The CARE of TREES
Arboricultural Consultancy

Tree Survey at Croft Lodge
Beckermet

3rd June 2022

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Bsc (Honours) For, Cert.Arb (RFS)

Summary

Three trees were surveyed within the grounds of Croft Lodge that included a Sycamore, an Ash and a Lime.

The Lime was found to have significant and extensive decay on the main stem caused by a decay fungus called Dryads Saddle. This has caused approximately seventy percent of the stem to hollow out causing a cavity and the surrounding wood to become significantly weakened through decay. The decay has breached the stem wall to the west and the north above the pruning wound.
This decay is likely to worsen due to the poor ability that Lime has to compartmentalise and create barrier zones within the wood that limit the spread of decay. This tree has been assessed as having an unacceptable level of risk given its proximity to the adjacent playing field car park and the garden and property of Croft Lodge and has therefore been recommended for removal.

Two other trees were surveyed, an Ash and a Sycamore growing on the southern boundary adjacent the boundary wall. The Ash has been infected by die back, this is caused by a fungus that causes death to shoots leading to a drop in vitality over time. Nearly all trees in Cumbria have been infected within the last three to four years and some of these trees have died. This tree although infected still has a reasonable amount of vitality, there is some dead wood in the canopy that has been recommended for removal due to its proximity to the outbuilding on the neighbouring property. Some light pruning has been recommended to reduce back some of the over hanging branches and to maintain its current size.

The Sycamore is growing adjacent the Ash on the southern boundary and shows little signs of ill health or disease. There are some wounds on the main stem caused by previous removal of the lower branches that have some superficial decay but this is minor and in no way affects the structural integrity of the tree.

Some minor pruning has been recommended for this tree also concentrating on pruning back some of the over hanging branches.

Both of these trees are protected by tree preservation orders under the authority of Copeland Borough Council and therefore an application will need to be submitted for their consent before any work in this report can be carried out, apart from the removal of dead wood from their canopies.

1. Introduction

1.1 Work Instruction

The survey has been instructed through the property owner John Ball. He has requested that a survey is carried out on three trees growing on his property.

This survey aims to assess the health and condition of the trees and the potential for them to cause damage to property and people. Where the risk is deemed significantly high, work recommendations have been given to reduce the likelihood of tree failure.

1.2 Report Limitations

The trees were inspected from ground level unless otherwise indicated. All visual recommendations relate to the condition of the trees on the date of the survey and are valid for one year. The recommendations in this report should be carried out to manage the risks posed by the trees and reduce them to an acceptable level.

Trees are dynamic living organisms whose health and condition can change rapidly and therefore no tree can be guaranteed one hundred percent safe. However they are unlikely to cause significant damage or harm once the recommendations in this report have been implemented, unless the weather have been extreme or the conditions on the ground have changed rapidly.

2. Site Visit and Observations

2.1 Conditions at Time of Survey

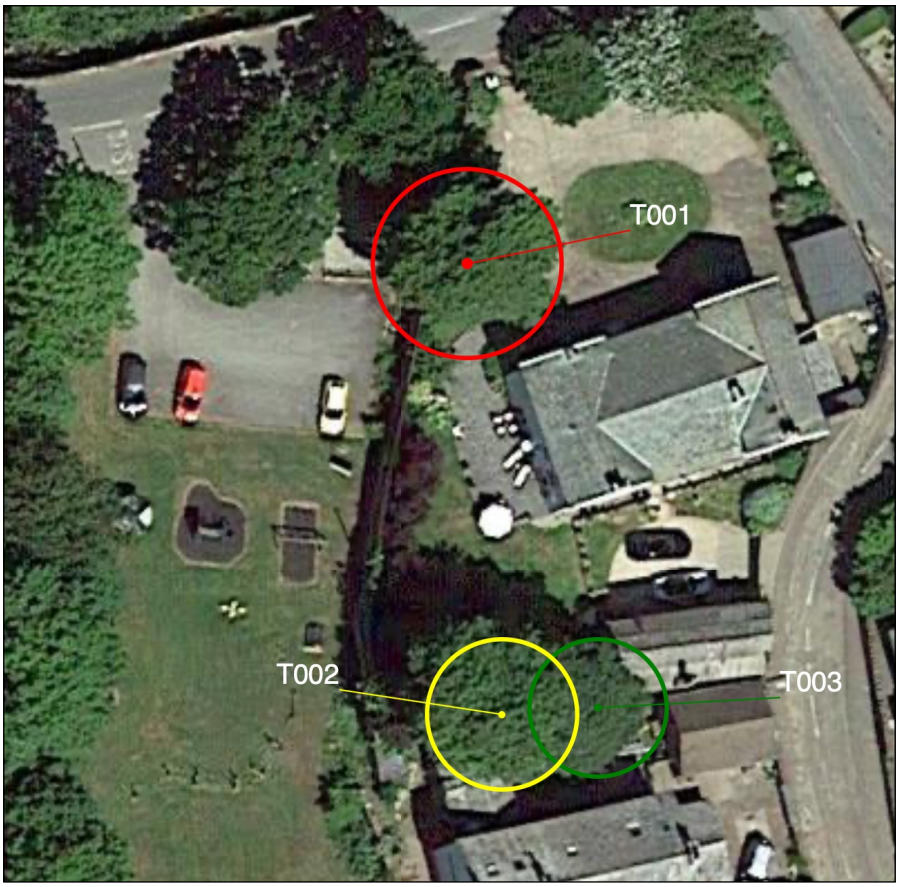
The trees were inspected on the 18th of May 2022. The weather was settled. The height, diameters and crown spreads were measured with a laser measurer and a diameter tape.

