

## Arboricultural Appraisal Report

### Subsidence Damage Investigation at:

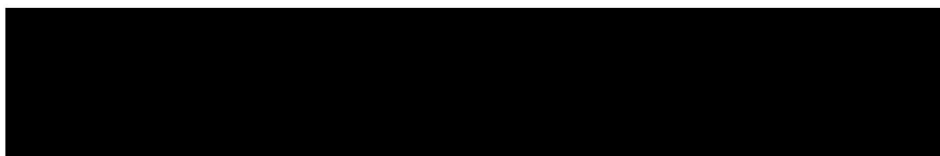
1 Mornington Crescent  
London  
NW1 7RH



CLIENT:	Crawford & Company
CLIENT REF:	[REDACTED]
MWA REF:	[REDACTED]
MWA CONSULTANT:	Andy Clark
REPORT DATE:	08/10/2021

### SUMMARY

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



## Introduction

Acting on instructions from Crawford & Company, the insured property was visited on 07/10/2021 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 5 storey end-terrace house of traditional construction originally built c.1780 and since extended with various additions to the rear and converted into seven self-contained flats - including adjoining with No.263 Hampstead Road.

External areas comprise gardens to the front and rear.

The site is generally level with no adverse topographical features, however the lower ground floors are vaulted lower than the surrounding site.

## Damage Description & History

Damage relates to the various rear projections of the building, with internal and external cracking affecting several of the flat's indicative of downward movement. Damage is reported to have first been observed during February 2020.

Damage is also noted at the property frontage, predominantly cracking in the render fascia. This is not subsidence related.

At the time of the engineer's inspection (09/09/2020) the structural significance of the damage was found to fall within Category 4 (Severe) 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.



## Site Investigations

Site investigations were carried out by Auger on 07/06/2021, when a single trial pit was 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	Brick corbel	650

### Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
TP/BH1	Dry very stiff brown fine to medium gravelly silty CLAY	35 – 50	Medium – High

### Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
TP/BH1	1150	Hedera spp. or the related Fatsia spp., and could be either Ulmus spp. or Leguminoseae spp. [poor samples – lacking bark]	Present
		Cannot rule out Hedera spp. or the related Fatsia spp. [very thin sample]	Absent

*Hedera spp. is Ivy*

*Fatsia spp. are shrubs related to Ivy*

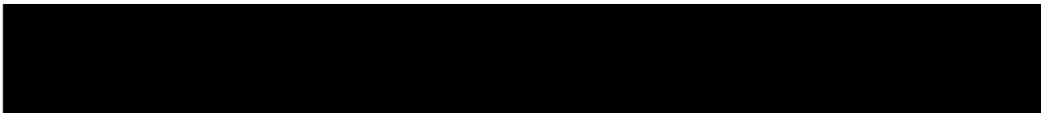
*Ulmus spp. are Elms*

*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 13/04/2021 and with two subsequent readings available at the time of writing.

Initial readings record uplift of the rear left-hand corner of the building [stud 6] of up to 2.4mm, indicative of the recovery [swelling] of clay soils as they rehydrate from a dehydrated state.



## 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 1.15m bgl in TP/BH1, and recovered samples have been positively identified (using anatomical analysis) as *Hedera* spp. or the related *Fatsia* spp., and could be either *Ulmus* spp. or *Leguminosae* spp. [poor samples – lacking bark].

The origin of the *Hedera* spp. or the related *Fatsia* spp. roots will be from nearby recently removed Ivy growth, which is not considered relevant to the damage. The tentatively identified either *Ulmus* spp. or *Leguminosae* spp. will be from the T2 Pagoda.

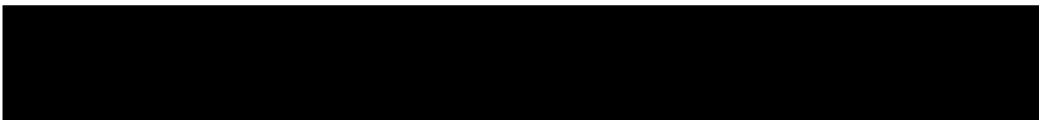
Irrespective of the identification of recovered root samples, our survey has identified vegetation within influencing distance of the building with a current potential to influence soil volumes below foundation level; the most significant of which in relation to the current damage are T1 Fig and T2 Pagoda.

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.

If an arboricultural solution is to be implemented to mitigate the influence of the implicated trees/vegetation we recommend that T1 Fig and T2 Pagoda are removed.

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.



### Conclusions

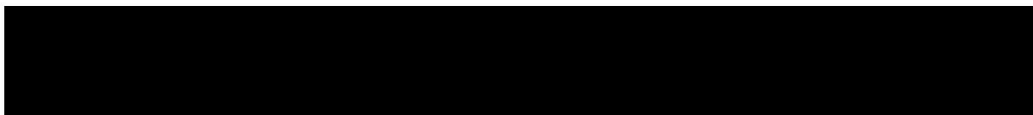
- Conditions necessary for clay shrinkage subsidence to occur related to moisture abstraction by vegetation have been confirmed by site investigations and the testing of soil and root samples.
- Engineering opinion is that the damage is related to clay shrinkage subsidence.
- There is significant vegetation 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
T1	Fig	12.0	300 Ms *	8.0	6.9	Younger than Property	Boundary Third Party 261 Hampstead Road, NW1 3EA &/or The Granby Grill NW1 3SA
Management history		No significant past management noted.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
T2	Pagoda	13.0	620	10.0	11.4	Younger than Property	Third Party The Granby Grill NW1 3SA
Management history		No significant past management noted.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					

