REPORT OF

Dr D P O'Callaghan

Dated:
30 January 2003

Specialist Field:
Arboriculture, Tree Failure, Hazard Evaluation, Risk Assessment

On Behalf of:
The Right Hon. Earl of Oxford & Asquith
Mells Estate

On Instructions of:
Norwich Union
Claims Technical Unit
Worthing, West Sussex

Subject:
Accident as a result of a Fallen Tree
Clavey's Farm, Mells, Frome, Somerset
11 July 2001

Inspection Date:
08 January 2003

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Consultants in Arboriculture, Urban Forestry and Biological Sciences

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1.0 INTRODUCTION

1.1 Professional Details

My name is Dealga O'Callaghan and I am a Consultant practising through OCA UK Limited, which is an arboricultural Consultancy practice based at Valleyfield, 1A Stratford Road, Aigburth, Liverpool, with a southern office located in Severalls Park, Wyncolls Road, Colchester, Essex. The Practice specialises in Arboriculture, Forestry, Urban Forestry, Biological Sciences and Project Management.

I am a consultant specialising in tree failure, hazard evaluation, risk assessment related to trees, planning and development where trees are involved, personal accidents involving trees, insurance claims where tree failure is involved and or building damage occurs which may be attributed to the activity of trees, Tree Preservation Orders etc.

1.2 Instructions and Documentation

I am instructed to act on behalf of the Right Honourable Earl of Oxford & Asquith, Mells Estate in the matter of an accident caused by a fallen tree at Clavey's Farm, Mells, Frome in Somerset. The accident occurred at about 12.50pm on 11 July 2001 when a motorcyclist sustained serious injuries when he collided with an Ash tree that either fell on him or had fallen across the road from the Mells Estate and he collided with it.

I have been asked to identify any arboricultural issues that arise in this case, to carry out a technical investigation, including desktop study and site visit and to express my opinion with respect to matters within my expert field that materially influence the situation that has arisen.

I have been supplied with, or obtained through investigation, the following documents, some of which appear within my appendices:

1. A letter of instruction from Norwich Union Claims Technical Unit dated 12 December 2002.

2. A copy of the Police Report dated 13 July 2001.

3. The Witness Statements of Ivor Francis dated 31 October 2001, which is unsigned.

1.0 INTRODUCTION (Continued)

4. Copies of a location map, and maps of the general area and a sketch map of the locus of the accident.

5. A copy of an extract from the Land Registry title ST171650 confirming ownership of the land at Clavey's Farm

6. A letter from Lyons Davidson Solicitors to Viscount Asquith of Morley dated 09 April 2002 and referenced MSB/V11/277407/1.

7. A letter from Humberts Surveyors to Aon Private Clients dated 15 April 2002.

8. A letter from Lyons Davidson Solicitors to Viscount Asquith of Morley dated 17 May 2002.

9. A copy of the ITT London & Edinburgh Public Liability Accident Report Form completed by Humberts and dated 30 May 2002.

10. A letter from AON Private Clients to Norwich Union Claims dated 17 June 2002.

11. A letter from Norwich Union Claims Unit to Lyons Davidson Solicitors dated 19 June 2002.

12. A letter from Norwich Union Claims Unit to AON dated 19 June 2002.

13. A letter from Lyons Davidson Solicitors to Norwich Union Claims Unit dated 13 August 2002.

14. A set of five photographs taken by Lyons Davidson in the same month as the accident occurred.

15. A set of 13 photographs of the location of the accident taken by Mr Nigel Clement, Claims Investigator for Norwich Union that were taken late in 2002.

16. A Legal Report on the weather conditions at the time and date of the accident prepared by Mr D L Crabb, Senior Forensic Meteorologist at the Met Office Legal Consultancy section.

17 Report from Dr D Rose, Plant Pathologist at the Forestry Commission, Forest Research Station at Alice Holt Lodge, near Farnham, Surrey.

1.0 INTRODUCTION (Continued)

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17 Report from Dr D Rose, Plant Pathologist at the Forestry Commission, Forest Research Station at Alice Holt Lodge, near Farnham, Surrey.

1.0 INTRODUCTION (Continued)

18. Records of tree work undertaken on the Estate since 1997, following safety inspections.

1.3 Synopsis

This matter is one associated with a claim in accordance with the Civil Procedures Rules and the Personal Injury Protocol for compensation for personal injuries sustained by Mr Gary Poll as a result of a collision with a fallen tree on Old Mells Road, Mells, Frome, Somerset. The accident occurred at about 12.50pm on 11 July 2001.

I am informed that Mr Poll was travelling on his motorcycle along the Old Mells Road towards Mells and rounding a corner he collided with a tree which fell from the land of Clavey's Farm onto the road. It is not clear if the tree fell on Mr Poll or if the tree had fallen shortly before he reached the location and he collided with the tree. In any event, Mr Poll was thrown from his motorcycle and sustained severe injuries as a result.

Messrs Lyons Davidson Solicitors have filed a claim on behalf of their client, Mr Poll, against the owner of the land, Viscount Asquith of Morley his insurers, Norwich Union Insurance Limited.

1.4 Disclosure of Interest

I hereby state that I have to my knowledge no connection with any of the parties, witnesses or advisers, involved in this case.

1.5 Appendices

The list of appendices to this report is as follows:

Appendix 1 Contains details of my experience and qualifications, appointments and specialist fields. In addition a list of my publications is attached.

Appendix 2 Contains documents I have considered together with copies or portions of the documents, which are essential to the understanding of my report.

1.0 INTRODUCTION (Continued)

Appendix 3 Contains photographs supplied to me and photographs taken during my site investigation.

Appendix 4 A report on the fungus found on the tree by Dr David Rose, Plant Pathologist at the Forestry Commission, Forest Research Labs at Alice Holt.

Appendix 5 A Legal Report prepared by Mr D L Crabb, Senior Forensic Meteorologist at the Met Office Legal Consultancy Division, Bracknell, Berkshire.

Appendix 6 Contains a list of texts and published material together with copies or portions of the documents, which are essential to the understanding of my report.

Appendix 7 Contains a sketch plan of the locus of the accident and copies of other illustrations prepared as a result of my site investigation.

2.0 THE BACKGROUND TO THE DISPUTE AND THE ISSUES

2.1 The Relevant Parties

The complainant is Mr Gary Poll of 38 Longfield, Mells in Somerset, BA11 3PZ.

The Solicitors acting for the complainant are Messrs Lyons Davidson Solicitors of Victoria House, 51 Victoria Street, Bristol, BS1 6AD.

The defendant is Viscount Asquith of Morley of Branch House Farm, Mells, Frome in Somerset, BA11 3RE.

I have not been informed of any Solicitors acting for the defendant.

The Insurance Company involved is Norwich Union Insurance Limited and the matter is being dealt with by the Claims Technical Unit at The Warren, Warren Road, Worthing, West Sussex, BN1 9QD. The person dealing with the claim is the Claims Manager, Mr Paul Knight. The Norwich Union Claims Investigator is Mr Nigel Clement.

The Defendant's Agents are Messrs Humberts Chartered Surveyors of Kings Head House, Market Place, Chippenham, Wiltshire, SN15 3HT.

2.2 The Assumed Facts

From the documents made available to me and following my site investigation I assume that the photographs provided to me that show the location of the accident were taken during the summer as all the trees and other vegetation are in full leaf. I further assume that some of the photographs were taken in 2002 as the cut end of the top of the subject tree that is visible in one photograph is weathered and there is no debris or arisings that would normally be present if the photograph had been taken at time of the accident.

From Mr Francis' witness statement and the Police Report, it is not clear whether the tree fell on the claimant or if it had already fallen across the road and he collided with it as he came around a sharp bend in the road. As the weather at the time is recorded in the Police Report as 'High Winds', I assume that the tree failed in the wind and fell across the road either hitting Mr Poll or causing an obstruction on the road and he collided with it.

2.0 THE BACKGROUND TO THE DISPUTE AND THE ISSUES (Continued)

2.3 The Issues to be Addressed

The Key issues to be addressed are:

1. What caused the tree to fail?
2. Were there any external signs that would have alerted a professional to the fact that the tree was likely to fail?
3. If there were external signs of weakness, over what period would these signs have been evident?
4. Was the failure of the tree reasonably foreseeable in the circumstances?
5. Who should have noticed external signs and whether or not failure was reasonably foreseeable?
6. Could anything have been done to prevent the failure of the tree?

3.0 THE TECHNICAL INVESTIGATION

3.1 Site Inspection and Associated Investigations

3.1.1 I travelled to the location of the accident on 08 January 2003. The weather was clear but very cold at about minus 5°C and there was snow and frost on the ground. I arrived on site at approximately 9.30am and spent one and half-hours on site.

3.1.2 Mr Christopher Rowe an independent Forestry Contractor who works for the Estate showed me the location of the accident. I asked Mr Rowe if he undertook regular safety inspections / surveys of the Estate trees that border highways, roads and footpaths that are used by the public.

3.1.3 I contacted the Highways Authority, Somerset County Council in order to determine if the Council has a system of regular inspection of trees on and close to the highways under its control. I spoke with Mr Steve Scriven in the County Environment & Property Department who has some responsibility for highway trees.

3.1.4 I examined the subject tree including that part that is still standing and the remains of the fallen part that is still *in situ*. I measured the height and diameter of all the stems of the tree and recorded the details.

3.1.5 I examined the base of the tree and noted the presence of fungal fruiting bodies. I took a sample of the fungal material and the wood to which it was attached and sent these for identification to Dr David Rose, the Senior Plant Pathologist at the Forestry Commission Research Laboratories at Alice Holt Research Station near Farnham, Surrey.

3.1.6 I took a number of photographs of the remains of the tree, the base of the tree where the failure had occurred and some general photographs of the location.

3.1.7 I orientated myself in relation to the location maps and sketch drawing of the locus of the accident and standing by the tree I took a compass bearing to determine the position of true north.

3.0 THE TECHNICAL INVESTIGATION (Continued)

3.1 Site Inspection and Associated Investigations (Continued)

3.1.8 I contacted the Meteorological Office in order to ascertain the weather conditions at the locus of the accident at the time and date of the accident. I spoke with a Mr D L Crabb, who is a Senior Forensic Meteorologist with the Met Office Legal Consultancy Division at Bracknell in Berkshire. Mr Crabb provided a Legal Report as to the weather conditions at Clavey's Farm, between 2300 GMT on 10 July 2001 and 1700 GMT on 11 July 2001.

3.1.9 I contacted both Mr Nigel Clement, the Claims Investigator who acted for Norwich Union in this matter and Mr Michael Bailey, the Solicitor at Messrs Lyons Davidson, to find out the dates upon which their photographs were taken.

3.2 Results of the Site Inspection and Associated Investigations

3.2.1 Mr Rowe informed me that he undertakes surveys on behalf of the Estate on an irregular basis. Furthermore these are not part of any formal system of tree inspection. However, he supplied me with copies of his records through Humberts. These are reproduced at **Appendix 2-1**.

3.2.2 In a telephone conversation, Mr Scriven explained to me that Somerset County Council does not have a formal systematic survey programme for highway trees in rural areas, although a new system of inspection is being planned and would be implemented in the future. He stated that the Highway Engineers undertake regular surveys and if suspect trees are recorded they are referred to him for further inspection and follow-up action. He also stated that suspect trees are brought to his attention by the Local Authorities within the county, Arboricultural Officers, Parish Councils and members of the public. All these are investigated and follow-up action scheduled or Notices served on landowners under the 1980 Highways Act.

3.2.3 Mr Scriven also stated that the County Council simply did not have the resources to survey all its own trees along rural roads let alone those in private ownership.

3.0 THE TECHNICAL INVESTIGATION (Continued)

3.2 Results of the Site Inspection and Associated Investigations (Continued)

3.2.4 The subject tree is a multi-stemmed Common Ash, (*Fraxinus excelsior*) that is located in the hedgerow that forms the boundary to Clavey's Farm. Three of the stems are still standing, while the fourth is the one that failed and caused the accident. The stems average 220mm in diameter and are between 12 and 15 metres in height.

3.2.5 The subject tree has been cut back in the past when the boundary hedge was layered to thicken it up. Thus the subject tree is in effect similar to a coppice stool that has not been cut back for some time and has grown on. Pictures of the tree and the stems are reproduced in Photographs **1** & **2** at **Appendix 3-2.**

3.2.6 The base of the tree contained an included bark union between the main remaining stem and the stem that failed, Photograph **3** at **Appendix 3.**

3.2.7 The base of the subject tree and part of the root system were found to be seriously infected with a decay fungus that causes 'white rot'. The fungus has not been positively identified, but it is likely to be *Perenniporia fraxinea* (in the USA *P. fraxinophila*), which is also variously named *Fomitopsis* (*Fomes*) *cytisina*, (**Appendix 4** and Photographs **4**, **5** & **6** pictures at **Appendix 3-2**).

3.2.8 The Police Report states that at the time of the accident there were 'strong winds', (**Appendix 2-2**). The Met Office Legal Report states that the winds at the three weather stations closest to the locus of the accident record average wind speeds of between 20 and 24 knots (23 to 28 mph) at the time of the accident, which are Force 6 or 'Strong Winds' on the Beaufort Scale (**Appendix 5**).

3.2.9 The winds at the time of the accident were coming from the west and southwest, i.e. between compass bearings 250 to 270 and the highest wind speeds would have been isolated gusts of 40 knots or 46mph at the time of the accident, (**Appendix 5**).

3.0 THE TECHNICAL INVESTIGATION (Continued)

3.2 Results of the Site Inspection and Associated Investigations (Continued)

3.2.10 The direction of North at the location of the accident as recorded on the various maps and sketch drawings was found to be 30° out. True North is actually where compass-bearing 340 would be on the maps if north was shown correctly, (**Appendix 7**).

3.2.11 I understand from Mr Clement that his photographs were taken on two separate dates. The first five photographs in his set of 13, were taken on 22 September 2002, while the remaining 8 photographs were taken on 31 October 2002.

3.2.12 I understand from Mr Bailey that all five photographs in his set were taken in July of 2001, within weeks of the accident. Mr Bailey could not provide a precise date, but he is sure that they were taken in July 2001.

4.0 THE FACTS ON WHICH THE EXPERTS OPINION IS BASED & DISCUSSION

4.1 Tree biomechanics and how trees fail

4.1.1 Trees are living structures. They have developed strategies by natural selection, which allow wood to be engineered so as to support the upward growth of the tree to ensure that the green parts can generate "food" through photosynthesis.

4.1.2 Trees are self-optimising mechanical structures and are economic in their use of internal resources and materials to make their structure as strong as is necessary for the conditions in which they are growing, (Mattheck & Breloer, 1994). If a tree is evenly loaded, i.e. if all points on the surface have to withstand the same stress, it will have no overloaded (breaking points) or under loaded areas. An optimal structure has a uniform stress over its whole surface, this is known as the 'Axiom of Uniform Stress'.

4.1.3 Mechanical structures generally fail if at some point within the structure, the stress reaches a critical value for the material concerned, in this case wood. Simply put, the structure will fail if the stress applied somewhere on the structure exceeds the failure value.

4.1.4 The model that currently influences arboricultural understanding of the biomechanics of trees was largely fashioned by Prof. Dr. Claus Mattheck.

4.1.5 Professor Mattheck is a material physicist who has directed much of his work towards the failure and growth of biological systems. He has been employed in public service at the Karlsruhe Research Centre, Germany, since 1980 and is also a licensed tree consultant and expert witness in the mechanics and fracture/failure behaviour of trees.

4.1.6 This is not to deny that arboriculturists/silviculturists have to some extent for many years appreciated the biomechanical character of tree systems in a rudimentary fashion. Mattheck himself cites Klein (1914) to illustrate that an appreciation of trees as self-optimising mechanical structures, is a key principle in biomechanical models and has been present for many years.

4.0 THE FACTS ON WHICH THE EXPERTS OPINION IS BASED & DISCUSSION (Continued)

4.1.7 However, although some research and related publications may have dealt with certain aspects of this self-optimisation, e.g. stem taper or callus formation, and / or wood and its properties in isolation from the tree system, we are unaware of any publications that draw the various strands together to provide a comprehensive biomechanical model of tree growth pre Mattheck.

