Simon Pryce Arboriculture

Report

Client:	**Greville (3) Residents Ltd**
Site:	**3 Greville Place, London, NW3 5JS**
Instruction:	**Mr D Tomlinson, William J Marshall & Partners**
Subject:	**Trees and other vegetation near the building and their effects on it. Specification for necessary or appropriate work.**
Inspection date:	**26 November 2015**
Report date:	**20 December 2015**
Reference:	**15/102**
Author:	**Simon Pryce, B.Sc., F.Arbor.A, C.Biol, MSB, MICFor Arboricultural Association Registered Consultant**

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Arboricultural Association
REGISTERED CONSULTANT

1 Introduction

1.1 This report has been commissioned by William J Marshall & Partners, the engineers investigating a claim for subsidence at 3 Greville Place, London, NW6 5JS.

1.2 The building has some history of subsidence and there have been previous investigation of this and some tree works carried out. However monitoring and site investigations are ongoing and the purpose of this inspection is to a preliminary survey and record of significant vegetation near the building. This report also makes recommendations for necessary or appropriate work, but these are preliminary and might be modified or supplemented in the light of findings from the ongoing investigations.

1.3 To date the only available background information is:

1. Engineering report by Infront Innovation, with associated site investigation, soil test and root identification reports, prepared in December 2007 for Ecclesiastical Insurance.
2. Arboricultural report prepared in 2008 by Marishal Thompson (MT) in connection with the claim.
3. Camden Council's online records of tree work applications and decisions.

1.4 This report is based on information from these sources and a site visit and inspection on 26 November 2015. The inspections were visual and made from ground level. Trees belonging to other parties were inspected as closely as reasonably possible, either from within the site or from the road.

1.5 This case is appraised and discussed below and a schedule of comments and recommendations for individual trees and shrubs is appended. Left and right are used as if facing the building from the front, unless noted otherwise.

2 Background

The site

2.1 The building is a large L shaped structure based on a large house that has been added to and extended over the years. The original part dates from about 1820, while the most recent parts are about 50 years old. The original part has two main storeys and a lower ground floor, but the other parts vary in size and design. The road in front has a slight fall from north to south (right to left), but the main part of the site is essentially level.

2.2 It is bounded to the right and rear by other back and to the left (south) by a nature reserve run by the London Wildlife Trust, which appears to be a former garden.

Previous damage

2.3 The Infront report states that the external walls of the building were underpinned in 1988, but that there had subsequently been movement in internal walls since at least 2003. They considered that the damage was subsidence caused by shrinkage to the clay subsoil and that it affected mainly the front and rear elevations at the left hand side of the building.

2.4 The site plans with their report and the MT one show two affected areas, one in the rear left addition and the other at the front left.

2.5 MT identified various trees or groups that they considered to be involved or to present threats and recommended either pruning or felling. Some of that work has been carried out, including the felling of a plane tree growing near the rear left hand corner of the building. Camden Council's records show that they did not object to the plane being removed but they refused consent in for the felling of a sycamore, MT's T2, tree 6 of this report. Unfortunately their online records are incomplete and do not include the decision notice.

Previous investigations

Soil conditions

2.6 In November 2008 Infront dug two trial pits (TPs) near the front and rear corner of the building respectively and each was extended to 6m as a bore hole (BH) to investigate soil conditions at depth. This revealed that the subsoil is a brown clay that was firm to stiff at the front, (BH1) becoming firm from 2m down to 6m, while in BH2 at the rear it was firm to stiff down to 6m. Samples had plasticity indices between 40 and 50%, indicating a high potential for shrinkage and swelling with changes in moisture content.

2.7 Moisture content and soil suction profiles show that it was dry down to 2 - 3m in BH1 and for the full depth of BH2, consistent with desiccation, i.e. the soil being drier that would be anticipated under normal climatic effects alone.

Roots

2.8 Roots were found for the full depths of both bore holes and samples identified as:

TP/BH	depth [m]	species	dia.	starch
1	0.7 - 6m	*Acer* (sycamore and maples) + 5 others similar	1.5mm	high
2	1.5 - 6m	*Platanus* (plane) + 2 similar	2mm	high
		Broadleaf too juvenile to identify + 2 other fragmentsin bad condition	1m	low

3 Current and ongoing investigations

3.1 William J Marshall & Partners will be carrying out detailed monitoring of the building to determine the precise nature and extent of the current movements. There will also be further site investigations, which will take place in late summer or early autumn, when the effects of any vegetation will be most apparent. That also allows trial pit and bore hole locations to be determined based on the monitoring results.

