Neutral Citation Number: [2006] EWHC 1411 (TCC)

Case No: HT-04-287

IN THE HIGH COURT OF JUSTICE
QUEEN'S BENCH DIVISION
TECHNOLOGY AND CONSTRUCTION COURT

Royal Courts of Justice
Strand, London, WC2A 2LL

Date: 22/06/2006

Before

THE HON. MR. JUSTICE RAMSEY

Between :

Mrs Mary Teresa M Eiles	**Claimant**
- and -	
London Borough of Southwark	**Defendant**

Daniel Crowley (instructed by Plexus Law) for the Claimant
Matthew Reeve (instructed by Barlow Lyde & Gilbert) for the Defendant

Hearing dates: 27, 29, 30, 31 March and 3 and 5 April 2006

Approved Judgment

I direct that pursuant to CPR PD 39A para 6.1 no official shorthand note shall be taken of this Judgment and that copies of this version as handed down may be treated as authentic.

THE HON.MR.JUSTICE RAMSEY

The Honourable Mr Justice Ramsey:

Introduction

In 1992 Mrs Eiles purchased a Victorian mid-terrace house at 18 Gowlett Road in Peckham, London SE15. The property consists of a four bedroom, two storey house constructed of solid brick with a tiled roof and a three storey back addition of similar construction. There is a cellar on the right hand side of the property (looking from the road) which extends to about 1.7m below ground level.

2. When Mrs Eiles purchased the property, a report and valuation was carried out in July 1992 by the Cheltenham & Gloucester Building Society. In that report there was reference to evidence of past movement which appeared to be long standing and non progressive and it stated that the likelihood of further significant movement seemed remote. It then stated:

> "*However there is a mature Silver Birch tree to the pavement approximately 30-feet high and within 10-feet of front elevation, a deciduous tree to the rear garden approximately 20-feet high and within 5-feet of rear elevation and these trees could constitute a potential risk to the structural integrity of the property and specialist advice from a tree expert may be prudent.*"

3. At some stage in 1995 or 1996 Mrs Eiles had the deciduous tree at the rear, a cherry tree, removed.

4. In 1998 she became concerned at cracking which she had observed in the property and, on the recommendation of friends, wrote on 23 October 1998 to Mr Trimming of R J Trimming & Associates, Structural Consultants and Surveyors, asking for his opinion on the situation and any necessary remedial work. He visited the property and Mrs Eiles asked him to produce information so that she could send a claim to her insurers, Co-operative Insurance Society Limited ("CIS").

5. Mr Trimming decided to monitor movement in the house and on 4 November 1998 two Avonguard tell-tales were installed, one internal and one external. The internal one was located to monitor a crack in the party wall with 20 Gowlett Road at the junction between the main house and the back addition at second floor level ("Crack A"). The external tell-tale was placed on the rear wall of the back addition to monitor a crack below the first floor window ("Crack B").

6. In May 2000 Mr Trimming issued a report in which he said this:

> "*The net result of the clay strata, dry climatic conditions, and mode of construction, variable foundation depths and the trees around the house has left it in need of remedial attention as a result of the differential subsidence that has occurred up to the time of the report.*"

7. On 31 July 2000 Mrs Eiles made a claim against her insurers, CIS, in which she said that cracks began to appear around September 1995 and had continued to do so since

then. CIS instructed Davies, Chartered Loss Adjusters, to act for them in respect of the claim and on 14 August 2000 Mr Graysmark of Davies visited the property to inspect it. He made a preliminary report on 15 August 2000 to which he attached photographs.

8. Mr Trimming had two trial holes dug to determine the soil conditions, the foundation depth and whether the sub-strata was influenced by factors such as roots. The locations were noted in his Technical Addendum of February 2001 as being "Rear extension rear wall at rear flank corner" and as "Front wall of the bay on the entrance porch side". Numerous roots were found in the trial hole at the front bay and these were analysed and found to be birch roots with moderate to low starch. The presence of starch is generally considered to indicate the presence of live roots. However, he expressed the view that the problem from the front tree only existed as far as the main spine wall but that with roots as large as 65mm diameter, the problem could gradually extend to the main rear wall.

9. The foundations to the bay at the front were reported to be at a depth of some 550 mm below ground; those to the back addition at a depth of some 250 mm below ground level. Although the structural engineering experts had agreed these figures, there was debate at the hearing as whether a depth of 250mm could be the depth of the foundations at the rear, in particular, at the flank wall of the back addition where the ground level was 500mm below the ground level along the rear wall of the back addition.

10. In June 2001 Mr Graysmark confirmed his view that the site investigation had shown that the front of the property was being significantly affected by the tree but suspected that the problem at the rear related to drain problems. He thought that the problem might be solved by removal of the tree at the front and repairing the drains and that it was too early to consider underpinning at that time.

To investigate the drains Mr Trimming had a drain survey carried out on 1 October 2001. That investigated the drain runs in the infill area between the flank wall of the back addition and the party wall with 16 Gowlett Road. That survey showed that there were defects in the drain in the form of offset joints but did not show any evidence of tree roots.

12. In the meantime Davies wrote to the Defendant on 28 November 2001 to say that investigations had highlighted the birch tree owned by them as a factor in the damage that had been caused to the front of the property. The Defendant wrote on 30 January 2002 to say that the birch tree was crown reduced by 20% and the crown lifted to 3m on 15 January 2002 as part of their three-year routine maintenance programme.

13. In December 2001 Mr Trimming produced a further report in which he set out the following principal developments since his February 2001 report:

> *"Cracks that existed in the house have now developed to a further extent and there has been a very slow but progressive appearance of new ones. The existing cracks narrowed for a period after the technical report but have now reached their widest point since monitoring commenced in November 1998."*

14. He then expressed the view that:

> *"At present, problems from the front tree primarily affect the main part of the house. It has to be realised nevertheless that roots as large as 65 mm diameter do affect all of it. This is evident when viewing the effect that the front tree has had on the rear extension. The effect has been achieved by the pavement tree pulling the main part of the house forward whilst the rear extension moved at a different rate. The overall effect has been the separation of the main part of the house and the rear extension and this is where the worst singular area of damage has been up to the present time. The desiccation at the front has caused the main section to be pulled forward."*

15. Mr Trimming recommended underpinning to the front of the house and the rear of the back addition.

16. On 19 February 2002 Davies issued a further report to CIS, having considered Mr Trimming's December 2001 report. They stated that there had clearly been movement throughout the entire property and that it was considered to be linked to the Defendant's tree. They stated that, in the circumstances, the proposed underpinning put forward was, in broad terms, likely to be necessary.

7. The Defendant notified its insurers who appointed Ufton Associates to investigate the claim. They visited the property on 2 May 2002 and wrote to Davies on 20 May 2002 in the following terms:

> *"We note from these that the damage is predominantly within the rear addition and at the addition junction with the main terrace. From our close inspection of the front wall of the property, there is negligible movement of the front bay and previous repairs noted have not reopened.*
>
> *Given that the front bay and front wall are on relatively shallow foundations, and adjacent to the deep foundations of the cellar, we would have expected significant cracking on the bay and front wall if subsidence at the front of the building was occurring as a result of tree root encroachment."*

18. By 31 July 2002 Mrs Eiles was reporting to the CIS that, despite the massive rainfall that year, the cracking of the rooms in the front of the house and especially in the back addition was noticeably increasing as could be seen with the naked eye.

19. Davies carried out a further inspection of the property on 3 October 2002 with Mrs Eiles and Mr Trimming. They noted and took photographs of a crack at high level in

the party wall with 16 Gowlett Road, at the front of the house. They then made a further report to CIS on 14 October 2002 in which they said this:

> "*Rear of House- From the monitoring results which the engineer has put forward, there has been continued movement of the back projection of the house. From the site investigation results it appears that this is due to general desiccation of the clay subsoil during dry periods. The engineer has recommended limited underpinning together with superstructure repairs and redecoration. Given the continuing movement indicated by the monitoring results this would appear to be the best way for the situation to be resolved.*
>
> *Front Elevation- We have previously advised that there was damage at the front of the property. However, unlike at the rear monitoring has not been undertaken by the engineer. By comparing the current damage with photographs previously taken it appears that there has been no progression of damage. Furthermore, whilst only an external inspection has been carried out by the loss adjusters acting on behalf of the Local Authority, their view is that there is no subsidence damage to the front bay, which is normally the first to be affected by tree roots*"

20. They therefore stated that on the present evidence they were unable to support the view that underpinning of the front elevation was necessary.

21 Mrs Eiles responded to this and stated that there were no cracks in the front living room wall when she last redecorated and that the cracks were now clearly visible and reached through the party wall to her neighbours at 16 Gowlett Road.