2.2 Site Description

Croft Lodge is located within the village of Beckermet near Egremont. The property has some mature trees in the garden that include an Ash, a Sycamore and a Broad Leaved Lime.

2.3 Location of Trees and Identification

The tree locations can be seen below on the map. The colour is in reference to their risk of harm rating that is co-ordinated throughout the report.



3. The Tree Survey Method

The tree survey method was carried out using the Quantified Tree Risk Assessment (QTRA) system which quantifies and combines the components of tree failure risk. It is possible to calculate with some accuracy the usage of vehicular and pedestrian targets upon which trees could fail. It is also possible to estimate the repair or replacement cost of property that could be damaged in the event of a tree failure. The probability that a tree or branch will fall can be estimated. The potential impact from a failing tree or branch can be estimated on the basis of the comparative assessment of the branch or stem diameter.

The Quantified Tree Risk Assessment system is based on mainly estimated values and whilst the system is numerically self consistent, the 'risk of harm' outcomes are based on observations made by tree inspectors, surveyors and land managers. The system provides a method for the probabilistic risk assessment of harm from tree failure but is not predictive in an absolute sense and does not seek to provide an absolute threshold. However the system does provide a statistical assessment of tree failure risk.

Where land is constantly occupied by people or by valuable property, a moderately small tree might, by virtue of its position, represent a significant 'Risk of harm'. On the other hand, a large tree in an area of low access such as a remote woodland or country park will represent only a very low 'Risk of harm' even where its stability is substantially compromised. In the latter scenario, access to a remote area will be considerably reduced during the high wind events that are most likely to result in failure of trees and as a result the risk from tree failure in these areas is further reduced.

The use of quantification in the assessment of tree failure risk enables property owner and managers to operate, insofar as is reasonable practicable, to a predetermined level of acceptable risk without expending disproportionate resources on either risk assessment or reduction.

3.1 The Method

The QTRA system produces a Risk of Harm figure, calculated from combining three components:

1. The Target
2. Size of part most likely to fail
3. Probability of failure

The system assesses the probability of significant harm from failure within a period of one year.

3.2 Risk of Harm

A probability of death or serious injury of 1/10,000 is suggested by the health and safety executive as the limit of acceptable risk to the public at large from the failure of any individual tree within one year of assessment. Using the 1/10,000 limit, risk exceeding 1/10,000 should be considered for urgent remedial action to reduce the risk to less than 1/10,000.

The key figure in the tree survey is the risk of harm. This figure represents the probability of a tree causing harm within the next twelve months.

3.3 Managing Risks

Current guidelines suggest that risk management should be proportional to the benefits conferred by trees and the costs of reducing risk levels. For example many trees may contain defects which could be deemed as a low risk. It is disproportionate to expect trees to have zero risk. This expectation would lead to hundreds of trees being removed for minor defects with huge cost involved.

The QTRA outputs can be measured against the HSE's Tolerability of Risk framework to aid decision relation to risk reduction works. The different categories of risk are as follows:

QUANTIFIED TREE RISK ASSESSMENT - RISK DECISION INFORMING FRAMEWORK

Risk Thresholds	Description	Action
	Unacceptable Risks will not ordinarily be tolerated	• Control the risk • Periodically review the risk
1/1 000	**Unacceptable** (where imposed on others) Risks will not ordinarily be tolerated	• Control the risk • Periodically review the risk
	Tolerable (by agreement) Risks may be tolerated if • those exposed to the risk accept it, or • the tree has exceptional value	• Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value • Periodically review the risk
1/10 000	**Tolerable** (where imposed on others) Risks are generally tolerable	• Assess costs and benefits of risk control • Control the risk only where a significant benefit might be achieved at a reasonable cost • Periodically review the risk
1/1 000 000	**Broadly Acceptable**	• No action currently required • Periodically review the risk

Figure 2 - Risk Decision Framework

3.4 Target Rating for Croft Lodge (Likelihood of occupancy by people and property)

Targets represent the value or occupancy. This considers the repair or replacement value of property that might be damaged and the average occupation by people over the coming year.

The risk assessment has been calculated for the part of the tree most likely to fail and varies with the tree and situation.

