AT2 Tree Surveys

Tree Survey
for
Woodland Cottage
Southwell

21st July 2020

The Stables, 14 King Street, Nether Broughton, Melton Mowbray LE14 3HA

Contents

Introduction

This report has been prepared with reference to the curtilage of Woodland Cottage and the adjacent woodland off Westhorpe in Southwell. The trees were surveyed to record their current condition and their longer-term value. The property is within the Southwell conservation area and the woodland is protected by a tree preservation order. The weather was fine and bright.

Limitations

The trees were inspected from ground level to produce a catalogue of species, size and general condition. The soil was not examined and no samples were taken for analysis. There has been no attempt to assess potential root damage or subsidence potential.

Trees are living organisms whose health and condition can change rapidly – best practise recommends that trees are inspected every 18 months when they are alternately in and out of leaf[13].

Considerations

Damage to Trees[1]

Trees that have good health and stability are well adapted to their surroundings. Any development activity which affects the adaptation of trees to a site could be detrimental to their health, future growth and safety. Tree species differ in their ability to tolerate change but all tend to become less tolerant after they have reached maturity or suffered previous damage or stress. Planning and subsequent site management should aim to minimise the effect of change.

The part of a tree most susceptible to damage is the root system, which, because it is not immediately visible, is frequently ignored. Damage to, or death of the root system affects the health, growth, life expectancy and safety of the entire tree. The effects of such damage may only become evident several years later. Damage may be the result of a number of insignificant but compounding factors that accumulate over time.

Damage to the stem and branches of a tree is not usually sufficient to kill the tree directly but may make it unsafe by affecting the weight of distribution of the crown or by facilitating decay in the long term. Such damage may also be disfiguring.

Roots perform several functions:

- Anchoring the tree in the ground
- Taking up water and minerals from the soil
- Storing food for times of dormancy

A tree typically has 80-90% of its roots within 60cm of the surface of the ground. Although they may be deeper within the dense mass of roots and soil close to the base of the tree it is rare for roots to penetrate to a depth greater than 2 metres (see figure 1 below).

Within a short distance of the stem the roots are highly branched so as to form a network of small-diameter woody roots that typically extend radially for a distance much greater than the height of the tree, except where impeded by unfavourable conditions. All parts of this system bear a mass of fine, non-woody absorptive roots.

Figure 1. Trees have relatively shallow but wide spreading roots

The root system does not generally show the symmetry seen in the branch system. The development of all roots is influenced by the availability of water, nutrients, oxygen and soil penetrability. As far as these conditions allow, the root system tends to develop sufficient volume and area to provide physical stability.

The uptake of water and mineral nutrients by the root system takes place via the fine roots, typically less than 0.5 mm diameter. Their survival and functioning - which are essential for the health of the tree as a whole - depend on the maintenance of favourable soil conditions. The fine roots are short-lived with the majority dying each winter and with fresh ones developing in response to the needs of the tree.

All parts of the root system, but especially the fine roots, are vulnerable to damage. Once roots are damaged, water and nutrient uptake is restricted until new ones have grown. Mature and over-mature trees respond slowly, if at all, to damage of their woody roots.

The main risks to tree roots come from physical damage and compaction to the surrounding soil.

Physical damage:

During construction damage is often sustained when digging foundations or trenches for services. Surface roots are at risk when laying driveways, hardstanding and landscaping. Damaged roots are an entry point for infection and if a root is cut completely the tree loses a proportion of its capacity to take up water and minerals, store energy for the winter and weakens its anchorage in the ground.

Figure 2 and Figure 3 show root damage from 'landscaping'. Using a mechanical digger, 30-40 centimetres of soil was removed from the original level (marked in red).

Figure 2. Ash roots damaged by 'landscaping'

Figure 3. Walnut roots smashed by an excavator.

Compaction:

This is common where surfaces are laid for vehicular traffic. Tree roots need oxygen to respire and growth is inhibited or stopped when the airspaces in the soil are lost through compaction.

Other damage:

To avoid contamination and compaction no material should be stored within 10 metres of a tree trunk or on any unprotected soil surfaces. This includes building materials, scaffolding, fuel, site huts and temporary toilets. Notice boards should not be attached to any part of a tree and no fires should be allowed on site.