4 Observations - trees and other vegetation

4.1 The most significant trees near the house include a middle aged sycamore and horse chestnut in the front garden, a sycamore to the front left, some well established goat willows and a large beech in the nature reserve to the left. There are also a large London plane and other trees in the central and right hand parts of the rear garden. Near the rear left hand corner of the house there is the stump of a London plane listed for felling in the MT report, item 15 in this report. Near the right hand side boundary is the stump of a large black poplar, item 25, reduced in 2008 and felled in 2014 because of its poor structural condition.

4.2 These are described individually in the schedule forming the second part of this report, with preliminary recommendations for any necessary or appropriate work. Some are also listed in the MT report and their numbers are also shown as well. They are numbered on the attached site plan.

5 General comments

5.1 Tree roots grow with little force, but can cause significant soil drying. Most clay soils shrink when dried and swell as they rehydrate, so this combination can cause subsidence in nearby buildings if their foundations do not extend below the affected zone. This usually starts during dry summers and shows a seasonal cycle, with downward movement in summer followed by recovery through the winter when the weather is cooler and wetter and the vegetation inactive.

5.2 Frequently this soil movement is purely seasonal, but large vigorous trees can cause a persistent moisture deficit at depth where the soil does not rehydrate fully in winter. If these die or are removed the consequent prolonged rehydration and swelling of the desiccated soil can lead to heave damage in buildings nearby, especially if they were built after the moisture deficit established. This movement can take several years if the desiccation is deep and severe.

5.3 The size, age and vigour of an individual tree all influence its drying effect on the soil, but there is also considerable variation between species. Poplars and willows are naturally well adapted for growth on clay, having deep, wide spreading roots and a strong ability to extract water. As a result they are more commonly associated with subsidence than many other species. Most of the other trees here are regarded as moderate water demanders but many grow well on clay sub soils and can cause damage in nearby buildings. Large shrubs and climbing plants can also cause significant soil drying and are frequently planted near buildings.

5.4 Pruning to reduce leaf area reduces water uptake, but most healthy trees respond by sprouting, so their water demand increases in proportion with the new growth, which is often vigorous. The small roots that absorb water die each winter, new ones develop in spring and grow according to the tree's needs so, provided the top growth is recut regularly to contain the crown, the extent and water uptake of the root system also reduces over the long term. However this is not always effective with large vigorous trees rooted close to buildings and can also harm the tree, although some species tolerate pruning better than others. Removing trees will eliminate any threat associated with them, provided there is not a potential for heave. It is sometimes possible to replace trees with other species that present a reduced risk without the need for intensive maintenance.

6 Discussion

Damage

6.1 The available results of the previous investigation confirm that the damage at the time was subsidence caused by the clay subsoil shrinking under the drying influence of roots from nearby trees. In particular the presence of plane roots in severely desiccated soil at the rear left implicated the plane tree growing about 3m away, my tree 15, MT's T3, which was felled not long afterwards. However the sycamore near the front, my tree 6, MT's T2 was not removed and it appears that Camden prevented that by making a TPO, although full details have not been found. That tree is now showing signs of decline, as is the smaller sycamore near the same part of the building, my tree 7, so neither of these will be causing as much soil drying as they were in 2007/8.

Remedial work

6.2 The building is a large, complex structure and the most recent site investigation was carried out eight years ago, so soil moisture conditions will have changed, particularly where trees were removed. There is also very little monitoring of any kind available at present, so current conclusions are provisional and might be amended in the light of the findings of the ongoing monitoring and site investigation.

6.3 Recommendations for work on the trees and other vegetation near the building are set out in the attached schedule, based on the available information and the most suitable arboricultural management of the species concerned. This will reduce any drying effect on the sub soil under the foundations significantly. However in view of the points made at 6.1 and 6.2 the specifications are provisional and might also need to be amended in the light of the findings of the ongoing investigations.