For the risk of harm calculations the potential consequences of damage to property has been used for all the trees. For small pieces of dead wood falling from the Ash the likelihood of damage up to a repair cost of £20-£200 or target range 5 is most likely. For the Lime the consequences could be multiple vehicles given the location of the adjacent car park, damage to a vehicle on the drive of Croft Lodge or damage to the main property. This cost of repair or replacement is likely to be between £20,000-£200, 000 or target rating 2. There is pedestrian usage of the car park and a bench and pedestrian area to the east of the Lime tree. The occupancy of these areas is likely to be much less than stationary property, for example parked cars due to the longer period of time that are present. Therefore the property has been assessed as having the greatest risk of damage.

The full risk of harm calculations can be found in the data and work scheduled appendix 2 and data and work schedule prioritised appendix 4. The full target ranges used in the risk of harm calculations can be found in appendix 5.

The information below has been organised according to the risk decision informing framework in figure 1.

To summarise:

Any tree with a risk rating of greater than 1/10,000 has an unacceptable level of risk and requires risk reduction measures to prevent harm to people and property. These are unacceptable risks where they are imposed on others without their agreement.

Any risk between 1/10,000 to 1/1 million is considered tolerable and depends upon the cost and benefit of risk control.

Risk less than 1/1 million is broadly acceptable and therefore no work is required.

4. The Tree Survey

Three trees were surveyed in this report that include a Sycamore, Ash and Lime. All of these trees are mature and are located to the south and west of the property.

4.1 T1 Broad Leaved Lime (*Tilia platyphyllos*)

The first tree surveyed was a Broad Leaved Lime, this is located closest to the property on the western boundary. Its height was measured at 18.5 m with a 7 m crown radius at its widest point. The stem measured 870 mm at 1.3 m.

4.1.2 Health and Vitality

The tree showed signs of good vitality indicated by the density of crown, colour of foliage and extension growth of shoots. There were no signs of pests or diseases affecting the vitality of the tree.

4.1.3 Structural Condition

Honey fungus (*Armillaria mellea*) was found at the base to the east that appeared to be decaying on an old Ivy stem that was severed some years back. Its rhizomorphs were on the bark in this area and there was white rot evident on the old Ivy stem. Honey fungus can be both saprophytic (decaying dead wood) and parasitic (decaying live trees). There was no evidence of any parasitic action for example decay within the base of the tree or mycelium under the bark.

The trunk has had a number of large branches removed in the past that have left some large wounds. Some of these have not occluded well to the west due to poor pruning cuts. To the north the occlusion of these wounds has occurred normally.

Figure 3 - Old pruning wound with decay

Figure 4 - Extensive cavity and decayed wood

It is normal for old pruning cuts to have some decay but in the majority of trees the decay is compartmentalised by the trees defences and limited in its spread.

The wound to the north from the ground appeared to have some decay within it. Upon further inspection this decay is extensive and with a probe measured 750 mm in depth. On the west of the tree there are coalescing wounds and above this the decay has spread out from the cavity into the main stem wall. On this side the decay extends some 500 mm into the cavity.

This decay has also spread through the main stem wall above the original pruning wound to the north.

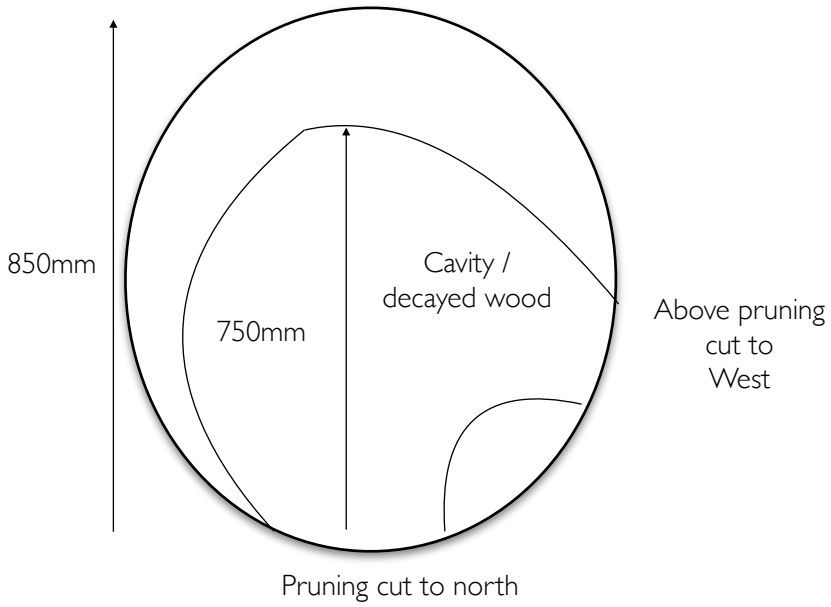


Figure 5 - Cross sectional analysis of the stem

The owner of the property mentioned that there is a decay fungal bracket at this point every year and after sharing some photos this was identified as Dryads Saddle (*Polyporus squamosus*). Dryads saddle causes a white rot that decays both lignin and cellulose of the wood.