4.1.8 Mattheck's contribution has been to systematically analyse model tree growth and failure patterns and to develop a practical field-based methodology for objectively assessing the structural integrity of trees, i.e. tree hazard evaluation.

4.1.9 This methodology, which he has called Visual Tree Assessment (VTA), has essentially three stages: visual inspection for diagnosis of symptoms, defects and tree vitality; thorough examination of any defects identified by visual examination, and; measurement and analysis of those defects which are considered critical.

4.2 Tree Hazard Evaluation

4.2.1 An appreciation of tree biomechanics as a model and of the interaction of the tree's biology with the environment is supplemented within the tree hazard evaluation system proposed by Matheny and Clarke and as published by the International Society of Arboriculture. By combining the concept of a "quality checked" hazard evaluation as proposed by Matheny and Clarke with Visual Tree Assessment techniques and arboricultural training, the arboriculturist should be able to effectively assess a tree pre-failure to ascertain its potential risk in a particular setting.

4.2.2 The key elements of the ISA system are:

- The size of tree part most likely to fail (small/large branches or the whole tree). Rate as 1 - 4 (4 being the highest score).
- The likelihood of a failure to the part most likely to fail (its biomechanical properties and the environment). Rate as 1 - 4 (4 being the highest score).
- The targets beneath the tree and use of the target area should the tree/tree part fail. Rate as 1 - 4 (4 being the highest score).

4.0 THE FACTS ON WHICH THE EXPERTS OPINION IS BASED AND DISCUSSION (Continued)

4.2.3 In the ISA system, the scores for each factor are added together to produce a total. The closer the score is to 12, the more hazardous the tree is and the more urgent hazard abatement measures become.

4.3 The subject tree is a multi-stemmed Ash in a hedgerow that had been cut back many years ago when the hedge was layered. Since that time it has been allowed to grow unchecked, as has the rest of the hedgerow. In re-growing, the Ash produced four stems from the original cutting point, which is typical of the species, which is a traditional coppice species.

4.4 When trees such as Ash grow back after cutting and produce multiple stems, they sometimes form what are known as 'included bark unions', which are structural defects of trees. These unions are prone to failure, particularly as the branches or stems that emanate from them get larger and heavier. This is not something that can be reversed; it is simply an inherent structural weakness. Trees try to compensate for this by producing what is termed 'reaction wood' close to the union. Whilst the tree is young or mature, the reaction wood tends to provide enough strength to hold the structure together. However, as the tree gets older and its mass increases, or if it is subjected to strong winds it does not have the available energy to continually add strong reaction wood. In addition, the stems or branches get larger, longer and heavier with time.

4.5 The evidence for the included union in the subject tree is shown on Photograph **4** at **Appendix 3-2**. In reality, the weakness of these unions is such that they can fail when a force is exerted upon them at right angles, a sudden gust of wind for example. Professor Claus Mattheck explores this subject in detail in his book, *"The Body Language of Trees"* (DoE Publication No 4 in Research for Amenity Trees, HMSO 1994 ISBN 0 11 753067 0). In Chapter 5 at Figure 35 (**Appendix 6-1**) Professor Mattheck says the following in regard to included unions

"The compression fork, optimised for withstanding the pressure of the two stems pressing against one another, is a structure that is absolutely bound to fail if a tensile load is applied at right angles to the axis of the stems, pulling them apart"

4.0 THE FACTS ON WHICH THE EXPERTS OPINION IS BASED AND DISCUSSION (Continued)

In my opinion Professor Mattheck overstates the case in relation to inevitable failure. Although included unions are weak and prone to failure, not all do fail and some species of tree produce adequate reaction wood. In my opinion the strength of included bark unions can become compromised over time.

4.6 Dr David Lonsdale supports the concept of included bark unions being weak and prone to failure in his book *"Principles of Tree Hazard Assessment and Management"* (DETR Publication No.7 in Research for Amenity Trees, HMSO, 1999, ISBN 0 11 753355 6). In Chapter 2, at page 31 he says the following:

"Failures of living branches in high winds are sometimes sited at their bases, ... The centre of a crotch is the exact point where such failure tends to be initiated."

"A fork comprising co-dominant leaders is somewhat weaker than a junction between a main stem and a subsidiary branch. .... The tendency for wood fibres in a co-dominant union to split apart can be considerably increased if there is a bark inclusion, (i.e. a zone of bark-to-bark contact) between members. Bark inclusions, which occur commonly both in forks and in the crotches of acutely angled branches, come to occupy the region where there would otherwise be an anatomical union between members. As a result, the strength of the structure can become increasingly compromised"

The emphasis in the text is mine and the full text is reproduced at **Appendix 6-2.**

4.7 Thus, included bark unions are features that indicate probable failure and would normally be what an arboricultural or forestry inspector would look for when inspecting trees. Had the subject tree been inspected closely by an experienced person, it is likely that the included union would have been noted and remedial work scheduled to abate the hazard. However, the subject Ash is deep within a dense hedgerow, which forms the boundary between the estate and the ditch between it and the road. This is illustrated in Photograph **1** at **Appendix 3-1.** Unless the inspector had looked very closely from the road side, which would have entailed access through dense undergrowth, I doubt that the union would have been recorded in a routine visual inspection. Mr Rowe's inspections were limited to fairly rapid visual inspections from the road and field sides.

4.0 THE FACTS ON WHICH THE EXPERTS OPINION IS BASED AND DISCUSSION (Continued)

4.8 In addition to the included union, the base of the subject Ash and part of its root system are infected with a decay fungus, (*Perenniporia fraxinea*), (**Appendix 4**). This is generally thought to be a comparatively rare fungus in Britain. Ash is more often attacked by fungi such as *Inonotus* spp or *Gannoderma* spp, which would be readily recognised by any competent arboricultural or forestry inspector. In an authoritative text on the subject, *'Diseases of Forest and Ornamental Trees'* by D H Phillips and D A Burdekin, (1982) (Macmillan Press Ltd, ISBN 0-333-32357-2), it is stated in Chapter 19 page 374 that this fungus is:

"Comparatively rare in Britain but is widely distributed in the rest of Europe and North America. ... may cause severe butt rot in ash and other species but is not of great significance because of its limited occurrence."

The full text is reproduced at **Appendix 6-3**. However, Dr David Rose informs me that it is more common than was previously thought but seems to be restricted to Ash and possibly Plane and with such a narrow range of hosts, it is not commonly seen by Arboriculturists.

4.9 Therefore, it is not surprising that the presence of *P fraxinea* would have been missed in any visual inspection. The bracket or fruiting body normally measures between 5 and 40cm, (the bracket on the subject tree is about 15 to 20 cm), and although white when it first forms, darkens with age to dark brown or black. The young form of the bracket is evident in photographs **2** & **3** at **Appendix 3-1**, while the old form is shown in Photograph **5** at **Appendix 3-2**. This latter picture should be compared with the illustration at Photograph **6**, which is reproduced from the publication *'Diagnosis of Ill Health in Trees'* by R G Strouts & T G Winter (DoE Publication No.2 in Research for Amenity Trees, HMSO, 1994, ISBN 0 11 752919 2). In comparison with other decay fungi such as *Gannoderma* or *Inonotus*, it is a small and easily missed bracket.

4.10 In addition, the photographs taken around the time of the accident (**Appendix 3-1**) and from those that I took, (**Appendix 3-2**), seem to indicate that the bracket was growing beneath the base of the tree where it overhung the ditch and may not have been visible to even an experienced inspector. A diagrammatic representation of the location of the bracket is at **Appendix 7-1**. Therefore, I conclude that the presence of the fungus could easily have been missed by even an experienced inspector.

4.0 THE FACTS ON WHICH THE EXPERTS OPINION IS BASED AND DISCUSSION (Continued)

4.11 The effect of *P fraxinea* is that it degrades the lignin in wood leaving only the cellulose component and thus degrades the strength of wood. It is a typical severe white rot that causes extreme weakening of the wood at the base of the infected tree. The effects are shown in Photographs **2** & **3** at **Appendix 3-1** and in Photograph **6** at **Appendix 3-2**. Coupled with a structural weakness in the form of an included bark union the subject Ash tree was bound to fail at some stage.

4.12 The winds at the time of the accident were recorded in the Police Report as 'Strong' (**Appendix 2-2**). The Met Office reports the wind speeds at the four weather stations closest to the locus as between 18 and 24 knots (22 to 28 mph), which are classified as Force 6, Strong on the Beaufort Scale, (**Appendix 5**).

4.13 However, Mr Crabb of the Met Office states in his report at paragraph **7.6**:

"It is my opinion that the mean wind speed is unlikely to have exceeded about 23 to 26 knots (27 to 30 mph) at any time during the period 2300 GMT on 10 July 2001 and 1700 GMT on 11 July 2001, and would very probably have been well below that level for much of the period, especially during the first half of the morning of 11 July 2001."

He goes on at paragraph **7.7** to say:

"It is my opinion that the highest hourly gusts of wind, during the specified period, would have varied between about 20 and 40 knots (23 to 46 mph), though isolated gusts may have reached 42 knots (48 mph). The highest gusts of wind are likely to have occurred in the area of Clavely's (sic) ***Farm, Mells, Frome, Somerset, during the latter part of the morning and afternoon of 11 July 2001, and it therefore possible that an isolated gust of up to 40 to 42 knots (46 to 48 mph) may have occurred during the period immediately around the time of the incident, at 12.45 pm (1145 GMT) on 11 July 2001."***

Mr Crabb also states that gusts of wind of up to 42 knots at 12 to 15 metres above ground are not unusual in the West Country, and that gusts of wind are likely to reach this level on numerous occasions during an average year. He also states that there would be many occasions when the wind would be appreciably stronger. The full text of the Met Office Report is reproduced at **Appendix 5**.

4.0 THE FACTS ON WHICH THE EXPERTS OPINION IS BASED AND DISCUSSION (Continued)

4.14 Although the winds were strong and probably gusting to 42 knots around the time of the accident, this is not unusual in the West Country. Winds of these speeds and higher occur frequently in an average year throughout the life of a tree. The subject tree would therefore have adapted and become optimised to withstand such winds and would not normally be expected to fail in these conditions. However, as I have shown above, the subject tree had an included bark union at its base and was infected with a severe white rot decay fungus. I conclude therefore that the failure in what were effectively common wind speeds was due to the presence of both the included bark union and the decay fungus in the subject tree.

4.15 It is my opinion that there was one external sign present that would normally have alerted a professional to the fact that the tree could fail, i.e. the included bark union. However, as stated at paragraph **4.7** above, this would not have been obvious as it is at the base of the tree on the ditch side of the field and obscured by dense undergrowth. Unless a programme of regular and systematic inspections, that included winter inspections, was in place, the presence of the included union could easily be overlooked. However, I am of the opinion that a multi-stemmed Ash resulting from a previously cut stool is likely to have an included union(s) and this type of tree adjacent to the highway would normally be singled out for detailed investigation by an experienced inspector.

4.16 Although the presence of a decay fungus would normally be regarded as an external sign of possible failure, the location form of the bracket of *P fraxinea*, explains why it would not have been noted. It is not very common and the fruiting body, if evident, might not be immediately obvious to an inspector who had not previously come across it. As stated at **4.10** above, it is likely that the bracket was obscured below the base of the subject tree in any event. However, the presence of a fungal bracket or fruiting body of any sort would normally alert an inspector to make a closer examination and lead to a positive identification. Although I did see it on site, I had the benefit of instructions to inspect the subject tree very closely and thus had more time than an average inspector. Once I noted the bracket I did not recognise it but took samples for identification. In the circumstances, it is my opinion that this fungus would not have been obvious to an inspector.

4.0 THE FACTS ON WHICH THE EXPERTS OPINION IS BASED AND DISCUSSION (Continued)

4.17 It is difficult to say how long the fungus has been infecting the subject tree. However, from the extent of the decay exposed following the failure and during my site investigation, I conclude that the subject tree has been infected for some years. However, the remaining stems are not showing crown symptoms that would alert a professional such that he/she would make a closer examination. The crown of the remaining tree as it appeared in September 2002 can be seen in Photograph **1** at **Appendix 3-3**. I am not in a position to state with certainty whether or not the stem that failed was showing any symptoms before it failed. However as the extent of decay in the base of the fallen stem is similar to that in the remaining stems (**Appendix 3-1**, Photos **2** & **3**), it is my opinion that it is unlikely that any symptoms would have been evident in the stem before it failed. The decay seems to be confined to the base of the stems and has not yet spread to the roots, therefore crown symptoms would not be expected.

4.18 The included bark union has been present on the subject tree for many years, probably since the hedgerow was last layered, which, judging from the size of the stems I would say was over ten years ago. However, as stated previously, the location of the union at the very base of the tree on the ditch side of the field and obscured by dense undergrowth, would have made it difficult to detect during any routine inspection. However, a re-grown multi-stemmed Ash would normally warrant closer than average inspection.

4.19 Based on the evidence set out above, it is my opinion that the failure was not reasonably foreseeable. Therefore, unless a full and detailed condition survey of each and every tree had been undertaken, which would most likely have exposed the presence of the included union, there was no reasonable action that could have been taken to prevent the failure of the tree.

4.20 I turn now to the question of who, if anyone, should have inspected and recorded the faults on the subject tree? It is my opinion that the Estate should undertake or have undertaken regular inspections of trees on its land that border highways, footpaths or other areas used by the public. To some extent the Estate does this as the records provided by Mr Rowe demonstrate, (**Appendix 2-1**).

4.0 THE FACTS ON WHICH THE EXPERTS OPINION IS BASED AND DISCUSSION (Continued)

4.21 However, I understand from Mr Rowe that these inspections are simply quick visual inspections and not detailed or systematic. In my opinion the Estate could do more than it is currently doing to ensure that trees on its land adjacent to highways and footpaths are inspected more thoroughly. However, given the number of trees similar to the subject tree that are located on field and road boundaries of the estate, this would require a significant increase in the allocation of resources to this activity.

4.22 There is also a duty on the local Highway Authority, (Somerset County Council), to inspect trees on the highway. Current Government advice on the matter is set out in Circular **52/75**, which is entitled *'Inspection of Highway Trees'*. The Circular provides guidance as the form of inspection and what points should be particularly noted during inspections of highway trees. Paragraph **4** of the Circular states that:

"... The officer should also pay attention to trees growing on private land which are within falling distance of the highway, and examine any which are suspect. ..."

The Circular also states that the Highway Authority has a right of access to private land for the purpose of inspection and has the power to require the landowner to have dangerous trees cut or felled in order to abate the hazard. The full text of the Circular is reproduced at **Appendix 6-4**.

4.23 I am informed that Somerset County Council does not regularly, or systematically inspect highway trees on rural roads, nor does it have the resources to inspect trees on private land that could threaten the highway. In my opinion the shear length of rural road through the County and the volume of trees such as the subject tree along those roads, would make detailed inspections on a regular basis almost impossible.

4.24 The majority of tree inspections for landowners in Britain are undertaken by tree work contractors, who have a basic competence in assessing the condition of trees. Detailed analysis and interpretation is normally beyond their competence. Mr Rowe is a Forestry Contractor, who, in the absence of crown symptoms, would simply have noted a typical hedgerow Ash among other hedgerow trees, looking as it should do and with nothing unusual about it that would cause him to inspect it more closely.

5.0 CONCLUSIONS

I conclude that:

5.1 The subject Ash tree is a multi-stemmed hedgerow tree that has grown back from a stool produced by a hedge layering exercise some years ago. It contained a structural weakness in the form of an included bark union.

5.2 The subject tree was infected with a decay fungus, (*Perenniporia fraxinea*), which causes severe white rot in Ash trees.

5.3 Unless a detailed and close inspection of the tree had been undertaken, the presence of the included union would not have been detected as it is at the very base of the tree and obscured from view by dense undergrowth on the road side. Additionally, it would not have been seen from the field side as it was positioned over the bank of a ditch away from the field.

5.4 The presence of the decay fungus would also have easily been missed from all but the most detailed of inspections. The tree was not showing any crown symptoms and the fruiting body (bracket) seems to have been positioned under the base of the tree on the side of the ditch.

5.5 The winds at the time of the accident were recorded as being Strong, Force 6. However, winds of this speed and stronger are common in the west country and the subject tree would have adapted and become optimised to withstand such winds and would not normally be expected to fail in such winds.

