Trees & Development Guidelines for Coventry

Supplementary Planning Document

October 2020

"*The tree which moves some to tears of joy is in the eyes of others only a green thing that stands in the way*"

Letter to Revd. Dr. Trusler; William Blake, 1799

"*There is little in the architecture of a city that is more beautifully designed than a tree*"

Jaime Lerner, Architect and Urban Planner –
Mayor of Curitiba (1971-1974, 1979-1983, 1989-1992)

Abbreviations

AIA – Arboricultural Impact Assessment

AMS – Arboricultural Method Statement

BS – British Standard

CAVAT – Capital Assessment Value for Amenity Trees

CEZ – Construction Exclusion Zone

LPA – Local Planning Authority

LTOA – London Tree Officer's Association

NATO – National Association of Tree Officers

NHBC – National House Building Council

NPPF – National Planning Policy Framework

PPG – Planning Practice Guidance

RPA – Root Protection Area

SMS – Site Monitoring Sheet

SPD – Supplementary Planning Document

TCP – Tree Constraints Plan

TPM – Tree Protection Measures

TPO – Tree Preservation Order

TPP – Tree Protection Plan

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Introduction

Purpose

1.1. Trees are a significant and highly visual component in the landscape, and as public awareness of environmental issues becomes more influential, there is an increasing need to focus attention on trees and their role in providing not only a pleasant environment, but their value to biodiversity and mitigating the adverse impacts of climate change, as well as positive health and wellbeing impacts

1.2. This Supplementary Planning Document (SPD) allows Coventry City Council to respond to these sentiments and build upon the policies included in the Coventry Local Plan 2016 (hereby referred to as the Local Plan) when and where it relates to trees in Coventry, and the preservation and protection of trees during new development, and on existing sites. More generally, it describes and explains how the Council will interpret and apply the relevant sections of Planning Practice Guidance (PPG), and the National Planning Policy Framework (NPPF).

1.3. Furthermore, it will help to inform developers, land-owners, agents, architects, planning consultants, landscape architects, arboriculturists, contractors and other interested parties of the standards that the Council expects from new development proposals with regard to existing trees. It seeks to ensure that important trees are afforded due consideration in the planning process, so that they can be effectively integrated into new developments.

1.4. This document provides a comprehensive guide to the planning system, and the preservation and protection of trees during development in Coventry. For this reason, the intention of this document is to lead to an improved approach to the retention and planting of trees; thus making an important contribution to sustainable development in the city.

1.5. The structure of this document has been set out to follow the logical sequences by which development matters are generally processed; i.e. site surveys, development planning and organisation, obtaining planning permission and subsequent implementation; as identified in BS 5837:2012 - *Trees in Relation to Design, Demolition and Construction*[1].

1.6. Applicants, developers and interested parties would benefit from reviewing this SPD in conjunction with the Council's latest Tree Strategy as well as, Green Infrastructure and Biodiversity Strategies, which are in the process of being drafted at the time of publication and will be available on the Council's website in due course.

Aims & Objectives

1.7. The Council is committed to ensuring that development proposals provide positive environmental benefits; including promoting the benefits of trees throughout the city, and thus encouraging sustainable management of the city's trees and enhancing the quality of their tree cover. This will be achieved in the first instance through negotiation, or if necessary, by using council planning powers.

[1] Permission to reproduce extracts from British Standards is granted by BSI Standards Limited (BSI). No other use of this material is permitted. British Standards can be obtained in PDF or hard copy formats from the BSI online shop: www.bsigroup.com/Shop

1.8. The necessity for an organised, methodical, coordinated and standard approach to ensure the effective integration of trees into new development is formalised within BS5837:2012. It is considered as the national standard for the approach to tree protection.

1.9. It is intended that this document will help to facilitate a quality, systematic approach to the retention and planting of trees, by explaining the approach to tree and development issues that will be required by the Council to comply with its own planning policies as established and adopted in the Local Plan.

1.10. For these reasons, this document is underpinned by the following aims:

- To provide details around the tree related Local Plan policies (most notably Policies GE3, GE4 and HE2).
- Aid the process of determining planning applications where trees are concerned.
- Assist in the arboricultural management practices of parks, garden and city trees.
- Provide advice about trees in Coventry.
- Guide development to meet and exceed best-practice examples and proven standards.

1.11. The following guidelines set out the procedures and design criteria necessary to ensure the successful integration of existing trees, and the planting of new trees, into development proposals. Compliance with these will ensure that sufficient information is submitted to enable the Council to assess the full long- term effect and impact of any new development and avoid unnecessary delays in the decision-making process.

Bannerbrook Park

Existing mature trees successfully integrated into new residential development by careful consideration and protection throughout the survey, design and construction stages.

Context

The Importance of Trees

2.1. Trees are of fundamental importance to the landscape and are widely appreciated for enhancing the urban and rural environment. They make a positive contribution to the scenic character and diversity of the landscape and built environment. Furthermore, their role in sustaining and enhancing biodiversity is vital as their physical structure is crucial to vast amounts of life, primarily by providing shelter and nutrients.

2.2. In addition, trees play an essential role in mitigating the adverse impacts of climate change by absorbing carbon dioxide and other pollutant gasses and producing oxygen. By reducing localised extremes in temperatures, trees can also lower energy consumption and costs for heating in winter, and air conditioning in summer.

2.3. In a planning and development context, the retention of trees provides an immediate sense of maturity which benefits sites and their surroundings; helping to raise the overall quality of schemes and support enhanced property values. However, where trees are damaged and subsequently decline and die, or where inappropriate design leads to conflict, trees can become a source of complaint and ultimately, any positive benefits are lost.

