Arboricultural Appraisal Report

Subsidence Damage Investigation at:

24 Bearfield Buildings
Bradford-on-Avon
BA15 1RP



CLIENT:	Crawford & Company
CLIENT REF:	SU2204762
MWA REF:	SUB230807-13939
MWA CONSULTANT:	Giles Mercer
REPORT DATE:	17/10/2023

SUMMARY

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

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Introduction

Acting on instructions from Crawford & Company, the insured property was visited on the 21/09/2023 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.

External areas comprise gardens to the front, right hand side and rear.

The site slopes downhill from the front to the rear and from right to left. The house is in an elevated position in comparison to the garden.

Damage Description & History

Damage relates to the front left-hand corner and rear right-hand area of the insured dwelling.

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

We have not been made aware of any previous claims.

Site Investigations

Site investigations were carried out by CET on 23/05/2023, 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	1500
TP/BH2	Concrete	2300

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1	Stiff brown grey CLAY	24 - 27	Medium
TP/BH2	Stiff brown grey CLAY	23 - 28	Medium

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TP/BH1	1500	probably Campsis spp.	Present
TP/BH1	1500	broadleaved species, too juvenile for positive identification	Present
TP/BH1	2500	broadleaved species, too juvenile for positive identification	Present
TP/BH2	2300	probably Rosa spp.	Present

Campsis spp. are flowering climbers including the trumpet vine.
Rosa spp. are roses.

Drains: No information available at the time of writing.

Monitoring: No information available at the time of writing.

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 both TP/BH1 & 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 2.5m bgl in TP/BH1 and to a depth of 2.3m bgl in TP/BH2. Recovered samples have been identified (using anatomical analysis) as Campsis spp., a broadleaved species and probably Rosa spp., the origin of which will be the Trumpet Creeper (C1), most probably the Philadelphus (S1) and the mixed species shrub group (SG3) confirming their influence on the soils below the foundations.

Irrespective of the identification of recovered root samples, the roots of the False Acacia (T3) 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 Trumpet Creeper (C1), the Philadelphus (S1), the mixed species shrub group (SG3) and the False Acacia (T3) are the principal cause of or are 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 Trumpet Creeper (C1), the Philadelphus (S1), the mixed species shrub group (SG3) and the False Acacia (T3) are removed. 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.
- 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
T3	False Acacia	5.2	80 *	4	3.75	Younger than Property	Third Party 23 Huntingdon Street BA15 1RF
Management history		No significant recent management noted.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
S1	Philadelphus	5	50 Ms *	5	4.9	Younger than Property	Policy Holder
Management history		Managed shrubs.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
SG3	Mixed species shrubs including pheasant berry, rose and others (third party vegetation with limited view).	3 *	15 Ms *	3	0.2 *	Younger than Property	Third Party 23 Huntingdon Street BA15 1RF
Management history		Managed shrubs.					
Recommendation		Remove (fell) to near ground level and treat stumps to inhibit regrowth along the length of the building (plus 2m clearance).					
C1	Trumpet creeper	2.3	35 Ms *	3.5	1.5	Younger than Property	Policy Holder
Management history		Managed shrubs.					
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
T1	Mulberry	9.5	280 Ms	9.5	9.5	Younger than Property	Policy Holder
Management history		No significant recent management noted.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
T2	Cercis	3	80 Ms *	4	8	Younger than Property	Policy Holder
Management history		No significant recent management noted.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
T4	Ash	15 *	650 Ms *	20 *	19	Older than Property	Third Party 23 Huntingdon Street BA15 1RF
Management history		Subject to past management/pruning - previously crown reduced (regrowth appears 4-5yrs age).					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
SG1	Mixed species shrubs Group includes honeysuckle, pyracantha, spirea, rose, chamomile, hypericum.	3.4	30 Ms *	3	1.7	Younger than Property	Policy Holder
Management history		No significant recent management noted.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
SG2	Mixed species shrubs Group includes quince and rose.	2.9	20 Ms *	2	1.7	Younger than Property	Policy Holder
Management history		No significant recent management noted.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					