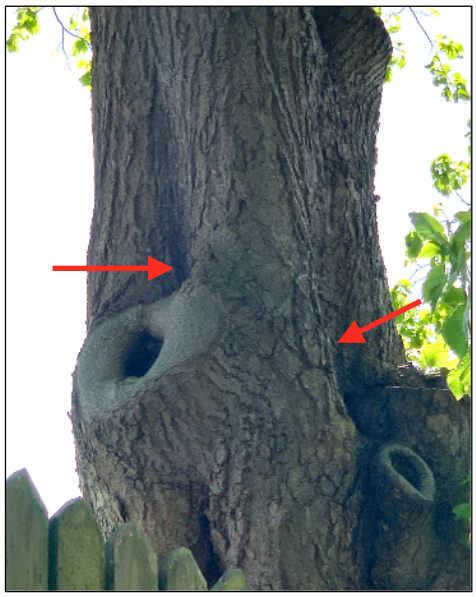


Figure 6 - Points where stem wall is decayed

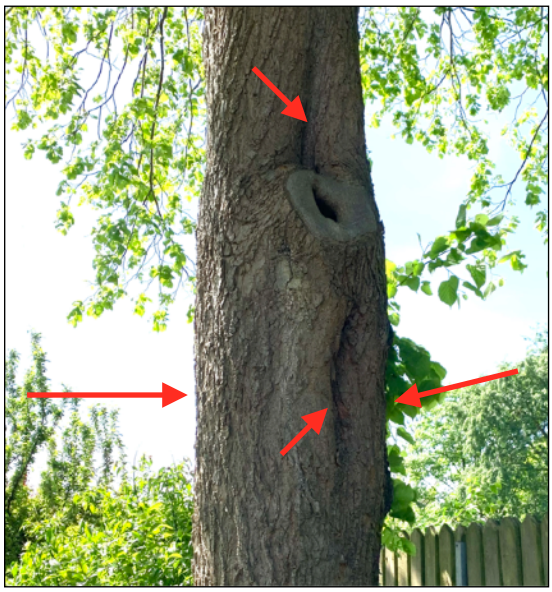


Figure 7 - Middle arrows show decayed areas above and below pruning cut and side arrows indicate stem thickening

Initially this decay would have been confined to a small area and in many trees it remains confined and zoned off limited in its spread throughout the main stem. In this case the decay is now becoming more expansive and has started breaking through the main stem walls. There are some signs of adaption / compensatory wood that can be seen on the trunk by increased stem thickening as identified in figure 7. This is caused when the tree senses increased bending stresses and attempts to allocate wood to areas of increase loading, in this case around the decay.

Lime compartmentalises decay poorly unlike an Oak that can produce barrier zones that effectively zones the decay off from spreading through the stem. Given that the decay has broke through the main stem walls and has moved up and down the stem and radially then it is clear that there is little resistance to its spread.

It is most likely to cause two open cavities in the main stem wall to the west and to the north above the pruning cut. Even though there are signs of adaption wood on the stem from a long term perspective the risk of failure of this stem will magnify over time.

4.1.4 Risk Assessment

The risk assessment has been calculated for whole tree failure onto property that may include multiple cars to the west and the property or vehicles to the east.

The risk of harm has been calculated as follows:

Target: Property 2
Size of Part: 1
Probability of Failure: 3

Risk of Harm: 1/3000

This is an unacceptable risk of harm.

4.1.5 Recommendations

If decay cavities are confined to a central column then trees can tolerate a significant amount of decay. The evidence that the decay is coalescing up and down the stem and that it has broken through the main stem wall to the north and west indicating that it is likely to cause a further decrease in strength of the stem.

I would recommend that this tree is removed given its proximity to people and property.

4.2 T2 Ash (*Fraxinus excelsior*)

This Ash is growing on the southern boundary and overhangs the neighbouring property outbuilding and yard area.

The Ash measured 17.5 m with a spread of 6 m and a stem diameter of 560 mm.

The Ash is growing at the bottom of the boundary wall and will have its roots restricted by the foundations.

Figure 8 - Ash and Sycamore on southern boundary

4.2.1 Health and Vitality

The tree has an average level of vitality. The tree has been infected by die back and this is evident in the crown. Although at present this is not severely infected.

Figure 9 - Dead shoots in crown typical of Ash die back

Nearly all Ash trees in Cumbria have been infected with varying stages of die back. This has become significantly established in Cumbria in the last three to four years.

The die back is caused by a fungus (*Hymenoscyphus fraxineus*), this causes death of shoots and a drop in vitality. As vitality drops and shoots and branches are killed, dead wood builds up in the canopies. As the infection advances further, trees can go into terminal decline or have such low vitality that they are infected by opportunistic decay fungi such as Honey fungus, leading to a quicker demise or failure at the stem as the decay progresses.

When it comes to assessing risk from these trees, the build up of dead wood can present a risk, especially in larger sizes to pedestrians and property.