22. CIS accepted that underpinning should be carried out to the rear but not at the front of the property. However, as stated by Davies in a letter to Mr Trimming on 14 January 2003, it was agreed that tenderers would be asked to quote for underpinning at the front and CIS would reconsider the matter on the basis that works to the front would be a preventative not a restorative measure.

23 Tenders were received in May 2003 and on 1 September 2003 Davies reported to CIS, in particular seeking instructions as to whether the underpinning to the front should be included. They set out their views as follows:

> "*As we have described above, we are not convinced that the damage at the front of the property is subsidence related and this is a view shared by the Loss Adjusters for the Local Authority. However, we cannot categorically state that this is not the case although there has been no deterioration during the monitoring period. Therefore, on technical grounds, we are unable to support the view that the front elevation should be underpinned. However, on economic grounds you may wish to give consideration to this.*"

24. On 3 September 2003 CIS authorised repairs on the basis of the recommended tender, including underpinning to the front elevation. Mrs Eiles wrote to CIS on 26 September 2003 in relation to the underpinning and the need for alternative accommodation. She said:

> *"Work is shortly to commence on underpinning for the above property. It has now been made clear to me that the underpinning work will be extremely disruptive. Work will require the removal of all the kitchen appliances and work areas, there will be no access in and out of the main hall, and because of the layout of the property (mid terrace) all soil and concrete will have to travel through the house to reach the rear underpinning area. For a considerable period (up to three months I am told) my house will be uninhabitable.*
>
> *I have therefore had to consider alternative accommodation for my household- myself, my son and daughter and my daughter's partner."*

25 CIS accepted that Mrs Eiles should obtain alternative accommodation. Party Wall Awards under the Party Wall etc Act 1996 were made in respect of 16 Gowlett Road on 7 October 2003 and in respect of 20 Gowlett Road on 17 October 2003, each including an agreed schedule of condition. On 27 October 2003 Mr Trimming drew up a specification for repairs and decoration at 18 Gowlett Road.

26. During the course of underpinning work, the underpinning to the front had to be extended due to the presence of roots. Further analysis of the roots at the front showed them to be birch roots with moderate to low starch content. In addition, during the underpinning to the back addition, the clay at the rear was found to be moist.

27. Mr Trimming wrote to Davies on 1 December 2003 to report on progress. He stated that the underpinning at the front was taken deeper because of tree roots and added:

> *"The writer would not have believed how extensive the root system from the Birch tree is below the house or large some of the roots are. The largest root measured by the writer up to the present time has been 149.10 mm. ... The basement has headroom of less than 2 metres and you have roots of up to 11 mm at that depth."*

28. He also referred to Crack A and stated that *"The underpinning at the rear is showing that the crack was not caused by the rear pulling away from the front and it must have therefore been caused by the front pulling away from the rear. To do that, the basement must have allowed the front to drop and it will continue to allow that to happen unless underpinned leaving Mrs Eiles wondering what all this has been about if the worst crack re-appears."*

29. The work to the property, including the repair and redecoration of the superstructure was completed and Mrs Eiles finally moved back into the property in mid October 2004.

30. These proceedings were commenced on 24 September 2004 claiming damages for nuisance and/or negligence on the basis that the encroachment of the roots of the birch tree had caused subsidence at the property. The Defendant served a Defence on 19 July 2005 and on 28 September 2005 made two concessions:

i) That the tree management undertaken by the Defendant was inadequate and the Defendant admitted that it was negligent in failing to pollard, crown or otherwise manage or control the growth of the birch tree adequately or at all.

ii) That it was reasonably foreseeable to the Defendant that there was a risk of subsidence damage from the tree to the front of the property only, by virtue of the proximity of the tree to the front of the premises and the nature of the sub-soil (Woolwich and Reading Beds).

31. In relation to the subrogated claim made by CIS, in the name of the Claimant, the damages for underpinning are now limited to the cost of the underpinning to the front of the property. The Claimant accepts that the cost of the underpinning undertaken at the rear is not recoverable from the Defendant.

The Issues

32. Counsel have helpfully identified the issues. They are as follows:

i) Breach of duty: The Defendant admits that the tree management of the Defendant was inadequate and therefore admits the breach of duty alleged in paragraph 6(2) of the Particulars of Claim.

ii) Foreseeability: The Defendant has admitted that it was reasonably foreseeable that there was a risk of subsidence damage from the tree to the front of the premises (namely the part of the house forward of the spine wall separating the front and rear reception room on the ground floor) by virtue of the proximity of the tree to the front of the premises and the nature of the sub-soil. Otherwise, foreseeability is denied.

iii) Damage to the property: What movement-related damage has the property suffered?

iv) Limitation: The extent to which such damage is historical (being attributable to the period before 24 September 2004) and, therefore, time-barred or recent (attributable to the period since that date).

v) Causation: In respect of any proven recent movement-related damage, was that damage caused by roots of the tree under the property? In particular,

a) What is the zone of influence of the tree?

b) Whether the main part of the house is rotating towards the front and/or the tree (as the Claimant's engineering expert suggests) or the back addition is rotating away from the main part (as the Defendant's engineering expert suggests).

vi) Apportionment:

a) Underpinning: To the extent that the property suffered recent damage, whether that damage justified underpinning at the front so that the cost of underpinning at the front is recoverable. The Claimant accepts that

the cost of the underpinning which was undertaken at the rear is not recoverable from the Defendant.

b) Superstructure repairs: In the event that the Court finds that there was movement-related damage caused by roots of the tree under the property, the extent to which the costs of repairs which were actually undertaken are attributable to that damage.

c) Without prejudice to the question of apportionment and causation, the Defendant does not suggest that the costs of the work charged were unreasonably expensive for the work actually done.

33 The main issue in this case is the cause of the damage. It is only when that question has been answered that issues of breach, foreseeability or damages can be considered. The approach to causation in cases of damage by tree roots was considered by the Court of Appeal in *Loftus-Brigham v. London Borough of Ealing* [2003] EWCA Civ 1490 where the question of causation was expressed in this way: whether desiccation from the tree roots materially contributed to the damage. This was based on the observation of Lord Reid in *Bonnington Castings v. Wardlaw* [1956] AC 613 at 620, cited with approval by Lord Bingham of Cornhill in *Fairchild v. Glenhaven Funeral Services* [2003] 1 AC 32 at para 14, that a claimant "*must make it appear at least that on the balance of probabilities the breach of duty caused or materially contributed to his injury.*"

34. In this case, the mechanism of causation relied upon by the Claimant and supported by Mr Freeman, its engineering expert, is that the roots of the birch tree have grown under the property and caused desiccation of the ground at the front. This has caused the sub-soil to shrink so that the foundations to the main house have settled, causing the main house to move away from the back addition.

35. This mechanism is disputed by the Defendant and its engineering expert, Mr de Silva. They state that there has not been any significant settlement or damage to the main house but that the back addition has settled and moved away from the main house because of the effect of an ivy plant adjacent to the rear wall of the back addition.

Vegetation

36. First, I consider what is known about the birch tree at the front and the ivy at the rear. These are now the main contenders for the cause of the movements.

37 The birch tree is a mature tree about 12.75m tall and it is on the pavement at the front and to the left hand side of the property. It stands 4.5m from the front bay and 4.9m from the main front wall as measured from the trunk.

38 The expert arboriculturalists, Mr Kelly for the Claimant and Dr Dobson for the Defendant, have agreed, from viewing aerial photographs, that the 2000 photograph shows that the crown of the birch tree is larger in 2000 than it was on the 1998 photograph.

39. The Defendant has provided the following information about the work it carried out to the birch tree. It states that:

i) In May 1997 the crown was thinned by 10% and lifted 4 metres;

ii) In March 1999 the crown was thinned by 10% and lifted 3 metres;

iii) In October 1999 the crown was reduced by 20% and thinned by 10%;

iv) In January 2002 the crown was reduced by 20% and lifted by 4 metres;

40. In cross-examination, the Defendant sought to suggest to Mr Kelly that the photographic evidence of growth between 1998 and 2000 was inconsistent with the work of crown reduction having been carried out in October 1999. However, that information on crown reduction was provided by the Defendant's solicitor by email on 25 March 2006. It was based on instructions from the Defendant and, in the absence of any evidence to show that an error was made in those instructions, I do not consider that the Defendant can properly dispute that information. Neither do I consider that the photographic evidence is inconsistent with that work being carried out in October 1999. Rather, that evidence appears to show growth between 1998 and 2000, although given the angles and shadows of the photographs, the extent of growth was unclear. However, at best the photographs would show, on the basis of a crown reduction of 20% in October 1999, that there had been some vigorous growth.

