Addendum Arboricultural Report

Subsidence Damage Investigation at:

2 Greenside
Crowthorne
RG45 6EX

CLIENT:	Crawford & Company
CLIENT REF:	SU2203515
MWA REF:	SUB221115-11252Rev01
MWA CONSULTANT:	Mark Bisley (BSc Hons)
INITIAL REPORT DATE:	16/12/2022
REVISION DATE: Rev01	22/07/2024

SUMMARY

Statutory Controls			Mitigation (Current claim tree works)	
TPO current claim	Yes – T4		Policy Holder	Yes
TPO future risk	Yes – T1, T2, T3, T7		Domestic 3rd Party	Yes
Cons. Area	No		Local Authority	No
Trusts schemes	No		Other	No
Local Authority: -	Wokingham Borough Council			

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Introduction

This is an addendum to our initial appraisal report dated 16/12/2022 and has been produced following a revision to the cause of damage at the garage and receipt of monitoring data.

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.

Acting on instructions from Crawford & Company, the insured property was visited on 13/12/2022 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 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, built in the 1960s with an attached garage to the left.

External areas comprise gardens to the front and rear. The site slopes up gently from the front to the rear.

Damage Description & History

The current damage affects the front and right elevations, with internal and external cracking present. Damage was first noticed in July 2022.

At the time of the engineer's inspection (22/09/2022) the structural significance of the damage was found to fall within Category 3 (moderate) of Table 1 of BRE Digest 251.

There is also some damage to the rear of the garage. This was initially thought to be the result of subsidence, however this has since been revised to thermal movement. Vegetation would not be a significant factor in that type of damage, so it is now excluded from this report.

For a more detailed synopsis of the damage please refer to the building surveyor's technical report.

Site Investigations

Site investigations were carried out by Fastrack on 08/11/2022, when two trial pits were hand excavated to reveal the foundations, each with a borehole sunk through the base of the trial pit to determine subsoil conditions. A drainage survey was also undertaken.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TP1	Concrete	800
TP2	Concrete	810

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1	Silty, sandy CLAY to 1.30m. Silty, clayey SAND to 1.60m. Silty, sandy CLAY to 1.90m. Silty, clayey SAND to 3.00m. Terminated at 3.00m.	24 – 45	Medium – High
TP/BH2	Silty, sandy CLAY to 1.40m. Silty, clayey SAND to 3.00m. Terminated at 3.00m.	21 – 31	Medium

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TP/BH1	2500	*Pinus spp.* *Quercus spp.*	Absent Present
TP/BH2	2500	*Pinus spp.* *Quercus spp.*	Absent Present

Pinus spp. are pines.
Quercus spp. are oaks.

Drains: The drains have been surveyed and no significant defects identified.

Monitoring: Level monitoring began on 14/10/2022 with six additional readings to 27/11/2023.

Discussion

Opinion and recommendations are made on the understanding that Crawford & Company are satisfied that the current building movement and the associated damage is the result of clay shrinkage subsidence and that other possible causal factors have been discounted.

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 both excavations at depths beyond normal ambient soil drying processes such as evaporation indicative of the soil drying effects of vegetation.

A comparison of soil suction data with Table 1 of BRE Digest 412 suggests moderate desiccation (155.14kPa) in TP/BH2.

Roots were observed to a depth of 2500mm bgl in TP/BH1 and recovered samples have been positively identified (using anatomical analysis) as *Pinus spp.* and *Quercus spp.*, the origin of which will be T7 and either T2 or T4 respectively, confirming their influence on the soils below the foundations.

Roots were observed to a depth of 2500mm bgl in TP/BH2 and recovered samples have been positively identified (using anatomical analysis) as *Pinus spp.* and *Quercus spp.*, the origin of which will be T7 and T4 respectively, confirming their influence on the soils below the foundations.

Irrespective of the identification of recovered root samples, the roots of T1 and T2 are also likely to be present below foundation level of the garage.