There may become a point when the tree is affected to such a degree that its amenity value is reduced and or the vitality drops to the degree that some management action is required.

At present the tree is infected but still has significant leaf coverage to maintain its vitality.

4.2.2 Structural Condition

The tree showed little signs of any major structural concern such as decay or decay fungi splits or cracks or anything that would indicate any increased probability of failure.

The boundary wall has been lifted by the proximity of the stem and roots to the foundations. The wall is not a safety hazard but has a definite bow in it and is cracked to the east of the tree. This will need to be monitored to ensure this does not worsen. Trees optimise themselves wherever they are growing and it is likely that the roots from this tree are situation to the east, west and the north within the garden of croft lodge.

Figure 10 - Ash and proximity to boundary wall causing movement

Figure 11 - Crack in retaining bed wall

There is also a crack in the small retaining wall on the flower bed. This is likely to be caused by root expansion as the roots grow under the wall into the lawn.

There are some pieces of dead wood in the canopy that could fall onto the adjacent property potentially damaging roof tiles. This would be better removed.

Figure 12 - Example of dead wood in Ash

4.2.3 Risk Assessment

The risk assessment has been calculated for dead wood falling onto the neighbouring property.

The risk of harm has been calculated as follows:

Target: Property 5
Size of Part: n/a
Probability of Failure: 1

Risk of Harm: 1/30,000

This is a tolerable level of risk.

4.2.4 Recommendations

Given the position of the tree, there are some overhanging branches particularly over the neighbouring outbuilding. These could be pruned back by 2-2.5 m to give some clearance from the outbuilding and to prevent significant shading. The canopy of the Ash could also be reduced if its size is to be maintained by 1.5 m as indicated in the photo below. I would not recommend a more significant reduction in crown size at present. The tree is infected with Ash die back that affects vitality, it is infected but not in a severe condition. A minimal reduction is all I would recommend due to the likelihood of a more significant reduction combined with the Ash die back leading to a drop in vitality.

Figure 13 - Recommended reduction if desired to maintain the size of the tree

4.3.1 T3 Sycamore (*Acer pseudoplatanus*)

This tree is growing adjacent the boundary wall close to the Ash. The tree measured 16.5 m with a 5.5 m crown spread and measured 600 mm stem diameter.

4.3.2 Health and Vitality

The Sycamore had average extension growth for its species, good crown density and colour of foliage. There were no signs of any pests or diseases.

4.3.3 Structural Condition

In the past the tree was crown lifted to a height of approximately 5-6 m. Where these branches were removed, there are some wounds on the stem, some with superficial decay. Wounds that do not occlude fully can be prone to decay. At present the decay within these wounds is acceptable and is superficial as to not affect tree stability in any way.

Figure 14 - Pruning wounds in close proximity to each other with some decay

Figure 15 - Decayed branch in crown

There is also some decay in a branch in the crown at the main stem union this shows signs of adaption wood given its size is not considered a risk at present.

Figure 16 - Crown over hanging neighbouring property

Similarly to the Ash the canopy of this tree is overhanging the adjacent property. The Sycamore has had a minor impact on the wall compared to the Ash.

4.3.4 Risk Assessment

The risk assessment has been calculated for small branches falling from the crown into the yard of the neighbouring property.

The risk of harm has been calculated as follows:

Target: Property 5
Size of Part: n/a
Probability of Failure: 6

Risk of Harm: 1/3 Billion

This is a broadly acceptable level of risk and therefore no work is required to reduce any risk associated with this tree.

4.3.5 Recommendations

This tree has been crown lifted significantly and therefore if size control is desired or pruning back of over hanging branches from the adjacent property to the south then this needs to be carried out as minimally as possible. A reduction of 1.5 m branch length over the crown is recommended with 1.5 - 2 m on the south side to reduce back over hanging branches as shown in the photos below.

Figure 17 - Recommended reduction of Sycamore

Figure 18 - Recommended reduction of Sycamore of overhanging branches from west

4.4 Work Priority

The Lime tree has a risk of harm rating of greater than 1/10,000 and therefore its removal should be carried out as soon as possible following consent from the local council.

The other work recommended is within the tolerable and broadly acceptable levels of risk. This can be carried out if desired and budgets allow, to lower the risk of damage to as low as is reasonably possible, for example presented by the dead wood in the Ash. The pruning back of overhanging branches and crown reductions for the Sycamore and Ash can be carried out at any time.

4.5 Summary

- The Lime has significant decay in an old pruning wound that is now causing decay on the north and west sides of the stem outside of the cavity. This tree is recommended for removal due to its location next to the play area car park and the drive and property of Croft Lodge. This tree has an unacceptable level of risk (red category) and will require removal as soon as possible.
- The Ash is infected by die back but this is not significant at present. There is some dead wood in the canopy that has a risk of harm rating of harm rating of 1/30,000. This is a tolerable risk of harm (yellow category) and it is not essential that this is removed from a health and safety perspective. This can be removed if budgets allow and it is desired. This tree could be reduced lightly as outlined in the recommendations if size control is an objective.
- The Sycamore has a broadly acceptable risk of harm (green category) but could be reduced lightly as recommended and the overhanging branches pruned back sympathetically as recommended in the report.
- All trees are protected by a tree preservation order and consent needs to be given before any work is carried out apart from the removal of dead wood from the canopy of the Ash.

