

Arboricultural Appraisal Report

Subsidence Damage Investigation at:

Finlandia
Kings Walden Road
Hitchin
SG5 3DT



CLIENT:	Crawford & Company
CLIENT REF:	SU2300596
MWA REF:	SUB230316-12685
MWA CONSULTANT:	Richard Percival (TechArborA)
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	Yes
Local Authority: -	North Hertfordshire District Council		

Introduction

Acting on instructions from Crawford & Company, the insured property was visited on 17/04/2023 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 two-storey detached house of traditional construction built in 1960. It has been extended with a two-storey addition to the front, a two-storey addition to the rear and a conservatory, also to the rear. The exact construction date for these is unknown but they pre-date the current ownership (2017). There is an integral garage to the front right of the property.

External areas comprise a paved driveway with gardens to the front and rear. The site is generally level with no adverse topographical features.

Damage Description & History

A subsidence claim was submitted in March 2017 by the then owner in respect of cracking to the front of the property. The damage was investigated by Subsidence Management Services who concluded that this damage was due to differential settlement of the foundations. This cracking was identified by the Insured's mortgage lender during the purchase and the mortgage application was initially declined.

Structural Engineers, Ian Trotter Associates Ltd, surveyed the property and undertook site investigations; they concluded the damage was not due to subsidence.

The current damage was first noted in July 2022 and relates to the centre of the property internally and to the right flank externally but the significant damage is at the right rear. For a more detailed synopsis of the damage please refer to the surveyor's technical report.

Site Investigations

Site investigations were carried out by CET on 09/05/2023, 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.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TP/BH1	Concrete	800
TP/BH2	Concrete	850

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1	Stiff brown-white slightly sandy slightly gravelly silty CLAY with pockets of chalk.	19 - 20	Low - Medium
TP/BH2	Stiff brown slightly sandy slightly gravelly CLAY	50 - 55	High

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TP/BH1	1400	<i>Fagus</i> spp.	Present
TP/BH2	2200	<i>Fagus</i> spp.	Present

Fagus spp. are commonly referred to as beech

Drains: No information available at the time of writing.

Monitoring: Level monitoring has been instructed.

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 in TP/BH2 at depths beyond normal ambient soil drying processes such as evaporation indicative of the soil drying effects of vegetation.

Roots were observed to a depth of 1.4m bgl in TP/BH1 & 2.2m bgl in TP/BH2 and recovered samples have been positively identified (using anatomical analysis) as *Fagus* spp., the origin of which will be the associated vegetation (beech) recorded in Table 1 (see below) confirming their influence on the soils below the foundations.

Irrespective of the identification of recovered root samples, the roots of the remaining vegetation detailed in Table 1 are also likely to be present below foundation level in proximity to the area of movement/damage and 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. Having considered the information currently available, it is our opinion that the vegetation recorded in Table 1 is the principal cause of or materially contributing to the current subsidence damage.

If an arboricultural solution is to be implemented to mitigate the influence of the implicated trees/vegetation we recommend that the works specified in Table 1 are carried out. Other vegetation recorded presents a potential future risk to building stability and management is therefore recommended.

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.

Recommended tree works may 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
T1	Beech	15 *	350 *	6	4	Older than extension(s) (assumed)	Third Party Great Offley Manangement Company Limited of 1 Manor Gardens SG5 3BQ
Management history		Subject to past management/pruning.					
Recommendation		Remove (fell) to near ground level. Owner to physically remove any regrowth (no chemical treatment due to translocation risk).					
TG1	Beech	Up to 15 *	Up to 350 Ms *	Up to 7	2.6	Older than extension(s) (assumed)	Third Party Great Offley Manangement Company Limited of 1 Manor Gardens SG5 3BQ
Management history		Subject to past management/pruning.					
Recommendation		Remove (fell) southernmost stem in group to near ground level. Owner to physically remove any regrowth (no chemical treatment due to translocation risk). Reduce remaining trees in height to ~8m and maintain at broadly reduced dimensions by biennial pruning. Subject to review if movement persists.					
TG2	Beech, elder	Up to 13	Up to 170 *	Up to 4	2	Older than extension(s) (assumed)	Third Party Great Offley Manangement Company Limited of 1 Manor Gardens SG5 3BQ
Management history		Subject to past management/pruning.					
Recommendation		Remove (fell) beech elements in group to near ground level. Owner to physically remove any regrowth (no chemical treatment due to translocation risk).					
TG3	Beech	Up to 15 *	Up to 260 Ms *	Up to 7	5	Younger than Property (assumed)	Third Party Great Offley Manangement Company Limited of 1 Manor Gardens SG5 3BQ
Management history		Subject to past management/pruning.					
Recommendation		Remove (fell) all trees in group that are within 10m of the property to near ground level. Owner to physically remove any regrowth (no chemical treatment due to translocation risk). Maintain remaining elements at broadly current dimensions by periodic pruning.					