5.6 The failure of the subject tree in the prevailing wind conditions was due to the combined presence of a structural weakness, (the included union), and a decay fungus (*P. fraxinea*).

5.7 Although the structural weakness and the decay fungus had been present in the tree for some years, neither would have been likely to have been recorded in anything other than a full and detailed assessment of the tree.

5.0 CONCLUSIONS (Continued)

5.8 The failure of the subject tree was not reasonably foreseeable as both the structural weakness and the decay fungus would only have been detected by a full and detailed structural assessment of the tree. Such inspections cannot reasonably be expected from either a contractor acting for the estate or and inspector from the County Council Highways Department.

5.9 In the absence of symptoms, the subject tree would have looked like the hundreds of other hedgerow trees, i.e. typical of what would normally be expected, with no signs that it warranted closer examination.

STATEMENT OF INDEPENDENCE

1. I understand that my duty included in providing written reports and giving evidence is to help the Court, and that this duty overrides any obligation to the party who has engaged me. I confirm that I have complied with that duty.

2. I believe that the facts I have stated in this report are true and that the opinions I have expressed are correct.

3. I have endeavoured in my report to be not only accurate but also complete. I have endeavoured to include in my report those matters, which I have knowledge of or of which I have been made aware that might adversely affect the validity of my opinion.

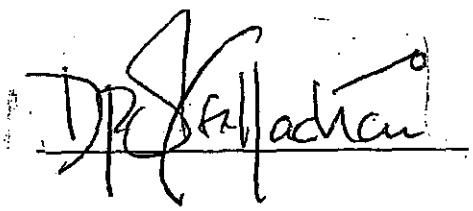
4. Further, I have not included anything, which has been suggested to me by anyone, (including particularly the Solicitors instructing me), without forming my own independent view thereon.

5. I will notify those instructing me immediately and confirm in writing, if for any reason my existing report requires any correction or qualification.

6. I further understand that:

   - My report will form the evidence I will give subject to any corrections which I may make before attesting as to its correctness;
   - I may be cross-examined on my report by a cross-examiner aided by an expert;
   - Should the Court conclude that I have not fairly tried to meet these standards, I am likely to be the subject of adverse criticism, during and after this case, and may be reported to my professional body, (The Academy of Experts), for breach of its rules of professional conduct.

7. I confirm that I have not entered into any arrangement where the amount or payment of my fees is in any way dependent on the outcome of the case.

Signed:  Dated: 30 January 2003

Name: Dealga P O'Callaghan Title: Arboricultural Consultant

OCA UK Limited

Consultants in Arboriculture, Urban Forestry and Biological Sciences

- January 2003 -

H:D/DPO/Legal Reports/8467Rpt.doc

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Appendix 1

Professional Resume and the Publications of Dealga P O'Callaghan

CURRICULUM VITAE

Name:	O'Callaghan, Dealga Peadar
Qualifications:	BSc(Hons), PhD, MIBiol., CBiol., MAE, F.Arbor.A.
Professional Qualifications / Membership of Learned Societies:	Member of the Institute of Biology (MIBiol.) European Chartered Biologist (EurBiol) Practising Member of the Academy of Experts (MAE). Fellow of the Arboricultural Association (F.Arbor.A.) Honorary Life Member of the International Society of Arboriculture, (ISA). Member of the Utility Arborist Association
Current Post:	Programme Leader – Arboriculture Myerscough College Adjunct Professor of Forest Resources Clemson University, South Carolina, USA
Previous Appointments:	Principal Consultant with Environmental Consultants International Ltd. (1996-1998) Principal Practice Consultant with OCA UK Ltd. (1990-1996) Senior Lecturer, Myerscough College (LCAH) (1983-1991) Research Fellow Salford University (1980-1983)
Main Teaching Activities:	Arboriculture Consultancy Practice Trees, Law, Litigation & Planning Urban Forestry, Project Management Expert Reporting, Utility Arboriculture etc.
Positions of Responsibility:	Chairman of OCA UK Ltd. Director of ECI Ltd President of UK/I Chapter of ISA Executive Director of BUAA General Conference Chair for the 74th Annual ISA Conference, Birmingham, 1998

Research Grants:

Hyland Johns Award 1998-2000 from ISA Research Trust.
Bartlett Foundation Award 1997-1999

Consultancy:

Vegetation Management Programmes
Expert Witness on matters Arboricultural
Planning & Public Inquiries
Litigation & Personal Accident

Presentations, Conferences Workshops etc.

Speaker at the Following ISA Events
ISA Conference, Philadelphia, 1991
ISA Conference, Bismarck, North Dakota 1993
ISA Conference Halifax, Nova Scotia, 1994
ISA 1st European Congress, Lahnstein, Germany May 1995
Trees & Buildings Conference, Chicago, 1995
Landscape Below Ground II, San Francisco 1998

ISA Chapter Events
Indiana Chapter, Indianapolis, 1995
Ohio Chapter, Columbus, Ohio, 1996
Pacific North West Chapter, Vancouver, 1997
Norway Chapter, Oslo, 1997

Arboricultural Association Conferences
Cambridge, 1992
Nottingham, 1994
Lancaster, 1995
Exeter 1996 & 1997
Various other Branch Seminars & Work Shops.

Professional Reports, Patents Software etc:

Various Templates for Planning, Development, Subsidence, & Expert Witness.
Licensed & Copyrighted Contractor Information
Pro-Forma, Development Site method Statement
Pro Forma, Licence Agreements etc.

Publications:

List Attached

PUBLICATIONS (Chronologically)

O'CALLAGHAN, D.P. (1976) *"Aggregation and sex pheromones in the confused flour beetles, Tribolium confusum (DV)"* Proc 2nd ECRO Confr (Reading)

RYAN, M.F. and O'CALLAGHAN, D.P. (1976) *"Aggregation and sex pheromones in the beetle Tribolim confusum"* J. Insect Physiol 22(11): 1501-1503

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O'CALLAGHAN, D.P., GALLAGHER, E.M. and LANIER, G.N. (1978) *"Field evaluation of pheromone baited trap-trees to control elm bark beetles"* J. NY. Entomol Soc 84(4): 315.

O'CALLAGHAN, D.P., GALLAGHER, E.M. and LANIER, G.N. (1980) *"A pheromone baited trap-tree approach to controlling populations of elm bark beetles, vectors of the Dutch Elm disease"* Environ Entomol 8(2): 181-185

KIRBY, S.G., O'CALLAGHAN, C.P. and FAIRHURST, C.P. (1980) *"Dutch Elm Disease; Problems and Prospects"* Landscape Research Volume 6 No. (2); 29-30

O'CALLAGHAN, D.P. (1980) *"The current status of the Dutch Elm disease epidemic in Ireland and what can be done about it?."* Viewpoint Column, Taisce Journal 4(6) 8-9.

O'CALLAGHAN, D.P. & FAIRHURST, C.P. *"Trap trees to control elm bark beetles, Merseyside Trials, 1980"* Report on Forest Research (1981).

O'CALLAGHAN, D.P. & ATKINS, P.D. (1981) *"Towards an Integrated Control Programme for the Dutch Elm Disease"* Arboric J. 5(4): 250-256.

ATKINS, P.M., O'CALLAGHAN, D.P. & KIRBY, S.G. (1981) Scolytus laevis (Chapuis) (Coleoptera: Scolytidae) new to Britain. Entomol. Gazette 32(4): 280.

O'CALLAGHAN, D.P. (1982) *"The Occurrence of Scolytus Multistriatus (Marsham) in Ireland"* Irish Nat J 20 (9): 384-385.

O'CALLAGHAN, D.P. & GIBBS, J.N. (1982) *"Low level of Broodwood Utilisation by Elm Bark Beetles in North West England"* Report on Forest Research 1982.

KIRBY, S.G., O'CALLAGHAN, D.P. & FAIRHURST, C.P. (1982) *"Death Has a Pattern"* GC & HTJ Nov. 12 1982 pp 18-22.

O'CALLAGHAN, D.P. & FAIRHURST, C.P. *"Evaluation of the Trap Tree Technique for the Control of Dutch Elm Disease in Northwest England"*. IN Dutch Elm Disease Research in Europe. For. Commission Bull. 60; 23-28.

O'CALLAGHAN, D.P., ATKINS, P.M. & FAIRHURST, C.P. (1984) *"Behavioural responses of elm bark beetles to elms killed with cacodylic acid"*. J.Chem Ecol 10 (11): 1623-1634.

MILLAR, J.G., ZHAO,c-h., LANIER, G.N., O'CALLAGHAN, D.P., GRIGGS, M. & SILVERSTEIN, R.M. (1986) *"Components of Moribund Elm Trees as attractants to the Elm bark beetles, Hylurgopinus rufipes & Scolytus multistriatus"*. J.Chem. Ecol. 12 (3): 583-608.

O'CALLAGHAN, D.P. (1989) *"Remedial Tree Work - A long Term Investment : A Long Term Project"*. Arboric. J. 13 (4): 303-311.

O'CALLAGHAN, D.P. (1991) *"Legal protection for trees in Britain & Ireland"*. J.Arboric. 17 (11): 306-312.

LAWSON, M. & O'CALLAGHAN, D.P. (1995) *"A Critical Analysis of the role of trees in damage to low rise buildings"*. J.Arboric. 21 (2) : 90-97.

O'CALLAGHAN, D.P. & LAWSON, M (1995) *"Trees & Development Conflicts : The importance of advance planning & site control in tree preservation plans"*. IN Proc. of Trees & Buildings Conference, G.Watson & D.Neeley EDS. ISA Publications.

O'CALLAGHAN, D.P. & LAWSON, M (1995). *"A Critical look at the potential for foundation damage caused by tree roots"*. IN Proc.of "Trees & Buildings Conference". G. Watson & D.Neeley EDS. ISA Publications.

O'CALLAGHAN, D.P. & CHARLTON, P.M. (1996). *"International Utility Arboriculture"*. Arborists News 5(1):13-15

O'CALLAGHAN, D.P. & CHARLTON, P.M. (1996). *"International Utility Arboriculture"*. UAA Quarterly 4(4):1-3

O'CALLAGHAN, D.P. (1996) *"Inclusion of Utility Arboriculture in revision of British Standard Recommendations for tree work, B.S. 3998 and development of competencies for Utility Arborists"*. Proc. of Arb. Assoc. Conference 1995 .

O'CALLAGHAN, D.P. (1999) *Planning Installation of Underground Services in Landscape Below Ground II*, G Watson & D Neeley EDS. ISA Publications

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Appendix 2

2-1 Survey records of Mr C Rowe

2-2 Police Accident Report

2-3 Witness Statement of Ivor Francis

Chris Rowe
Forestry Contractor
20, Blind Lane
Southwick
Trowbridge
BA14 9PG
Tel: 01225 767466

Work carried out on Mells Estate since 1998.

cut Ivy on all trees surround estate to establish condition of trees
therefore
- Cundick Lane - Large Ash tree alongside road dying therefore felled.
- Half way along Cundick Lane row/hedge of Oak trees - removed all dead wood overhanging the road & cut scrub at roadside.
- Clarays Farm Leigh on Mendip road Ash tree dying therefore felled.
- Mells Green School elms by school - dead therefore felled.
- Hill going into Little Green dead elms by roadside - therefore felled.
- Top road going towards Post Office opposite prospect Farm Vegetation growing into road & therefore making it narrow - removed.
- Duck Pond Mells Pollarded Willows due to broken limbs
- Post office paddock Ash trees & scrub overhanging neighbouring property cut & removed.

- Bottom Road Dead monkey Puzzle tree felled Limbs on Ash trees hanging into the road therefore removed.
- Tintshill sycamore trees along roadside heavy Squirrel damage shedding tops & Limbs therefore felled.
  Scots pine tree dying - felled.
- Yew tree Cottage roadside bank sycamore copice & Ash tree copice hanging into road. Cleared bank to make road wider.
- Fairview Felled 5 poplar trees ~~trees~~ 1 due to storm damage but had to cut rest down for safety reasons.
- Marlercombe vegetation hanging into road. Felled unstable Ash on the stretch of road.
- Claregg Farm Leigh on mondip road - Dead Elms felled along this road.
- Rashford Lane Horse Chestnut storm damaged felled.
  3 In front of Mells manor sycamore tree root plate moving felled.

8

TB MRS

AVON AND SOMERSET CONSTABULARY

ACCIDENT REPORT

PLEASE USE BLOCK CAPITALS
(and black ball point pen)

Book 1 of 1 BOOKS

Officer dealing (Name/Rank/No.) WALTON PC 3797

Officers Station FROME Div

Non Stop		POLAC	
Fatal	Serious	✓ Slight	Non Injury

Date of Accident: Day 14 Month 07 Year 01

WEDNES Day

No. of Vehicles Involved: 2

No. of Casualties: 2

Local Authority: MENDIP

1st Road – Class'n & No.: UNCLASS

2nd Road – Class'n & No.:

Speed Limit: 60

Time of Accident: Hours 12 Mins 50

Time Reported: 12 55

Time police Arrived: 13 11

Who reported: WITNESS

Where reported: ROADSIDE - MOBILE PHONE

Location (to nearest junction): O/S FINGER FARM, OLD WELLS RD, NR FROME. BETWEEN MELLS GREEN & LEIGH ON MENDIP

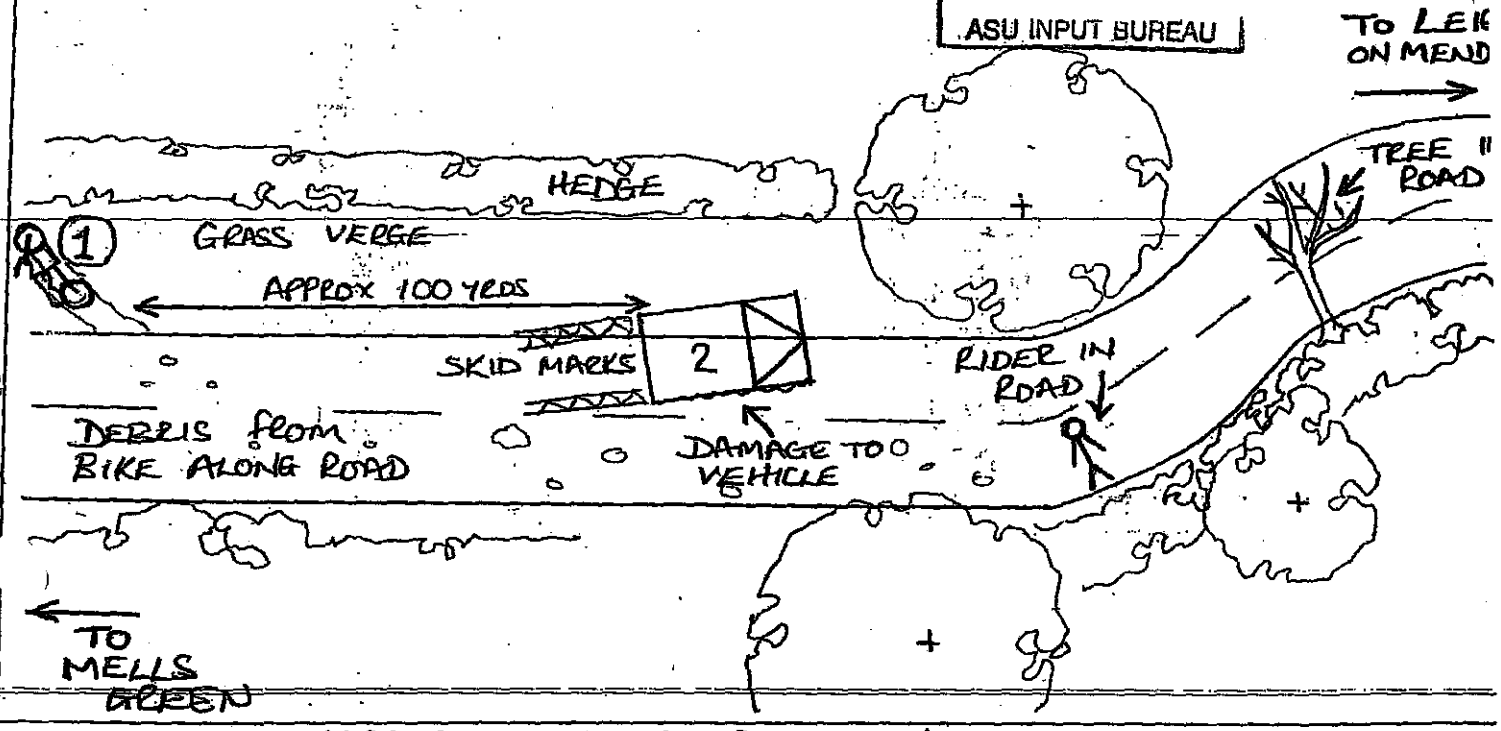
Police District Code

EASTING NORTHING

Map Ref: 4787

SKETCH PLAN (If of Evidential or Explanatory value)