History of Trees in Coventry

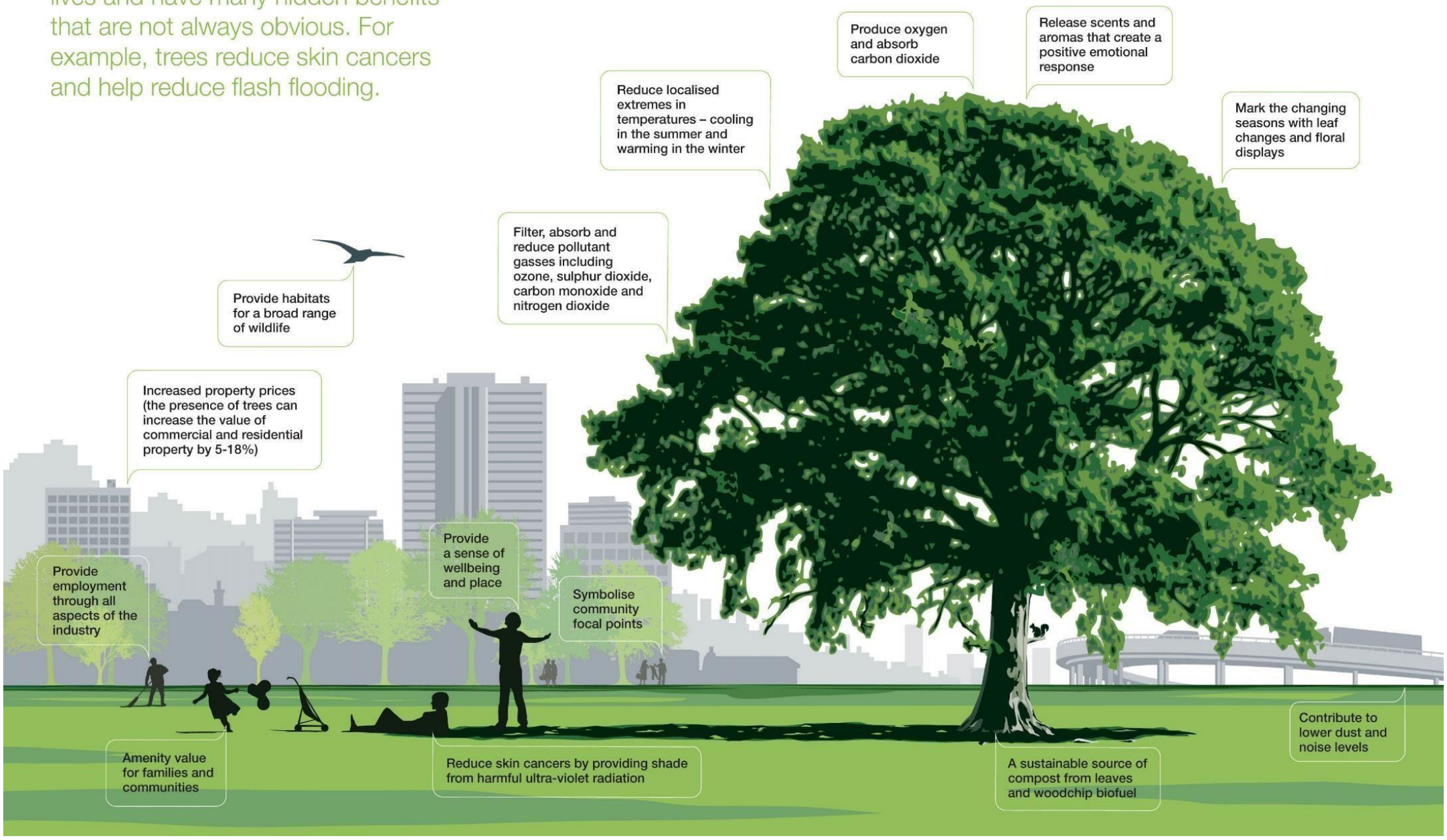
2.4. The area where Coventry now stands was once covered by the Arden Forest. Large areas of the Forest were cleared for agriculture during the Bronze Age and subsequent Roman occupation. The Forest may have grown back to some extent after the Romans left, but it is also possible that the Roman and medieval landscape character were broadly similar anyway i.e. a mosaic of enclosed and unenclosed pasture, inter-mixed with woodland.

2.5. This ancient landscape now exists mainly only in the north west of the city in Coventry's Ancient Arden Historic Landscape Area. However, remnants of the hedges and hedgerow Oaks still remain scattered throughout the urban area. Medieval Oak woodlands have survived quite well on the west and south- west of Coventry, and these and are also frequently associated with archaeological interest.

2.6. Many of the grandest trees remaining in Coventry originate from the Victorian period. They are the result of designed landscapes during a wealthy period in the city's history. Traders in the 19th Century built homes with large gardens planted with fashionable trees of the time, including mixed groups of non-native conifers such as Cedars and Redwoods. The tree which has safely remained as the oldest tree within the inner-City is the historic Mulberry tree which was originally located within a Spon Street Victorian Watchmaker's garden. It can now be found to the rear of this property (21 Spon Street), within the curtilage of Croft Road car park. Many of these large houses have since been converted into schools, nursing homes etc., yet the trees have been relatively well preserved.

Why trees are good for us

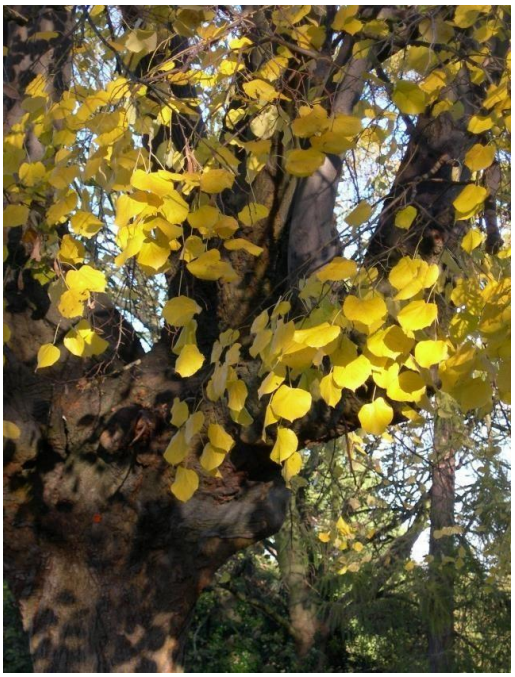
Trees are an important part of our lives and have many hidden benefits that are not always obvious. For example, trees reduce skin cancers and help reduce flash flooding.