41 The expert arboriculturalists agreed the following in respect of the ivy at the rear of the property in their Memorandum of 17 March 2006:

> "*The Ivy growing near the right hand boundary wall, whose stem is 0.7m from the party wall, at one time covered part of the rear wall to second floor height. The remains of Ivy tendrils can be seen up to the height of the bathroom vent (6-8m). But we believe that it was removed well before the onset of this claim. It now grows to the full height (approximately 2.5m) of the boundary wall with No. 20.*"

42. However, during the course of the evidence the ivy took on more significance and by the end of the hearing was relied on by the Defendant as the cause of the movement of the back addition. At my invitation, the expert arboriculturalists met again during the course of the hearing. On the basis of the photographs, they agreed that there was no obvious ivy growth before May 1992 and the next photograph on which the rear wall was visible, taken on 18 October 1998, showed ivy on the rear wall of 20 Gowlett Road up to approximately first floor height. A photograph attached to the Davies report of 15 August 2000 shows ivy growing on the rear elevation to a height of the first floor window on the rear wall. The aerial photograph of 23 September 2000 is agreed to show a similar picture to 1998 and the photo taken by Davies on 3 October 2002 shows ivy growing to the top of the second floor window.

43 Mrs Eiles' evidence is that the ivy was cut down on occasions by her son and grew up again. The evidence therefore establishes that from about 1998 onwards ivy grew at the rear of the property, climbed up the rear elevation and was cut back on occasions prior to 2003. The ivy stem is at 0.7 m from the rear elevation in a bed of earth which

is surrounded by a low wall. In those circumstances, the original expert agreement that the ivy on the rear wall of the back addition was removed well before the onset of this claim has clearly been superseded by this later agreement.

44 In terms of the possibility of vegetation causing damage, a large number of roots were found beneath the front of the property and over 70 identifications showed these to be birch roots. The roots were found to a depth of 2.8 metres below the front bay; to a depth of about 2.6 metres below the left party wall, including under the chimney breast in the front room. Dr Dobson had no difficulty in accepting that the roots might extend further and Mr Kelly considered that they were likely to extend significantly beyond the point where they were seen.

45 To the rear of the property, there is no evidence of tree roots at relevant locations and Mrs Eiles gave evidence of the absence of roots in the 2001 trial hole and during underpinning at the rear. The information contained in Mr Trimming's February 2001 report states "not many roots at rear" but any roots were not analysed and in the 2005 investigation it states that one significant root was found but was very thin and decayed. The experts agree that this was most likely to be a root from the sweet peas planted by Mrs Eiles.

46 The expert arboriculturalists do not agree on the likely depth and spread of the ivy roots or the potential of the ivy to cause the damage noted.

47. Dr Dobson considers that the ivy could be rooted to a depth of at least 0.5 to 1m and have a lateral extent of 3m or so, including beneath the property. Mr Kelly considers that the root is more likely to develop in areas that contain an adequate supply of available water and cited an extract from a book "Water deficits and plant growth", edited by Kozlowski at p. 233. The experts do agree, though, that the growth of roots is opportunistic and they grow according to the environmental conditions they encounter. Mr Kelly considers that this means that the roots of the ivy are more likely to be in the garden area at shallow depth.

48. As to the likelihood that ivy could cause damage, Mr Kelly states that he has never encountered ivy of such modest size causing cracks to open in the manner shown here. Dr Dobson accepted that he has never dealt with a case involving movement caused by ivy. The experts agree that there is little published guidance on the influence of ivy on building subsidence but the NHBC advises that:

> "*Shrubs have considerable potential to cause damage to foundations. Pyracantha, Cotoneaster and climbers such as Ivy, Virginia Creeper and Wisteria can be particularly damaging.*"

49. Dr Biddle, an accepted expert and author of "Tree Root Damage to Buildings" notes at p.150 that:

> "*A shrub on a single stem can therefore cause localised soil drying, potentially associated with considerable angular distortion. Near the centre of a wall the foundations may be able to bridge such influence, but near a corner, particularly if there are window openings, localised movement and damage can occur.*"

50. He adds that:

> "*Climbers, such as ivy, Virginia creeper or Wisteria, can often cover a very extensive area off a single stem with the potential to cause intense soil drying in that location.*"

51. Dr Biddle also states at p.151:

> "*Although shrubs have the ability to cause damage, there is little information on the influence of different species, or their propensity to cause damage. Experience suggests that some of the shrubs in the Rosaceae family are the most likely to cause damage, particularly Pyracantha and Cotoneaster, possibly because these are frequently grown to large size in immediate proximity to buildings (Figure 9.16). Other genera in the Rosaceae (see Figure 14.1, page 219) are encountered more frequently as a cause of damage, compared with genera from other families.*
>
> *Although some shrubs may cause soil drying to sufficient depth to cause some damage, it seems probable that these effects will always be comparatively shallow and entirely seasonal.*"

52. The experts are agreed that the ivy is likely to have extracted substantially less moisture from the soil than the birch tree but the ivy could have caused localised desiccation but probably less than the extent of the rooting. Mr Kelly also considers that the birch tree is likely to have water use which is 100 or more times that of the ivy. This precise magnitude is disputed by Dr Dobson.

53. On that evidence, I consider that an ivy plant did have potential for local desiccation in the area of the rear wall of the back addition but that the water extracted by the ivy would be comparatively small by comparison to the birch tree. I shall consider the other aspects when I assess the evidence of damage.

The sub-soil

54. The British Geological Survey maps show the boundary between the London clay and the Woolwich and Reading beds to be close to Mrs Eiles' property.

55. The evidence of the soil properties comes from the two trial holes excavated in 2001 (one at the front and one at the rear) and from four boreholes (one at the front and three at the rear) carried out in June 2005. The engineering experts have agreed that the subsoil at the rear and below 1.8 m depth at the front seems to be natural, undisturbed, material but is untypical of London clay. Tests carried out in 2001 show this natural subsoil to be of high shrinkage potential. Above 1.8m depth at the front the evidence suggests that the material is a clay fill consisting of soil that has been

excavated and replaced at some stage and the 2001 tests show it to be of medium shrinkage potential.

In terms of soil desiccation, the engineering experts are agreed that the results from the January 2001 site investigation show no evidence of desiccation at the front or at the rear but that there are high moisture levels between about 1 metre and 1.5 metres depth at the rear. In relation to the results of the June 2005 site investigation, the experts agree that there were lower moisture contents at the front, to 1.65 metre depth, compared with the 2001 data; that the soil suctions were indicative of desiccation to about 1.65 metre depth at the front, assuming soil over that depth is fill but that there was no evidence of desiccation at the rear.

57. The important conclusion that I draw from that information is that neither investigation showed evidence of desiccation at the rear but rather the opposite, moist soil conditions at between 1 and 1.5 metres depth. There is, however, some evidence of desiccation down to 1.65m depth at the front.

Distortion Survey

58 A distortion survey was carried out by Gryphon Surveys in June 2005 to take external level and verticality measurements to the front and rear elevations and also to take levels on the ground floor. Mr de Silva carried out his own survey using a one metre spirit level when he visited site in July 2005.

59. The engineering experts agree that the Gryphon survey showed that:

i) the rear wall of the back addition leans towards the rear by 56-73 mm over its full height;

ii) the front wall of the main house leans towards the front by 25-31 mm over its full height;

iii) the rear wall at the back addition has a slope of 22 mm down towards the right hand party wall;

iv) the front wall of the main house has a slope of 43-67 mm down towards the left hand party wall.

The internal ground floor level Gryphon survey shows differences of levels of 40mm maximum at ground floor with higher levels at the sides and back of the main house. Mr de Silva's survey of the ground floor does not contain sufficient data to draw conclusions.

61 Mr de Silva's survey shows the rear wall of the main house to lean to the rear at ground floor but to be vertical at first floor level. His sketch of the front elevation indicates the elevation sloping to the left hand side (towards 16 Gowlett Road) and he notes that the front elevations of the houses appear to show an historic dip towards the tree. He also shows a slope in the back addition at first floor level of 10 mm/m.

62. The main conclusion to be drawn from the surveys, as accepted by both engineering experts, is that the property has been subject to historic movement before 1998. That

movement has generally been towards the birch tree at the front. At the rear, the movement appears to have been towards the opposite corner. Otherwise, given the fact that floors were taken up during the remedial work and some floors were, it seems, relevelled, I do not glean much assistance from the surveys of the internal ground floor levels. The local reading of a slope of 10mm/m by Mr de Silva at first floor level in the back addition may be of more significance but I consider that, as Mr Freeman says, it is more likely to be consistent with the historic movement of the house than to indicate recent movement.

