Arboricultural Appraisal Report

Subsidence Damage Investigation at:

134 Abbey Road
London
NW6 4SN

CLIENT:	Crawford & Company
CLIENT REF:	[redacted]
MWA REF:	
MWA CONSULTANT:	Andy Clark
REPORT DATE:	09/06/2021

SUMMARY

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

[redacted]

Introduction

Acting on instructions from Crawford & Company, the insured property was visited on 28/05/2021 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 pair of four storey Victorian semi-detached properties of traditional construction, built C.1870 and since subdivided into eight self-contained flats.

External areas comprise gardens to the front and rear.

The site is generally level with no adverse topographical features.

Damage Description & History

Damage relates to the front portico porch and entrance steps where cracking indicates downward movement. Damage is also noted to the front boundary wall. Damage is reported to have first been observed during July 2020.

At the time of the engineer's inspection (20/10/2020) the structural significance of the damage was found to fall within Category 3 (Moderate) of Table 1 of BRE Digest 251. 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.

[redacted]

Site Investigations

Site investigations were carried out by Auger on 21/12/2020, when two 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	None – brickwork bearing onto ground level	N/A
TP/BH2	Concrete	200

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1	Moist stiff to dry very stiff brown fine gravelly sandy silty CLAY	14 – 51	Low – High
TP/BH2	Moist light brown to dry stiff brown fine gravelly sandy silty CLAY	36 – 50	Medium - High

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TP/BH1	1000	Acer spp. and Leguminoseae spp.	Present
TP/BH2	1900	Acer spp. and likely an Herbaceous (non woody) plant	Present
		Very thin sample - cannot rule out Acer spp.	Absent

Acer spp. are Maples and Sycamores
Leguminoseae spp. includes False Acacia, Laburnum, Pagoda tree, Honey Locust, Judas tree/Redbud, Silk tree) and Mimosa, as well as such shrubs as Wisteria, Lupins, Gorse and Brooms

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, commencing on 02/12/2020 with two subsequent readings available at the time of writing.

Initial readings show uplift of up to 16.6mm into the spring months of 2021, indicative of the recovery [swelling] of shrinkable clay soils as they re-hydrate from a dehydrated (shrunken) state.

[redacted]

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.

Roots were observed to a depth of 1.0m bgl in TP/BH1 and to 1.9m bgl in TP/BH2, and recovered live samples (positive Starch test) have been positively identified (using anatomical analysis) as Acer spp. and Leguminoseae spp.; the origins of which will be T4 False Acacia and the nearby T5 Maple, confirming their influence on the soils below the foundations.

Irrespective of the identification of recovered root samples, the roots of the T8 Apple 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 combined soil drying effects of T4 False Acacia, T5 Maple and T8 Apple are the cause of the current subsidence damage.

If an arboricultural solution is to be implemented to mitigate the influence of the implicated trees/vegetation we recommend that T4 False Acacia and T5 Maple are removed and T8 Apple reduced. Other vegetation recorded presents a potential future risk to building stability and management is therefore recommended. Recommended tree works may be subject to change upon receipt of additional information.

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.

[redacted]

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.

[redacted]

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	False Acacia	5.5	180	1.0	4.2	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - recently reduced/pruned to current dimensions.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
T5	Maple	12.0	340	9.0	5.0	Younger than Property	Local Authority
Management history		Subject to past management/pruning - appears regularly pruned.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
T8	Apple	6.5	180 *	5.5 *	6.0	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - previously crown reduced.					
Recommendation		Reduce by ~1.5-2.0m leaving balanced crown and prune on biennial cycle to maintain broadly at reduced dimensions.					

Ms: multi-stemmed * Estimated value

[redacted]