Heave

6.4 The previous report found evidence of deep desiccation at the rear left and the removal of the plane there would have caused some soil swelling. However soil conditions will have altered since then and with a complex building like this and a range of trees growing nearby any heave potential will have to be assessed on the basis of the findings of the site investigation later this year.

Restrictions

6.5 The local planning authority is the London Borough of Camden and their website shows that the site is in St Johns Wood Conservation Area, so they must be given six weeks notice of any proposed felling or pruning of trees over 75mm diameter at 1.5m. There is no site specific information about tree preservation orders (TPOs) but Camden's list of planning applications shows work to some of the trees dealt with mainly under the conservation area procedures. It appears that the only tree protected by a TPO is tree 6 of this report, the sycamore at the front left and that this was made following a conservation area notice to fell the tree in connection with subsidence. That would need to be checked and it might be necessary to make a further application, depending on the findings of the ongoing investigation.

6.6 The trees in the nature reserve belong to London Wildlife Trust, so there is no direct control over them. However tree owners can also be liable for any reasonably foreseeable damage that they do not take suitable steps to prevent.

Tree work

6.7 Any treework should be carried out in accordance with BS 3998: 2010, Recommendations for Treework, and any other relevant standards. It is essential that the contractor doing the work has appropriate third party and public liability insurance. The Arboricultural Association has a list of approved contractors, published on their web site at www.trees.org.uk.

6.8 Where any trees or other woody plants are removed it is advisable to remove the stumps and main roots, if possible, in order to avoid colonisation by honey fungus [*Armillaria* sp.]. This can spread and infect other vegetation nearby, either killing plants or decaying structural roots and making them unstable.

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7 Conclusions

7.1 The available information is consistent with the previous investigations showing that the damage in the building is subsidence caused by the sub soil shrinking as it has been dried by roots from nearby vegetation.

7.2 One plane tree was removed, but others are still present and likely to be affecting the soil beneath the foundations. Most are well established, but healthy and capable of more growth.

7.3 Damage has continued and, given the time since the previous investigation and tree work being carried out, the building is to be comprehensively monitored and site investigation carried out later in 2016, when the effects of any vegetation will be more apparent.

7.4 The recommended work will reduce any drying effect on the soil under the building significantly, but the conclusions and specification might need to be reviewed in the light of the ongoing investigation and monitoring.

7.5 The site is in a conservation area and at least one tree is protected by a TPO.

7.6 Some of the trees belong to other parties so there is no direct control over them.

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Trees inspected by Simon Pryce, 26 November 2015

Tree no.	MT no.	Species	Distance	Height	Trunk dia.	Est. age	Comments and recommendations
The trees are described in order, starting to the front left of the building and going round clockwise. Marishal Thompson (MT) numbers are shown for trees that they inspected. Asterisks indicate those in other ownership.							
1	-	Amelanchier	7m	3m	50mm	3+	Small young tree, not a significant threat. • *No work needed at present.*
2	TG1	Horse chestnut	7m	17m	730mm	100+	Has been pollarded at about 4m early in its life then left to grow on, lower branch ends are near the roof and will touch it when in leaf. There is a light well about 2m deep between the tree and the building and the front foundations are below that. • *Shorten lower branches to clear the roof by 3 - 4m. No other work needed at present, could be reduced if the need arose.*
3	TG1	Sycamore	7m	15m	490mm	100+	Also pollarded at about 4m and regrown. One of the main limbs is dead and the rest of the crown is dying back. Not very likely to have affected the building, but is dying and becoming dangerous. • *Fell for safety, could replace with lower risk species such as birch.*
4	T1	Flowering cherry	7m	5m	200mm	50+	About 4m from the front porch. Healthy, but mature and not particularly vigorous. • *No work needed to safeguard the building.*
5	-	Wisteria	0m	5m	m/s	50+	Growing on the porch. Has been pruned, not particularly large and is rooted behind a retaining wall, well above foundation level of the main building. • *Trim annually to keep it to this size or smaller.*
6	T2	Sycamore	7m	18m	750mm	100+	Has been pollarded when younger and regrown. Heavily covered in ivy and has sparse twig growing indicating that it is declining, so its water uptake will not be as high as when it was younger and healthier, although it is a likely source of the *Acer* roots found in BH1, which implicates it in the previous damage. Would not tolerate any major pruning. • *Cut ivy. If implicated the only option would be to remove it.*
7 *	TG2?	Sycamore	3m	12m	300mm	20+	Sparse twig growth indicating decline and heavily covered in ivy, close to the corner of the building and also a possible source of the *Acer* roots in BH1. • *Remove.*