5. Legal Considerations

5.1 Tree Preservation Orders and Conservation Areas

This trees are protected by a tree preservation order and therefore any work recommended in this report apart from the removal of dead wood from the canopy will require an application submitting to Copeland borough council for their approval.

5.2 Felling License

This work is exempt from the felling license legislation.

5.3 Carrying Out Tree Work

Any tree work should be carried out by a suitable qualified arborist/ tree surgeon to British Standard 3998:2010 Tree work - Recommendations. They should also abide by Health and Safety legislation and be suitably insured to carry out such work.

5.4 Future Tree Surveys

These trees should be surveyed once every two to three years or after a severe storm.

5.5 Highway Law and Trees

Landowners Responsibility

The Highways Act 1980 states that a public highway should be kept clear of obstructions. Trees are living and growing organisms that can grow, in time, over a highway and impede the movement of pedestrians and vehicular traffic. Therefore landowners who have properties adjacent to the highway should be aware of their responsibilities to keep vegetation and trees clear.

Height Clearance over highway

Minimum clearance should be 2.4m over a footpath and 5.2m over a road (measured from the centre line). As a guide, these minimum clearances should be sufficient to allow a 2m person with an umbrella up to walk unimpeded along a footpath and a double-decker bus to travel along a road without hitting any overhanging branches.

Street lights and signs

The landowner also has a responsibility to ensure that vegetation is kept clear of road signs and street lights.

Dangerous trees

The landowner has a 'duty of care' to ensure that trees in their ownership do not pose a danger to highway users. This includes dead trees, dangerous trees, and dead and dangerous branches etc.

5.6 The Occupiers Liability Act

The Occupier's Liability Act 1957/1984 lays down a duty for landowners to take reasonable steps to ensure that their premises are reasonably safe for visitors. In relation to trees, steps should be taken to ensure that the trees are inspected and kept in reasonable condition.

5.7 Duty of Care

The landowner has a 'duty of care' to ensure that trees in their ownership do not pose a danger to passersby and property. This includes dead trees, dangerous trees, and dead and dangerous branches etc.

5.8 Wildlife Protection Legislation

Any tree work carried out should comply with the following legislation:

Bats and Birds

Wildlife and Countryside Act 1981: Certain plant and animal species are scheduled in the Act, and in addition all wild birds are protected during nesting (Schedule 1 Birds, Schedule 5 other animals, Schedule 8 plants). It is an offence to ill treat any animal; to kill, injure, sell or take protected species (with certain exceptions): or intentionally to damage destroy or obstruct their places of shelter. Bats and their roosts enjoy additional protection including when found in a dwelling house, and their discovery must be reported to Natural England

The Conservation (Natural Habitats, etc.) Regulations 1994 (the Habitat Regulations):

This Act implements the requirements of the European Habitats Directive and affords additional protection to animals and plants listed in Annex IV of the Directive. It is an offence to deliberately kill, injure, take or disturb listed animal species; to destroy their resting places or breeding sites; or to pick, collect, cut, uproot or otherwise destroy listed plant species.

Countryside and Rights of Way Act 2000: Part III of the Act strengthens the protection of SSSIs and the enforcement of the Wildlife and Countryside Act. It also supports the growing importance of Biodiversity Action Plans and the role of local wildlife sites in contributing toward Biodiversity Action Plans.

Appendix 1

1. Qualifications and Experience

1.1 Qualifications

Matthew Jones has a BSc in Forestry and Woodland Management from the University of Central Lancashire and has The Royal Forestry Certificate in Arboriculture. He is also a certified QTRA (Quantifiable Tree Risk Assessment) licensed user.