Unless the damage is extremely severe it is unlikely that a tree will show symptoms immediately. More typically there is a steady decline over a few years with smaller leaves, crown dieback and possibly, eventual failure.

Protection of trees during construction

BS5837: 2012 *Trees in relation to design, demolition and construction*[1] gives guidelines on the implementation of protection for trees and roots before and during construction. The Tree Survey Schedule in Appendix B gives the radius of the Root Protection Area (RPA) for each tree. This is the minimum distance at which barriers should be stationed to protect trees and their roots from construction work.

Trees subject to Statutory Control

Local Planning Authorities may assess trees as beneficial to the wider community in terms of their amenity value. They may protect such trees with a Tree Preservation Order (TPO). Work may still be permitted on protected trees but permission for the works must first be obtained from the LPA.

Some areas are designated conservation areas. Before carrying out works on a tree in a conservation area notice must be given to the LPA. The LPA can either allow the works to proceed or impose a TPO.

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Where felling would produce more than five cubic metres of saleable timber a felling license may be required from the Forestry Commission.

Trees and Wildlife

Trees are hosts to nesting birds and mammals. It is an offence under the Countryside and Wildlife Act to disturb any nesting bird or bat. Before carrying out any works it is important to ensure that there are no birds or bats in residence.

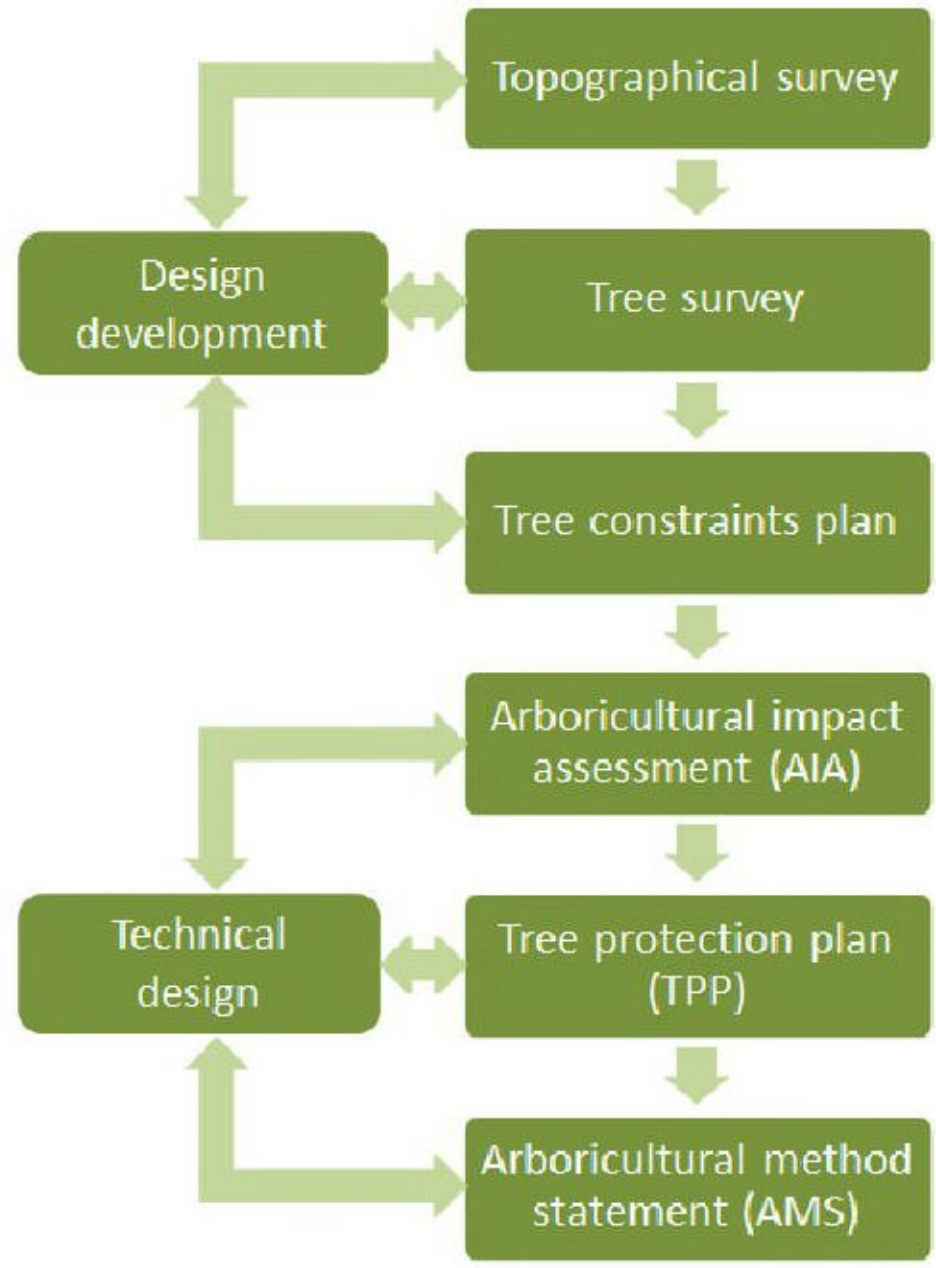
Implementation of Tree Works

BS 3998: 2010 *Recommendations for Tree work*[2] is the standard by which any contractor should carry out tree work.

Timing of the tree survey

The British Standard BS5837[1] recommends that:

> *A tree survey should be undertaken by an arboriculturist to record information about the trees on or adjacent to a site. The results of the tree survey, including material constraints arising from existing trees that merit retention, should be used (along with any other relevant baseline data) to inform feasibility studies and design options. For this reason, the tree survey should be completed and made available to designers prior to and/or independently of any specific proposals for development.*



The tree survey provides an objective catalogue of the species, size and condition of the trees including the size of the root protection area (RPA) which needs to be "no-dig" regarding development. The RPA is nominally a circle but roots are influenced by a range of underground factors so it is often useful to carefully excavate a trial trench either by hand or, ideally, using an air-spade to determine the actual root morphology. This information will determine the design of nearby foundations. Pile and beam foundations are a common solution where piles are placed in-between the roots and bridged with ground beams.