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Tree no.	MT no.	Species	Distance	Height	Trunk dia.	Est. age	Comments and recommendations
8 *	TG2	2 no. goat willow	3.3m	15m	250mm	20+	Also heavily covered in ivy, but are healthy and high water demanding species. They stand pruning but are too close to the building for that to be effective. • *Remove.*
9 *	SG1	Cotoneaster	4m	6m	m/s	20+	Under the goat willows, but not unduly suppressed. Not an imminent threat but will grow larger with the willows removed. Stands pruning well. • *Reduce and keep to 2.5 - 3m high.*
10 *	TG3?	Goat willow	7.5m	15m	320mm	40+	Healthy vigorous specimen and is a high water demanding species. • *Remove.*
11	-	Wisteria	0m	4m	m/s	10+	Pruned and trained on the side wall, not very large, but rooted close to one of the affected areas. • *Remove.*
12 *	SG2	Viburnum gp	2.5m	5m	m/s	20+	Healthy specimens rooted close to the boundary. • *Reduce and keep to 2.5 - 3m high.*
13 *	-	Cherry plum	7.5m	10m	250mm	40+	Large bushy specimen, more or less full grown and not unduly close to the building. • *No work needed at present, could be reduced if the need arose.*
14 *	-	Ash	11m	10m	200mm	10+	Healthy young sapling. Not an immediate threat but will grow much larger now the plane has been removed. • *No work needed at present, not suited for long term retention.*
15	T3	London plane	2.5m	17m?	800mm	80+	Stump of a tree recommended for removal by MT, as the previous investigation showed that it was affecting the building. Has not sprouted so is dead and no longer a threat. If monitoring shows heave in this area this might be the cause, but there are no arboricultural remedies for that. • *No work needed.*
16	T4	Copper beech	12m	20m	900mm	120+	One sided due to growing near the plane. Could not be inspected but looks sound and healthy, if not very vigorous. Low to moderate water demander, not likely to cause problems at this range. • *No work needed at present, could be reduced lightly if the need arose.*
17 *	-	Goat willow	17m	16m	350mm	40+	Healthy looking, but not likely to have affected the building from this distance, • *No work needed to safeguard the building.*

Trees inspected by Simon Pryce, 26 November 2015

Tree no.	MT no.	Species	Distance	Height	Trunk dia.	Est. age	Comments and recommendations
18 *	-	Goat willow	28m	15m	350mm	40+	One sided due to growing near other trees, healthy but not a significant threat at this distance. • *No work needed.*
19	-	Apple	9m	4m	100mm	30+	Small specimen that has been topped and pruned, not a significant threat. • *No work needed beyond normal maintenance.*
20	-	Flowering cherry	5.5m	10m	350mm	50+	Has been reduced in the past and grown on. Healthy looking but not particularly vigorous. • *No work needed at present, could be reduced if the need arose.*
21	-	Laburnum	11m	6m	160mm	40+	Leans but sound and healthy, low risk species, not a threat from this distance. • *No work needed beyond normal maintenance.*
22	-	Laburnum	16m	6m	180mm	40+	Similar to the previous one, also unlikely to cause problems. • *No work needed beyond normal maintenance.*
23	-	Sycamore	22m	16m	750mm	90+	Has slightly sparse foliage and some ivy, otherwise healthy, but is well away from any of the buildings. • *No work needed.*
24	-	Pear	25m	7m	220 + 130mm	60+	Has been topped in the past. Healthy but not a threat this range. • *No work needed beyond normal maintenance.*
25	-	Black poplar	24m	20+m?	1.2m	80+	Stump of what would have been a very large tree, not mentioned in the MT survey. Camden Council's records show that it was felled in 2014 for safety. Dead and decaying and there are no sprouts or root suckers. High water demander and could have been affecting the building, although there is no firm evidence of that and it is no longer a threat. Its felling is unlikely to cause heave at this range. • *No work needed.*
26	-	London plane	17m	27m	1.1m	100+	Large specimen that leans towards the building due to growing near the poplar for much of its life. Crown thinned after the poplar was felled. Could affect the building from this range but is a moderate water demanding species and not a major threat. • *No work needed at present, could be reduced if the need arose.*

