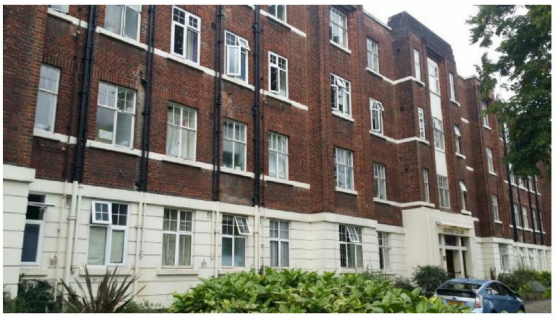
Arboricultural Appraisal Report

Subsidence Damage Investigation at:

Flat 2, Gilling Court
Belsize Grove
Hampstead
London
NW3 4UY



CLIENT:	Crawford & Company
CLIENT REF:	SU1604808
MWA REF:	SUB170818-1673
MWA CONSULTANT:	Andy Clark
REPORT DATE:	30-08-2017

SUMMARY

Statutory Controls			Mitigation (current claim)	
TPO	Yes – T2 & T3		Insured	Yes
Cons. Area	Yes		3rd Party	No
Trusts schemes	N/A		Local Authority	No
Planning	N/A		Other	No
Local Authority: -	London Borough of Camden			

[redacted]

Introduction

Acting on instructions received from Crawford & Company, the insured property was visited on 23/08/2017 for the purpose of assessing 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 4-storey purpose built block of flats built in C. 1933.

External areas comprise gardens and access roadways to the front and hardstanding car park and garage blocks to the rear.

The site is generally level with no adverse topographical features.

Damage Description & History

The current damage affects front centre of the property with damage reported in flat 2 [ground floor] and flat 28 [first floor] of the property, as well as communal first and second floor landings, and ground floor entrance lobby. Damage was first noticed in October 2016.

We understand that Cunningham Lindsey dealt with a claim in 2008 regarding damage to flat 2, which resulted in repairs. The leaseholder of Flat 2 advised that cracks reappeared about 8 months later.

At the time of the engineers' inspection (03/01/2017) the structural significance of the damage was found to fall within Category 4 (Severe) of Table 1 of BRE Digest 251.

Site investigations

Site investigations were carried out by CET on 23/02/2017, when trial pits were hand excavated to reveal the foundations with a borehole being sunk through the base of the trial pit to determine subsoil conditions.

Foundations:

Ref	Foundation type	Depth at Underside (mm)
TP1	Brick corbel	1050
TP2	Brick corbel	1050

Soils:

Ref	Description	Plasticity Index (%)	Volume change potential (NHBC)
BH1 + Datum	Stiff to very stiff orange-brown silty CLAY	54 - 66	High

Roots:

Ref	Roots Observed to depth of (mm)	Identification	Starch content
BH1 + Datum	4000	Tillia spp. Berberis or Mahonia spp.	Present Present

Drains: The drains have been surveyed and only minor cracks and fractures were observed with some root ingress. Recommendations for drainage repair are contained within the Site Investigation report.

Monitoring: Level monitoring is in progress and commenced on 08/05/2017 on a bi-monthly visit schedule; with one subsequent reading taken on the 11/07/2017. Readings taken demonstrate movement from 0.90mm to 4.80mm across MP's 1 to 9 during this initial monitoring period.

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 of high volume change potential (NHBC Classification) susceptible to undergoing volumetric change in relation to changes in soil moisture. A comparison between moisture content and the plastic and liquid limits suggests desiccation in BH1 at depths beyond normal ambient soil drying processes such as evaporation indicative of the soil drying effects of vegetation.

Shear vane testing of the substrate indicates that it is sufficiently consolidated to bear the imposed load and as such the damage cannot be attributed to consolidation settlement. This is borne out by the relative age of the building and the recent appearance of damage.

Roots were observed to a depth of 4.0m bgl in BH1 and recovered samples have been positively identified (using anatomical analysis) as Tillia spp. and Berberis or Mahonia spp., the origin of which, given their relative proximity to the property, will be T3 Lime, confirming the influence of this trees on the soils below the foundations. The recorded Berberis or Mahonia spp. roots will relate to small nearby shrubs which are not considered to be relevant. Irrespective of the root identification however, the roots of T1, T2, T4 and T5 are also likely to have a significant presence below the foundations of the property given their size and relative proximity to the structure.

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 available information, it is our opinion that T3 Lime is the principal cause of the current subsidence damage with T2 Lime also being contributory. If an arboricultural solution is to be implemented to mitigate the current damage and allow the soils beneath the property to recover to a position such that an effective repair solution can be implemented we recommend that T2 and T3 are removed.

Consideration has been given to pruning 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. Replacement planting may be considered subject to species choice and planting location.