Depending on the design proposals it is possible that the local planning authority may require an arboricultural method statement and tree protection plan to detail how trees will be protected from damage during development.

Tree Survey

Site description

The frontage to Westhorpe looking west.

The survey site is a woodland plot to the south of Westhorpe including Woodland Cottage. It is believed that the woodland area used to be an orchard with pig sties but there are only a few dead remnants of apple trees and the remains of some brickwork. Today, the wood mainly consists self-set sycamore with the occasional ash, cherry or goat willow. In competition for light the trees have an etiolated form with a high, closed canopy and no understorey other than ground elder, ivy and a few nettles. Several of the trees have codominant stems with significant included bark (see Appendix D).

Along the road frontage there are two mature yews together with a line of hawthorns which, many years ago, was probably a boundary hedge. A tree plan is included in Appendix A showing canopies shaded in accordance with their BS5837 categories and their root protection areas coloured magenta.

Tall, spindly stems and ground elder growing over remains of brickwork.

View looking north along the footpath running to the west of the woodland plot.

To the south of the woodland, the cottage has mature gardens with fruit trees and semi-ornamental planting.

The garden of Woodland Cottage looking north.

Recommendations

The woodland has not been managed for many years and the fruit trees have been replaced with self-set sycamore which have grown tall and spindly in competition for light. The trunks are densely packed and will not be able to grow to maturity leading to future failures. With a 22-metre canopy, very little light reaches the ground; the lack of understorey demonstrates that very little can thrive in the deep shade and there is very little biodiversity.

To have a realistic chance of getting light to the woodland floor and replanting with a more diverse range of species it will be necessary to fell the sycamore in significant blocks. The felling could be split into two or three phases spread in different years starting with the southern end of the plot which would allow most light into the wood. It would be possible to start at the north end of the plot but here any new trees would still be overshadowed by the tall trees to the south.