Monitoring

63 Crack monitoring was undertaken of Cracks A and B between November 1998 and September 2003 by Mr Trimming. The results of the horizontal and vertical movement of the tell-tales at those cracks has been shown on graphs produced by both experts. They show seasonal opening and closure to both cracks. They also show increasing horizontal and vertical movement across the crack over the period 1998 to 2003.

64. Mr de Silva has superimposed the crack movements for Cracks A and B and they show a remarkable correlation in the size of the horizontal movement of the two cracks until mid to late 2001 when the movements in Crack B become smaller and there is a rapid change of 1.5mm in the vertical movement of Crack B. Over the period 1998 to 2003 Crack A shows horizontal movement of 4 to 5mm and vertical movement of 2 to 3mm, whilst Crack B shows movement of 3 to 4mm and 1 to 2 mm in those directions.

65. Mr de Silva questions the significance of the increasing crack width and the cause of the change in the movements of Crack B after 2001. He considers that the increasing crack width could be caused either by a "ratcheting" effect or softening of the clay at depth due to excessive moisture in the ground. The "racheting" effect occurs because debris lodges in the crack and prevents the crack closing and therefore increases crack width. The softening of the clays at depth might, he considers have been caused by the excessive wetness in the band of subsoil at 1 to 1.5 m at the rear.

66 Mr Freeman does not accept those explanations. His view is that whilst open cracks can fill with debris, in his experience cracks caused by seasonal movement tend to open and close equally and the shape of the graphs with a reversal of amplitude from year to year strongly suggests that the crack opening is not caused by debris. In relation to the softening of the subsoil, Mr Freeman does not accept that the water would soften the clay or that progressive movement due to soil softening has been caused. He believes that the wet band of soil may be a sand layer.

67. I prefer the evidence of Mr Freeman on this aspect. The crack movement reversal, for instance for Crack A in 2000/2001, shows that it closed more than it had opened, indicating strongly that the previous closing had not been limited by debris. Neither do I consider that a mechanism exists which would permit free water to soften clay at depth and cause vertical movement of the foundations at the rear. The clay is confined and will only absorb water if stresses are reduced so that softening cannot occur, as it might if it were exposed to free water in an excavation.

68. Another issue which divides the experts is the significance of the change in readings for Crack B in 2001. Mr de Silva considers that the brick to which the tell-tale, or one part of it, was fixed might have become loose so as to mean that the tell-tale did not properly record the movement. Mr Freeman, on the other hand, considers that the change in amplitude is more likely to have happened because of a physical change in the wall. He points to the photographs of the tell-tale at Crack B and states that there is a lack of evidence for a loose brick. Also, he states that a loose brick would be more likely to give rise to random movements and not the movements seen in this case: a rapid increase of 1.5 mm vertically and a decreased amplitude of cyclic horizontal movement.

69. Again, I prefer the explanation put forward by Mr Freeman. Although the photographs are not perfect, a loose brick is not evident and was not noted by the person taking results. Whilst, as demonstrated by a model produced by the Defendant, a brick could be loose and still record movements, I consider that the cyclical nature of the movements and their reduced amplitude, coupled with the rapid change in the amplitude of the vertical crack movement, strongly suggests that a physical change has taken place. I therefore do not accept that the discontinuity in the crack width readings in Crack B in 2001 can be explained by a loose brick. It is more likely that a physical change occurred which meant that the connection to the source of the causative movement was altered. This, of course, leaves open the issue of whether that change occurred because the back addition wall moved, as Mr de Silva believes, or because the connection to the main house changed, as Mr Freeman believes.

70. Mr Freeman has marked on a graph of the movements in Cracks A and B, the dates when the Defendant carried out work to the birch tree. In summary this shows in relation to horizontal crack movement for Crack A in the April to October growing season for each year:

i) 1999: +3.0 mm – crown thinned and lifted in March 1999;

ii) 2000: +1.5mm – crown reduced and thinned in October 1999;

iii) 2001: +2.7mm – no tree work;

iv) 2002: +1.4mm – crown reduced and lifted in January 2002;

v) 2003: >+2.8mm – no tree work.

71. On that basis, Mr Freeman, supported by the evidence of Mr Kelly, concludes that the opening of Crack A (and Crack B, at least until 2001) is directly related to work carried out on the birch tree.

72. The Defendant submits, in closing, that the evidence of the movement in cracks A and B cannot be related to the known history and development of the birch tree. It states that there was no record of any significant damage during the drought years of 1995-1997; birch trees are likely to suffer reduced growth in the years after a drought and, on the Claimant's case, the cracks developed in 1998, a wet year when the birch is likely to have been previously affected by the drought.

73 The arboricultural experts agree that the work carried out in March 1999 is likely to have had little impact on tree water use and that any impact on water use of the work in January 2002 is likely to have been restricted to the 2002 growing season. The work carried out in October 1999 was only known late and so the experts did not deal with it in their agreement but, evidently, it represents a similar situation to the crown reduction in 2002.

74 Mr Kelly's evidence in support of this is that crown thinning and crown lifting have little impact on tree water use but crown reduction does. He cites a paper, "Controlling water use of trees to alleviate subsidence risk" produced by the Building Research Establishment for the Horticulture LINK Project No 212, as support for the impact of crown reduction on water use. At page 11 that paper states:

> *"The re-growth after crown-reduction produced trees with greater leaf density (m^2 leaf/m^3) because they had larger leaves more closely packed together within a smaller crown volume compared to non-pruned trees.*
>
> *Crown-thinning reduced the leaf area density, and generally the trees took longer to recover their canopy leaf area than for crown-reduction.*
>
> *Total tree water use (transpiration) was reduced by crown-reduction and unaffected by crown-thinning in the year of pruning.*
>
> *Crown-reduction reduced soil drying by trees in the year of pruning, but the effects were generally small and disappeared within the following season, unless the reduction was severe, in which case the effects were larger and persisted for up to two years."*

75 Dr Dobson originally considered that the comparison between movement in 2000 and in 2002 showed that crown reduction had no influence on reduced water use. However, at that stage he was unaware of the crown reduction which had been carried out in October 1999 (so as to affect the 2000 growing season). However, when the October 1999 tree work was disclosed, Dr Dobson's comparison between 2000 (with, he thought, no crown reduction) and 2002 (with crown reduction) could no longer be sustained. Rather, the similarity of movement in 2000 and 2002, when the growth was influenced by crown reduction in both years, supported Mr Kelly's position.

76. Dr Dobson then pointed to page 12 of the Horticulture LINK Project paper where it stated:

> *"For practical soil moisture conservation, severe crown-reduction 70-90% of crown volume would have to be applied. Reduction of up to 50% crown volume is not consistently effective for decreasing soil drying."*

77 Dr Dobson therefore questioned whether a 20% crown reduction would have the same impact.

78. Mr Kelly relied on page 36 of the Horticulture LINK Project Paper which stated:

> *"The soil remained wetter under the crown reduced trees than under crown thinned or non-pruned trees between May and November 1999; differences between treatments were significant in July (P=0.059), September (P=0.095) and November (P<0.05)"*

79. Dr Dobson queried the statistical significance attributed to the treatments in July and September on the basis that a probability value of less than 0.05 was not statistically significant.

80. So far as the arboricultural evidence is concerned, both Mr Kelly and Dr Dobson are well qualified in this specialised subject. In assessing their evidence, I found Mr Kelly more convincing in his views and Dr Dobson more tentative and less certain. In addition the Defendant's case developed and, as noted above, Dr Dobson's evidence changed during the hearing, with the late reliance on the ivy as the cause of the problem and the disclosure of the October 1999 tree work.

Having assessed their evidence, I prefer the evidence of Mr Kelly and the general support for it from the LINK paper. I consider that he has established that there is a causative effect between crown reduction and a reduction in water use in the following season. Whilst the greater the crown reduction, the greater the effect on soil moisture, I am satisfied that the principle of a link between crown reduction and an effect on soil moisture is likely even at 20% crown reduction. Such crown reduction would tend to reduce the extent that the ground would dry out and, in turn, this would lead to a smaller amount of shrinkage of a clay subsoil. The lesser the shrinkage of the subsoil, the smaller the amplitude of the vertical foundation movement and the smaller the potential impact on crack movement.

82. In those circumstances, the evidence of the correlation shown in Mr Freeman's graphs between work carried out to the birch tree and crack movement provides powerful support for the Claimant's case that movement in the back addition, as measured at Cracks A and B, was caused by the birch tree.

The movement mechanism

83. Having considered the available evidence, I now turn to consider the competing opinions on the cause of the movement at the property and whether the mechanisms relied on by Mr Freeman and Mr de Silva could, in principle, cause the movement in cracks A and B.