INDICATE NORTH



Road surface and condition: TARMACADAM - GOOD CONDITION

If defective: Local Authority Informed? YES ☐ NO ☐ Street Lights YES ☐ No ☑

Weather / Visibility: DRY AND CLEAR BUT HIGH WINDS

Road Sign / Markings: SINGLE DOTTED WHITE LINE

Damage to property other than vehicles: BT LINE DOWN (UNDER TREE)

Owner's name and address: BRITISH TELECOM

Informed YES ☐ NO ☐

ACCIDENT NUMBER 52SU0929080101

RESULTS OF PROCEEDINGS

Defendant's Name

Date Court Verdict

Inquest on:

Date Place Verdict

8/2000

	Veh. No. 1	Veh. No. 2
Did vehicle fail to stop	YES ☐ NO ☑	YES ☐ NO ☐
VRM	T688 VAE	E966 SAX
PNC Check	YES ☐ NO ☑	YES ☐ NO ☐
Make	SUZUKI YAMAHA	AUSTIN
Model / CC	JS 500 E	VAN
Type		
Colour	BLUE	GREY
Manual	☐	☑
If HGV Max. G.V.W.		
Automatic	☐	☐
If PCV No. of seats		
PNC Check	YES ☐ NO ☐	YES ☐ NO ☐
Driver's Name (Mr / ~~Mrs / Miss~~)	GARY POLE	IVOR FRANCIS
Address	38 LONGFIELD MILLS, NR HEDNESFORD	WHITE LANE FARM BOTLEIGH, NR GRANTHAM
D.o.B.	28/5/64	10.11.42
Occupation		ELECTRICIAN
Tel. Home		
Tel. Work		
Owner / Keeper	AS ABOVE	COMPANY - GOBLIN CROSS
Address		
Initial Breath Test	Pos. ☐ Neg. ☐ Hosp. ☐ Refused ☐	Pos. ☐ Neg. ☑ Hosp. ☐ Refused ☐
Written Statement obtained?	YES ☐ NO ☑	YES ☐ NO ☑
Is mechanical defect cause of accident?	YES ☐ NO ☑	YES ☐ NO ☑
If yes – was vehicle examined?	YES ☐ NO ☐	YES ☐ NO ☑
Verbal Explanation at (time) (Caution if appropriate)	TAKEN TO HOSPITAL (HELICOPTER)	WHILST DRIVING TO STREET, SAW A MALE LED IN ROAD + MOTORBIKE COMING TOWARDS ME. MOTORBIKE COLLIDED WITH FRONT WING, DOOR + REAR PANEL BEFORE ENDING UP IN HEDGE
Driver's Signature		

DOCUMENTS

	Veh. No. 1	Veh. No. 2
Driving Licence	Correct ☑ Offence ☐ Provisional ☐	Correct ☐ Offence ☐ Provisional ☐
No.		
Insurance	Correct ☑ Offence ☐	Correct ☐ Offence ☐
Name of Company	NORWICH UNION	ALL IN ORDER
Certificate No.	011567443	NOT RECORDED ON HORT
Test Certificate	Correct ☐ Offence ☐ Not Required ☐	Correct ☐ Offence ☐ Not Required ☐
Excise Licence	Correct ☐ Offence ☐	Correct ☐ Offence ☐
HGV / PCV Lic.	Correct ☐ Offence ☐ Provisional ☐	Correct ☐ Offence ☐ Provisional ☐
Other (Specify)	Correct ☐ Offence ☐	Correct ☐ Offence ☐
HO/RT/1 Issued	YES ☐ (attach copy) NO ☐	YES ☑ (attach copy) NO ☐
To produce at		
DAMAGE: Possible write off?	YES ☐ NO ☐	YES ☑ NO ☐
V.23 Submitted – Date		
Description of Damage		SMASHED WINDSCREEN, DAMAGE TO WING, O/S DOOR + REAR PANEL.
Vehicle Details		NOT KNOWN

STATS DONE 12/7

CASUALTIES

No. 1

Name (Mr / Mrs Miss) GARY FOLK

Address 38 LONGFIELD MELLS NR FROME

Tel. Home ____ Tel. Work ____

Age ____

Driver ☐ Rider ☑ Passenger ☐

Vehicle No. ☐ Pedestrian ☐

Injury: Fatal ☐ Serious ☑ Slight ☐

Details BROKEN ARM, NECK, BACK + HIP PAIN.

Hospital AIRLIFT TO BATH R.U.H

Detained YES ☑ NO ☐ Next of Kin informed YES ☑ NO ☐

If car passenger, which seat? Front ☐ Rear ☐

School attended (if appropriate) N/A

Casualty No 2

Name (Mr / Mrs Miss) IVOR FRANCIS

Address WHITE LAWN, BARTON ROAD BUTLEIGH NR GLASTONBURY

Age 59 Tel. Home ____ Tel. Work ____

Driver ☑ Rider ☐ Passenger ☐

Vehicle No. ☐ Pedestrian ☐

Injury: Fatal ☐ Serious ☐ Slight ☐

Details FALLING FRONT + RIGHT HIP/DI LOW BLOOD PRESSURE.

Hospital FROME VICTORIA

Detained YES ☐ NO ☑ Next of Kin informed YES ☑ NO ☐

If car passenger, which seat? Front ☐ Rear ☐

School attended (if appropriate) N/A

Casualty No. ☐

Name (Mr / Mrs Miss) ____

Address ____

Age ____ Tel. Home ____ Tel. Work ____

Driver ☐ Rider ☐ Passenger ☐

Vehicle No. ☐ Pedestrian ☐

Injury: Fatal ☐ Serious ☐ Slight ☐

Details ____

Hospital ____

Detained YES ☐ NO ☐ Next of Kin informed YES ☐ NO ☐

If car passenger, which seat? Front ☐ Rear ☐

School attended (if appropriate) ____

Casualty No. ☐

Name (Mr / Mrs Miss) ____

Address ____

Age ____ Tel. Home ____ Tel. Work ____

Driver ☐ Rider ☐ Passenger ☐

Vehicle No. ☐ Pedestrian ☐

Injury: Fatal ☐ Serious ☐ Slight ☐

Details ____

Hospital ____

Detained YES ☐ NO ☐ Next of Kin informed YES ☐ NO ☐

If car passenger, which seat? Front ☐ Rear ☐

School attended (if appropriate) ____

WITNESSES

Witness No. 1 Written statement obtained? YES ☐ NO ☑

Name IVOR FRANCIS

Address WHITE LAWN, BARTON ROAD BUTLEIGH, NR GLASTONBURY

Age 59 Tel. Home ____ Tel. Work ____

Independent ☐ Passenger in Veh. No. ☐

Explanation / Remarks COULDN'T OBTAIN STATEMENT HE WAS TAKEN TO HOSPITAL

Witness No. ☐ Written statement obtained? YES ☐ NO ☐

Name ____

Address ____

Tel. Home ____ Tel. Work ____

Independent ☐ Passenger in Veh. No. ☐

Explanation / Remarks ____

WITNESSES

Witness No. ☐ Written statement obtained? YES ☐ NO ☐ Explanation / Remarks

Name

Address

Age Tel. Home Tel. Work

Independent ☐ Passenger in Veh. No. ☐

Witness No. ☐ Written statement obtained? YES ☐ NO ☐ Explanation / Remarks

Name

Address

Age Tel. Home Tel. Work

Independent ☐ Passenger in Veh. No. ☐

CRIBE HOW ACCIDENT HAPPENED

GIVE VEHICLE AND PEDESTRIAN MOVEMENT AND DIRECTION OF TRAVEL – GIVE AS MUCH DETAIL AS POSSIBLE

IT IS UNSURE AT THIS STAGE WHETHER THE MOTOR BIKE HIT THE TREE CAUSING IT TO FALL INTO THE ROAD OR THE TREE FELL DUE TO HIGH WINDS AND THE MOTORBIKE HIT IT.
AFTER THE RIDER FELL FROM THE BIKE IT CONTINUED ALONG THE ROAD & COLLIDED WITH THE VAN BEFORE ENDING UP IN THE HEDGE.

REPORTING OFFICERS COMMENTS and RECOMMENDATIONS
(e.g. opinion as to blame, Con & Use offences disclosed)

NO OBVIOUS BLAME

Measurements taken by (Name / Rank / No) NOT TAKEN

Time / Date:

Was any vehicle moved before the police arrived? YES ☐ NO ☐ If 'YES' give number(s)

Was any driver present whilst measurements were taken? YES ☐ NO ☐ If 'YES' give number(s)

Tick if the following attended:

Accident Investigator	S.O.C.O.	Consultant Engineers

Supervising Officer

Signed

CLAIM NUMBER:
STATEMENT NUMBER:
MADE ON BEHALF: The Earl of Oxford Estate
SURNAME & INITIALS: Francis I
DATE STATEMENT MADE: 31 October 2002
INITIALS AND NUMBER OF EXHIBITS:

Witness Statement

I, Ivor Francis of Whitelawn Barton Road Butleigh BA6 8TL (d.o.b. 10/11/42) occupation semi-retired Electrician

1. I recall the incident which occurred on Wednesday 11 July 2001. At the time I was driving my employer's van an Austin Maestro van registration number E966SAX.
2. I seem to recall it was about 12:45 mid-day. It was broad daylight. It was dry but a bit windy with the cloud blowing across the road, blowing from my right.
3. I was travelling along the road from Mells towards Shepton Mallet. It would be a southerly direction.
4. The road surface was dry and in good condition, no bald patches or mud on it.
5. I believe I was travelling at about 40 mph there were no other vehicles ahead of me.
6. There are a number of bends on the road and so visibility is limited. They are not tight bends but the road wanders. Otherwise visibility was good.
7. As I came round one of the bends I could see something across the road and started to slow down and break. I then realised it was a tree. I brought my vehicle to a stop.
8. Suddenly a motorcyclist appeared through the tree travelling in the opposite direction to me. When I first saw him I would say he was on his correct side of the road. As he emerged through the tree he appeared to come off the bike and he landed on the ground while the bike came up the road towards me. It veered across the road and collided with my stationary van.
9. The motorcycle hit my van on the driver's side. The handle of the motorcycle hit the pillar on the driver's side of the front window. The bike bounced off and then travelled further down the road, about 50 yards I would say. It must have stayed upright for some way and then veered off into the ditch on my side of the road.
10. I would say I managed to stop about 30 yards or so away from the tree.

I can confirm that I have been informed that false statements verified by a statement of truth constitute a contempt of court if made without honest belief in their truth. I believe that the facts stated in this witness statement of 3 *page(s) are true.*

Signature:

Date:

Continued...

11. I would say the motorcyclist ended up about 5 to 10 yards away from the tree and he was on his correct side of the road, just about.

12. There was quite a lot of trees, it was an ash, I recognised it from its leaf when I got closer. I would say there was lots of branches and it went about 10 feet above the road. The branches were completely across the road with the tips touching the grass verge on my side of the road.

13. I got out of my van and went over to the motorcyclist. I know something of first-aid and soon established that he had fallen into a recovery position.

14. By now some other cars had arrived at the scene behind me. One had a mobile phone and called the Police.

15. I could see the motorcyclist was hurt. There was no blood but his neck looked in an awkward position.

16. The visor on his helmet was missing. I recall that sometime later while I was still at the scene someone said that it was under the tree. I assumed therefore that it must have been ripped off by a branch of the tree as he went through it.

17. I did not see the tree falling. The tree was already across the road when I came along and it was down when it came into my sight.

18. I would estimate I was about 60 yards away when I first saw the tree across the road.

19. It was still in full leaf and when I looked at the tree it appeared to be perfectly normal branch colour. I know a little about trees and plants living in the country and I have to say it looked like a healthy tree to me.

20. I stayed at the scene for sometime but was taken away by ambulance as my blood pressure was too high. I was taken to Hospital at Shepton Mallet where I stayed for a couple of hours. I was shaken up by what I had seen, my boss came to collect me about 4 pm.

21. I did not look at where the tree had fallen from.

22. I do not know the names of the people who came along behind me.

23. I did not know the motorcyclist, I do not think I would be able to recognise him again.

24. The motorcyclist was wearing a helmet and full motorcycling leathers.

25. I had not been able to see the motorcyclist at all prior to him coming through the tree, I could not see through the tree the branches and leaves were too thick. I had not heard the motorcyclist coming at all prior to him coming through.

26. I know the road but I would say I only drive along it occasionally. I have never seen any trees down along there before or since. I would estimate it was about 3 or 4 seconds between me seeing the tree down for the first time and seeing the motorcyclist emerge from it.

I can confirm that I have been informed that false statements verified by a statement of truth constitute a contempt of court if made without honest belief in their truth. I believe that the facts stated in this witness statement of 3 *page(s) are true.*

Signature:

Date:

27. The motorcyclist was taken away by air ambulance.

28. I did not really speak to the people at the scene.

29. I spoke to the Police at the scene and I gave them brief and general details. I have not been involved with them since.

I can confirm that I have been informed that false statements verified by a statement of truth constitute a contempt of court if made without honest belief in their truth. I believe that the facts stated in this witness statement of 3 page(s) are true.

Signature:

Date:

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Appendix 3

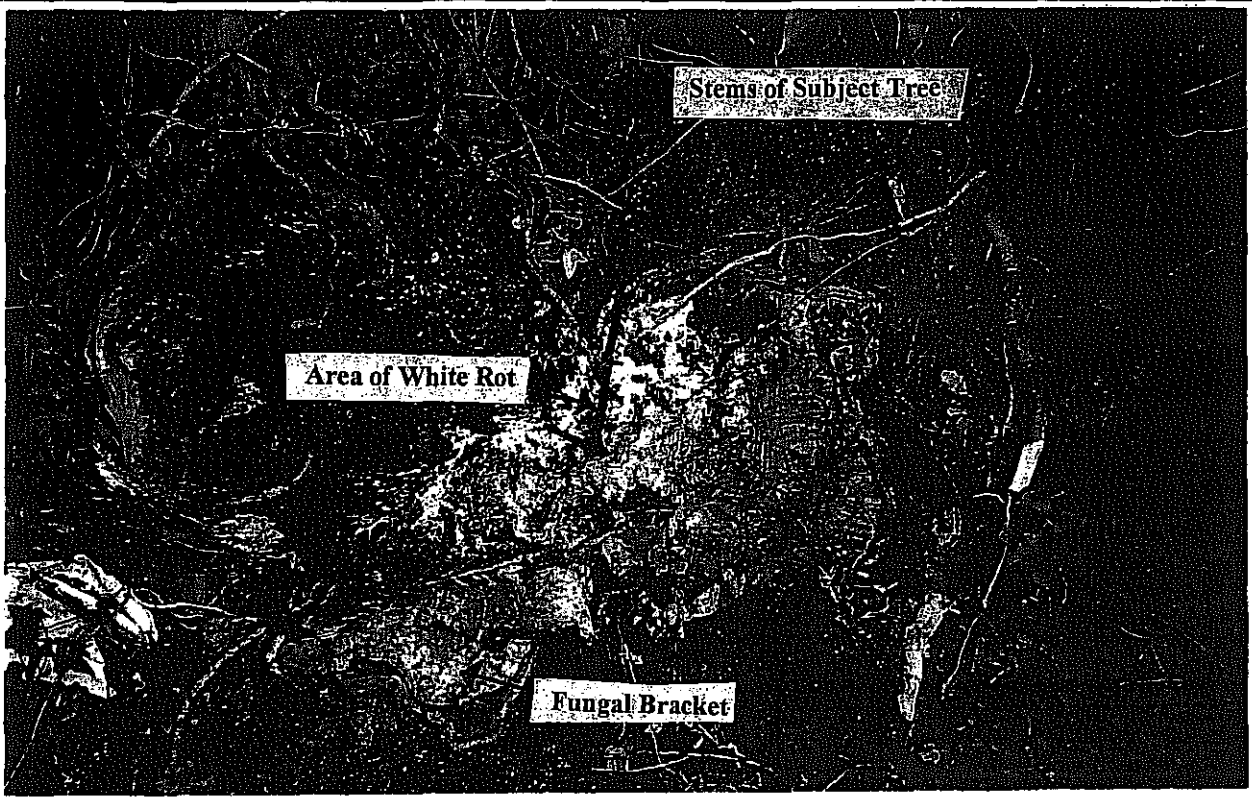
3-1 Photographs taken on behalf of the Claimant in July 2001

