

Arboricultural Appraisal Report

Subsidence Damage Investigation at:

36 Grand Avenue
Muswell Hill
London
N10 3BP



CLIENT:	Crawford & Company
CLIENT REF:	SU2206286
MWA REF:	SUB221215-11722
MWA CONSULTANT:	Andy Clark
REPORT DATE:	22/05/2023

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	None at present
Trusts schemes	No	Other	No
Local Authority: -	London Borough of Haringey		

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 split-level part two-storey/ part three-storey mid-terrace house of traditional construction, extended with a single-storey addition to the rear. The property also benefits from a loft conversion.

External areas comprise gardens to the front and rear.

The site is generally level however the rear is approx. 3.0m lower than the front which is accounted for by the rear lower-ground floor.

Damage Description & History

Damage relates to the front bay and associated areas of the front elevation, where cracking indicates downward movement. Damage is reported to have first been 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 24/02/2023, when two trial pits were hand excavated to reveal the foundations, with a borehole sunk through the base of TP/BH1 to determine subsoil conditions.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TP/BH1	Brick corbel	1600
TP2	Brick corbel	1600

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1	Moist very stiff brown fine to medium gravelly silty CLAY	44 – 46	High

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TP/BH1	1600	Platanus spp. and Prunus spp.	Present

Platanus spp. are Planes, both London Plane and Oriental Plane

Prunus spp. includes Cherries, Plums and Damsons, Almonds, Peaches and Apricots, Blackthorn/Sloe, as well as the shrubby Cherry laurel and Portuguese-laurel

Drains: No information available at the time of writing.

Monitoring: No information available at the time of writing.

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 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 1.6m bgl in TP/BH1, and recovered samples have been positively identified (using anatomical analysis) as *Platanus* spp. and *Prunus* spp.; the origins of which will be T2 and T3 London Planes – both of which are within influencing distance of the property frontage – and the Cherry and/or Purple Leaved Plum elements of the TG4 group within the property front garden.

Irrespective of the identification of recovered root samples, the roots of the H1 Privet hedge and multiple other of the larger elements of TG4 group of trees and shrubs within the property front garden may also be present below foundation level in proximity to the area of movement/damage and contributing to the influence of 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.

The London Planes T2 and T3 had been pollarded shortly prior to our survey, affectively reducing their soils moisture uptake until new growth emerges. At this stage no further works to T2 or T3 are considered necessary.

Initial recommendations are set out at Table 1 below to address the contributory influence likely exerted by the larger vegetation of the TG4 group and the H1 Privet hedge within the subject property front garden. If movement persists however once these works are completed, the management of T2 and T3 may need to be reviewed.

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
T2	London plane	7.5	460	5.0	8.4	Younger than Property	Local Authority
Management history		Subject to past management/pruning – very recently pollarded at current dimensions.					
Recommendation		Pollard on biennial cycle.					
T3	London plane	7.5	550	5.0	8.9	Younger than Property	Local Authority
Management history		Subject to past management/pruning – very recently pollarded at current dimensions.					
Recommendation		Pollard on biennial cycle.					
TG4	Mixed spp. group of mostly Bottlebrush, Olive, Purple Leaved Plum, Amelanchier and Cherry with understorey shrubs of mostly Lavender, Jasmine, Rose, Forsythia, Current, Photinia, Hydrangea and Viburnum	5.0	130	4.0	0.2	Younger than Property	Policy Holder
Management history		No significant recent management noted.					
Recommendation		Remove (fell) all woody shrubs within 1.5m of the bay window to near ground level and treat stumps to inhibit regrowth. Remove (fell) tree elements [Bottlebrush, Olive, Purple Leaved Plum, Amelanchier and Cherry] to near ground level and treat stumps to inhibit regrowth. Prune remaining woody shrubs back to individual form no larger than 1.0m high by 0.5m spread and re-prune annually thereafter to maintain at reduced dimensions.					
H1	Privet	2.0	10 Ms *	1.0	0.4	Younger than Property	Policy Holder
Management history		Subject to past management/pruning - appears regularly trimmed.					
Recommendation		Reduce height to 1.5m and trim back sides to leave hedge no thicker than 0.5m. Trim thereafter on an annual cycle to maintain at broadly reduced dimensions.					