84. The expert engineers have agreed that the relative movement observed was due either to subsidence of the main house relative to the back addition (Mr Freeman's view) or subsidence of the back addition relative to the main house (Mr de Silva's view) or a combination of these two mechanisms (supported by neither expert).

85 The Claimant relies on the evidence of Mr Freeman to contend that seasonal foundation movement at the front of the property associated with the birch tree was the effective and substantial cause of the damage at the rear of the property.

86. Mr Freeman's explanation of the mechanism which caused the damage to the rear of the property is this:

i) the direction of movement of the front bay is towards the street tree (as shown in the distortion survey). The front of the property rotates forward during summer as a result of shrinkage due to the street tree;

ii) the rear of the main house is in tension because it is resisting rotation resulting in extensive minor damage;

the rotation causes a crack at the party wall close to the junction between the main house and the back addition (Crack A);

in the back addition, the force of the rotation towards the front causes a pull in the flank wall of the back addition which, in turn, causes a crack in the rear wall to open up on the outside (Crack B);

v) the party wall of the back addition is stable because of the support from the neighbouring property at 20 Gowlett Road.

87. The Defendant relies on the evidence of Mr de Silva and Dr Dobson, as developed at the hearing. In summary, the Defendant contends that the probable cause of the movement at Cracks A and B is foundation movement beneath the back addition, in the area of the rear right corner. It relies on the following:

i) The foundations of the back addition were only 25cm deep.

ii) They were on clay with a high potential for shrinkage.

iii) The cherry tree which was removed in 1995/6 is likely to have caused subsidence and damage to the structures of the back addition, including the rear wall. Hairline cracks in that wall were recorded in the purchase survey. The distortion survey showed an historical tilt to the rear. Such damage is likely to have rendered the back addition more vulnerable to foundation movements at the rear.

iv) The old roots of the cherry tree beneath the rear wall of the addition provided conduits through which the roots of other vegetation might grow.

v) There was, throughout the relevant period, ivy at about 70cm from the rear wall of the addition. Ivy is known to be capable of intense localised soil drying. It was capable of rooting to a depth of at least 0.5-1m and for a lateral distance of 3m in any direction. It was capable of causing localised desiccation beneath the foundations of the back addition.

vi) There was never any proper search conducted which was likely to identify the roots of the ivy or the cherry tree under the foundations of the back addition, near the right rear corner.

vii) The pattern of cracks around the right rear corner of the back addition is indicative of foundation movement in that area.

viii) The vertical cracks either side of the windows in the rear wall of the addition are indicative and illustrative of foundation movement in the area of the right rear corner. Crack B most probably records rotation of the panel of brickwork in the rear wall to the right of the crack monitor.

ix) This cause is consistent with the usual expectation that the most extreme damage occurs closest to the foundation movement and the source.

88. The Defendant criticises the Claimant's case on causation as being implausible. It says that:

> The significant observed movement in the house at Cracks A and B was movement in the two walls which met at the right rear corner of the back addition. The movement was physically and structurally remote from the foundations at the front of the property and physically and structurally close to the right rear corner. It is therefore more likely to have been caused by a cause closer to that movement.

ii It is incongruous to suggest that forwards movement in the front of the house could lead to movement in Crack B at the very rear of the property.

iii) The Claimant's theory also required forward rotation in the right party wall (supported by the basement) to cause Crack A but the distortion surveys are inconsistent with such forward movement and there was no evidence of recovery after the underpinning.

iv) The crack development is inconsistent with the known history and development of the birch tree.

v) There is no evidence of desiccation beneath the foundations at the front at the relevant time, particularly beneath the basement.

89 I now consider those criticisms. The Claimant's case depends on movement occurring at the front of the main house and being transferred to cause Cracks A and B. Movement would have to be transferred to form Crack A in the party wall with 20 Gowlett Road at the junction between the main house and the back addition. Movement would also have to be transmitted from the back wall of the main house to the flank wall of the back addition so as to cause Crack B. It is therefore necessary to consider the method by which the movement could be caused so as to create those cracks.

90. In cross-examination a number of recent calculations prepared by Mr de Silva were put to Mr Freeman to establish the movement required at the front of the house to cause Cracks A and B to open. Mr Freeman agreed with various figures but emphasised that those calculations assumed that the transfer of movement was occurring as though the walls were acting as a series of rigid plates, which he did not accept reflected the position. He stated that analysis of movements in the house required what he referred to as a more "holistic" approach and an appreciation that houses built with lime mortar were more "robust". These phrases were criticised by the Defendant as being an attempt to avoid the consequences of the calculations. I do not accept that. The house will not act as a series of rigid plates because it consists of

a series of interlinked elements, walls, floors and roof. These will act as a whole and transfer movement from one part of the house to another. This, in my view, has two consequences. First, movement is capable of being transferred through elements of the house without immediately causing cracks. Mr Freeman observed that a strain or angular distortion of more than about 1 in 250 is required for a brick wall to crack. Secondly, cracks will occur at points of weakness. It is therefore possible for damage to be caused at a location which is remote from the point of movement. In this case the connection between the back addition and the main house would be just such a potential point of weakness. Also, as Mr de Silva accepted, so would be the rear wall of the back addition in the area where there were windows.

91 In relation to Crack A, on the basis of the calculations put forward in cross examination, the party wall with 20 Gowlett Road would only need to settle at the front by about 4 mm to cause a 3mm crack at Crack A. Such a vertical movement would be unlikely to cause cracking because of the ability of the house structure to cope with such movements. If movement occurred at the front of the house at the party wall with 16 Gowlett Road at the corner adjacent to the birch tree then I see no reason why such movement could not be transferred through the walls, floor and roof so as to cause movement at the other side of the front, adjacent to 20 Gowlett Road. The precise transfer mechanism would depend on a complex series of factors and I accept Mr Freeman's evidence that calculations are neither necessary nor helpful in explaining the mechanism. I consider that this transfer mechanism provides a plausible explanation which relates Crack A to movement at the corner of the house adjacent to the birch tree. Whether that mechanism has operated will depend on consideration of all the other evidence relating to the movement.

92 In relation to Crack B, on any view the postulated transfer mechanism is more complex. The calculations, based on rigid plate movement, would indicate that for a horizontal movement of 2.2mm in Crack B on the rear wall of the back addition, there would have to be a movement of 35 mm at the front of the house adjacent to the birch tree. The movement would have to be transferred through the rear wall of the house into the flank wall of the back addition. This raises the question whether the connection between the back wall of the house and that flank wall would enable that movement to be transferred. There is evidence from the schedule of repair drawn up by Mr Trimming that there is a crack at this junction indicating that there has been movement across that connection. That schedule simply states: "Crack at rear extension/rear wall corner rising ground to roof behind SVP." It is unclear whether there is also an internal crack at this corner.

93 Mr Freeman considers that there might be some physical connection or strengthening at the junction between the two walls but there is no evidence that this is or is not the case. As Mr de Silva accepted, if there was movement in the back wall of the main house, some movement could be transferred into the flank wall and a crack would develop depending on whether the connection could sustain that transfer. This would depend on whether, for instance, the brickwork was bonded at the connection and how it was bonded. Again, there is no evidence on this, one way or another. There is, though, the evidence of the crack at the connection which shows, at least on the outside face, that a crack developed. This does not preclude movement being transferred across the connection before the crack developed and, depending on whether the crack penetrates the whole thickness, after the crack had developed.

94. Once the movement is transferred into the flank wall then, as Mr de Silva also accepted, the window openings in the rear wall of the back addition would represent an area of weakness where the cracking could develop.

95. Whilst the mechanism for transfer of the movement from the front of the house to the rear wall of the back addition is clearly more complex, I see no reason why, in principle, that mechanism could not occur. Again, whether it did will depend on a consideration of all the evidence of the observed movement.

96. I now turn to consider whether the mechanism developed by the Defendant provides a possible explanation for the existence of Cracks A and B.

97. That mechanism consists of foundation movement beneath the back addition, in the area of the rear right corner. If there was settlement of the foundation, Mr de Silva considers that Crack A would open up and he produced calculations to show that the vertical movement required was about 2mm to cause Crack A to open by 2mm.

98. In relation to Crack B, Mr de Silva developed a more detailed explanation in the evidence he gave at the hearing. He considered that Crack B had been caused by a crack developing on the other side of the windows, closest to the rear right corner. That crack had been caused by a "buttress of brickwork" moving down and causing the panels between the windows to distort opening up Crack B at the other side of the window.

99. I consider that this mechanism could, in principle, explain both Crack A and Crack B. Whether it provides the explanation in this case will depend on a consideration of all the evidence of the observed movement.