2.7. 'Spinney', on the south of the city, evolved from waste land and was formalised by the Victorians. It combines with a double Oak avenue, planted about 220 years ago along the Kenilworth Road, to form one of the finest assets of Coventry in arboricultural terms, providing a very attractive and grand entrance into the city from the South. This is incorporated into the Kenilworth Road Conservation Area.

2.8. Sir Joseph Paxton, who established the first major arboretum in the country at Chatsworth, also created a fine arboretum in Coventry as part of his design for the London Road Cemetery. Many of the originally planted trees remain today. These include an avenue of unique high-grafted Candelabra Weeping Silver Limes, high-grafted Narrow Leaved Ash, and a selection of introduced exotic coniferous trees from around the world. The design of the cemetery carries the prestigious award of Grade 1 listed Parks and Gardens, by Historic England.

2.9. Other mature trees from the 20th Century mainly relate to municipal planting such as the London Plane avenue along Holyhead Road, and Limes planted as street trees in areas such as the Butts. Unfortunately, during the 1970s, along with the rest of the country, Coventry lost thousands of Elm trees through civic felling programmes. Climate change brings new threats of pests and disease to our trees including Phytophthora, Oak Processionary Moth, and Ash Dieback amongst others.



Top row: Victorian Planting at Coundon Court School.

Bottom left: Candelabra Weeping Silver Lime.

Bottom right: Arboretum at London Road Cemetery.

Legislation, Guidance and Policy

2.10. The Council will take account of adopted local plan policies, relevant supplementary planning statements and documents, and the most up-to-date legislation, government advice and recommendations (as issued through the NPPF and PPG).

2.11. This document is informed by, and must conform to, those relevant pieces of legislation, guidance and policy issued by government. They are set out below.

2.12. The Town and Country Planning Act 1990 (Part VIII, Section 197)[2] recognises the importance of trees and charges local planning authorities with a specific 'duty' in relation to their preservation and planting. Subsequent sections (up to and including Section 214) provide the powers and details surrounding Tree Preservation Orders (TPO), and Trees in Conservation Areas.

2.13. At present – in terms of statutory tree protection – there are over 460 TPO's, covering approximately 4500 trees, whilst there are also 16 Conservation Areas in Coventry covering many more. In the interests of transparency, the Council's evaluation method for TPO assessment, and its making and serving procedure are included in Appendix 1 and 2.

2.14. The Hedgerow Regulations 1997 (SI 1997/1160)[3] , implemented under Section 97 of The Environment Act 1995, require Local Planning Authorities, in determining planning applications, to consider the effects of proposed developments on 'important' hedgerows. Specifically it was created to protect rural hedgerows which are at least 30 years old, or play a significant role in archaeology/history of an area.

2.15. The Natural Environment and Communities Act 2006[4] provides that any public body or statutory undertaking in England and Wales must have regard to conserving, enhancing, restoring and/or protecting biological diversity in the execution of its functions.

2.16. National Planning Policy Framework (NPPF)[5] and Planning Practice Guidance (PPG)[6] set out the government requirements for the planning system, this includes ancient woodlands and veteran trees.

2.17. The NPPF was updated in February 2019 and sets out the UK Government's planning policies for England and how these are expected to be applied. Of particular relevance to this document are paragraphs 170, 171, 175, 180 and 181. Within these sections, it is made explicitly clear that the planning system and the decision-making process in

[2] Part VIII of the Act can be found using the following hyperlink:
https://www.legislation.gov.uk/ukpga/1990/8/part/VIII

[3] The entire regulations can be found using the following hyperlink:
http://www.legislation.gov.uk/uksi/1997/1160/contents/made

[4] The entire Act can be found using the following hyperlink:
https://www.legislation.gov.uk/ukpga/2006/16/contents

[5] The NPPF can be found using the following hyperlink:
https://www.gov.uk/government/publications/national-planning-policy-framework--2

[6] PPG can be found using the following hyperlink:
https://www.gov.uk/government/collections/planning-practice-guidance

relation to planning applications must protect and minimise the impact upon ecological networks on a broad level, whilst also enhancing the local natural environment.

2.18. Trees are given specific protection through paragraph 170(b) and 175(c). On a general level, ancient woodland is considered to be an "irreplaceable habitat", and thus emphasising the significant importance attached to these areas. Furthermore, Ancient and Veteran trees and Ancient Woodland are now specifically protected under the notion of; "presumption in favour of sustainable development", therefore, development that involves the loss of Ancient and/or Veteran trees or Ancient Woodland should be refused. In addition, all benefits of trees and woodland (including economic) should be protected and enhanced, even on the scale of simply recognising the beauty and character that natural capital provides.

2.19. The important role that trees play in the maintenance and improvement of air quality alongside noise and visual damping/buffering qualifies them for protection through paragraphs 180 and 181 amongst others.

2.20. Further detail including a suite of information underpinning the NPPF is available in the form of PPG. Ancient woodland, ancient trees and veteran trees: protecting them from development (Rev 5-11-18) The PPG is continuously updated and provides further details to the NPPF. It is regularly updated in line with changes to government policy and legislation. The most significant chapters concerning trees are; '*Natural environment*', '*Tree Preservation Orders and trees in conservation areas*', '*Air quality*' and '*Ancient woodland, ancient trees and veteran trees*'. Within them there are strong references to the safeguarding of Ancient Woodlands and Ancient and Veteran Trees. For this reason, the Council will consult with the Forestry Commission and Natural England to seek their advice and assistance when appropriate.