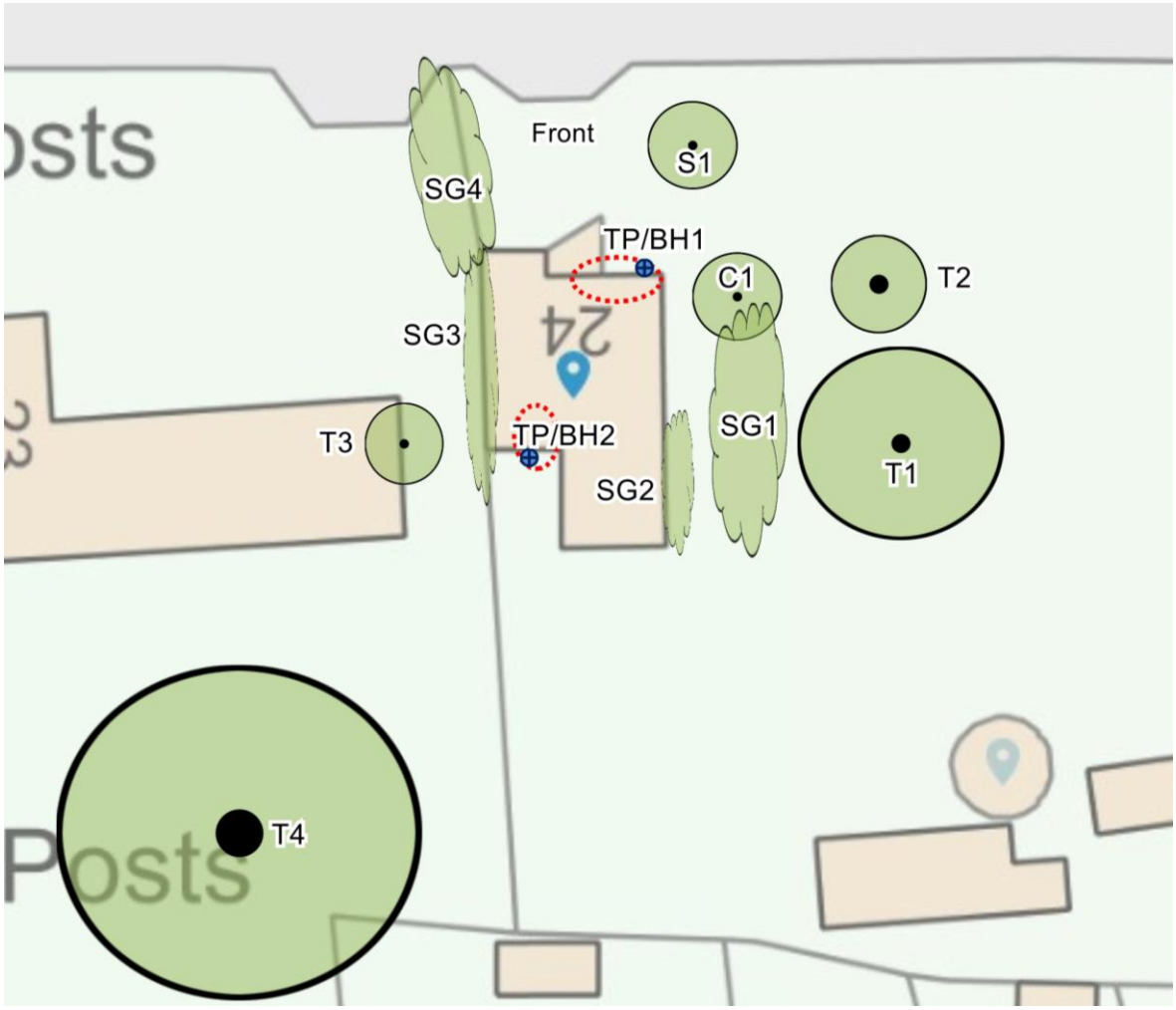
Ms: multi-stemmed * Estimated value

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
SG4	Mixed species shrubs Group includes euonymus, bramble, viburnum, philadelphus	4	50 Ms *	3	0.3	Younger than Property	Boundary Policy Holder &/or 23 Huntingdon Street BA15 1RF
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 C1



View of C1 & SG1



View of the front elevation and SG4



View of S1



View of C1 & SG1



View of SG1



View of SG2



View of T3, T4, SG3 & SG4



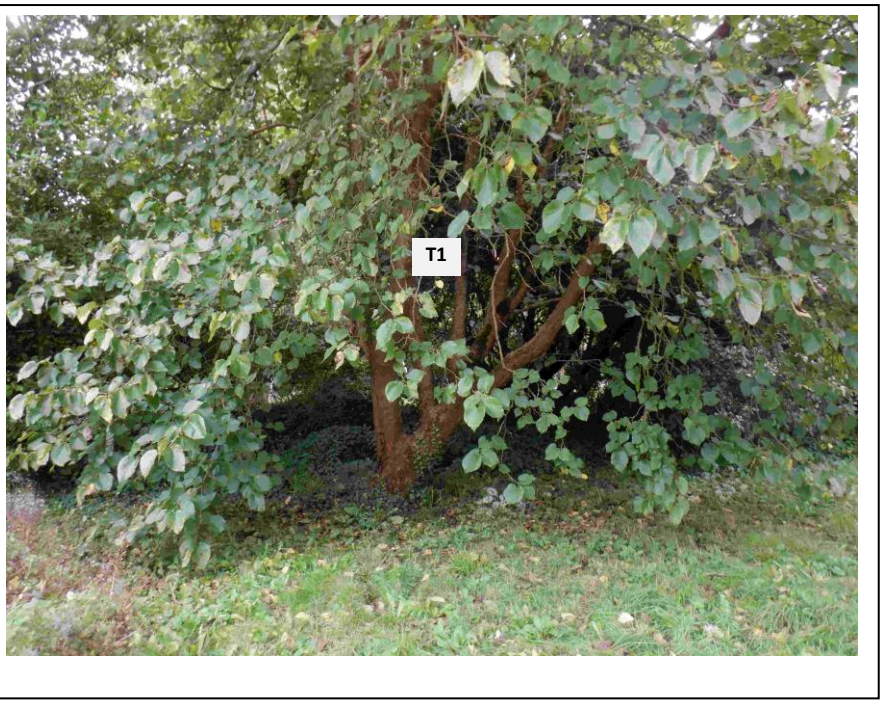
View of SG3



View of SG4



View of T1 & T2



View of T1



View of T3



View of T4

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.