Movement at the front of the property

100. The first question in respect of the Claimant's mechanism is whether there has been sufficient movement at the front of the house to develop the cracks at Cracks A and B. The evidence which was gathered by Mr Trimming in the period 1998 to 2003 concentrated on Crack A and Crack B. He did not place any tell-tales at the front of the property. Therefore there are no measurements of cracks there and limited factual evidence. It has been suggested by the Defendant that this means that Cracks A and B were therefore the two most significant cracks in the property. Whilst they were significant cracks, in his report of May 2000 Mr Trimming does not state that he chose the largest cracks but that he was more concerned to see if the cracks suffered from current movement.

101 He describes damage to the front elevation, a number of cracks in the front room including a crack in the party wall "*dropping from the ceiling to the picture rail but, due to decoration it is only visible for a length of approximately 300mm below the picture rail before disappearing.*" He also reports on damage to the bedroom above the front room. He said that the rear room at ground floor level "*did not appear to be significantly affected by subsidence" although it did have some small cracks.*" He said that the rear wall was affected to some extent.

102. Evidence of the position in August 2000 is contained in a report produced by Mr Graysmark of Davies, who also took photographs. He notes that "*To the front left corner of the front first floor bedroom, there is vertical cracking evident upon the front wall above the picture rail. In the front lounge below, the rucking of the wallpaper can be seen in a similar area.*" There is a photograph of the front ground floor room showing the crack.

In his February 2001 Report, Mr Trimming stated that the existing cracks had developed to a further extent although there did not appear to be new ones. He said that the front of the house forward from the spine wall still had developing subsidence cracks although their development had not been rapid. He said that the front wall and rooms enclosed by it were slowly cracking and the bedroom was cracking to a greater extent than the front reception room.

In his December 2001 Report, Mr Trimming observed that the cracks that existed in the house had developed to a further extent and there had been a very slow but progressive appearance of new ones. He observed that movement at the front had developed subsidence cracks but their development rate had not been spectacular. He repeated his comment that the front wall and rooms enclosed by it were very slowly cracking with the front bedroom cracking to a greater extent than the front reception room.

105. In October 2002 Mr Payne of Davies visited the house. A "*crack at high level*" was noted in the front room and a photograph taken. He observed that a comparison with the photographs taken previously appeared to show that there has been no progression of damage. He referred to the comments by Ufton Associates (loss adjusters for the Defendant) who in May 2002 observed, on only an external inspection of the front, that there was negligible movement of the front bay.

106. In his October 2003 Specification for Repairs and Decoration, Mr Trimming refers to repairing the "main cracks" in the front living room and front bedroom and to repairing "small wall cracks" in the rear living room and "cracks" in the rear bedroom. For the exterior walls, there was repair to "several front bay cracks in the stonework" and "Front wall crack between the bay and No 16 from ground to cill."

107. Mrs Eiles gave evidence of damage to the front. On 31 July 2002 she had written to the CIS and stated "*the cracking in the front of the house and especially in the back addition is noticeably increasing as can be seen with the naked eye.*" She said that she was capable of making her own observations and that she was concerned at cracking in the party wall with 16 Gowlett Road which seemed to be progressing. It was narrow but getting bigger quickly and it was much longer when the paper was taken off during the underpinning. She said that from about 1993 she thought that every room had been redecorated and she did not remember there being cracks at the time.

108. On 12 November 2002 she had written to the CIS in response to Mr Payne's comments on the front elevation where he had said "*there is insufficient cracking to confirm subsidence damage*" and "*there does not appear to be a progression of damage*". She responded by stating: "*As I live in the house I can categorically state that this last is untrue – there were no cracks in the front living room wall when I last redecorated, or I would have filled them in. The cracks are now clearly visible...*". She said that she was most concerned about the front bedroom where the wallpaper

was rucking and she complained to Mr Trimming about it. She also referred to damage to the front garden wall.

I consider that there was progressive and significant damage to the front in the period 1998 to 2003 and this is borne out by the evidence of Mrs Eiles who came across as an honest witness who did her best to recall the progress of the damage. She accepted that she could not say what progress had been made between certain dates but, on the basis of her letters to the CIS, it is clear that progressive significant damage was noticed in 2002. Her evidence is supported by the Reports prepared by Mr Trimming in 2000 and 2001 and, to some extent, by the Specification he drew up in 2003. It is also consistent with the damage to the garden wall.

110. Whilst the reports and photographs produced by Davies and the comments by Ufton Associates would suggest that there was little development in the damage at the front between August 2000 and October 2002, I do not find the photographic comparison simple and, in the absence of monitoring it is difficult to rely on subjective observations by two different people at different times. Both, however, considered that there was a crack in the front room which was worthy of note. Ufton Associates only carried out a superficial inspection of the outside of the building. As a result, I find the evidence of both the representatives of Davies and Ufton Associates to be less cogent than that of Mrs Eiles, supported as she is by Mr Trimming's reports.

11 Having come to the conclusion that there was further significant damage to the front of the property in the period 1998 to 2003, then, as Mr de Silva accepted, this movement, forward of the spine wall dividing the front and rear reception rooms, would be caused by the birch tree.

However, that does not answer the question of whether the movement at the front of the house caused the cracking in the back addition, in particular Cracks A and B. I now turn to consider whether the evidence supports that mechanism. In doing so, I also consider the mechanism relied on by the Defendant but, as always, I bear in mind that the burden of proof lies on the Claimant.

113. The engineering experts are agreed that Cracks A and B must have been caused by the same mechanism. In addition, the engineering experts both put forward mechanisms which are based on desiccation of the soil as being the cause of the settlement.

The required movement across the front of the property, on Mr de Silva's calculations, would be about 35mm at the left hand side (party wall with 16 Gowlett Road) and about 4mm on the right hand side (party wall with 20 Gowlett Road). There would also need to be movement at the top of the rear wall where it meets the house of about 24 mm.

115. Mr Freeman explained that, in his view, such movement would be likely to consist of movement of the whole house, with the left-hand side of the house (adjacent to 16 Gowlett Road) moving more than the right-hand side of the house (adjacent to 20 Gowlett Road). There would only be cracking where the angular distortion exceeded the figure of about 1 in 250. Otherwise his view was that the movement would not cause cracking to the brickwork which, in his opinion, had considerable flexibility. On that basis he considered that the limited, but significant, cracking observed at the front of the house would be consistent with this mechanism. He referred to an

example of another house in North London where a crack between the main house and the back addition had been caused by the action of tree roots at the front of the house.

Mr Freeman also considered the crack at the junction between the flank wall of the back addition and the rear wall of the house. He observed that whilst a crack was shown in Mr Trimming's Specification for Repairs, produced in October 2003, rising from ground to roof behind the SVP and a further crack was shown in the coursing of the flank wall, these were not observed by Mr Trimming in his May 2000 Report when he had said that the flank wall did not appear to have external cracks in it. He considers that these cracks developed and the development may explain the change in the behaviour of Crack B.

Mr Freeman is therefore of the view that damage observed in Cracks A and B is consistent with forward rotational movement of the front left-hand corner of the main house. He does not, on the other hand, consider that the cracking observed is consistent with subsidence of the rear right-hand corner of the back addition. He states that he had never seen subsidence cause the type of cracking observed in the rear wall of the back addition. He sketched the type of damage which he would expect on a drawing of the elevation of the back addition walls. There are two "classic features" which he states he would have expected and which were absent. First, he would have expected there to be arching of the brickwork and secondly he would have expected diagonal cracks becoming wider towards foundation level. He demonstrated this by reference to Figure 15 on page 53 of the book "Has your house got cracks? A homeowner's guide to subsidence and heave damage" which he co-authored.

118. Mr de Silva, on the other hand, considers that the effective and substantial cause of the damage to the property was movement of the back addition relative to the main house. In the joint statement of engineering experts he stated that this movement was due to subsidence caused by the band of wet soil at the rear and, what he described as "normal seasonal effects". In his evidence, he modified this and said that he should have mentioned the vegetation at the back. As the evidence developed, this related solely to the ivy at the rear. He said that he was influenced in this view by the fact of rotation of the back addition away from the main house as shown in the Gryphon Survey; by the slope of the floor in the first floor bedroom of the back addition; by the seasonal movements in Cracks A and B and by the existence of very shallow foundations in the back addition.

Mr de Silva considers it unlikely that the main house, including the cellar, would be moving as a unit as suggested by Mr Freeman to give rise to the movements in Cracks A and B. If Mr Freeman were right then Mr de Silva would have expected to see differential movement between the parts of the house over the cellar which were founded at 1.7 m below ground level and the other parts founded at 0.55m but he observed no evidence of that damage. Mr de Silva could not see how movement of the main house could be transferred to cause the cracking in the rear wall of the back addition in circumstances where there was a crack at the junction of the flank wall of the back addition and the rear wall of the main house.