Trees inspected by Simon Pryce, 26 November 2015

Tree no.	MT no.	Species	Distance	Height	Trunk dia.	Est. age	Comments and recommendations
27	-	Laburnum	10m	5m	100 + 80mm	40+	Heavily covered in ivy, not very vigorous. Poor specimen but not a threat to the building. • *No work needed to safeguard the building.*
28	-	Apple	8m	8m	200 + 100mm	60+	Leans due to growing under the plane and is very heavily covered in ivy. Not very vigorous and not an imminent or major threat. • *No work needed at present, could be reduced if the need arose.*
29	-	Philadelphus & eleagnus	3-4m	5m	m/s	30+	Pair of large healthy shrubs, rooted close to the building. • *Reduce and keep to 2 - 2.5m high.*
30	-	Evergreen magnolia	2m	4m	50mm	2+	Healthy young tree, capable of growing larger, but is among the lower risk species. Tolerates pruning well if started at an early age. • *Prune to keep as a bushy specimen 3 - 4m high.*
31	-	Bay	4m	8m	320mm	80+	Healthy and fairly close to the building, although there are retaining walls and lightwells between them. Trimmed regularly. • *Continue trim annually to keep it to this size or smaller.*
There are assorted small and medium sized shrubs in planting beds near the back of the house. Most are regularly trimmed and maintained and not in need of anything beyond that, although any tree seedlings that appear should be removed before they can become established.							

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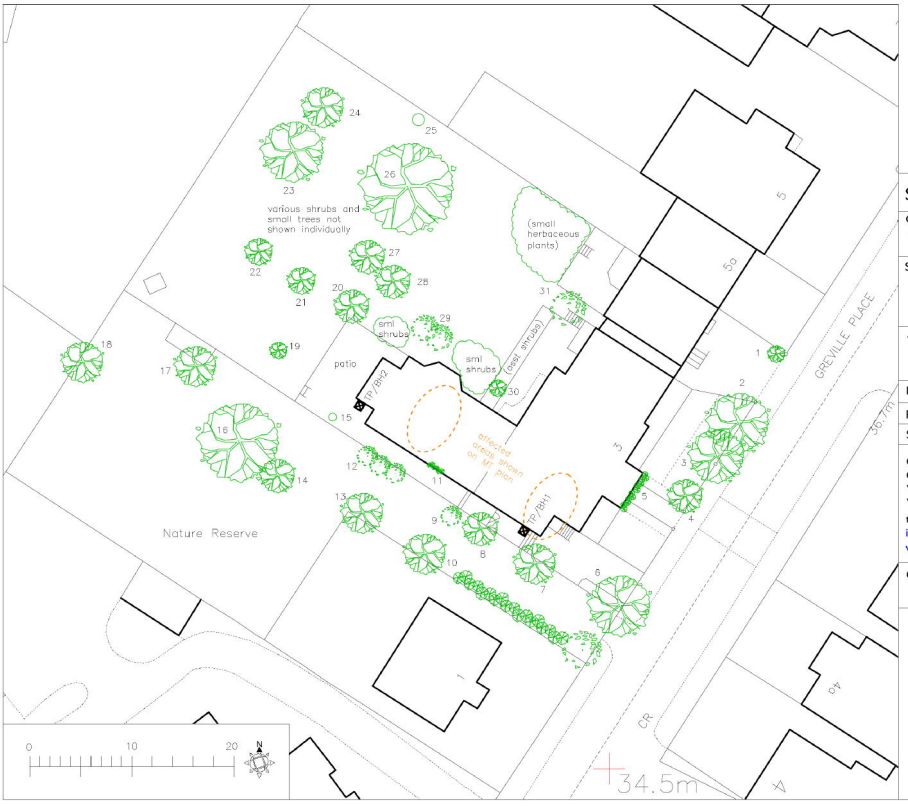

Simon Pryce Arboriculture

Client:
Greville (3) Residents Ltd

Site:
3 Greville Place, London, NW6 5JS

Title:
Trees and subsidence claim

Date: 26 November 2015

Ref: 15/102 | Rev: a

Scale: 1:400 at A4

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