3-2 Photographs taken during the site inspection on 08 January 2003

3-3 Photographs taken by Nigel Clement of Norwich Union on 29 September 2002

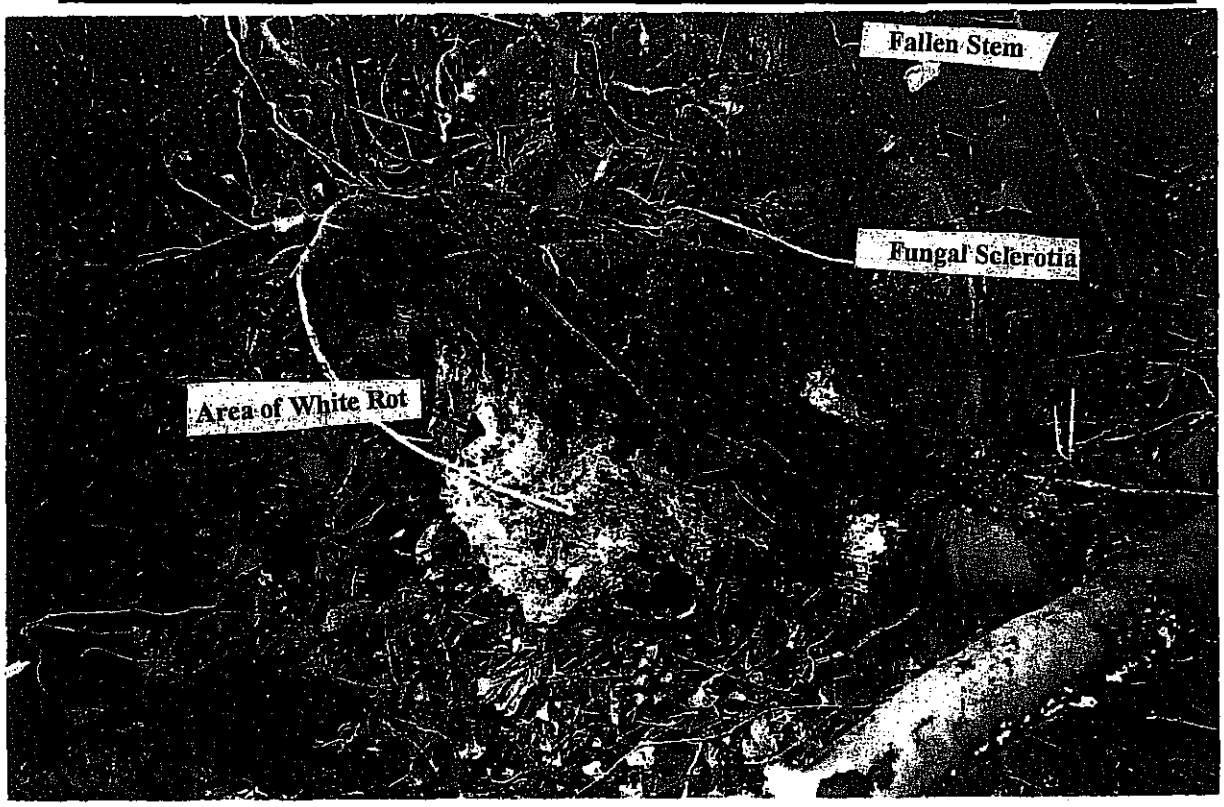
Appendix 3-1: Photograph 1

Position of the base of the subject tree masked by dense undergrowth.



Appendix 3-1: Photograph 2

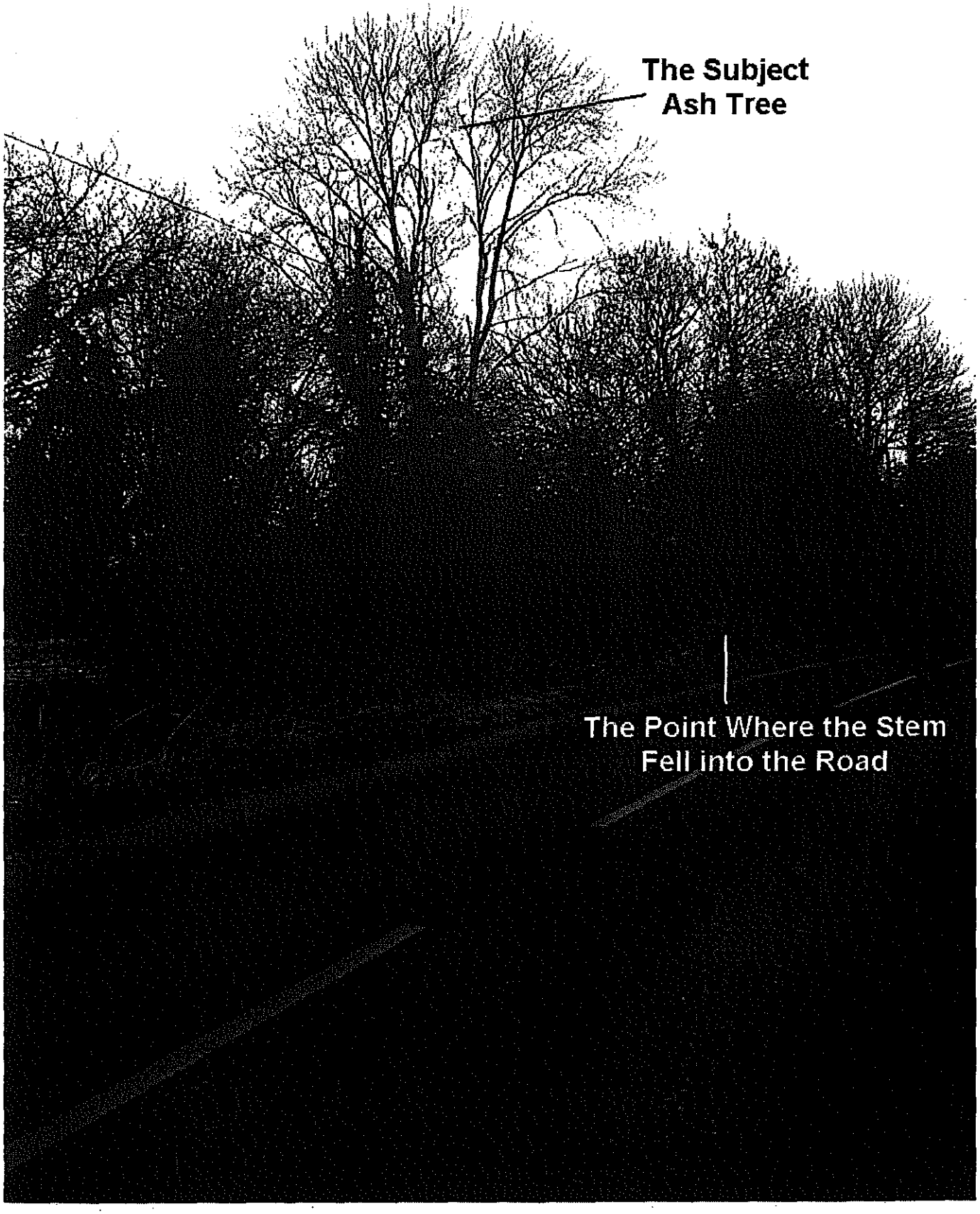
The base of the subject tree showing areas of decay (white) and young fungal fruiting body or bracket (yellow brown)



Appendix 3-1: Photograph 3

Base of the failed stem showing the white rot and sclerotia of the fungus (Black)

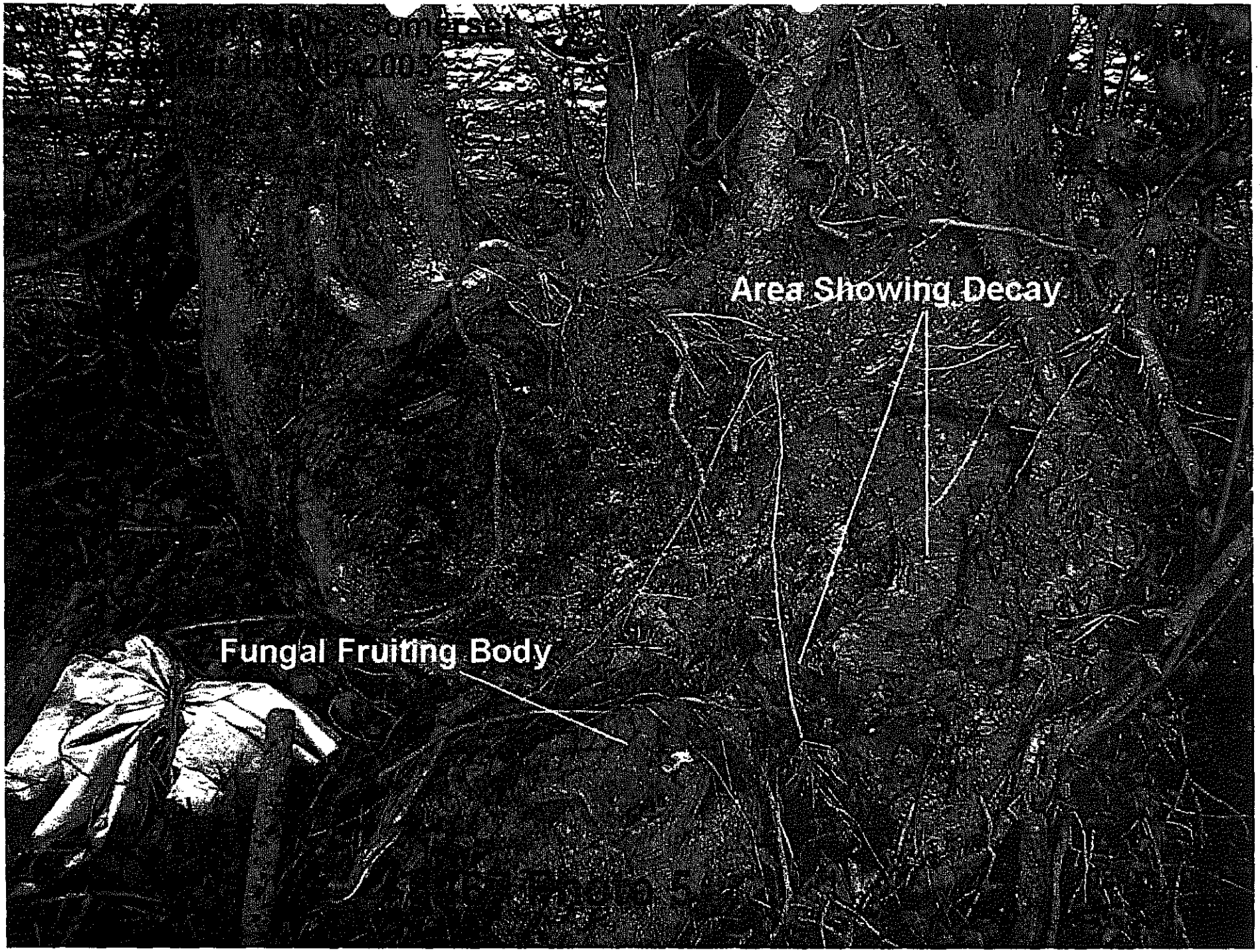
Clavey' Farm, Mells, Somerset
Accident 11 July 2001




Clavey's Farm, Wells, Somerset
Accident 11 July 2001
Stems Still Standing


Fallen Stem


Clavey's Farm, Mells, Somerset
Accident 11 July 2001
Included Bark Union
That Failed
8467 Photo 4


Area Showing Decay
Fungal Fruiting Body

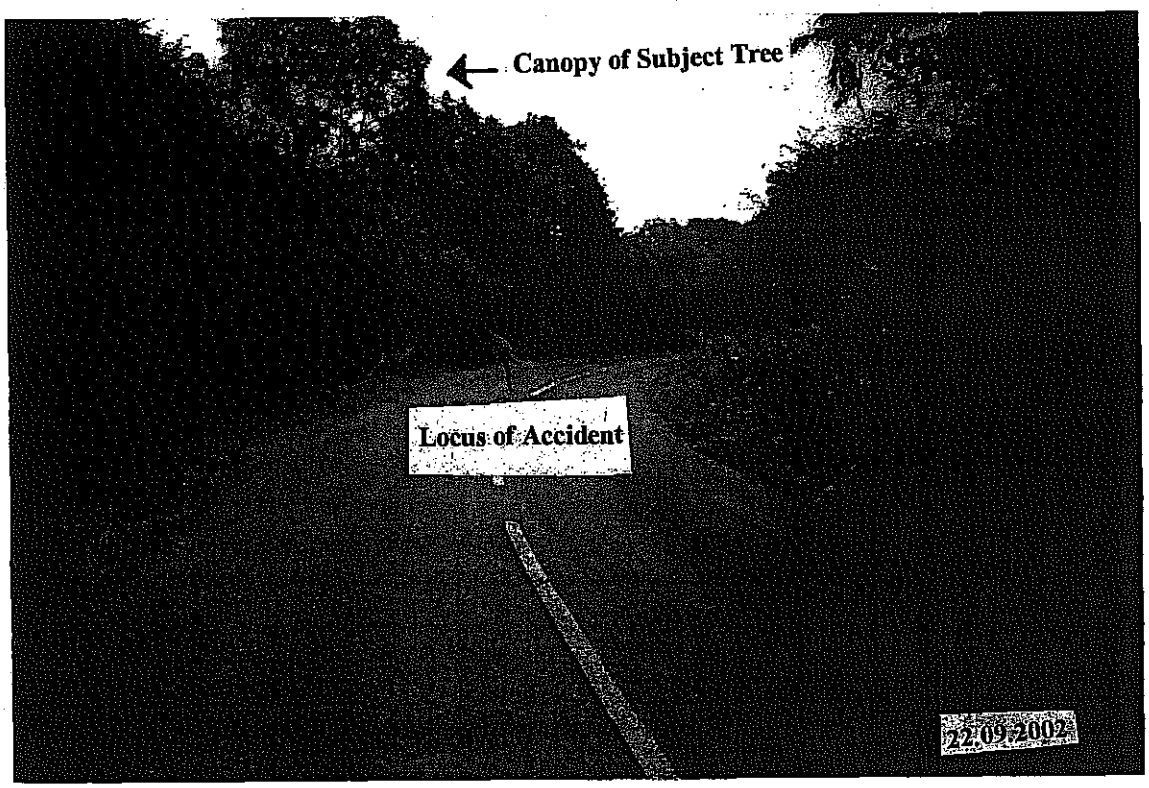

Harvey's Farm, Mells, Somerset, Accident 11 July 2001
Serious Decay in Roots
Decay in Base of Trunk
8467 Photo 6

Appendix 3-2: Photograph 7

Picture of an old fruiting body/bracket of *Perenniporia fraxinea* (=*Fomitopsis cytisina*)

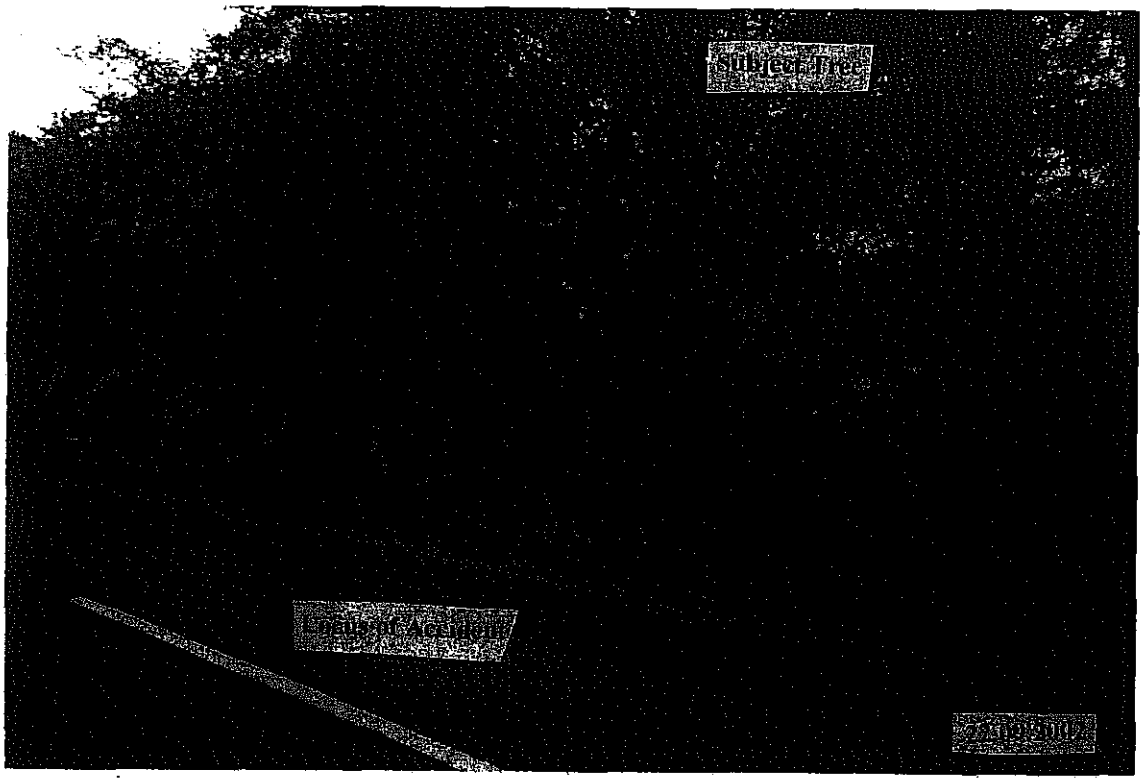
Reproduced from Fig.309 in Diagnosis of Ill Health in Trees (R G Strouts & T G Winter 1994)

Compare this with Photograph 5



Appendix 3-3: Photograph 1

Picture of the locus of the accident taken on 22 September 2002 showing the crown of the subject tree in full leaf.