Ms:      multi-stemmed                      \* Estimated value



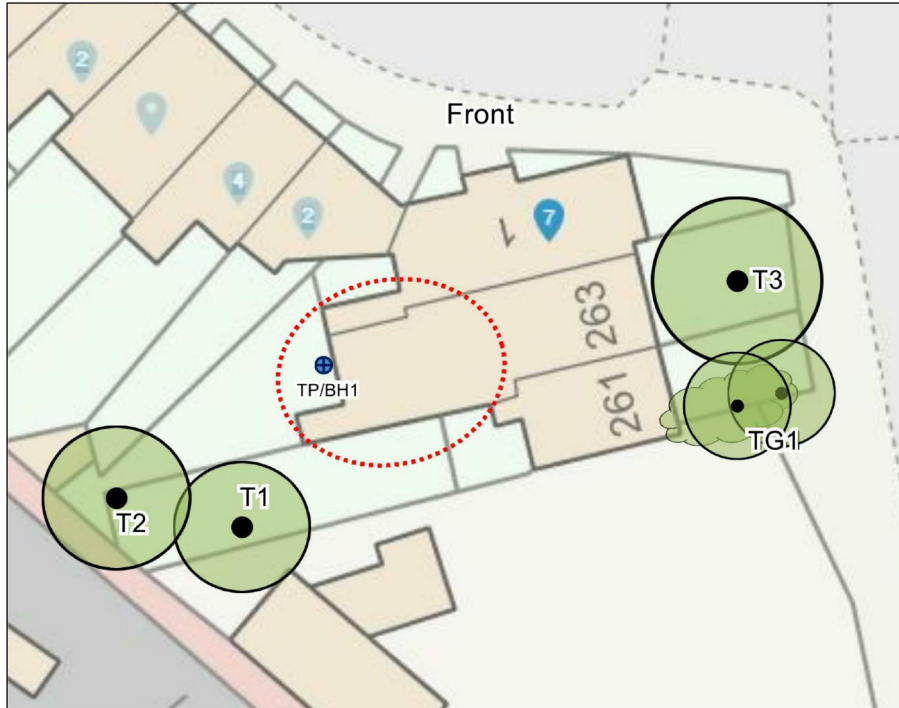
**Table 2 Future Risk - Tree Details & Recommendations**

Tree No.	Species	Ht (m)	Dia (mm)	Crown Spread (m)	Dist. to building (m)	Age Classification	Ownership
T3	Pagoda	14.5	6820	10.0	3.5	Younger than Property	Policy Holder
Management history		No significant past management noted.					
Recommendation		Remove (fell) to near ground level and treat stump to inhibit regrowth.					
TG1	Pagoda [lapsed self-sown] and ivy with mixed spp. shrub understorey	12.5 *	280 Ms *	8.0	0.1	Younger than Property	Third Party 261 Hampstead Road, NW1 3EA
Management history		No significant past management noted.					
Recommendation		Remove (fell) Pagoda stems and ivy to near ground level and treat stumps to inhibit regrowth.					


Ms: multi-stemmed \* Estimated value

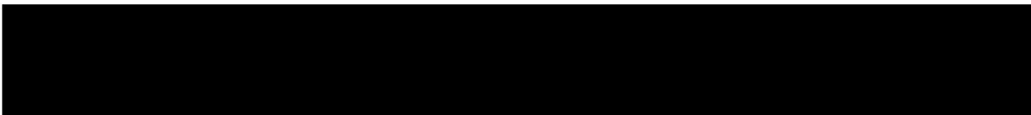


Site Plan



Plan not to scale – indicative only

 Approximate areas of damage

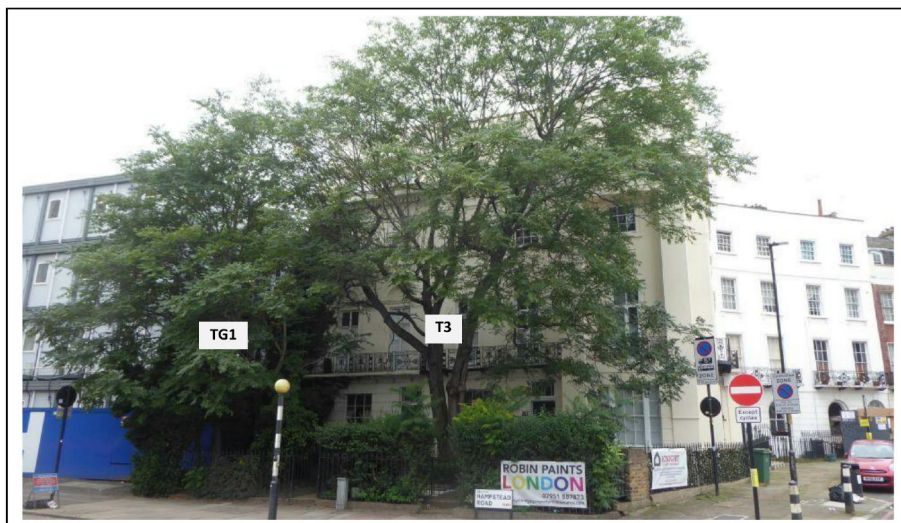




Images



View of T1 and T2



View of T3 and TG1



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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.