The Forestry Commission control felling in woodlands. Felling more than five cubic metres of timber in any calendar quarter would require a felling licence. A typical sycamore stem would contain between 0.5 and 1 cubic metre.

A proportion of the timber should be stacked in lengths on-site to provide habitat for invertebrates whilst the brash should be chipped and used as a mulch around the newly planted trees.

There is a wide choice of trees that would be suitable for replacement planting offering different qualities including habitat, fruit, size, longevity and suitability for local soils. Some species are good pioneers, establishing quickly until they can be replaced with slower growing species that will form woodland for future generations. The selection of a range of native species is to be encouraged to support better biodiversity and mitigate the risk of loss from pests and diseases.

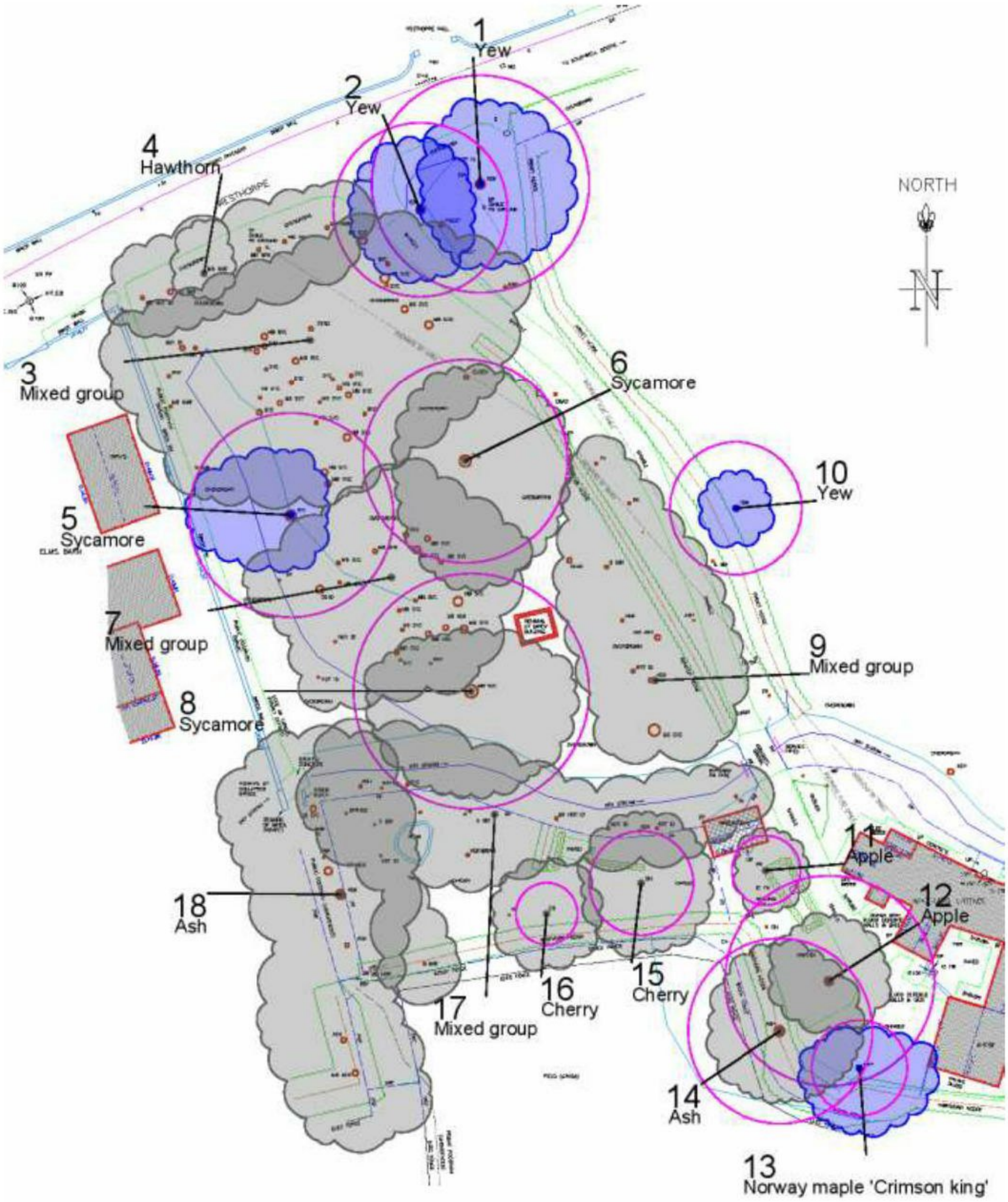
Recorded information

The results are tabulated in Appendix B. For each tree the following details were recorded:

- Species; Common name and *botanical name*
- Height in metres measured using a Nikon 550 Forestry Pro hypsometer
- Circumference and diameter measured at 1.5 metres above ground level (# denotes estimated measurement where trunk is inaccessible).
- Whether the tree has a single or multiple stems
- The calculated radius in metres for the Root Protection Area (shown in magenta in the tree plan in Appendix A).
- The cardinal spread of the crown in metres.
- Canopy height in metres (ground clearance)
- The height in metres to the crown break (height of the lowest branches on the main trunk)
- The age class
    - Young: establishing, usually with good vigour but as yet of limited significance in the landscape.
    - Semi-mature: established, normally vigorous, increasing in height and of increasing landscape significance.
    - Early-mature: established; approaching mature height with crown spreading.
    - Mature: fully established trees around the middle of their typical life expectancy; generally retaining good vigour and achieving full height but their crowns still spreading.
    - Over-mature: fully established trees toward the end of their typical life expectancy with declining vigour.
    - Ancient: surviving beyond the typical age range for the species. Very old with low vigour and liable to decline. May include important Veteran Trees.
- Condition including the presence of physical defects and decay
- Estimated remaining contribution in years
- Tree quality assessment grading in accordance with BS5837:2012 (see Appendix C)

For expediency some trees may have less detail recorded and, in some cases, similar trees may be grouped for the purposes of this survey.

Appendix A – Tree Survey Plan



Appendix B – Tree Survey Schedule

Plan ID	Species	Height (m)	Circ. (cm)	Diameter (m)	No. of Stems	RPA radius (m)	Spread (m)	Canopy height (m)	1st sig. branch hght/dir	Life stage	Observations, condition, notes & recommendations	Remaining contribution (years)	Grading
1	Yew *Taxus baccata*	14	250	0.80	1	9.5	N 7 E 8 S 7 W 5	2	2	Mature		20+	B2
2	Yew *Taxus baccata*	12	200	0.64	1	7.6	N 6 E 4.5 S 6 W 6	2	4	Mature		20+	B2
3	Mixed group *Mixed group*	22	95 typ. 135 max.	0.30 0.43	1	3.6	N E S W			Semi mature	Mainly sycamores with some cherry and goat willow.	10+	C2
4	Hawthorn *Crataegus monogyna*	10	60 typ.	0.19	1	2.3	N 4.5 E 2.5 S 2 W 2.5	0	2	Mature	Ivy smothered.	10+	C2
5	Sycamore *Acer pseudoplatanus*	19	235	0.75	1	9.0	N 5.5 E 3 S 4.5 W 9	4	4	Early mature	Ivy smothered.	20+	B2
6	Sycamore *Acer pseudoplatanus*	22	235	0.75	1	9.0	N 8 E 9 S 11 W 6	2	2	Early mature	Codominant stems.	10+	C2
7	Mixed group *Mixed group*	22	95 typ.	0.30	1	3.6	N E S W			Semi mature	Mainly sycamores with some ash.	10+	C2
8	Sycamore *Acer pseudoplatanus*	20	140 114 155 130	0.45 0.36 0.49 0.41	6	10.4	N 5 E 9 S 9 W 9	4	4	Early mature	Multi-stemmed with codominant stems.	10+	C2
9	Mixed group *Mixed group*		95 typ.	0.30	1	3.6	N E S W			Mature	Sycamore with ash and silver birch.	10+	C2