Appendix 3-3: Photograph 2

Locus of the accident on 22 September 2002 with the subject tree in the background in full leaf.

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Appendix 4

Report on Fungal Identification of Dr D R Rose

Forest Research
An agency of the Forestry Commission

Forest Research,
Alice Holt Lodge,
Wrecclesham, FARNHAM,
Surrey
GU10 4LH
Tel: 01420 23000
Fax: 01420 23653
Email:
ddas@forestry.gsi.gov.uk

Disease Diagnostic & Advisory Service

Summary Report

DATE: 30 January 2003 **TIME:** 14:33

TO: Dr D O'Callaghan

OCA Ltd

DIAGNOSTICIAN: David R Rose

REF: **PAT 2002/447** **YOUR REF:** **8467.02**

CC:

Report on decay from ash

The material sent consisted of sections of severely decayed heartwood (abundant tyloses in xylem vessels were detected on microscopic examination) bounded by black sclerotial sheets of an unknown fungus. The decay was an intense white rot and microscopic examination did not detect any fungal hyphae within the decayed wood. In an attempt to isolate the fungus responsible for the decay cultures of the decayed wood and portions of the sclerotial sheets were made. Unfortunately these did not produce any decay fungi.

In summary I can say that the fungus involved was able to produce an intense white rot in heartwood and was able to form thick, black sclerotial sheets. These features rule out *Inonotus hispidus*, the most common fungus which decays heartwood in ash as it produces a brown cubical rot. I can also rule out *Ganoderma* species which produce a white-rot but which is permeated with mycelium. Of all the fungi associated with decayed heartwood in ash the most likely candidate would be *Perenniporia fraxinea* (=*Fomitopsis cytisina*). I regret that I cannot be more positive than this.

OCA UK Limited

Appendix 5

Met Office Legal Report by D L Crabb

LEGAL REPORT

PLACE: CLAVELY'S FARM, MELLS, FROME, SOMERSET

TIME: 12.45 PM (1145 GMT)

DATE: 11 JULY 2001

Legal Consultancy

Date : 9 January 2003

Met Office
Legal Consultancy
Customer Centre (PD9)
Powell Duffryn House
London Road, Bracknell
Berkshire RG12 2SX

Tel: 01344 856847
Fax: 01934 832578
e-mail: dave.crabb@metoffice.com

OCA UK Limited
1A Stratford Road
Aigburth
Liverpool
L19 3RE

Your Ref: 8467.02

Our Ref: ISU/27082/DLC

LEGAL ENQUIRY

INCIDENT

PLACE: CLAVELY'S FARM, MELLS, FROME, SOMERSET
TIME: 12.45 PM (1145 GMT)
DATE: 11 JULY 2001

STATIONS USED IN COMPILATION OF REPORT

THE BRISTOL WEATHER CENTRE
YEOVILTON MET OFFICE
LYNEHAM MET OFFICE
LARKHILL MET OFFICE

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1. The Met Office is an executive agency within the Ministry of Defence and is the official source of national meteorological information.

2. **TERMS OF ENGAGEMENT**

To provide a detailed legal report, giving an expert opinion as to the most likely wind conditions in the area of Clavely's Farm, Mells, Frome, Somerset, during the period between midnight on 11 July 2001 (2300 GMT on 10 July 2001) and 6.00 pm (1700 GMT) on 11 July 2001, and in particular at around the incident time, at 12.45 pm (1145 GMT) on 11 July 2001. This report has been prepared on instructions from Dr O'Callaghan of OCA UK Limited, contained in a letter dated 7 January 2003.

3. DETAILS OF METEOROLOGICAL STATIONS USED IN REPORT

3.1 Among the closest sites to Clavely's Farm, Mells, Frome, Somerset, at which the wind speed and direction was continuously monitored and recorded by means of an anemometer linked to an anemograph, during July 2001, were at The Bristol Weather Centre, approximately 28 kilometres to the Northnorthwest, at Yeovilton Met Office, approximately 31 kilometres to the Southsouthwest, at Lyneham Met Office, approximately 40 kilometres to the Northeast and at Larkhill Met Office, approximately 41 kilometres to the East.

3.2 An anemometer is an instrument continuously recording the speed and direction of the wind, and is normally linked to an anemograph, which provides a permanent record of wind conditions. The internationally accepted ideal standard exposure for the recording head of an anemometer is at the top of a mast, 10 metres above ground, erected on a flat plain, with no obstructions.

3.3 On occasions, for practical reasons, the standard exposure requirements cannot be met. Where an anemometer has to be placed above a building or in other locations, the recorded wind speeds and directions will not necessarily be representative of those at the standard height. In order that the wind observations will be compatible, it is the practice of the Meteorological Office to correct the observed wind speed to what it is estimated the speed would have been, at the standard exposure. For this purpose each anemometer is assigned an "effective height". The "effective height" is the height over open, level terrain in the vicinity of the anemometer which it is estimated would have the same mean wind speeds as those actually recorded by the anemometer.

3.4 At The Bristol Weather Centre the recording head of the anemometer is on top of a 13 metre mast, on the roof of an 8-storey building. The "effective height" of the anemometer is reckoned to be 13 metres.

3.5 At Yeovilton Met Office the recording head of the anemometer is on top of a 12 metre mast. The "effective height" of the anemometer is reckoned to be 10 metres.

3.6 The anemometers at Lyneham and Larkhill Met Offices conform to the ideal international exposure requirements.

4. WIND DETAILS

4.1 Hourly analyses of the anemograph wind records at The Bristol Weather Centre, at Yeovilton Met Office, at Lyneham Met Office and at Larkhill Met Office, between midnight and 6.0 pm on 11 July 2001 (2300 GMT on 10 July 2001 and 1700 GMT on 11 July 2001), are set out on the attached data sheets 1 to 4.

Our ref: ISU/27082/DLC

5. THE FOLLOWING EXPLANATORY NOTES APPLY TO THE DATA SHEETS

5.1 ANEMOGRAPH PARAMETERS

5.1.1 HRLY DD: Wind direction is measured in degrees from true north and relates to the direction from which the wind is blowing. The hourly wind direction is averaged over the 60 minutes ending at the time of entry.

5.1.2 HRLY SP: Wind speeds are given in knots (1knot=1.15mph). The hourly wind speed is averaged over the 60 minutes ending at the time of entry.

5.1.3 GUST SP: The maximum gust speed is the maximum instantaneous speed that occurred during the hour ending at the time of entry.

5.1.4 The terms used for describing wind strength are as follows:-

Beaufort Force	Term	Average speed at 10 metres above the ground	
0	Calm	<1 knot	(< 1 mph)
1-3	Light	1-10 knots	(1-12 mph)
4	Moderate	11-16 knots	(13-18 mph)
5	Fresh	17-21 knots	(19-24 mph)
6	Strong	22-27 knots	(25-31 mph)
7	Near Gale	28-33 knots	(32-38 mph)
8	Gale	34-40 knots	(39-46 mph)
9	Strong Gale	41-47 knots	(47-54 mph)
10	Storm	48-55 knots	(55-63 mph)

Note: Beaufort Forces only apply to average wind speeds and should not be used in reference to gusts. The speeds given above would be considerably exceeded in Gusts. For example, in a gale, gusts of over 48 knots (over 55 mph) are common.

5.1.5 **All times are in Greenwich Mean Time (GMT). Add one hour to obtain clock time, when British Summer Time (BST) is in operation, which was the case throughout July 2001.**

Our ref: ISU/27082/DLC

6. SIGNIFICANCE OF THE DATA SHEETS

6.1 SHEET 1: At The Bristol Weather Centre the wind was blowing **from** around the Westsouthwest or the West throughout the period between 2300 GMT on 10 July 2001 and 1700 GMT on 11 July 2001. The mean hourly wind speeds were generally moderate or fresh (force 4 or 5) throughout, varying between 15 and 21 knots (17 and 24 mph). The highest recorded hourly gusts of wind varied between 34 knots and 40 knots (39 mph and 46 mph). During the specific hour between 1100 GMT and 1200 GMT (midday and 1.00 pm) on 11 July 2001 the mean wind speed was 19 knots (22 mph) the highest recorded gust was 37 knots (43 mph).

6.2 SHEET 2: At Yeovilton Met Office the wind was blowing **from** between the Westsouthwest and the West throughout the period between 2300 GMT on 10 July 2001 and 1700 GMT on 11 July 2001. The mean hourly wind speeds were light or moderate (force 4 or less) up until 0800 GMT, then fresh or strong (force 5 or 6), varying between just 8 knots and 24 knots (9 and 28 mph). The highest recorded hourly gusts of wind varied between 17 knots and 38 knots (20 mph and 44 mph). During the specific hour between 1100 GMT and 1200 GMT (midday and 1.00 pm) on 11 July 2001 the mean wind speed was 23 knots (27 mph) and the highest recorded gust was 37 knots (43 mph).

6.3 SHEET 3: At Lyneham Met Office the wind was blowing **from** between the Southwest and the West throughout the period between 2300 GMT on 10 July 2001 and 1700 GMT on 11 July 2001. The mean hourly wind speeds were moderate (force 4) up until 0600 GMT, then fresh or strong (force 5 or 6), varying between 11 knots and 24 knots (13 and 28 mph). The highest recorded hourly gusts of wind varied between 18 knots and 37 knots (21 mph and 43 mph). During the specific hour between 1100 GMT and 1200 GMT (midday and 1.00 pm) on 11 July 2001 the mean wind speed was 23 knots (27 mph) and the highest recorded gust was 35 knots (40 mph).

6.4 SHEET 4: At Larkhill Met Office the wind was blowing **from** between the Southwest and the West throughout the period between 2300 GMT on 10 July 2001 and 1700 GMT on 11 July 2001. The mean hourly wind speeds were moderate (force 4) up until 1000 GMT, then fresh (force 5) thereafter, varying between 11 knots and 20 knots (13 and 23 mph). The highest recorded hourly gusts of wind varied between 20 knots and 36 knots (23 mph and 41 mph). During the specific hour between 1100 GMT and 1200 GMT (midday and 1.00 pm) on 11 July 2001 the mean wind speed was 20 knots (23 mph) and the highest recorded gust was 35 knots (40 mph).

Our ref: ISU/27082/DLC

7. CONCLUSIONS AND OPINIONS

7.1 Based upon the data, analysis and sources which have been presented above, together with a study of the general weather situation, my conclusions and opinions as a weather expert, as to the most likely wind conditions in the area of Clavely's Farm, Mells, Frome, Somerset, during the period between midnight on 11 July 2001 (2300 GMT on 10 July 2001) and 6.00 pm (1700 GMT) on 11 July 2001, and in particular at around the incident time, at 12.45 pm (1145 GMT) on 11 July 2001, can be stated as follows:

7.2 A West to Westnorthwesterly airflow persisted across Southern England throughout 11 July 2001, bringing mainly dry and bright conditions, with sunny periods, and just scattered shower.

7.3 Although no data are available for any recording stations closer to the incident locus than the stations sued in the report, it is my opinion that the winds recorded at these stations, being located to the Northnorthwest, to the Southsouthwest, to the Northeast and to the East of the incident locus, provide good general guidance as to the wind conditions that would have prevailed in the area of Mells, Frome, Somerset. However, the winds recorded at these 4 stations were those blowing at, or reckoned to have been blowing at between 10 and 13 metres above ground level, in open and well-exposed locations. Wind speed generally increases with height above the ground in the lowest layer of the atmosphere. The rate of change of wind speed with height varies with the lapse rate of temperature (thermal correction), with wind speed (the extent of mechanical turbulent mixing), and with the terrain (surface friction and topographically induced eddies). The wind speed at 10 metres above the ground is generally around 20 to 25 percent greater than at 1 to 2 metres above the ground, 15 to 20 percent higher than at 3 to 4 metres above the ground, and 10 percent higher than at 5 metres above the ground. Conversely, the wind blowing at 10 metres above ground level is generally lower than at somewhat greater heights above the ground. I am given to understand that the incident involved a tree, and that the height of the top of this tree was between about 12 and 15 metres above the ground. At this height the wind is likely to be less than 10 percent greater than at 10 metres above the ground. The conclusions and opinions expressed will be for a height of around 12 to 15 metres above ground level, equating to the height of the top of the tree. The approximate wind speed at other heights of less than 12 to 15 metres, can be estimated by reference to the approximations provided above.

7.4 I would emphasise that the conclusions below can only represent my considered opinion as to the most likely wind strengths blowing in open and well exposed locations. Without specific knowledge of the incident locus, only obtainable by visiting the site, I cannot make any comment as to the localised effects that other trees, buildings or other obstructions might have on the winds blowing at the specific incident site.

7.5 It is my considered opinion that the wind would have been blowing **from** between the Southwest and the West throughout the period between midnight on 11 July 2001 (2300 GMT on 10 July 2001) and 6.00 pm (1700 GMT) on 11 July 2001, in the area of Clavely's Farm, Mells, Frome, Somerset.

7.6 It is my opinion that the mean wind speed is unlikely to have exceeded about 23 to 26 knots (27 to 30 mph) at any time during the period between 2300 GMT on 10 July 2001 and 1700 GMT on 11 July 2001, and would very probably have been well below that level for much of the period, especially during the first half of the morning of 11 July 2001.

7.7 It is my opinion that the highest hourly gusts of wind, during the specified period, would have varied between about 20 and 40 knots (23 to 46 mph), though isolated gusts may have reached about 42 knots (48 mph). The highest gusts of wind are likely to have occurred in the area of Clavely's Farm, Mells, Frome, Somerset, during the latter part of the morning and afternoon of 11 July 2001, and it is therefore possible that an isolated gust of up to 40 to 42 knots (46 to 48 mph) may have occurred during the period immediately around the time of the incident, at 12.45 pm (1145 GMT) on 11 July 2001.