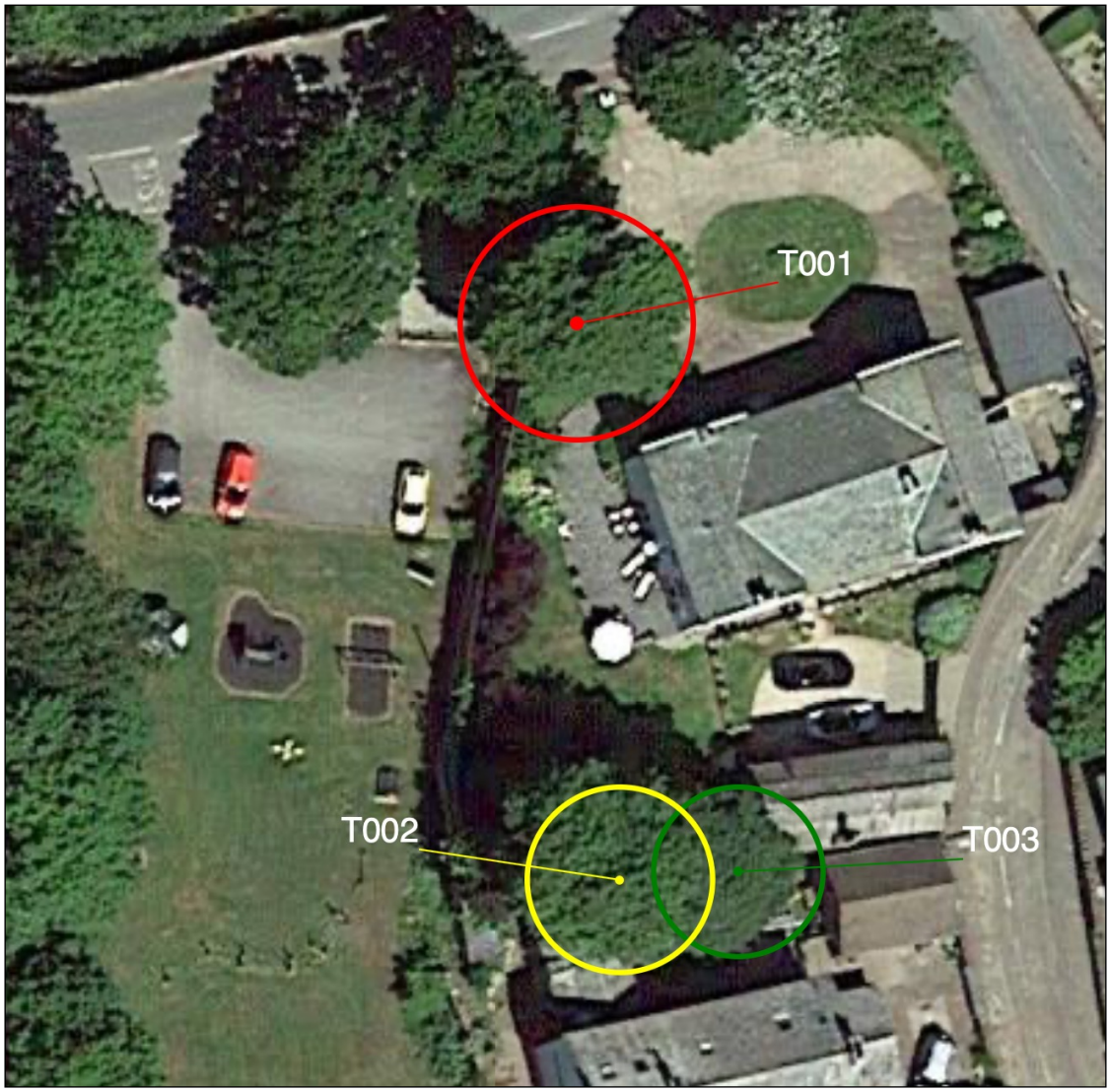
1.2 Practical Experience

Matthew Jones has spent over fifteen years working in the Arboricultural industry. Firstly as a tree surgeon in the UK, America and New Zealand, later in a tree management role for Oxford County Council managing thousands of trees within their care. He has also worked for Capita Symond's, one of the largest consultancy companies in the UK. In 2011 he set up his own company The Care of Trees specialising in providing tree reports and surveys.

Appendix 2 - Tree Survey Data and Work Schedule

Tree No	Common	Botanical	Height	DBH (cm)	Crown Radius	Life Stage	Vitality	Structural Condition	Description	Survey Notes	Target Range	Size	Probability of Failure	Risk of Harm	Recommendations
T001	Broad-leaved Lime	*Tilia platyphyllos*	18.5	87	7.5	Mature	Good	Poor	Target # - car park. Target # - dwelling	Decay fungi - Honey fungus appears to be on old dead wood close to base on east side, rhizomorphs present on bark. West Side decay evident on main trunk from decay originating from previous pruning wound on North at 4m. Decay pocket from north here is approximately 70cm deep, on west 40cm deep, above pruning wound to North decay is appearing above wound and coalescing to west. Thin wall of sound wood to east. Decay down to 1m below pruning cut and 1m above. Included union at main stem junction in crown, normal for Limes. Diffuse porus no barrier zones in general. Vitality is good, good crown density	Property(2) £200,000 - £20,000	Property	PoF(3) 1/100 - 1/1K	1/3K	Fell
T002	Ash	*Fraxinus excelsior*	17.5	56	6	Mature	Average	Fair	Target # - dwelling. Target # - garden	Ash die back - significant Dead wood 25mm -110mm Splaying at base near wall due to inhibited rooting, the wall is also bowing out due root and trunk expansion of tree to South and small retaining wall to North for flower bed has crack in it	Property(5) £200 - £20	Property	PoF(1) 1/1 - 1/10	1/30K	Remove dead wood, reduce canopy by 1.5m and reduce back overhanging branches by 2-2.5m
T003	Sycamore	*Acer pseudoplatanus*	16.5	60	5.5	Mature	Good	Fair	Target # - dwelling. Target # - garden	Decay on stem old pruning wound, superficial at 4.5m west, decay in old pruning wounds on neighbours side at 4.5m, some decay in crown at 9m wound wood development present	Property(5) £200 - £20	Property	PoF(6) 1/100K - 1/1M	1/3B	Reduce canopy by 1.5m and reduce back overhanging branches by 1.5-2m