Defining Ancient and Veteran Trees

2.21. It is acknowledged that in defining ancient and veteran trees, the NPPF takes primacy and the associated PPG should be read alongside it. The definition of Ancient and Veteran Trees is set out in Annex 2 – Glossary of the NPPF. The key features of both types of tree include the aspects of exceptional relating biodiversity, culture and heritage value. All ancient trees are veteran trees. Not all veteran trees are old enough to be ancient but are old relative to other trees of the same species. Very few trees of any species reach the ancient life-stage. The NPPF definition of an ancient and veteran tree states: "*A tree which, because of its age, size and condition, is of exceptional biodiversity, cultural or heritage value. All ancient trees are veteran trees. Not all veteran trees are old enough to be ancient but are old relative to other trees of the same species. Very few trees of any species reach the ancient life-stage".* Key word being: relative. This definition of Veteran is similar to that of BS5837 :2012 and BS3998 for Tree work: 2010 which recommends that a Veteran tree a tree that by recognized criteria shows features of biological, cultural aesthetic value that are characterised of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. Noting that these characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem[7].

2.22. An appropriate model which illustrates the 10 developmental life stages of a tree, is the Pierre Raimbault's model where full maturity is illustrated at phase 7. Therefore,

[7] https://shop.bsigroup.com/ProductDetail/?pid=000000000030213642

the majority of and the greater population of *other trees of the same species* are younger and smaller than a tree at mature age class, with very few trees of any species reaching the ancient life-stage.

2.23. Also included in Annex 2 – Glossary of the NPPF is the starting point for defining Ancient Woodland. The Council recognises the importance of an existing continual historic record since 1600 when determining when an Ancient Woodland is present.

2.24. In addition to the NPPF, PPG adds more detail to the unique defining features of a Veteran tree and also of an Ancient tree and also Ancient Woodland. Ancient Woodland is identified by its irreplaceability based upon its wildlife, soil, wood pasture, historical, cultural and/or landscape value(s).

2.25. Paragraph 175 (part c) of the NPPF and paragraph 009 of PPG 'Natural environments'[8], identifies that both Ancient Woodland and Ancient/Veteran Trees are "*irreplaceable habitats*". As such, it is very difficult to undervalue the importance that these types of trees should be afforded. The NPPF further highlights the significance of conserving, restoring and enhancing; priority habitats, priority species, ecological networks and biodiversity (paragraph 174, part b) which PPG states are likely to be found in veteran tree environments. This must include appropriate mitigation measures and adoption of an appropriate 'buffer zone' to reduce such harm (paragraph 175, part a). Therefore, another key feature of Ancient or Veteran Trees and Woodland notes how they support important ecological features such as valuable and high-quality biodiversity, and in some cases species and habitats which may be of priority or threatened either on a local or national scale. It is important to conserve, restore and enhance these networks and biodiversity through the adoption of an appropriate buffer zone. Ancient Trees are in the ancient stage(s) of life, whereas veteran trees may not be very old – but exhibit decay features. Trees may become veteran because of their age, size or condition, but not all three of these characteristics are required to be present. Please see appendix 4 with regards to the level of specialist ecological survey information required, with examples of impacts of Indirect Damage upon an Ancient Woodland as a whole and upon its ecology for the requirement of adequate buffers depths.

2.26. Natural England (NE) define the term Veteran more in line with PPG, BS 5837 and BS3998. The NE Specialist Survey Method is the industries survey method for the collection and monitoring of a tree's wildlife and ecological features and other qualities over a period of time, where scores values and sets out individual 25-30 year Veteran tree management plans in order to prolong the Veteran trees safe life spans, such as the work the Council have achieved at Coombe Country Park (see the Council's Tree Strategy).

2.27. As noted within paragraph 031 of PPG 'Natural environments'[7], in the first instance, identifying Ancient Woodland can be achieved by utilising the Ancient Woodlands Inventory[9]. Although continually updated, this dataset only includes woodland that exceeds 2Ha. Furthermore, many 'wood pastures' and 'historic parkland' are not recorded because of their low tree density not registering as woodland on historic maps. As such any spatial or density criteria is not required for either Ancient/Veteran

[8] https://www.gov.uk/guidance/natural-environment
[9] https://naturalengland-defra.opendata.arcgis.com/datasets/ancient-woodlands-england

Trees or Ancient Woodland due to the fact that all such trees/woodland are important, regardless of spatial extent and concentration.

2.28. It is also important to be aware that there exist no conditional aspects to Ancient Woodland definition according to PPG (paragraph 033). In other words, Ancient Woodland can be of low quality or in poor health. Protection and subsequent enhancement through good and proper management can improve their quality and health. The Council will not define Ancient Woodland and/or Ancient/Veteran Trees by using quality or health indicators, or any minimum trunk diameter. A site which contains Veteran and/or Ancient trees will need to have such trees assessed under a specialist veteran tree survey method such as Natural England's Specialist Survey Method levels 1-6, which undertakes a detailed record of a complex list of wildlife features of a Veteran and/or Ancient tree, and requires a 25-30 year Veteran Tree Management Plan.