7.8 Even if gusts of wind of up to 42 knots did occur (at 12 to 15 metres above ground level) in the specified area, such wind speeds are not unusual in the Westcountry, and gusts of wind are likely to reach this level on numerous occasions during an average year, with many occasions when the wind would be appreciably stronger.

8. SUMMARY OF CONCLUSIONS

8.1 It is my opinion that the wind would probably have been blowing from between the Southwest and the West, in the area of Clavely's Farm, Mells, Frome, Somerset, during the period between midnight on 11 July 2001 (2300 GMT on 10 July 2001) and 6.00 pm (1700 GMT) on 11 July 2001. At a height of 12-15 metres above ground level the mean wind speed is unlikely to have exceeded about 23 to 26 knots (27 to 30 mph) at any time during the period, and would very probably have been well below that level for much of the period, especially during the first half of the morning of 11 July 2001. The highest (isolated) gusts of wind would probably have been around 40 knots (46 mph), though an isolated gust to as high as 42 knots (48 mph) may have occurred. However, even gusts of 40 to 42 knots are not unusual, and could be expected to occur, or be significantly exceeded, on numerous occasions during an average year.

9. EXPERIENCE AND QUALIFICATIONS OF THE AUTHOR

9.1 The author has been employed by the Met Office since 1965, and has been a weather forecaster since 1976.

9.2 The author's forecasting experience includes the provision of forecasts and warnings for aviation, to the public, the media, and also local authorities for winter road gritting and snow clearance.

9.3 The author has also had 4 years' experience as a weather presenter on regional television, and 10 years' experience of radio broadcasting.

9.4 In the author's current post, in the Meteorological Office Commercial Division, his main duty is the preparation of reports and certified statements on weather conditions, in connection with legal matters, as an expert on the weather. The author has been accepted as an Expert Witness in Court on numerous occasions during the last 8 years.

10. DECLARATION

I understand my overriding duty of objectivity to the Court, and have complied with that duty, and will continue to comply with that duty. I confirm that insofar as the facts stated in my report are within my own knowledge I have made clear which they are and I believe them to be true, and that the opinions I have expressed represent my true and complete professional opinion.

REPORT PREPARED BY

DAVID LEWIS CRABB
Senior Forensic Meteorologist
Met Office, Legal Consultancy

Hourly climatological

: BRISTOL WC : GR 3584E 1728N : 42m AMSL :

Items selected as follows:

HRLY DD : Mean hourly wind direction (degs) (past hour)
HRLY SP : Mean hourly wind speed (knots) (past hour)
GUST SP : Maximum wind speed (gust) (knots)

	HRLY DD	HRLY SP	GUST SP
Wed 11Jul01			
00GMT	260	17	35
01GMT	260	19	37
02GMT	260	18	37
03GMT	260	18	40
04GMT	260	16	35
05GMT	260	15	34
06GMT	260	15	35
07GMT	260	16	35
08GMT	260	19	37
09GMT	260	19	39
10GMT	260	17	38
11GMT	260	18	34
12GMT	260	19	37
13GMT	270	19	40
14GMT	260	21	39
15GMT	260	20	39
16GMT	250	20	40
17GMT	250	20	40

Hourly climatological

: YEOVILTON : GR 3551E 1232N : 20m AMSL :

Items selected as follows:

HRLY DD : Mean hourly wind direction (degs) (past hour)
HRLY SP : Mean hourly wind speed (knots) (past hour)
GUST SP : Maximum wind speed (gust) (knots)

	HRLY DD	HRLY SP	GUST SP
Wed 11Jul01			
00GMT	240	13	25
01GMT	250	12	21
02GMT	250	10	22
03GMT	240	9	20
04GMT	240	10	19
05GMT	250	8	20
06GMT	250	8	17
07GMT	250	11	24
08GMT	260	12	26
09GMT	270	19	32
10GMT	270	21	38
11GMT	270	23	37
12GMT	270	23	37
13GMT	270	24	36
14GMT	270	24	36
15GMT	270	21	33
16GMT	270	20	31
17GMT	270	19	31

Hourly climatological

: LYNEHAM : GR 4006E 1782N : 145m AMSL :

Items selected as follows:

HRLY DD : Mean hourly wind direction (degs) (past hour)
HRLY SP : Mean hourly wind speed (knots) (past hour)
GUST SP : Maximum wind speed (gust) (knots)

	HRLY DD	HRLY SP	GUST SP
Wed 11Jul01			
00GMT	220	14	24
01GMT	220	13	21
02GMT	220	13	21
03GMT	230	11	20
04GMT	230	12	18
05GMT	230	13	23
06GMT	230	13	24
07GMT	250	17	29
08GMT	260	19	30
09GMT	250	21	37
10GMT	260	21	37
11GMT	250	24	37
12GMT	250	23	35
13GMT	260	24	37
14GMT	250	21	34
15GMT	250	22	35
16GMT	250	23	34
17GMT	250	20	31

Hourly climatological

: LARKHILL : GR 4136E 1447N : 132m AMSL :

Items selected as follows:

HRLY DD : Mean hourly wind direction (degs) (past hour)
HRLY SP : Mean hourly wind speed (knots) (past hour)
GUST SP : Maximum wind speed (gust) (knots)

	HRLY DD	HRLY SP	GUST SP
Wed 11Jul01			
00GMT	230	11	21
01GMT	230	12	21
02GMT	230	13	24
03GMT	230	14	24
04GMT	230	12	22
05GMT	230	12	22
06GMT	230	12	20
07GMT	230	13	25
08GMT	240	15	32
09GMT	240	15	32
10GMT	250	15	36
11GMT	260	18	32
12GMT	260	20	35
13GMT	260	20	34
14GMT	250	19	34
15GMT	260	19	34
16GMT	260	18	32
17GMT	250	15	27

153

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Appendix 6

6-1 Extracts from *'The Body Language of Trees'*
C Mattheck & H Breloer (1994)

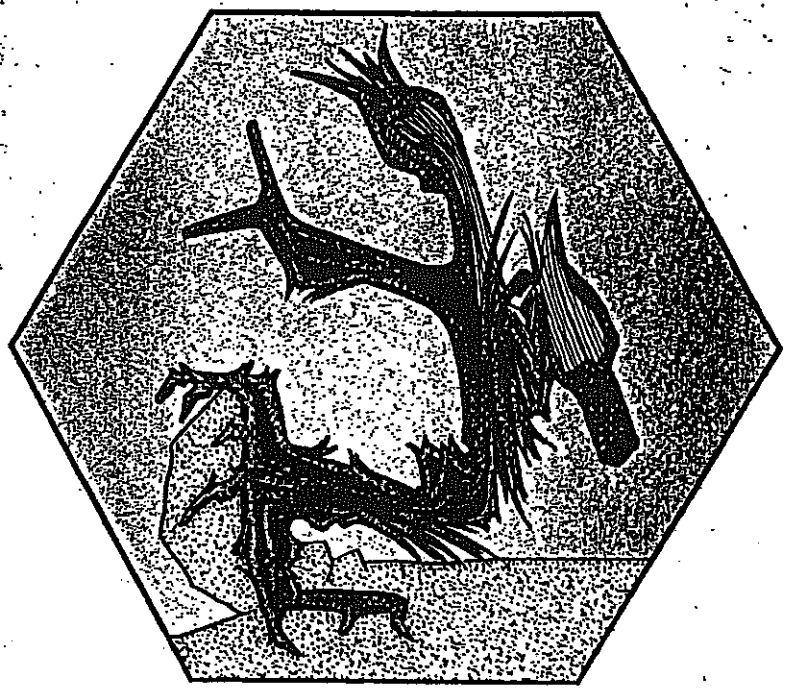
6-2 Extracts from *'Principles of Tree Hazard Assessment and Management'*
D Lonsdale (1999)

6-3 Extracts from 'Diseases of Forest & Ornamental Trees'
D.H. Phillips & D A Burdekin (1982)

6-4 Department of the Environment Circular ROADS 52/75

Department of the Environment

No. 4 • Research for Amenity Trees No. 4 • Research for Amenity Trees



The body language of trees

A handbook for failure analysis

by Claus Mattheck and Helge Breloer

Edited by David Lonsdale
from a translation by Robert Strouts

in two successive gusts that coincide with the resonant frequency of the tree. Under severe loading the stem breaks by fibre buckling on the side opposite to its junction with the upper end of the 'rope' (Fig. 34C).

Usually the lower end of the 'rope' terminates at a sinker root that turns the crack downwards. Thus the end of the crack runs into a zone of compression which squeezes it together so that crack stops at this point (Fig. 34C). If it is not the fate of the crack to be captured, so to speak, by one of these sinker roots, the stem above is free to bend so much that it fails by kinking in a gust of wind. As the stem falls, the lower end of the rope of fibre bundles can tear away completely from the upper roots (Fig. 34D). It is also conceivable that the pre-stressed upper part of the root tears away before the stem fails, so that the rope of fibres is catapulted upwards before the stem breaks at about shoulder height with the same end-result. The hazard beam, well camouflaged and concealed in the root buttress, is solely responsible for the longitudinal splitting. On the other hand, once this splitting (delamination) has separated this rope of fibres from the stem, it is the sudden straightening of the rope that finally allows the main stem to break completely by transverse fracture at shoulder height.

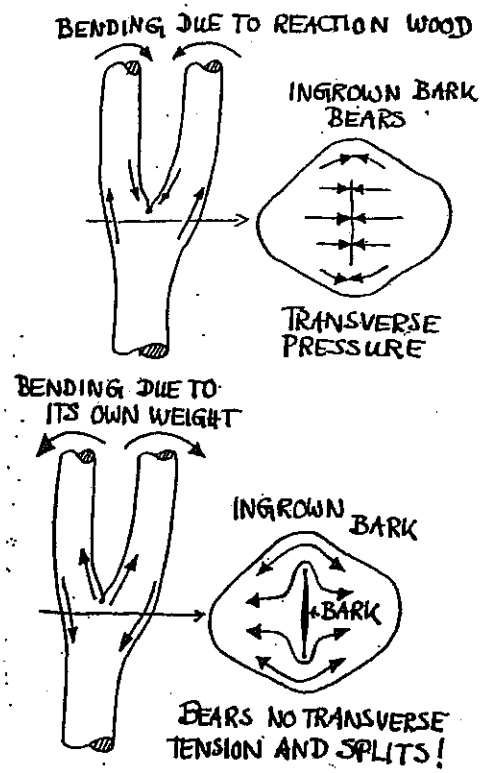


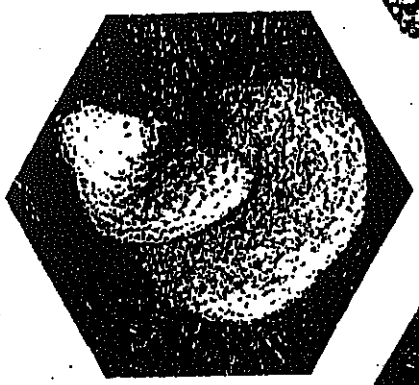
Fig 35. The compression fork, optimized for withstanding the pressure of the two stems pressing against each other, is a structure that is absolutely bound to fail if a tensile load is applied at right angles to the axis of the stems, pulling them apart.

DETR
ENVIRONMENT
TRANSPORT
REGIONS

Research for Amenity Trees No. 7 • Research for Amenity Trees No. 7 • Research for Amenity Trees No. 7

Principles of Tree Hazard Assessment and Management

by David Lonsdale



Forestry Commission

Thus, if it had not been important for trees to have a large photosynthetic area, they might perhaps have evolved without branches. Incidentally, certain tropical pines, such as *Pinus caribaea*, produce occasional genetic variants that have just such a form. Despite the inherent engineering problems represented by branched structures, branch junctions have an anatomical structure which confers remarkable strength [106, 156], as long as they do not contain large amounts of included bark.

Failures of living branches in high winds are sometimes sited at their bases, and it is stated by Mattheck & Breloer [106] that the centre of a crotch is the exact point where such failure tends to be initiated. At this point, the fibres of the parent stem diverge to pass to the left and right of the branch. These authors also suggest that the triggering of failure in the parent stem can also take place at this point. Basal failure usually results in the tearing out of the branch, so that a deep wound is left in the parent stem, with consequent decay being possible. Some species seem to undergo such failure more often than others; *Cedrus atlantica* var. *glauca* (Blue Atlas cedar) and *Aesculus hippocastanum* are said to be particularly affected.

A fork comprising co-dominant leaders is somewhat weaker than a junction between a main stem and a subsidiary branch [155]. In the region where a branch merges with the parent stem, its wood is partially enveloped by the latter due to its smaller annual growth in diameter. Shigo [156] has also pointed out that the formation of each annual increment within the main stem and branch begins asynchronously, so that overlapping layers of branch fibres and stem fibres are formed at the junction. The stem fibres also change direction abruptly around the branch base, so as to enclose it partially. In a co-dominant fork, the fibres of the two members meet symmetrically at a shallow angle and can be separated with relative ease. This can be demonstrated by trying to tear apart different twigs or small branches by hand, comparing co-dominant and ordinary unions.

The tendency for the wood fibres in a co-dominant union to split apart can be considerably increased if there is a bark inclusion (i.e. a zone of bark-to-bark contact) between the members (Plate 1). Bark inclusions, which occur commonly both in forks and in the crotches of acutely angled branches, come to occupy the region where there would otherwise be an anatomical union between the members. As a result, the strength of the structure can become increasingly compromised. Some crotches develop a sunken cup-like shape (Plate 2), which is probably more resistant to splitting than a union with a bark-to-bark contact, but is not as strong as an open U-shaped formation. The overflow of rainwater from the 'cup' may help to reveal its presence when viewed from below, but is not necessarily an indication of decay in this region as is sometimes supposed.

The term 'compression fork' has been used to describe a union in which the pressure between the two members diverts the flow of mechanical forces, stimulating an increased growth of wood on either side of the union [106]. The resulting broadening (Plate 1) does not fully compensate for the lack of

DISEASES OF FOREST AND ORNAMENTAL TREES

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MACMILLAN

Fomitopsis cytisina (Berk.) Bond. and Sing. (*Fomes fraxineus* (Bull.) Fr.)

Fomitopsis cytisina is comparatively rare in Britain but is widely distributed in the rest of Europe and North America. The most important hosts in Britain are ash, *Robinia* and laburnum but it also occurs on elms, poplar and beech. It is found on these host species throughout Europe; in the United States it has been found on other hardwoods including oak and maple.

The bracket-shaped fruit body measures 5–40 cm across, is sometimes imbricate and is found at the base of infected trees or on stumps. The upper surface is initially whitish but darkens with age to become fuscous and then dark brown or black. The flesh is soft and yellowish at first but soon turns hard and woody. The tubes, 5–25 mm in length, are similar in colour to the flesh, in contrast to the otherwise rather similar fruit body of *Rigidoporus ulmarius* where the tubes and flesh differ in colour. The pores are small, 0.25 mm in diameter and pinkish brown. The hyaline spores are subglobose and measure 6–7 x 6 μm (Rea, 1922).

Decay is usually restricted to the basal part of the main trunk. At an early stage, infected wood tends to break readily across the grain; later the wood decomposes into a felt-like mass of white mycelium.

Montgomery (1936) and Campbell (1938) have described the fungus in culture. Growth starts with fine radiating hyphae appressed to the surface of the culture medium. A white felted mat develops on 2 per cent malt agar and pore surfaces may form over an extensive area. Normal basidiospores are produced on these surfaces. A pale buff coloration may be seen in the centre of the culture but this tends to lighten and become creamy-white in older cultures.

F. cytisina may cause a severe butt rot in ash and other species but it is not of great significance because of its limited occurrence.

Ganoderma applanatum (Pers. ex Wallr.) Pat. (*Fomes applanatus* (Pers. Wallr., *Polyporus applanatus* (Pers.) Fr.) and *G. adspersum* (Schultz) Donk (*G. australe* (Fr.) Pat.)

Ganoderma applanatum is a cosmopolitan polypore that causes heart rot in many broadleaved species. Its fructifications may appear throughout the year as large, often imbricate brackets on the trunks of the host trees. They are up to 12 in (30 cm) across with a reddish-brown, lumpy upper surface covered by a crust which is soft when young but hard and laccate when old. The pores are small, at first white, but becoming brownish with age. The tubes are reddish brown or cinnamon, and may be broken away from the flesh, which is brownish, thick and hard but felt-like. The basidiospores are cocoa-brown in the mass, measuring 6.5–8.5 x 5–6.5 μm (Ryvarden, 1976). The spores are copiously produced, and often coat the tops of the fruit bodies as a brown dust.

