



Management of vegetation to alleviate clay shrinkage subsidence.

All vegetation requires water to survive which is accessed from the soil. Clay soils shrink when water abstracted by vegetation exceeds inputs from rainfall, which typically occurs during the summer months. When deciduous vegetation enters dormancy and loses its leaves and rainfall increases during the winter months, soil moisture increases and the clay swells. (Evergreen trees and shrubs use minimal/negligible amounts of soil water during the winter).

Buildings founded on clay are susceptible to movement as the clay shrinks and swells which can result in cracking or other damage.

Where damage does occur, pruning (reducing leaf area) can in some circumstances be effective in restoring stability however, removal of the influencing vegetation (trees, shrubs, climbers) causing the ground movement offers the most predictable and quickest solution in stabilising the clay and hence the building and for this reason is frequently initially recommended as the most appropriate solution.

Often this is unavoidable due to the size or number of influencing trees, shrubs etc and their proximity to the building. Very heavy pruning of some species to a level required to effectively control its water use can result in the trees decline and ultimately death and is one factor considered when making recommendations for remedial tree works. Pruning alone, whilst reducing soil moisture uptake is often an unpredictable management option in restoring building stability either in the short or long term.

In some circumstances however, where vegetation initially recommended for removal is subsequently pruned and monitoring indicates the building has stabilised, removal becomes unnecessary with decisions based on best evidence available at the time.