2.29. The Woodland Trust and Ancient Tree Forum provides an alternative definition of both an Ancient Tree and a Veteran Tree to the NPPF but still in line with the PPG. The key points to note from the Woodland Trust is that an Ancient Tree has passed through maturity and is old in comparison with other trees of the same species. Whereas Veteran Trees are delineated irrespectively of their chronological age, but rather through their marked ancient characteristics which offer habitat and forage to local wildlife and ecology. The Woodland Trust's Ancient tree guide 4, defines an Ancient tree as one that has passed beyond maturity and is old, or aged, in comparison with other trees of the same species. Its canopy may be small. It will probably have a very wide trunk relative to other trees of the same species. Veteran is a term describing a tree with habitat features such as wounds or decay. The terms ancient and veteran have been used interchangeably in the past, however, it is important to know what the differences between them. A veteran tree is a survivor that has developed some of the features found on an ancient tree, not necessarily as a consequence of time, but of its life or environment. Ancient veterans are ancient trees, not all veterans are old enough to be ancient. A veteran may be a young tree with a relatively small girth in contrast to an ancient tree, but bearing the 'scars' of age such as decay in the trunk, branches or roots, fungal fruiting bodies, or dead wood. These veteran features will still provide wildlife habitat. Guidance from the Ancient Tree Forum and the Woodland Trust also states that a dead tree can provide benefits for wildlife and ecology as veteran or ancient. A dead tree could not thus be positively included within a BS 5837 survey, but it could be included in an ecological or habitat report for planning purposes.

2.30. The Woodland Trust[10] provides a short definition of an Ancient Woodland. It emphasises the importance of a continual historic record of wooded areas since at least 1600CE.

2.31. The definition provided by the Forestry Commission and Natural England[11] for Ancient Trees and Veteran Trees note how they can be individual or groups of trees, often found alongside Ancient Woodlands which are of exceptional value based on their irreplaceability.

[10] https://www.woodlandtrust.org.uk/publications/2008/11/what-are-ancient-veteran-and-trees-of-special-interest/
[11] https://www.gov.uk/guidance/ancient-woodland-and-veteran-trees-protection-surveys-licences

2.32. VETree[12] (Vocational Education and Training on Veteran Trees) makes the point that Veteran Trees do not need to be of large chronological age, and can be quite 'young'.

The Recognition of Veteran Trees

2.33. Natural England offer a definition on veteran trees taken from their Veteran Trees Initiative Specialist Survey Method. This is the only complex method for collecting veteran tree habitat features and the following is an extract from levels 1-3:

2.34. Veteran status is associated with late maturity. However, trees of different species approach late maturity at different ages. Although there is no precise definition of veteran status for the purposes of field work, knowledge of species longevity, size typically associated with old age and local conditions affecting tree growth contributes to the recognition of veteran trees in the field. Their special quality in the landscape is reflected in the view that these trees "are of interest biologically, aesthetically, or culturally because of their age" (see 'Guide to the care of ancient trees', Veteran Trees Initiative, English Nature 1996).

2.35. Apart from obvious veteran candidates of massive scale and known antiquity, the surveyor is often likely to encounter uncertainty in the field as to the veteran status of certain trees. In such instances, reference should be made to the range of veteran attributes indicating habitat and associated flora and fauna addressed on the recording form, rather than tree size alone. If in doubt record the tree.

2.36. The Council accepts the most recent PPG definitions of the difference between an Ancient tree and a Veteran tree as being complimentary to the NPPF definition but that the NPPF has primacy. Planning Practice Guidance (Natural Environmental pages 21st July 2019), Ancient & Veteran Trees:

"Ancient trees are trees in the ancient stage of their life. Veteran trees may not be very old but exhibit decay features such as branch death or hollowing. Trees become ancient or veteran because of their age, size or condition. Not all of these three characteristics are needed to make a tree ancient or veteran as the characteristics will vary from species to species."

PPG Paragraph: 032. https://www.gov.uk/guidance/natural-environment

2.37. On balance, the Councils preferred approach is the definition of the PPG above but the Council does recognise that the NPPF does take primacy.

Ancient Woodland Buffers

2.38. The current national guidance at the time for minimum buffer depths will be assessed to be provided and maintained for Ancient Woodlands when proposals come forward; including at the construction phase. This SPD responds to take nationalguidance and focuses on how the Council will implement this 'minimum buffer' approach dependent upon the type and scale of development.

[12] https://vetree.eu/en/page/98/Veteran+tree+definition

2.39. The National Practice Guidance issued by the Forestry Commission and Natural England 'Ancient woodland and veteran trees: protecting them from development' currently recommends that they require a Root Protection Area (RPA) *buffer* radius equivalent to x15 times their trunk diameter rather than the x12 trunk diameter given by BS 5837:2012, or 5m from the edge of its canopy, whichever is the greater.

2.40. It is the Council's view that there is no 'one size fits all' approach to buffer design, or in respect of Ancient Semi-natural Woodland, Ancient Trees & Veteran Trees which is backed up by recent research[13]. Each proposal should be designed to fulfil the sensitivity of species and woodland specific requirements of its location and the type of scale of development proposed plus type and scale of likely direct and indirect damage. Nevertheless, the minimum buffer of an Ancient Woodland should be the minimum recommended buffer to the PPG at the time. As a precautionary principle, the Council will apply this most recent (national) minimum buffer as the starting point for assessing and maintaining buffer zones in relation to development proposals.

2.41. The preferred design approach for a buffer is to create an open corridor adjacent to the woodland edge in order to maintain accustomed light through the woodland edge for ground and aerial fauna and flora, and to maintain bat foraging routes, ideally of 5- 10m depth. The outer buffer would preferably be made up of native shrub layer and small species native trees which are appropriate for the area, to provide for new habitat including native woodland, around existing Ancient Woodland. This will help reverse the historic fragmentation of this unique habitat. The consequent increase in ecological connectivity between areas of Ancient woodland will create the resilient landscapes recommended in DEFRA's 'Making Space for Nature'. To this extent, the Council are conscious of guidance from the Woodland Trust with recommendations for buffer zones in excess of 50m.

2.42. It is important to appreciate that a woodland as we see it today, is just one snapshot of time and how it has developed within the past 11.000yrs. We need to recognise that it will change again in the future as it has in the past, and we must allow nature to take its cause without interruption, for new trees to naturally grow and where others die. Such new trees of the future may grow to be of champion sized girths and crown dimensions in locations where we today see only small trees or currently no trees present.