In Great Britain, *G. applanatum* causes root and butt rot of many broadleaved trees. It is especially damaging to old, over-mature beeches, but is also the commonest cause of rot in standing poplars, and is frequent also in elms. It also attacks oak, sycamore, horse chestnut, willow and walnut (Cartwright and Findlay, 1958).

Circular ROADS NO 52/75

Department of the Environment
2 Marsham Street London SW1P 3EB

Direct line 01-212 8514
Switchboard 01-212 3434

The Chief Executive
County Councils in England
Greater London Council
London Borough Councils
The Common Council of the City of London
District Councils in England

Your reference

Our reference HM 23/2/001

Date 12th December, 1975.

Dear Sir

INSPECTION OF HIGHWAY TREES

1. General advice on the inspection and maintenance of wayside trees and hedges is given in DOE Circular No. 90/73 which, together with a Circular to be issued later relating to trees in urban areas, replaces an earlier Circular ROADS on this subject. The timing of these inspections and the detail in which they should reasonably be carried out have presented highway engineers with some problems, and the purpose of this Circular, which replaces Circular ROADS 34/74, now cancelled, is to help in resolving them.

2. Trees growing within the highway are a most important amenity feature, but they can also present very real danger to persons using the highway. For this reason the trees should receive adequate attention to preserve healthy growth, and they should also be examined regularly for any signs of injury or decay which could lead to their becoming a hazard.

3. During the course of his work the road inspector should make a note of any obviously dead, dying dangerous trees, whether within the highway itself or within falling distance of the highway. If he finds there has been any accident or damage to a tree, that it is unstable in any way, large branches have been broken, or, if in leaf, there is any sign of wilting or die-back, then the facts should be reported to the County Engineer, who will arrange for further examination by a competent person and for any follow-up action found to be necessary.

4. In addition the County Engineer should arrange for examination of the trees by a competent person at regular intervals, preferably when they are in full leaf, in order to make sure that they are safe and are likely to present no danger to road users before the next inspection takes place. If further action is considered necessary, this should take place urgently. The period between these inspections and the degree of examination will depend on the age and history of the trees, surgery, disease, accidents, etc. It would be helpful to the examining officer if a record could be kept of any previous damage or work done etc. on wayside trees, and brought up to date at subsequent inspections. The officer should also pay attention to trees growing on private land which are within falling distance of the highway, and examine any which are suspect. The highway authority has a right of access for this purpose, and may require the owner or occupier of land on which there is any tree which is dead, diseased, damaged or insecurely rooted to be cut or felled in order to remove the likelihood of danger (Sec. 10 Highways (Miscellaneous Provisions) Act, 1961).

5. Points which should particularly be noted during inspections are those related to general symptoms of debility. Thinning of the foliage and dying back of the branches is an indication of ill health in a tree. Trees in this state will need close inspection. Wounds where branches have been removed should be checked, as it is often through these that disease enters a tree. Areas where bark has peeled off should be examined, as they indicate dead wood beneath. Galls and cankerous lesions are a sign of fungal or bacterial disease and the presence of toadstools or brackets usually indicates an advanced state of fungal decay. Any moisture issuing from the trunk of the tree, or staining by water running down the trunk, may also indicate the presence of internal rot. When symptoms such as these have been spotted, either they should be further investigated with an auger, or the advice of a tree surgeon should be sought.

6. Regard should also be paid to works carried out by statutory undertakers near trees in the highway, and consideration given to felling if it is ascertained that so many of the roots have been severed that the tree may become unstable. Similar consideration should also be given to mature trees remaining after roadworks or statutory undertakers works have removed the protection afforded by other trees, or where the root systems have been damaged either by the works or by alterations to the soil level. Inspection should also cover the possibility of damage to footways, carriageway and street furniture by roots. As a rough guide root spread is usually about $1^1/_3$ times height. Any damage should be reported to the County Engineer or other officer responsible.

7. Any enquiries on this Circular should be made to Room S7/16 at Marsham Street (01-212.8514) or, if of a technical nature, to Room 1385 at Thames House South, Millbank, London, SW1P 4GH (DOE Horticultural Advisers) (01-211.3538). Distribution enquiries should be made to Highways Manual Branch (01-212.4944).

Yours faithfully

J.L.Hammond
Assistant Chief Engineer.

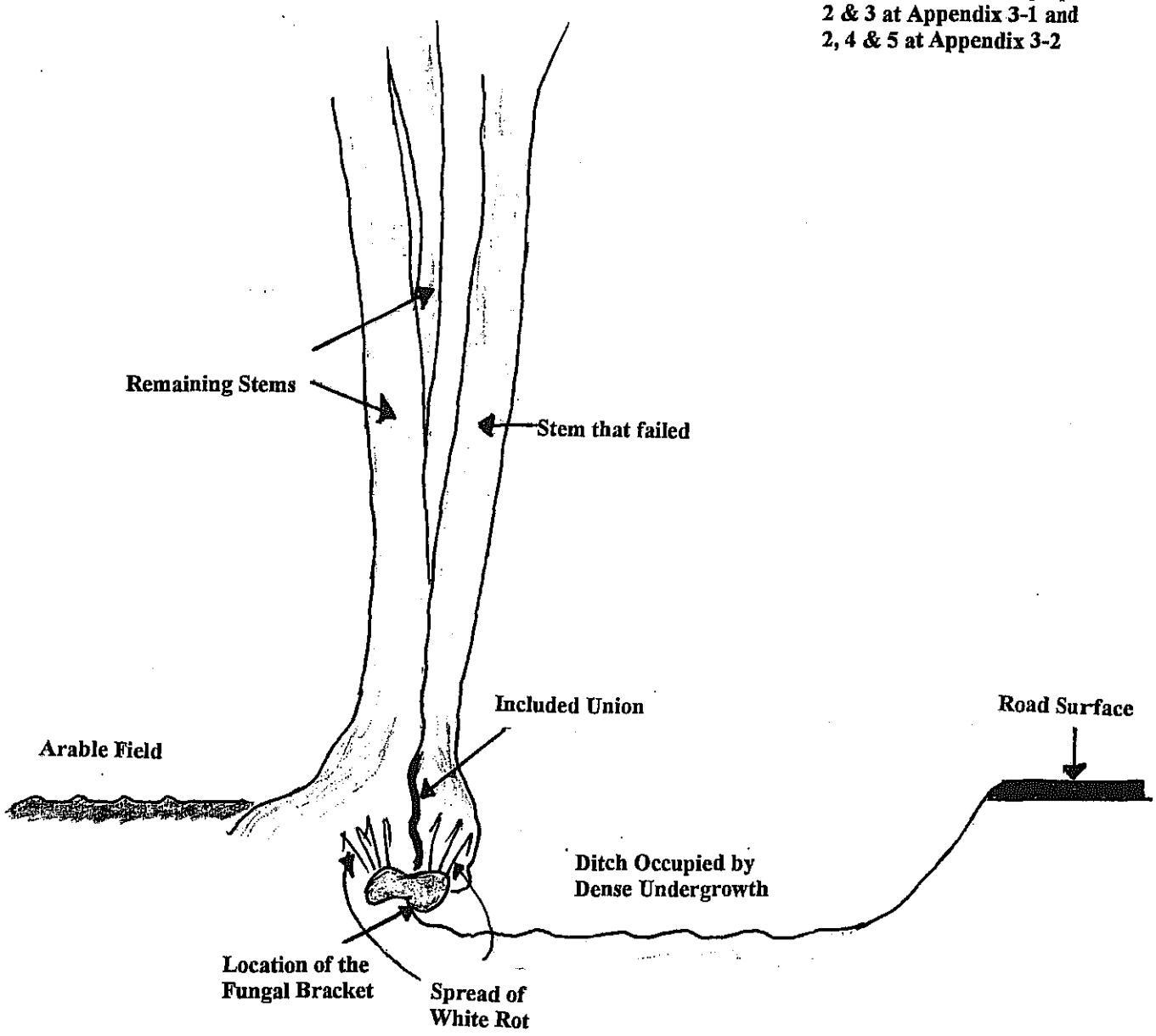
OCA UK Limited

Appendix 7

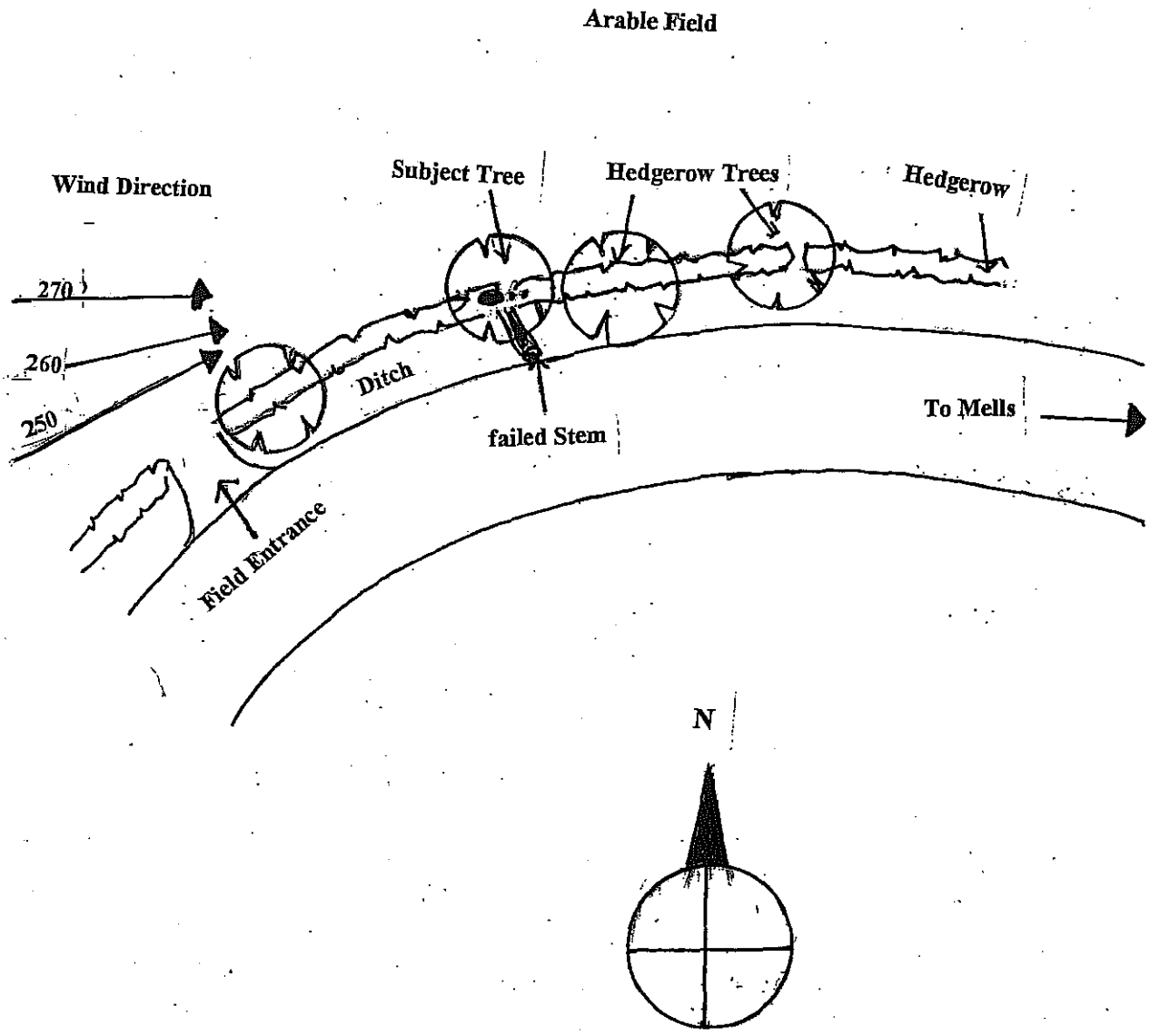
7-1 Sketch Illustration of the Subject tree before failure

7-2 Sketch plan of the locus of the accident

Compare with Photograps 2 & 3 at Appendix 3-1 and 2, 4 & 5 at Appendix 3-2



Title:	Diagrammatic Representation of The Subject Tree Pre-Failure	Scale: N T S	OCA UK Limited Consulting Arboriculturists
Client:	The Rt. Hon. Earl of Oxford & Asquith, Mells Estate	Drawn Date: Jan. 2003 Job Ref: 8467.02	Valleyfield 1A Stratford Road Aigburth, Liverpool L19 3RE Tel.No: 0151 4941108 : Fax.No: 0151 4274541



Title:	Sketch Plan of the locus of the Accident indicating the Wind Direction.	Scale: N T S	OCA (UK Limited) Consulting Arboriculturists
Client:	The Rt. Hon. Earl of Oxford & Asquith, Mells Estate	Drawn Date: Jan. 2003 Job Ref: 8467.02	Valleyfield 1A Stratford Road Aigburth, Liverpool L19 3RE Tel.No: 0151 4941108 : Fax.No: 0151 4274541

OCA UK Limited

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Dealga P O'Callaghan

Professional Details

I am Dealga Peadar O'Callaghan and I am a Consultant practising through O'Callaghan Associates Ltd. which is an arboricultural consultancy practice based at Valleyfield, 1A Stratford Road, Aigburth, Liverpool, England. The Practice specialises in arboriculture, forestry, urban forestry, biological sciences and project management throughout the United Kingdom and Ireland. I hold an Honours Baccalaureate Degree in Science, (BSc. Hons) and a Doctorate in Philosophy (PhD) in biology.

I am a Fellow and formerly a Registered Consultant of the Arboricultural Association. I am a Member of the Institute of Biology, (MIBiol.), and a Chartered European Biologist, (CBiol., EurBiol). I am a Practising Member of the Academy of Experts, (MAE), and a Law Society Accredited & Checked Expert Witness. I am a professional Member of the International Society of Arboriculture and am currently a Past President of the United Kingdom & Ireland, (UK/I), Chapter of that organisation. I acted in the capacity of General Conference Chair for the ISA Annual Conference held at Birmingham in August of 1998.

I am involved in Arboricultural Education and am currently an examiner for the Royal Forestry Society's Professional Diploma in Arboriculture, (written section). I am *'pro tem'* Head of Arboriculture at Myerscough College, Preston Lancs. and have served as the Principal Examiner for the Arboricultural Association's Technicians Certificate from 1988 to 1990. I have also been involved in the development of the ISA Certified Arborist Programme in the United Kingdom. Currently I am involved in developing a Chartered status for Arboriculturists through the Institute of Chartered Foresters, (ICF) and I am an Adjunct Professor in the Department of Forest Resources at Clemson University in South Carolina, USA.

I have been involved in the development of the arboricultural industry for many years and have served on a number of National & International Committees. For example, I have represented the Arboricultural Association on the British Standards Committee developing the standard for Chainsaws; I was a member of the working party that developed the Code of Practice for 'Tree Climbing Operations', (ASC1 now FASTCo 401); I have served on the European Standards Normalisation Committee, TC 144, Working Group 6 - 'Powered Hand Tools'. I have also served on the Arboricultural Association Review Group and am currently a co-opted Member of the Association's Professional Committee Review Group and am currently a co-opted Member of the Association's Professional Committee.

Dealga P O'Callaghan

Professional Details (Continued)

I am a consultant specialising in tree failure, hazard evaluation, risk assessment related to trees and buildings, planning and development where trees are involved, protection of trees on or close to construction sites, personal accidents involving trees, insurance claims where tree failure is involved and or building damage occurs which may be attributed to the activity of trees, Tree Preservation Orders, Statutory Designations and the like.

I have over 14 years experience in planning & development where trees and tree preservation orders are involved. I have acted for many clients both public and private and have experience of public inquiries ranging from small house extensions through to major developments of 1,800 units to Highway and Runway Inquiries. I have acted in respect of all aspects in the redevelopment of Airfields and the restoration of runway length at Civil Aerodromes up to and including a Parliamentary Public Inquiry at the House of Lords. I have also acted for Local Authorities in appeals and public inquiries