

Simon Pryce Arboriculture

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GAB Robins UK Ltd,
15 Ashton Gate,
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Romford,
Essex,
RM3 8PZ

Date: 6 July 2010
Your ref: B1007794 T Pither
My ref 10/082
FAO Tim Pither
By e mail only

Dear Tim,

Mr & Mrs Cooney, 54 Arthur Road, Wokingham, RG41 2SY

Further to your recent instructions I enclose my report on this case.

Although the drains have defects the available evidence points to the oak being the main cause of the damage in the back of the house. Monitoring should give a clearer indication in due course. There isn't any clear evidence of desiccation but the relative ages of the tree and house do give some concern about possible heave. It would survive being reduced harder, but that would create other problems and the council would probably resist it, particularly with the option of a shorter pruning cycle. As you see I am not convinced that a root barrier would give much benefit, unless it could be run through adjacent gardens as well.

I hope this is helpful, this one is not as simple as it might look at first sight, if you want to discuss it further please do not hesitate to let me know. I have enclosed my invoice, made out to Fortis as requested.

Yours sincerely,


Simon Pryce

Simon Pryce, B.Sc., F.Arbor.A, C.Biol, MICFor, CEnv
Arboricultural Association Registered Consultant



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Report

Client: Fortis Insurance

Site: 54 Arthur Road, Wokingham, Berks, RG41 2SY

Instruction: Mr T Pither, GAB Robins

Subject: Trees and other vegetation near the back of the house and its effects on it. Specification for necessary or appropriate work.

Inspection date: 22 May 2010

Report date: 5 July 2010

Reference: 10/082

Author: Simon Pryce, B.Sc., F.Arbor.A, C.Biol, M.I.Biol, MICFor
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I Introduction

- 1.1 This report is based on supplied information and a site visit and inspection on 22 May 2010. The inspections were visual and made from ground level.
- 1.2 Investigation of cracking in the back of the house indicates that an oak in the rear garden and possibly other vegetation nearby are at least partly responsible. The purpose of this inspection was to determine the extent of its involvement and recommend measures to alleviate the current problems and lessen the risk of damage continuing or recurring in future.
- 1.3 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 house from the front, unless noted otherwise.

2 Background

The site

- 2.1 The subject property dates from about the 1970s and is a two storey detached house on a more or less level site. There are no signs of any later additions or extension, but it has a conservatory built across part of the rear elevation. The age of this is unknown but it does not look recent. Cracking and signs of foundation movement have occurred and are being investigated for the insurers by GAB Robins, their reference B1007794. Their report and those of the other specialists involved contain a full account of the case but some points are summarised below.

Damage and monitoring

- 2.2 The damage forming the basis of this claim started in the summer of 2009 and consists of cracking where the conservatory meets the back of the house, with the general pattern indicating downward movement and rotation away from the house. Level changes are being monitored, but at present only the initial readings are available.

Foundations

- 2.3 In March 2010 Bowbuild Ltd dug two trial pits [TPs] near the rear corners of the conservatory. TP1, near the rear of the right hand side wall revealed a concrete strip footing 550mm deep, while TP2, near the left hand end of the rear wall, exposed a similar foundation 600mm deep.

Ground conditions

- 2.4 The sub soil is an orange brown clay and bore holes [BHs] sunk from the bases of the pits showed that this extends down to at least 3m in both locations. Samples had plasticity indices between 27 and 35%, indicating medium potential for shrinkage and swelling with changes in moisture content.
- 2.5 Sample moisture contents were not unduly low, being more than both the plastic limits and 0.4x the liquid limits. Shear vane readings show a slight peak at about 1m in TP1, but the moisture content and Atterberg Limits are also slightly higher at that point.
- 2.6 Water was struck at 2.6m in BH1 and 2.3m in BH2, in the latter it rose to 1.05m after 60 minutes.

Roots

- 2.7 Roots up to 5mm diameter were found down to 1.4m in TP/BH1 and 1mm diameter down to 2.1m in TP/BH2. Sample from both places were identified as being from *Quercus* [oak].

Drains

- 2.8 CCTV surveys of the drains near the back of the conservatory revealed some defects, including root penetration. The rainwater down pipes from the house connect to pipes under the corners of the conservatory and these were found to be blocked. The drain runs are to be repaired and the rain water system cleared to make a more detailed survey.

3 Observations

- 3.1 There are some small shrubs round the sides of the rear garden, but the only significant tree in the vicinity is a mature oak growing near the rear boundary. It has had some lower branches removed in the past and the policyholders have it crown reduced about every four years, with the next operation being due shortly. It is described in more detail in the attached schedule and the site layout is shown on the site plan.

4 General comments

- 4.1 Tree roots grow with little force but during the growing season their drying effect can be considerable. Most clay soils shrink when dried and swell as they rehydrate in winter. This can cause movement in buildings nearby if their foundations do not extend below the affected zone, particularly during dry summers. There is usually a seasonal cycle, with downward movement in summer followed by recovery over winter when the weather is cooler and wetter and the vegetation inactive.
- 4.2 Actively growing trees can also cause a progressive drying at depth where the soil does not rehydrate fully in winter. This causes a persistent moisture deficit [desiccation] and if such trees die or are removed the consequent rehydration and swelling can lead to heave damage in buildings nearby, especially if they were built after the moisture deficit established. This movement can take a considerable time if the desiccation is deep and severe.
- 4.3 The size, age and vigour of an individual tree will all influence its drying effect on the soil, but there is also considerable variation between species. Oaks 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.
- 4.4 Pruning will reduce water uptake, but most healthy trees respond by sprouting and their water demand increases in proportion with the new growth, which is often vigorous. This needs to be recut regularly in order to maintain control, which is not always effective with large vigorous trees close to buildings. This kind of management can be harmful in the long term, although oaks will tolerate it better than many other species, even if started when mature. Felling will remove the threat, 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.