Ms: multi-stemmed * Estimated value

Property: Finlandia
Kings Walden Road, Hitchin
SG5 3DT

Client Ref: SU2300596
MWA Ref: SUB230316-12685

Table 1 **Current Claim - Tree Details & Recommendations cont'd**

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
C1	Wisteria	4	250 *	7	0.1	Younger than Property	Policy Holder
Management history		No recent management noted.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
C2	Virginia Creeper	8 *	40	3	0.1	Younger than Property	Policy Holder
Management history		No recent management noted.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					

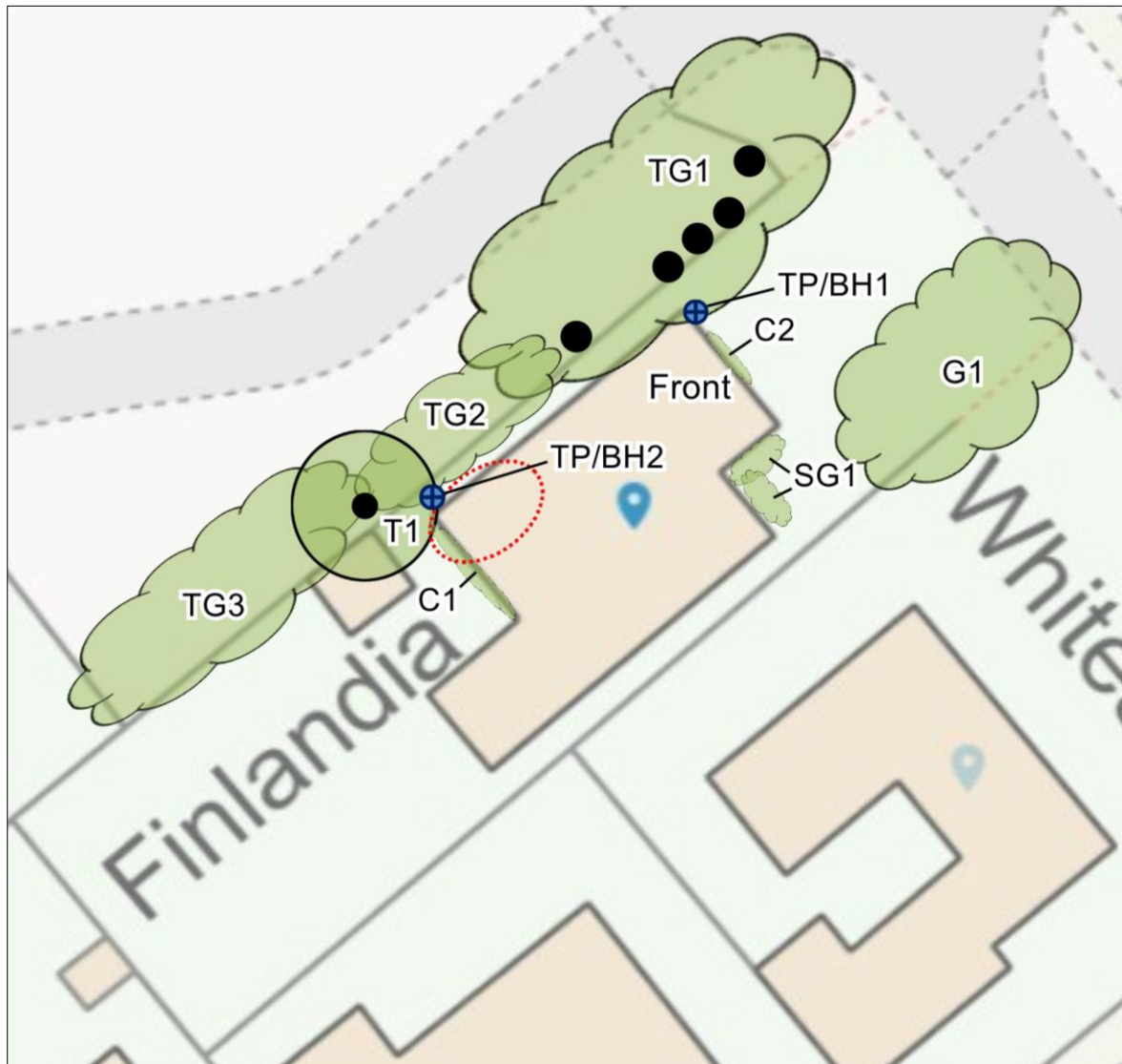
Ms: multi-stemmed * Estimated value

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

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
SG1	Including cornus, shrubs	Up to 2 *	Up to 40 Ms *	1	0.2	Younger than Property	Policy Holder
Management history		Subject to past management/pruning.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
G1	Including elder, cotoneaster, Holly, cherry	Up to 6	Up to 120 Ms *	Up to 3	3 *	Younger than Property	Policy Holder
Management history		No 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





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.