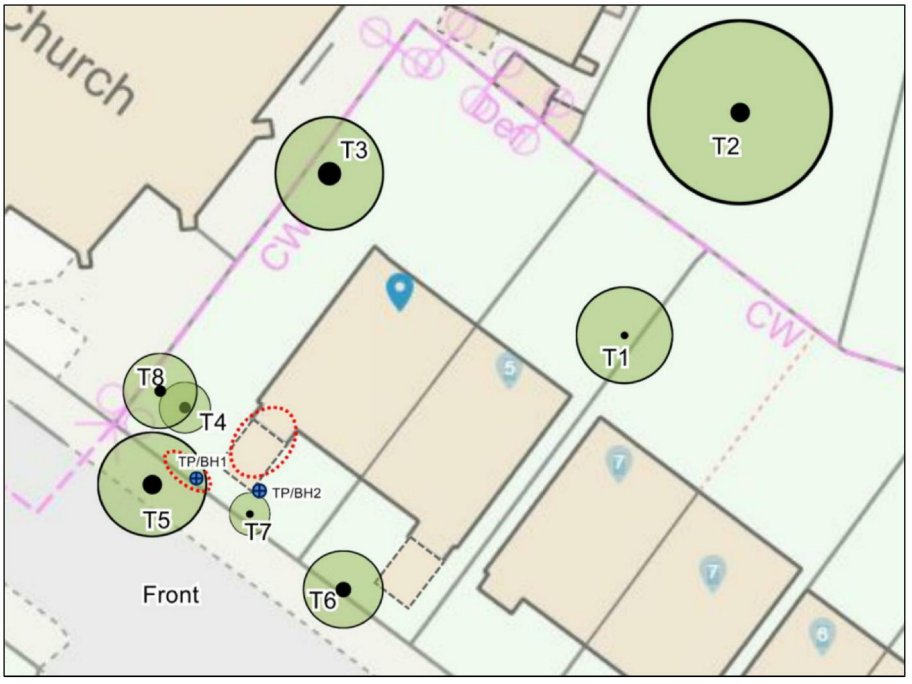
Table 2 **Future Risk** - Tree Details & Recommendations

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T1	Cotoneaster	5.5	160	3.5	5.8	Younger than Property	Policy Holder
Management history		No significant past management noted.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
T2	Oak	15.0 *	450 *	14.5 *	22.5	Younger than Property	Third Party 263 Goldhurst Terrace NW6 3EP
Management history		No significant past management noted.					
Recommendation		None at present.					
T3	Lime	15.0	600	8.5	6.2	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - previously pollarded.					
Recommendation		Maintain broadly at no more than current dimensions by periodic pruning.					
T6	Sycamore	5.5	280	2.5	1.8 [to eastern steps]	Younger than Property	Policy Holder
Management history		Recently reduced/pruned. Future risk to eastern steps.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
T7	Magnolia	4.5	50	1.0	1.9	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

[redacted]

Site Plan



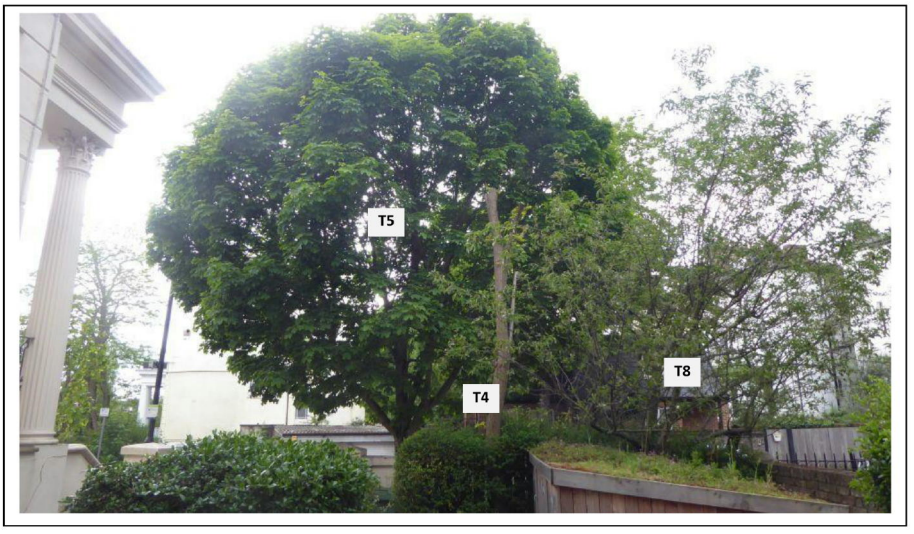
Plan not to scale – indicative only

Approximate areas of damage

[redacted]

Images

View of T5 Maple and T7 Magnolia



View of T4 False Acacia and T8 Apple, with T5 Maple visible beyond – small understorey shrubs are not considered relevant

[redacted]

View of T7 Magnolia with T6 Sycamore visible beyond

[redacted]

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.

[redacted]