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10	Yew *Taxus baccata*	9	153	0.49	1	5.8	N 3 E 3 S 3 W 3	2	2	Mature		20+	B2
11	Apple *Malus domestica*	7	80	0.25	1	3.1	N 3.5 E 3.5 S 3.5 W 2.5	2	1.5	Mature		10+	C2
12	Apple *Malus domestica*	8	242	0.77	1	9.2	N 5.5 E 5 S 4 W 5	2.5	2	Mature	Very large, hollow trunk.	10+	C2
13	Norway maple 'Crimson king' *Acer platanoides 'Crimson King'*	12	110	0.35	1	4.2	N 3 E 6.5 S 5.5 W 5	2	2	Early mature		20+	B2
14	Ash *Fraxinus excelsior*	16	95 108 102 120	0.30 0.34 0.32 0.38	4	8.1	N 7.5 E 7 S 6 W 6	2	4	Early mature	Codominant stems and cavities.	10+	C2
15	Cherry *Prunus*	7	120	0.38	1	4.6	N 6 E 6 S 6 W 5	2	1	Mature		10+	C2
16	Cherry *Prunus*	7	71	0.23	1	2.7	N 4.5 E 4.5 S 4.5 W 4.5	2	2	Mature		10+	C2
17	Mixed group *Mixed group*		115 max.	0.37	1	4.4	N E S W			Mature	Alder, birch, apple.	10+	C2
18	Ash *Fraxinus excelsior*	20	117 typ.	0.37	1	4.5	N E S W			Early mature		10+	C2

Appendix C – BS 5837:2012 Cascade chart for tree quality assessment

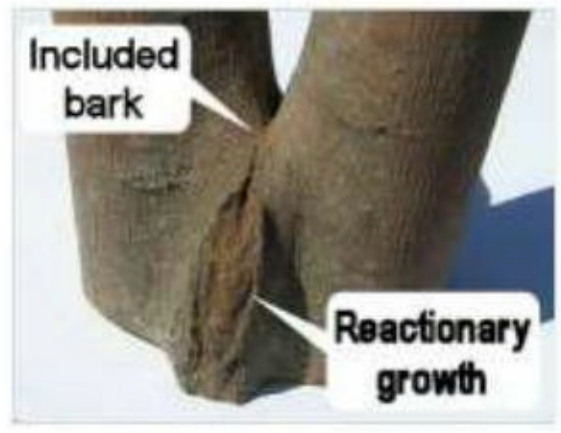
Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve*			Red
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention				
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	Green
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	Blue
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	Grey

Appendix D – Codominant Stems or compression forks

Codominant stems occur when a tree grows with two or more main stems or 'leaders' that are about the same diameter and emerge from the same location on the main trunk. As the tree grows older the stems remain similar to each other in size without any single one becoming dominant. They are especially common in some species including ash, acer and lime.

Depending how the tree has grown codominant stems can result in an increased risk of failure.

'V' shaped union with included bark



Where the stems have grown in a tight 'V' shape bark may have been trapped in the junction in between. The trapped or 'included' bark prevents the tree forming a strong joint between the stems.

'U' shaped union with bark ridge

A more open 'U' shape forms a stronger union with no included bark.

Instead the bark maintains a barrier or crack that weakens the union.

Another example showing a crack formed by included bark

The annual growth ring for each stem pushes against the opposing stem acting like a wedge forcing them apart. This is also known as a compression fork.

The tree will produce reactionary growth forming ribs at the ends of the crack to bind the stems. The size of these ribs is a strong indicator as to the extent of the bark inclusion.

The presence of codominant stems with included bark reduces the strength of the union and therefore increases the risk of failure under loading during strong winds.

Failed ash tree with two codominant stems.

However, the presence of included bark does not mean the tree will fail. Codominant stems are a common feature of many trees and most will live to the end of their natural life without a problem. The decision whether to take remedial action should take a range of factors into consideration including the size, position and condition of the tree and the proximity of 'targets' close to the tree.

Appendix E – References

1 British Standards Institution, (2012). *BS 5837: 2012 – Trees in relation to design, demolition and construction – Recommendations*. Milton Keynes: BSI

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13 Cavanagh v Witley Parish Council (1) and D Kevin Shepherd (t/a Shepherd Tree Surgeons & Forestry Contractors) (2) [2017]