2.43. Therefore, each proposal will be managed and considered on its own merits. The Council will work with applicants to determine any additional buffer requirements over and above a statutory minimum. This will have regard to the following key points which should all be robustly assessed by the applicant at the point of submitting a planning application. These include the following:

- Impact upon Root Protection Areas;
- Impact upon Ecology;
- Assessment of buffer(s);
- Impact of animal predation
- Impact of light pollution; and
- Risks to woodland and buffer areas through pedestrian trampling.

[13] Andrews, L Pearson, J McGill & J Mullholland (2019) Introducing the "Derived Root-system Radius" Arboricultural Journal, 41:3.

2.44. Just as important are the heritage polices of the local plan; HE1, HE2 and HE3. Of particular worth to tree protection is policy HE2 which sets out how the Council will sustain the historic character and local distinctiveness of areas recognised to contain special historic, landscape and/or townscape significance. It is acknowledged that trees play a fundamental part of these significances and therefore are afforded a high level of protection as a result. Indeed, trees located within Conservation Areas are automatically protected to the equivalent level of a TPO.

2.45. Furthermore, the Local Plan makes consideration to planning for climate change through policy EM1. It has been established that adaption to, and prevention of, climate change impacts can partly be met through the appropriate application of green infrastructure. This includes the retention and planting of trees as tools for; urban cooling, shading, flood risk management and ecological sustainability.

2.46. Should exceptional circumstances be proven, and it is considered that the benefits of conserving any trees is outweighed by the benefits of development, then compensatory provisions will be mandatory. This could be in the form of replacement trees as close as possible to the proposed development, or alternatively the Council will request a financial contribution from the developer; a sum equivalent to the value of the removed tree(s). This valuation should be calculated using an appropriate assessment agreed with the Council. The Council recommends employing the CAVAT approach. Please refer to paragraph 3.16-3.25 of this SPD for details on this methodology.

Planning for Trees Pre-Development

3.1. The format of the rest of this document has been set out to follow the logical sequences by which development matters are generally processed; i.e. site surveys, development planning and organisation, obtaining planning permission and subsequent implementation; as identified in BS 5837:2012.

3.2. Existing trees on development sites are particularly vulnerable to damage during the construction process. Careful planning is essential to achieve a functionally effective, sympathetic development, whilst at the same time ensuring the long-term retention of trees. The starting point to producing a successful design that achieves this is the gathering of information, particularly from carrying out a thorough and comprehensive site survey, both topographical and arboricultural.

Land Surveys

3.3. A Land Survey should show all existing features in and around the site, detailing the accurate locations of all vegetation (trees, hedges and shrub masses), structures, old buildings, watercourses, ponds, ditches, services, service runs, roads, driveways, walls and any areas of nature conservation interest.

3.4. A detailed levels survey should be incorporated showing existing contours or spot heights throughout the site. Levels information is very important in order to ensure that existing ground levels are maintained around retained trees.

3.5. Land surveys will be expected to meet the requirements of Section 4.2 of BS 5837:2012 and should follow the standard drawing conventions within BS 1192:2007. For the avoidance of doubt, should the land survey not meet the requirements set out above, the application would either; not be validated, refused, or advised to be withdrawn.

Tree Surveys

3.6. The majority of planning applications involve development proposals on sites which contain, or are in close proximity to, existing trees. In such cases, the Council will normally require the submission of a detailed Tree Survey produced in accordance with Section 4.4, 4.5 and 4.6 of BS 5837:2012, in conjunction with the aforementioned Land Survey.

3.7. Tree surveys should plot the accurate locations of all existing trees and should detail the following information, in accordance with Section 4.4[.2.5] of BS 5837:2012 in plan or tabular form:

a) Reference Number – for each specific individual tree.
b) Species – common and scientific names.
c) Height (m) – from ground to top.
d) Stem Diameter (mm) – measured at 1.5m above adjacent ground level (on sloping ground to be taken on the upslope side of the tree base) or immediately above the roof flare for multi-stemmed trees.
e) Branch Spread – taken at the four cardinal (compass) points to derive an accurate representation of the crown.
f) Height (m) – of crown clearance above adjacent ground level (to inform on ground clearance, crown stem ratio and shading).
g) Age Class – for example; young, middle aged, mature, over-mature, veteran.
h) Physiological Condition – for example; good, fair, poor, dead & Structural Condition – for example; collapsing. Presence of any decay or physical defect along with any Preliminary Management Recommendations including further investigation of suspected defects and potential wildlife habitats.
i) Estimated Remaining Contribution (years) – for example; less than 10, 10-20, 20-40, greater than 40.
j) Tree Quality Assessment – (see table 1 of BS 5837:2012) to be recorded in plan on the tree survey drawing. This should also include sub-categories: 1 – mainly arboricultural value(s), 2 – mainly landscape value(s), 3 – mainly cultural value(s) including conservation.

3.8. It is important to note that Tree Surveys must be prepared by professionally qualified and experienced arboricultural consultants and should be available before any detailed design decisions are made in relation to the development proposals.