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	Lime	14.5	600	7.0	10.4	Younger than property	Policy Holder
Management history		Crown reduced in recent past – regrowth appears <1yr Moderate basal and epicormic growth					
Recommendation		Fell to ground level and treat stump to inhibit regrowth					
T3	Lime	20.5	Ms [x4] 400	14.0	11.1	Younger than property	Policy Holder
Management history		Pollarded in past @ approx. 15m – regrowth appears <10yrs Included unions @ main stem fork cluster					
Recommendation		Fell to ground level and treat stumps to inhibit re-growth					

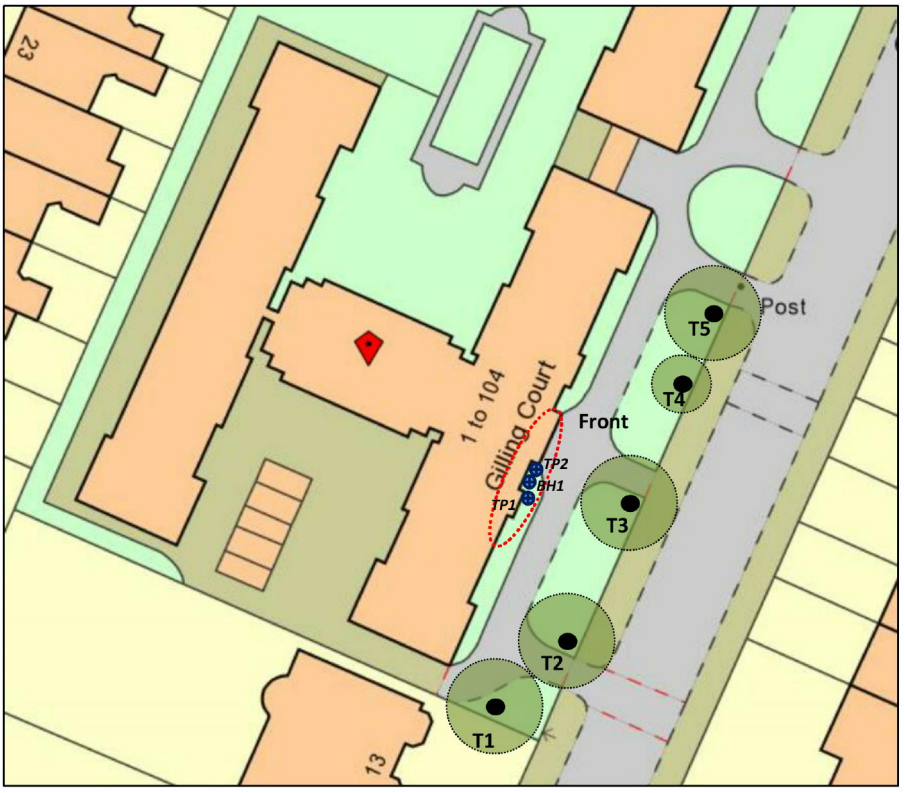
Ms: multi-stemmed * Estimated value

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	Ash	15.5	530	7.5	6.8	Younger than property	Policy Holder
Management history		Crown reduced in recent past – regrowth appears <1yr					
Recommendation		Fell to ground level and treat stumps to inhibit re-growth. The tree is too close and is an inappropriate species for its location.					
T4	Cherry	12.5	350	3.5	11.2	Younger than property	Policy Holder
Management history		Leaning stem and asymmetrical crown growth habit Crown reduced in recent past – regrowth appears <1yr					
Recommendation		Do not allow to exceed current dimensions through a programme of regular [triennial] pruning					
T5	Horse Chestnut	13.5	870	11.0	11.4	Younger than property	Policy Holder
Management history		Pollarded in past @ approx. 5.5m – regrowth appears 10> yrs Moderate stem decay at old pollard points					
Recommendation		Do not allow to exceed current dimensions through a programme of regular [triennial] pruning					

Ms: multi-stemmed * Estimated value

SITE PLAN



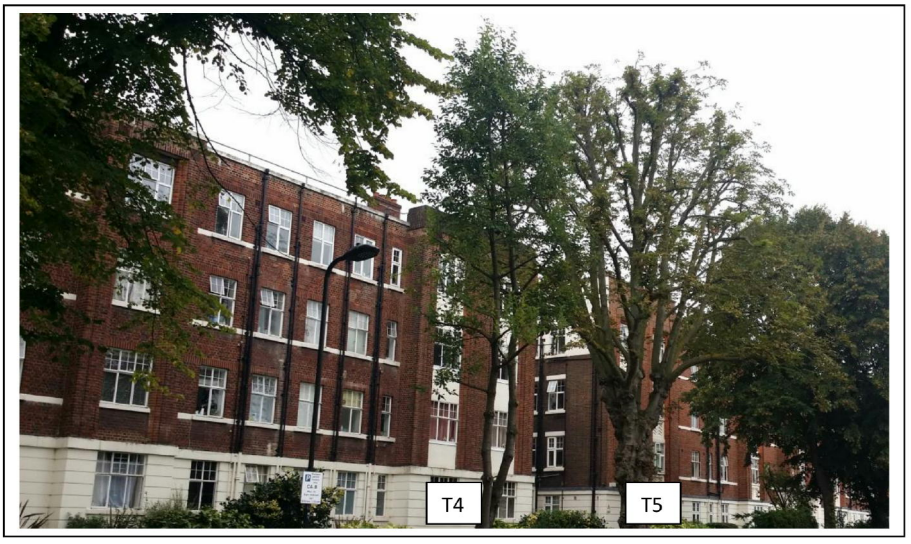
Plan not to scale – indicative only

Approximate areas of damage

Images

View of T1 Ash and T2 Lime

View of T3 Lime



View of T4 Cherry and T5 Horse Chestnut