Appendix 3 - Map Of Tree Locations



Appendix 4 - Risk Assessment Calculation Values and Ranges

Table 4. QTRA Target Ranges

Target Range	Property (repair or replacement cost)	Human (not in vehicles)	Vehicle Traffic (number per day)	Ranges of Value (probability of occupation or fraction of £2 000 000)
1	£2 000 000 – >£200 000	**Occupation:** Constant – 2.5 hours/day **Pedestrians & cyclists:** 720/hour – 73/hour	26 000 – 2 700 @ 110kph (68mph) 28 000 – 2 900 @ 100kph (62mph) 31 000 – 3 200 @ 90kph (56mph) 32 000 – 3 300 @ 80kph (50mph) 36 000 – 3 700 @ 70kph (43mph) 42 000 – 4 300 @ 60kph (37mph) 47 000 – 4 800 @ 50kph (32mph)	1/1 – >1/10
2	£200 000 – >£20 000	**Occupation:** 2.4 hours/day – 15 min/day **Pedestrians & cyclists:** 72/hour – 8/hour	2 600 – 270 @ 110kph (68mph) 2 800 – 290 @ 100kph (62mph) 3 100 – 320 @ 90kph (56mph) 3 200 – 330 @ 80kph (50mph) 3 600 – 370 @ 70kph (43mph) 4 200 – 430 @ 60kph (37mph) 4 700 – 480 @ 50kph (32mph)	1/10 – >1/100
3	£20 000 – >£2 000	**Occupation:** 14 min/day – 2 min/day **Pedestrians & cyclists:** 7/hour – 2/hour	260 – 27 @ 110kph (68mph) 280 – 29 @ 100kph (62mph) 310 – 32 @ 90kph (56mph) 320 – 33 @ 80kph (50mph) 360 – 37 @ 70kph (43mph) 420 – 43 @ 43kph (37mph) 470 – 48 @ 50kph (32mph)	1/100 – >1/1 000
4	£2 000 – >£200	**Occupation:** 1 min/day – 2 min/week **Pedestrians & cyclists:** 1/hour – 3/day	26 – 4 @ 110kph (68mph) 28 – 4 @ 100kph (62mph) 31 – 4 @ 90kph (56mph) 32 – 4 @ 80kph (50mph) 36 – 5 @ 70kph (43mph) 42 – 5 @ 60kph (37mph) 47 – 6 @ 50kph (32mph)	1/1 000 – >1/10 000
5	£200 – >£20	**Occupation:** 1 min/week – 1 min/month **Pedestrians & cyclists:** 2/day – 2/week	3 – 1 @ 110kph (68mph) 3 – 1 @ 100kph (62mph) 3 – 1 @ 90kph (56mph) 3 – 1 @ 80kph (50mph) 4 – 1 @ 70kph (43mph) 4 – 1 @ 60kph (37mph) 5 – 1 @ 50kph (32mph)	1/10 000 – >1/100 000
6	£20 – £2	**Occupation:** <1 min/month – 0.5 min/year **Pedestrians & cyclists:** 1/week – 6/year	None	1/100 000 – 1/1 000 000

Vehicle, pedestrian and property Targets are categorised by their frequency of use or their monetary value. The probability of a vehicle or pedestrian occupying a Target area in Target Range 4 is between the upper and lower limits of >1/1 000 and 1/10 000 (column 5). Using the VOSL £2 000 000, the property repair or replacement value for Target Range 4 is £2 000 - >£200.

Table 5. QTRA Size Ranges

Size Range	Size of tree or branch	Impact Potential
1	> 450mm (>18") dia.	1/1 - >1/2
2	260mm (10½") dia. - 450mm (18") dia.	1/2 - >1/8.6
3	110mm (4½") dia. - 250mm (10") dia.	1/8.6 - >1/82
4	25mm (1") dia. - 100mm (4") dia.	1/82 - 1/2 500

* Range 1 is based on a diameter of 600mm.

Table 6. QTRA Probability of Failure Ranges

Probability of Failure Range	Probability
1	1/1 - >1/10
2	1/10 - >1/100
3	1/100 - >1/1 000
4	1/1 000 - >1/10 000
5	1/10 000 – >1/100 000
6	1/100 000 – >1/1 000 000
7	1/1 000 000 – 1/10 000 000

The probability that the tree or branch will fail within the coming year.