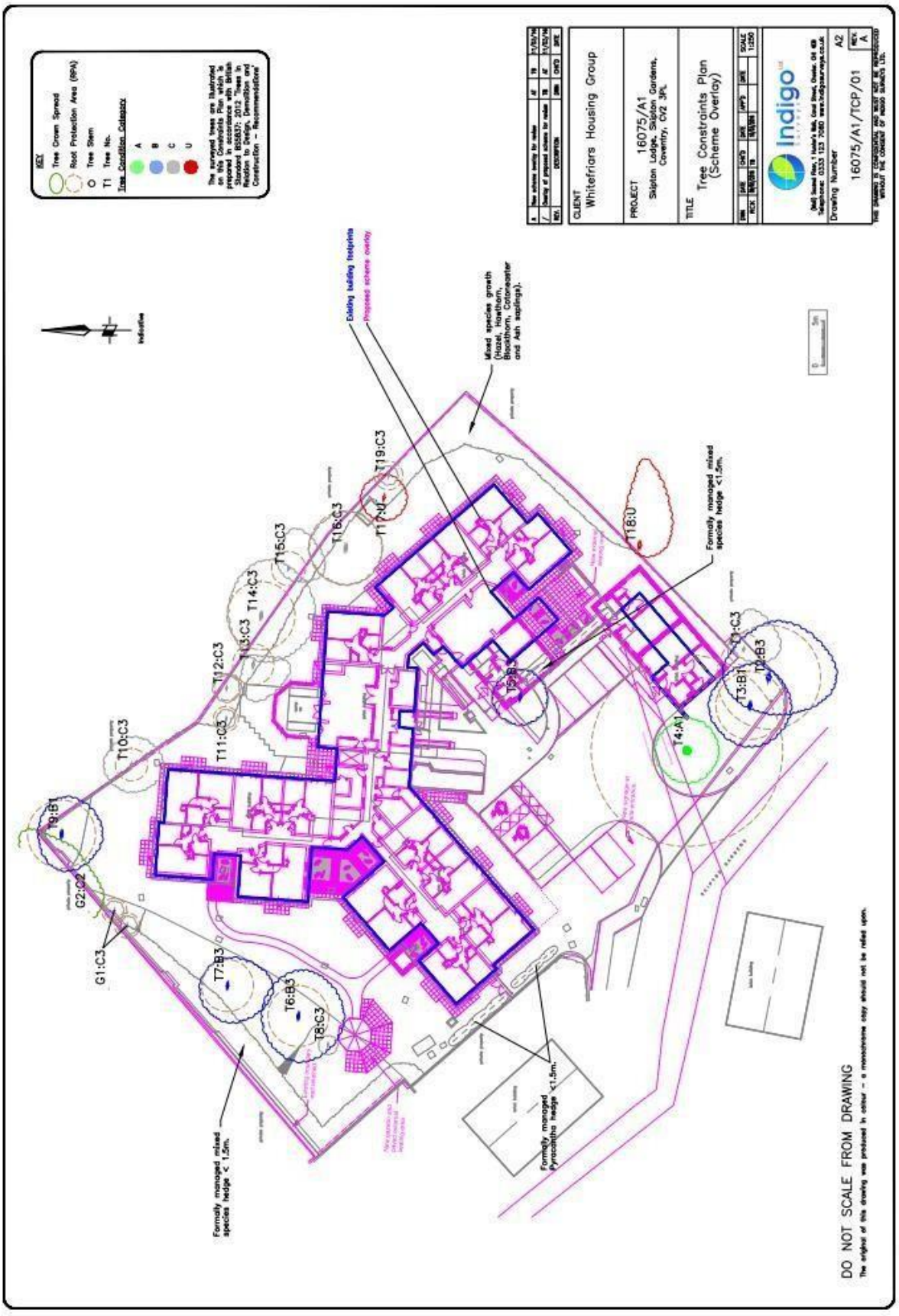
3.9. Where hedgerows or lengths of hedgerow are to be removed to facilitate developments, sufficient information should be submitted to allow the Local Planning Authority (LPA) to:

- Assess whether the proposed removals fall within the scope of the Hedgerow Regulations 1997.

- Assess whether the hedgerows to be removed are 'important' by virtue of the Hedgerow Regulations 1997.

3.10. Where development proposals abut woodland, *normally* only the woodland edge trees will need surveying. Where development is proposed within a woodland, all the trees will need to be surveyed.

3.11. Trees on some sites may form the basis of locally important wildlife habitats or enhance other adjoining valuable habitats. In such cases, qualified ecological advice should be obtained and where appropriate, an evaluation report added to the survey information.



Best-practice example of a Tree Survey Schedule. Reproduced with kind permission from Indigo Surveys ltd.

Tree Constraints Plan

3.12. The Tree Constraints Plan (TCP) is an essential tool to help the design team plan the development, whilst retaining 'important' trees. It shows the 'above and below ground constraints' from existing trees that need to be considered. It must include:

- Below ground constraints; the Root Protection Area (RPA) around each tree or group of trees and hedges, which should be determined by reference to Section 5 of BS 5837:2012. Please refer to paragraphs 4.22 to 4.31 of this document for further details concerning RPA's.
- Above ground constraints; the current and ultimate height and spread of Category A, B and C trees, where this would cause unreasonable obstruction of sunlight/daylight to the development. The extent of shadowing should be shown also be superimposed upon the proposed layout plan. This can be calculated using proprietary software, but in practice, can be represented by a segment with a radius from the centre of the stem equal to the height of the tree drawn from due North West to due East to indicate the shadow pattern during the main part of the day.

3.13. The current and ultimate height and spread of a tree are also constraints due to size, dominance and movement in strong winds, and should be taken into consideration as a constraint at the design stage.

Arboricultural Method Statement

3.14. The submission and approval of a detailed Arboricultural Method Statement (AMS) will generally be required as part of a tree protection planning condition and will be expected to address the following:

- Timing and phasing of all arboricultural works in relation to the proposed development.
- Implementation, monitoring, supervision and maintenance of the TPS.
- Implementation, monitoring, supervision and maintenance of the tree work specification/schedule/scheme.
- Provision for regular monitoring of ongoing development operations to ensure full compliance with the approved TPS and AMS for the duration of the development.
- The setting up of an agreed framework for maintaining appropriate levels of communication between all involved parties.
- Provision for qualified arboricultural supervision.

3.15. Planning conditions and/or legal agreements will be attached to planning permissions to ensure full compliance with the approved AMS. Failure to comply with the terms of the approved AMS or any other conditions or legal agreement imposed upon a planning consent, or any other action which results in the loss of or damage to trees or hedgerows which have been specified for retention, may result in enforcement proceedings. Or where appropriate, prosecution under the relevant sections of the Town and Country Planning Act 1990; Town and Country Planning (Trees) Regulations 1999 (as amended), Town and Country Planning (Trees in Conservation Areas) Regulations 1975 (as amended), Hedgerow Regulations 1997, and the Town and Country Planning (Tree Preservation) Regulations 2012; and their subsequent revisions.