Ms: multi-stemmed * Estimated value

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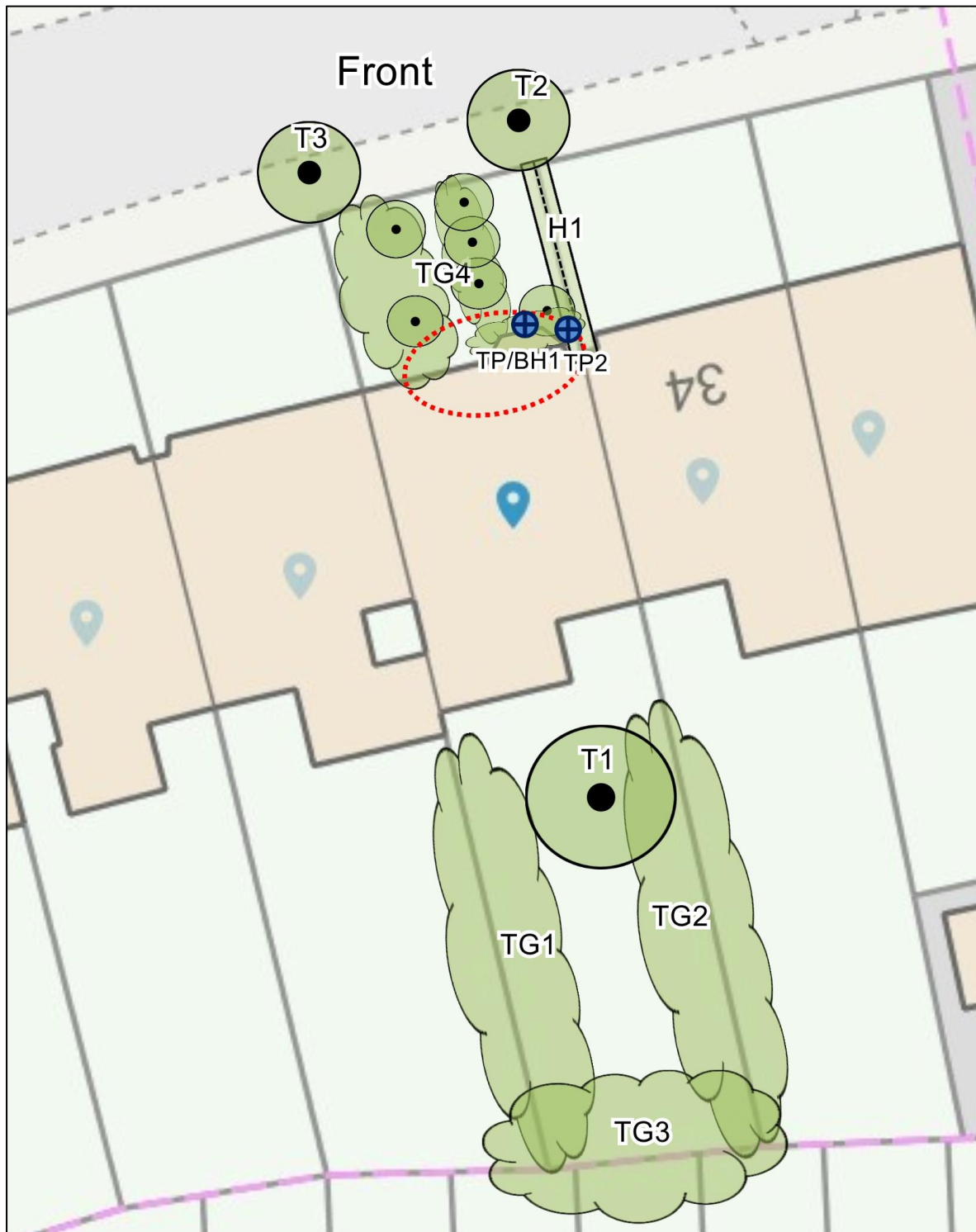
Table 2 **Future Risk - Tree Details & Recommendations**

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T1	Goat willow	6.0	310	5.0	4.7	Younger than Property	Policy Holder
Management history		Recently reduced/pruned.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
TG1	Mixed spp. group of mostly Rose, Cherry, Ceanothus, Ornamental Willow and Passionflower	6.5	100	5.0	3.8	Younger than Property	Policy Holder
Management history		No significant past management noted.					
Recommendation		Maintain broadly at no larger than current dimensions by regular [annual] pruning.					
TG2	Mixed spp. group of mostly Birch, Buddleia, Cherry, Berberis and Pyracantha	7.0	90	5.0	5.5	Younger than Property	Policy Holder
Management history		No significant past management noted.					
Recommendation		Maintain broadly at no larger than current dimensions by regular [annual] pruning.					
TG3	Cypress and False Acacia group	12.0	330 Ms *	9.0	18.0	Older than extension(s)	Policy Holder
Management history		No significant past management noted.					
Recommendation		Maintain broadly at no larger than current dimensions by regular [annual] pruning.					

Ms: multi-stemmed

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Site Plan



Plan not to scale – indicative only



Approximate areas of damage

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Images



View of TG4 group in property front garden with H1 Privet hedge to left of frame



View of T2 and T3 London Planes with TG4 group and H1 Privet hedge beyond

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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.