In our original report we considered that T1, T2 and T4 were the principal cause of or were materially contributing to the current subsidence damage and that, if an arboricultural solution was to be implemented to mitigate the influence of the implicated trees/vegetation, then T1 and T4 should be removed and T2 reduced.

T5 and T6 were recommended for removal under Future Risk due to a combination of the loss of companion shelter from T4 and their ability to replace that tree's influence if they are retained.

T1 would only be a factor at the garage so this is now excluded in relation to the Current Claim and placed in Future Risk.

T2 has the potential to be affecting the entire house, so cannot be fully excluded as a factor, however its location relative to the area of damage makes T4 the most likely cause of the damage to the house.

Level monitoring shows that there was recovery at the front right corner of the house, with the rest being fairly stable. This would suggest that the house is able to sustain the effects of T2 without undue harm. Based upon this T2 is moved to Future Risk.

However, both T1 and T2 represent a potential future risk to stability and on this basis the original recommendations are maintained.

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

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.
- Replacement planting may be considered subject to species choice and planting location.

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

Tree No.	Species	Ht. (m)	Dia. (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T4	English Oak	21	770	22 *	5	Older than Property	Joint Policy Holder & 1 Badgers Sett RG45 6EY
Management history		No significant recent management noted.					
Recommendation		Remove (fell) to near ground level. Owner to physically remove any regrowth (no chemical treatment due to translocation risk).					

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
T1	Scots pine	16	425 *	9 *	2.5	Similar Age to Property	Third Party 4 Greenside RG45 6EX
Management history		No significant recent management noted.					
Recommendation		Remove (fell) to near ground level.					
T2	English Oak	23	850 *	18	7	Older than Property	Policy Holder
Management history		No significant recent management noted.					
Recommendation		Reduce height to 20m and spread to 15m leaving balanced crown. Prune on a triennial cycle to maintain at broadly reduced dimensions.					
T3	Birch	22	675 *	11	8	Older than Property	Policy Holder
Management history		No significant recent management noted.					
Recommendation		No works required.					
T5	English Oak	10	225 *	6.5 *	6 *	Younger than Property	Third Party 1 Badgers Sett RG45 6EY
Management history		No significant recent management noted.					
Recommendation		Remove (fell) to near ground level. Owner to physically remove any regrowth (no chemical treatment due to translocation risk).					
T6	English Oak	15 *	225 *	6.5 *	8.5 *	Younger than Property	Third Party 1 Badgers Sett RG45 6EY
Management history		No significant recent management noted.					
Recommendation		Remove (fell) to near ground level. Owner to physically remove any regrowth (no chemical treatment due to translocation risk).					