In his report Mr de Silva had also questioned whether, based on what was said in a book by Cutler & Richardson "*Tree Roots and Buildings*", the effect of the birch tree would have reached further back than the front reception room. However, in cross-

examination, he withdrew this and accepted that effects on one part of the house could lead to effects on other parts of the house. Originally, though, he relied on this as making the birch a less likely cause of the movement.

121 Mr de Silva started from the position that the house and back addition had been subject to long-term historic damage prior to 1998, as disclosed in the Gryphon Survey and in his own observations on his visit to the property. That movement had been to the front left-hand corner of the main house and to the rear left hand corner of the back addition. He considered that this led to the development of Crack A many years ago. On its own the further development of Crack A could, he accepted, have been caused by either movement of the front or movement of the back addition.

It was the causation of Crack B in the back addition by movement in the front of the house which Mr de Silva found difficult to accept. He pointed to the fact that there were cracks at the junction of the flank wall and the main house which would prevent transmission of movement and that there was little sign of movement in the rear of the main house. He also found the pattern of cracking in the rear wall, described by Mr Trimming, difficult to explain on the basis of Mr Freeman's version of events.

Instead, Mr de Silva considered that the shallow depth of foundations for the back addition, the presence of ivy at the rear and reference to roots in Mr Trimming's 2001 Report made it more likely that Cracks A and B were caused by local movement of the back addition.

Both Mr Freeman and Mr de Silva are well qualified and experienced experts. In assessing their evidence, I have found that Mr Freeman's views have been more consistent than Mr de Silva's and the Defendant's case and Mr de Silva's evidence in support of it developed during the hearing. That having been said, I was impressed by the evidence of both experts and they clearly were expressing their honest viewpoints on the difficult case of causation which arises in these proceedings. In the end it has been support within the factual material which has most assisted me in deciding which evidence is to be preferred.

On the basis of that assessment, I have come to the conclusion that Mr Freeman's opinion of the cause of the damage in Cracks A and B is to be preferred for a number of reasons. First, the existence of the clay sub-soil conditions, the presence of tree roots from the birch and of the evidence of desiccation at the front all point to the birch tree causing movement. This, in my judgment, is also confirmed by the significant damage which I have found to have been caused at the front. In contrast, the evidence at the rear shows that the soil was less susceptible to desiccation and there was a marked absence of evidence of root growth beneath the back addition during underpinning or in trial pits. The late reliance by the Defendant, through their experts, on the ivy was not convincing and if the ivy had been the likely cause I would have expected the parties, Mr Trimming, the loss adjusters and the experts to have noted its significance at a much earlier stage. There is no doubt that the evidence of soil conditions, tree roots and desiccation provides strong support for the involvement of the birch tree in the mechanism.

Secondly, whilst the cyclical movement, in particular in Crack A, is clearly related to seasonal movement which, in principle, could be due to ivy or other vegetation at the rear of the property or to the birch tree, there are two factors which I find are

compelling in pointing to the birch tree being the cause. As I have found, the evidence of the crown reduction work carried out to the birch tree shows a remarkable correlation with the reduced movement in the subsequent season. In particular, the late disclosure by the Defendant of tree work being carried out in October 1999 provided further confirmation of the explanation put forward by the Claimant and undermined the Defendant's position. As I have said, the late attempts by the Defendant to contradict the clear statement made by its solicitor and suggest that work was not carried out in October 1999 were not sustainable. Further, the withdrawal by Mr de Silva of his evidence of the extent of influence of the birch, based on Cutler & Richardson, weakens the Defendant's overall position in relation to causation by the birch tree.

Thirdly, I accept the evidence of Mr Freeman that the nature of the brickwork in Victorian houses makes them more robust, in the sense that they can absorb differential movement without reaching angular strains at which brickwork would crack. This detracts substantially from the concerns that Mr de Silva had as to the absence of signs of cracking caused by differential movement. There would necessarily be differences in the amount of movement in different parts of property due to the different stiffnesses of components, foundations, walls, floors and roof. However, the construction of the house would, as Mr Freeman observed, be likely to cause less cracking.

128 Fourthly, whilst Mr de Silva raises important concerns in relation to Crack B, he fairly accepts that Crack A could, in principle, be caused by the forward movement of the property. The fact that there is less movement in the rear of the house, in particular the rear wall of the house, at first seems inconsistent with Mr Freeman's theory as to the cause of Crack B. However, if Mr Freeman's theory is correct, the connection between the rear wall of the house and the flank wall would have to have allowed some transfer of forces across it. That would have reduced the apparent movement in the rear wall of the main house. On the basis of Mr Trimming's Reports and Specification, I find that originally there was no cracking in the flank wall but that this developed in the period from 1998. Having rejected the Defendant's lately developed "loose brick" theory as an explanation of the change in the pattern of movement in Crack B, I consider that the more likely explanation was the development of a crack at the junction of the flank wall of the back addition and the rear wall of the house, consistent with Mr Trimming's Report and Specification.

Fifthly, in relation to the pattern of damage in the back addition, I find Mr Freeman's evidence more persuasive. Mr de Silva's explanation is that a brickwork pillar in the rear wall subsided, causing vertical cracks to appear on the right-hand of the windows which led to rotation of the brick panels and consequent opening of cracks on the left-hand side of window to form Crack B. Whilst this provides a theoretical explanation of Crack B, I am not satisfied that it provides a correct explanation, for two reasons. First, there is no evidence that the panels of brickwork rotated or that the cracks on either side of the window were narrow or wide consistent with that movement. In this respect, I do not consider that the change in movement of the Avonguard at Crack B, given its location, can be representative of rotational movement in the brick panels. Secondly, I accept that removal of support of the foundation beneath the pillar of brickwork with lateral support at the party wall would be much more likely to cause some or all of the features of arching and diagonal

cracks as indicated in Figure 15 of the book co-authored by Mr Freeman. Rather, the nature of the crack combined with its location strongly supports a mechanism caused by movement of the flank wall.

Sixthly, as I have said, I do not accept that the progressive movement in Cracks A and B was caused by debris in the cracks or softening of the wet clay sub-soil at 1 to 1.5 m depth, as suggested by Mr de Silva. Such an explanation is necessary in circumstances where, on his view of the mechanism, seasonal cyclic movement would normally not lead to progressive movement.

Finally, I do not find the existence of the historic damage to the back addition in the form of movement to the right-hand corner of significance to the cause of the current damage. The evidence shows that until about 1995 or 1996 there was a cherry tree adjacent to that corner which, on any view, would have been likely to have caused historic movement until that cherry tree was removed. The evidence shows that the soil at 1 to 1.5 m depth was wet, not desiccated, and I do not consider that, in those circumstances, such historic movement can be relied on as pointing to the cause of current damage. I find that there is no support for the suggestion made in submissions that the old roots of the cherry tree beneath the rear wall of the addition provided conduits through which the roots of other vegetation, such as the ivy, had grown.

On that basis, I find that the main house moved away from the back addition, as demonstrated by Cracks A and B, and that the cause of this rotational movement was the desiccating effect at the front of the house of the tree roots from the Defendant's birch tree.

I now turn to consider liability although I can do so briefly in the light of the position taken by the Defendant. As I have stated above, the Defendant conceded "that the tree-management undertaken by the Defendant was inadequate" and admitted breach of duty in relation to paragraph 6(2) of the Particulars of Claim. The Defendant therefore admits that it was negligent and in breach of duty in "Failing to pollard, crown or otherwise manage or control the growth of the said tree adequately or at all".

The failure of the Defendant to manage or control the growth of the tree was, I find, effective in permitting the birch tree to cause the damage. The damage to the property would not have occurred if the Defendant had taken steps to remove or otherwise severely control the growth of the tree.

Initially, the Defendant made a limited admission as to foreseeability of damage. Whilst it admitted that it was reasonably foreseeable that there was a risk of subsidence damage from the tree to the front of the premises (that is, the part of the house forward of the spine wall separating the front and rear reception room on the ground floor) by virtue of the proximity of the tree to the front of the premises and the nature of the sub-soil, foreseeability was otherwise denied. However, during closing submissions the Defendant rightly, in my view, conceded the issue of foreseeability as to damage at the rear of the property.

136 Accordingly, I find that the Defendant is liable to the Claimant for damage caused by the birch tree and I now turn to consider the damages claimed by the Claimant in respect of that damage.