5 Discussion

Causation

- 5.1 Site investigation shows that the sub soil is a clay of medium shrinkage potential and that it extends well below the foundations of the conservatory. There were no clear signs of desiccation, but the samples were taken in late spring, so the ground would have been rehydrating for several months since the end of the 2009 growing season. Roots were found to 1.4m and 2.1m in the bore holes respectively, which also indicates that the soil would have been much drier during the growing season. The damage occurred during a dry summer when the tree was on the third year of the four year cutting cycle and the tree had a substantial crown. This indicates that the damage is subsidence caused by the sub soil shrinking as it has been dried by the roots, which were identified as being from the oak. The tree is mature but if the regular pruning is neglected it is capable of growing larger, with its water uptake increasing in the process.
- 5.2 The drain and rainwater system defects could also have affected the soil, although the recovered samples were well below their liquid limits and the weather has not been unduly wet. The free water found in the bore holes appears to be natural or from a different source, as it was much deeper than the drain runs and there are no indications that it was foul. Level monitoring started recently, but will give a more conclusive indication of the cause. Any downward movement after the drains are repaired or recovery through the winter would confirm that the damage is due to clay shrinkage and swelling.

Remedies

- 5.3 The tree could be reduced more severely, but would need to be made much smaller in order to reduce its water uptake significantly and new growth would still need to be recut. It would survive it, but the consequent large pruning cuts would be susceptible to decay. Shortening the current four year cycle to two years would give a similar benefit, without the problems, although it would not eliminate the risk of damage in future, especially if a dry summer coincides with the second or later year of growth.
- 5.4 Root barriers can give some protection, but there is a risk of roots getting over or under them or round the ends. The rear garden is long enough to install a barrier without endangering the house or tree unduly, although, with an oak of this size it would need to be about 4m deep, with the top incorporated into a path or similar feature across the rear garden. It would also best to have it between the tree and the drain runs, to avoid having to seal round points where the pipes go through the barrier. That could be achieved but, unless it was extended into adjacent gardens each side, which would need the neighbours' agreement, it would be relatively easy for roots to get to the conservatory by going round the ends.
- 5.5 Deepening the foundations would make the conservatory more resistant to any soil shrinkage or swelling, but detailed consideration of that is an engineering matter. Depths are normally determined by existing root growth so, unless possible future growth is allowed for, it would still be advisable to continue pruning the tree regularly.

Heave

- 5.6 There were no signs of persistent desiccation, but the tree predates the house and conservatory by a considerable amount, which can indicate a potential for heave if it is removed completely. Installing a root barrier would cut all roots growing towards the building, so would have a similar effect. That could be investigated further if required.

Restrictions

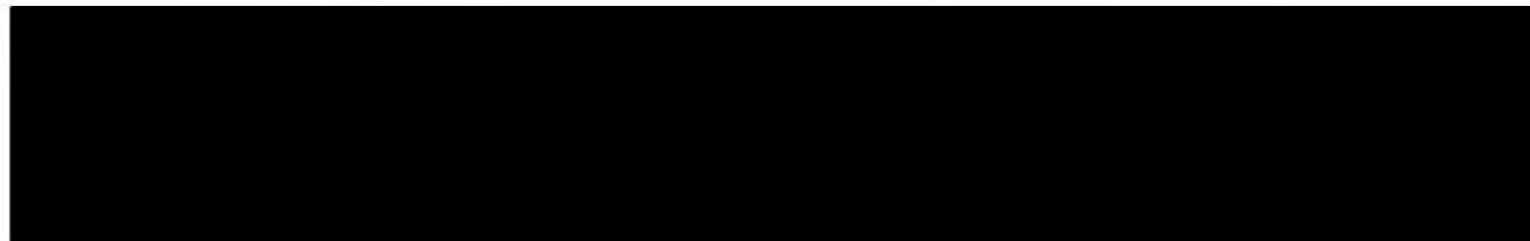
- 5.7 Wokingham Borough Council's web site shows that the garden is not in a designated conservation area but the tree is known to be protected by a tree preservation order [TPO], so consent would be needed for any work. If this is refused it is possible to appeal and in some cases to claim compensation for any consequent loss.

Tree work

- 5.8 Work to date has been done to a high standard and any further treework should be carried out in accordance with BS 3998: 1989, 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 in the Tree Services section of their web site at www.trees.org.uk or they can be contacted on 01242 522152.

6 Conclusions

- 6.1 Site investigation shows that the damage in the conservatory is subsidence caused by the sub soil shrinking as it has been dried by roots from the oak in the rear garden. It has been reduced every four years and, if that is neglected, it is capable of growing larger.
- 6.2 Drains are defective, but appear not to be involved; ongoing level monitoring will give a more conclusive indication in due course.
- 6.3 The tree could be reduced more severely, but would still need regular recutting and it would create other problems. Shortening the current cycle to two years would give similar benefit, although it would not eliminate the risk.
- 6.4 In this case a root barrier would have to extend into adjacent gardens in order to give a reasonable degree of protection.
- 6.5 The tree is older than the house, which can indicate that felling or major root cutting could cause heave.
- 6.6 Deepening the foundations would make the conservatory more resistant to movement, but if future growth is not allowed for the pruning would need to continue.
- 6.7 The oak is protected, so any work would need consent from Wokingham Borough Council.


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