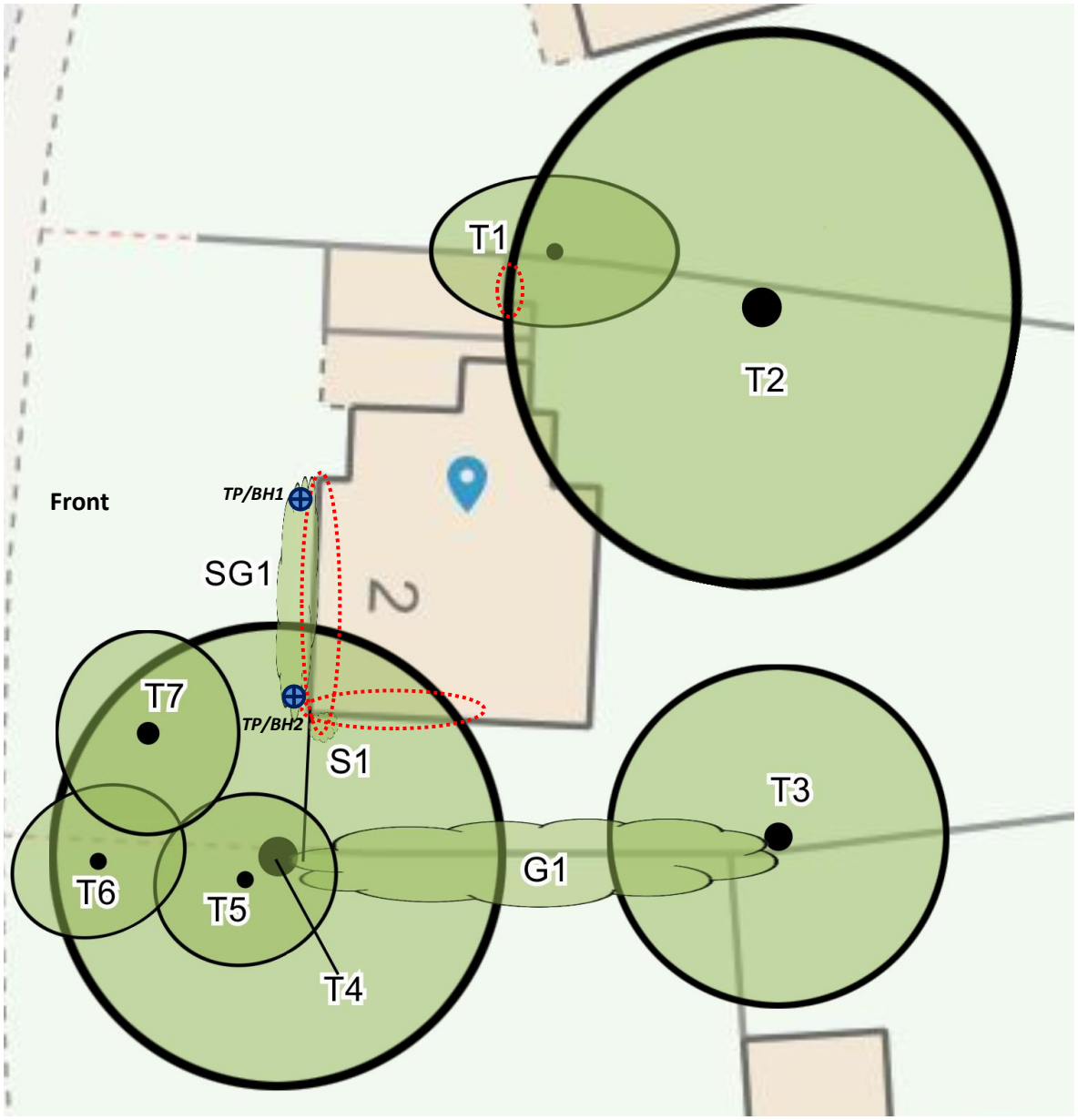
Ms: multi-stemmed * Estimated value

Table 2 **Future Risk** - Tree Details & Recommendations Cont'd

Tree No.	Species	Ht. (m)	Dia. (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T7	Scots pine	22	580	6	5	Younger than Property	Policy Holder
Management history		No significant recent management noted.					
Recommendation		Do not allow to exceed current dimensions.					
S1	Rhododendron	2	15 *	1	0	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - appears regularly trimmed.					
Recommendation		Remove (fell) to near ground level. Owner to physically remove any regrowth (no chemical treatment due to translocation risk).					
SG1	Includes Camelia, Hypericum, Privet	2	15 Ms *	2	0	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - appears regularly pruned.					
Recommendation		Do not allow to exceed current dimensions.					
G1	Yew, Cherry-laurel, Rhododendron	5 *	200	7	4	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - appears regularly pruned.					
Recommendation		Do not allow to exceed current dimensions.					