Damages

The Claimant originally claimed a sum of over £115,000 for underpinning work, the necessary repair work to the property, the cost of alternative accommodation and various other matters. The Claimant has now accepted that it cannot recover the cost of the underpinning to the rear of the property or the element of repair and other general expenses relating to that work. In those circumstances, Mr Freeman and Mr de Silva have helpfully agreed certain figures and the Claimant has now adopted the relevant figures as the sum which is claimed as damages. In addition, the Claimant seeks a sum for general damages for the disruption and inconvenience caused.

now turn to consider the various heads of damages.

Underpinning to the front

As I have said, the Claimant accepts that the cost of the underpinning which was undertaken at the rear is not recoverable from the Defendant. That underpinning consisted of underpinning the walls of the back addition, the central part of the rear wall of the house and an area of the WC and utility room in the infill. The cost of that underpinning is £20,257.00.

140. The Defendant does not contest that underpinning at the front is recoverable if Cracks A and B are proved to have been caused by the birch tree, as I have found. Rather, the Defendant contends that if the Claimant's theory of the cause of the movements in Cracks A and B were not proved, there would be no recent damage at the front of the property which justified underpinning at the front.

In fact, as I have found there was significant damage to the front of the house and in my judgment that, in itself, would have justified the recovery of the cost of underpinning at the front of the house. I do not accept that there would need to be damage at the front in excess of Category 2 in BRE Digest 251 to justify underpinning at the front. Whilst such damage might, generally, be sufficient to justify underpinning, the whole purpose of underpinning is to prevent future damage. Therefore, even if there is damage below Category 2, the cost of underpinning might be recoverable if it could be shown that continuing significant future damage was likely. In this case, even absent the damage to the back addition, I consider that the evidence shows that the birch tree was causing significant damage to the front of the property. Mr de Silva considered that underpinning of the front was not necessary provided that the growth of the birch tree was controlled but he said this depended on the view of the arboricultural experts. That evidence shows, effectively, that removal or substantial reduction of the tree was required to prevent damage and the Defendant has not done this. As a result, Mr de Silva would, it seems, support underpinning in these circumstances.

In any event, I find that the underpinning at the front was necessary to prevent the continuing progressive damage at the rear and also would have been necessary, without damage at the rear, in the light of the significant damage caused, post 1998, to the front and the likelihood of progressive serious damage at the front, given that the Defendant would not remove the tree to prevent the continuing damage.

143 The Claimant is therefore entitled to recover the sum of £26,492.63 which is the sum, including VAT, agreed by the engineering experts.

Repair to damage to the back of the property

The Claimant claims a sum of £29,240.34 in relation to damage to the back of the property. From the schedule helpfully produced by the experts it can be seen that Mr de Silva disputes these costs, generally on the basis that damage other than damage to the front reception room, front bedroom and, to some extent, the front hallway and stairs was not attributable to the birch tree. There appear to be two other reasons for disputing sums. First, it is said that 80% of the repairs to the hallway and stairs were necessary because of historic damage, that is damage prior to 1998. Secondly, Mr de Silva disputes work relating to the roof as he says that this relates to water damage caused by the leak to the roof and therefore he disputes that it is attributable to damage caused by the birch tree.

145 The Claimant has not relied on any evidence in its submissions to deal with the matters raised by Mr de Silva and prove that the disputed items are recoverable. I therefore disallow the sum of £1,347.02 (item 2.2) which Mr de Silva attributes to historic settlement and the total sum of £ 9,423.51 (items 2.19, 2.23 to 2.29) which he attributes to the leaking roof. Otherwise, I find that the damage to the rear of the house and to the back addition was caused by the birch tree and that the Defendant is liable for the sum of £18,469.81, being the sum claimed less the two sums that I have disallowed.

Common Costs

The experts have adopted the usual pragmatic approach of apportioning the common costs pro-rata to the underlying sums for the cost of underpinning and repair. The common costs which are therefore attributable to the sum of £29,240.34 claimed by the Claimant for repair to damage to the back of the property are £11,053.96.

147. On the basis that I have only allowed £18,469.81 for that claim it follows that the sum recoverable for common costs must also be similarly reduced. I therefore find that the sum recoverable as common costs related to the repair to damage to the back of the property is £6,982.29.

Alternative accommodation

The Defendant relies on the evidence of Mr de Silva that, if underpinning had only been carried out to the front of the property then it would not have been necessary for Mrs Eiles and her family to move to alternative accommodation. Instead, he explains that the work could have been carried out by entering through the bay window and by sealing up the front reception room and also, or alternatively, by carrying out some underpinning by a tunnelling method.

149. In his evidence, Mr de Silva gave cogent reasons why he would have organised the work in this way. However, I am not persuaded that Mrs Eiles and her family would have been able to maintain a reasonable living standard with work being carried out in the manner suggested by Mr de Silva. The necessary noise, dust and activity of workmen at the house would mean that conditions would have been difficult to bear

and there was evidence that Mrs Eiles' daughter suffered asthma. In my judgment, the decision taken by the insurers and Mrs Eiles for Mrs Eiles and her family to move out of the house was a reasonable one, even had the work been limited to the underpinning at the front of the house and the repair to the superstructure throughout the property.

Obviously, though, the period for which the alternative accommodation was needed was increased by the time needed to carry out the underpinning to the rear of the property. I note that the engineering experts have agreed that a period of 4 weeks should be allowed for this in the schedule and I see no reason to exclude any other period on the basis of the evidence.

As a result, having already deducted the sum of £1,655.00 for the period of 4 weeks, I find that the Claimant is entitled to recover the balance of £21,811.11.

General damages

The Claimant also claims general damages for the distress and inconvenience which was suffered by Mrs Eiles. It is submitted by the Claimant that Mrs Eiles suffered serious distress and inconvenience over a period of 5 years and that, relying on the matters set out in her witness statement, the distress and inconvenience was more serious than in other comparable cases.

I have been referred to the excellent articles by Ms Kim Franklin "*Damages for Heartache: The Award of General Damages for Inconvenience and Distress in Building Cases*" (1988) 4 Const. L.J. 264 and "*More Heartache: A Review of the Award of General Damages in Building Cases*" (1992) 8 Const. L.J. 318. On the basis of those articles, which are now some years old, the Claimant submits that a figure of about £1000 per year for 5 years would be indicated as appropriate, taking account of inflation.

The Defendant does not challenge the principle of the recovery of such general damages or challenge the evidence given by Mrs Eiles. From Mrs Eiles' statement it is evident that concerns commenced when she contacted Mr Trimming in October 1998. She then made a claim to the CIS in July 2000. From then until work commenced in October 2003 she was in regular correspondence with Mr Trimming, loss adjusters and the CIS. She subsequently moved out from October 2003 until October 2004 when the work was completed. She refers to the general stress and strain of having the work carried out, including the dust and the dirt which caused her to spend a considerable time cleaning up after the workmen left.

The approach of the courts to the question of general damages for such vexation, distress and worry is to provide compensation which is "not excessive, but modest" and which "may not be very substantial" per Lord Denning MR and Oliver LJ in *Perry v. Sidney Phillips* [1982] 1 WLR 1297. In *Watts v. Morrow* [1991] 1 WLR 1421 Bingham LJ said that general damages were recoverable but were limited, generally, to damages for physical inconvenience and discomfort and mental suffering directly related to that.

In this case, there was the physical inconvenience and discomfort of having a house which was cracking and having the house invaded by various people investigating the

cracks. There was then the need to move out of the house for a period of a year, causing the inconvenience of moving out, moving back, settling into the alternative temporary accommodation and moving back to a house which had been the subject of the remedial work. I bear in mind, though, that the alternative accommodation meant that Mrs Eiles did not have to suffer the level of inconvenience and discomfort that would have occurred if she had remained in the house. She did, however, continue to visit to keep an eye on the work being carried out to her home.

157. The level of inconvenience and discomfort between 1998 and 2003 was significantly less than at the time of the moves out of and back to the property in 2003 and 2004 and during that year. It seems to me that a figure of £1,000 is appropriate to cover the period of the first five years and a figure of £1,250 is appropriate to reflect the disruption in 2003 and 2004. I bear in mind that general damages are awarded for this to provide modest, not generous, compensation. Overall, I therefore allow a figure of £2,250.

Summary

Accordingly, I allow damages in the total sum of £76,005.84 as follows:

(1) Cost of underpinning to the front of the property:	£26,492.63
(2) Cost of repair to the damage to the rear of the property:	£18,469.81
(3) Common costs associated with (2):	£6,982.29
(4) Cost of alternative accommodation:	£21,811.11
(5) General damages for inconvenience and discomfort:	£ 2,250.00
	£76,005.84

I invite further submissions as to interest, if that is not agreed.