Ms: multi-stemmed * Estimated value

Site Plan



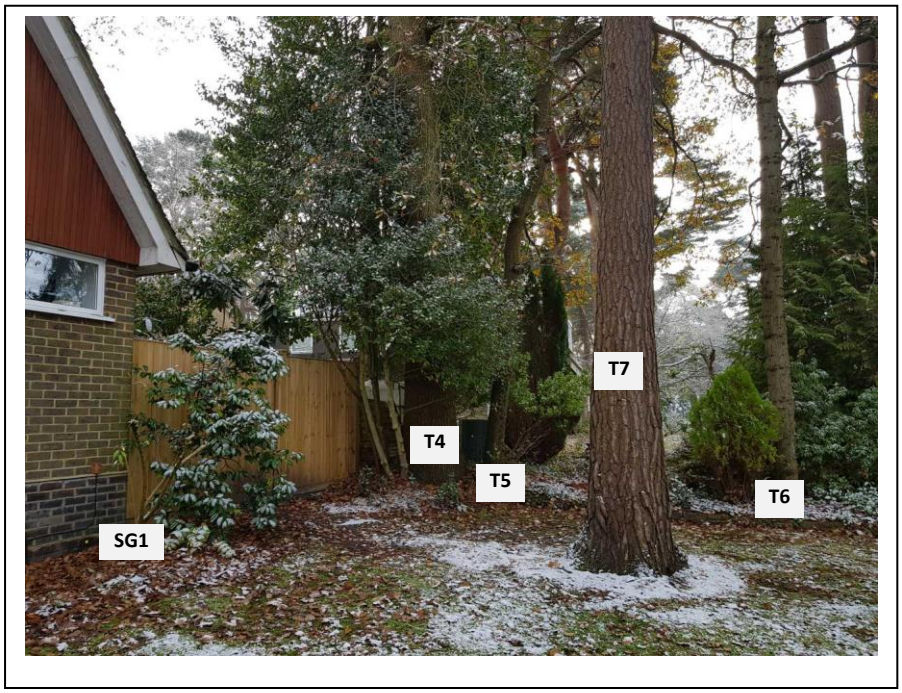
Plan not to scale – indicative only

Approximate areas of damage

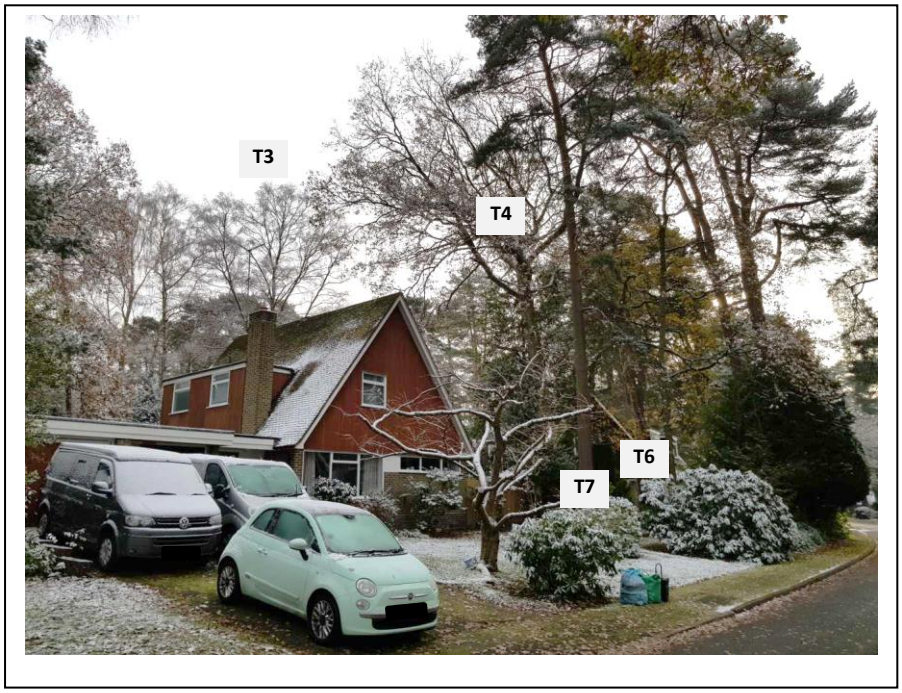
Images

View of T1 and T2 from front

View of T1 and T2 from rear garden



View of bases of trees to front right



View of trees to front right

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.