Capital Asset Value for Amenity Trees

3.16. Capital Asset Value for Amenity Trees (CAVAT) is a UK developed approach to express the amenity value of trees in terms of cost for equivalent replacement. This is the popular method within the arboricultural industry for managing trees as public assets. Furthermore, the functional value of the tree factors in the local population density to represent its role in the amelioration of a particular locality.

3.17. This approach is intended particularly for councils and other public authorities and primarily for publicly owned trees. However, it may be used by other public bodies (including the courts), private institutions and individuals to assess other components of an areas stock. This is because the Town and Country Planning Act 1990 (sections 198 & 199) establishes that trees have value as a public amenity and that local planning authorities have a duty to act to protect trees in the public interest. It is therefore of particular value to trees benefiting from a TPO or that meet the criteria for such an order.

3.18. The system is designed not only to be a strategic tool and aid to decision-making in relation to the tree stock as a whole but can be applied to both individual and groups of trees; as well as healthy and damaged trees (Directly and Indirectly) or trees which are accused of damaging property.

3.19. In the case of damaged or destroyed trees, a compensatory value is calculated; in the case of damaging trees, trees are ranked to set the required levels of evidence as part of the Joint Mitigation Protocol. In all circumstances where the value of a single tree needs to be expressed in monetary terms, it is beneficial.

3.20. CAVAT sets out to assess the monetary value of a tree by calculating a unit value for each square centimetre of tree stem based on the average tree cost and using that figure to produce an average cost for each centimetre of trunk diameter. For the purposes of assessing the monetary value of the tree(s), they must be considered as individuals using the Full Method (detailed below). For information, the Community Tree Index (CTI) factor for Coventry is calculated to be 125% for its population density, as sourced from Office of National Statistics[14].

3.21. The full method involves seven steps, and sets of key variables:

- Basic value/unit value of tree size.
- CTI value/location, in terms of population density.
- Location value, based on a tree's visibility from public vantage points and the tree's public accessibility.
- Functional crown value/structural value – part 1.
- Functional crown value/structural value – part 2.
- Amenity value/positive and negative factors.
- Full value/life expectancy of tree.

3.22. The full method is used in situations when a more detailed and precise assessment of the value of trees as individuals are required.

[14] https://www.ltoa.org.uk/documents-1/capital-asset-value-for-amenity-trees-cavat/125-national-community-tree-index

3.23. The replacement value is calculated for the cost of the tree at the present time of purchase, plus any additional cost including delivery, planting, maintenance etc to enable replacement and/or compensation to be achieved in relation to:

- Development Management functions.
- Management decisions, including trees subject to TPOs, or of TPO quality upon site or within Conservation Areas.
- Assist in legal proceedings (for example to advise a court as to the value of a tree, either publicly or privately owned, following the tree having been illegally removed or damaged, or in planning enquiries/appeals).
- Management of the tree stock, to allow agreement as to adequate funding of replacement planting as detailed above.

3.24. Given its links to public sector organisations and recognised weight in matters of planning, appeals and court proceedings, the CAVAT approach represents the Council's preferred method for calculating tree values when circumstances require it. However other approaches are available for use including the 'Helliwell System', 'CTLA approach' and 'i-Tree' etc. Should an applicant wish to rely on an alternative method, they should notify the Council at the earliest possible opportunity. However, for clarification, the use of any approach will be a last resort as the Council's preferred position will always seek to ensure the retention of trees.

3.25. Further details of CAVAT can be found on the London Tree Officer's Association website: https://www.ltoa.org.uk/. An example CAVAT sheet is included in the appendices to this SPD.

Design Criteria

3.26. The Council will take account of adopted local plan policies, relevant SPDs, and the most up-to-date legislation, Government advice and recommendations (as issued through refreshed PPG). The Council will not *normally* grant planning permission for:

- Developments which directly or indirectly threaten trees or woodlands of significant amenity value.
- Developments which have inadequate or inappropriate landscape proposals that fail to provide measures to conserve, or where appropriate, enhance the character of the landscape.
- Developments which directly or indirectly threaten 'important' hedgerows.

3.27. The creation of a sustainable tree stock is a prime consideration when planning any landscape scheme. It is important that the tree stock incorporates trees of all age ranges and a diversity of species; appropriate to the particular location and landscape character.

3.28. In general, site layouts will be expected to:

- Provide for the retention of as much of the existing tree cover as is practicable. The allocation of space of trees must be assessed in terms of the overall landscape of the area; continuity and long-term sustainability of tree cover are important criteria to be considered.
- Make adequate provision for long-term retention of trees, groups of trees or areas of woodland, which are identified as having significant current or potential future amenity value as set out in BS 5837:2012. Preference should be given to retaining A and B category trees, however there will be instances where C

category trees should be retained; for example, until new planting is established (generally allow 5-10 years) or to provide temporary screening.

- Provide for the retention of as much of the existing hedgerow cover as practicable.
- Ensure the long-term retention of all 'Important Hedgerows' according to the Hedgerow Regulations 1997.
- Allow appropriate space for new planting.
- Ensure that where proposals include the felling of existing trees, landscape schemes make provision for sufficient replacement planting to compensate adequately for any resulting loss of amenity.
- Include sufficient information to allow for a full, detailed assessment of the short and long-term arboricultural and landscape implications of the development proposals to be made.

3.29. The layout of any development must be designed with detailed reference to the site survey information, particularly the Tree Survey and the Arboricultural Impact Assessment (AIA).

3.30. The AIA should also identify the impact of the proposed design and layout on existing trees and detail measures to mitigate adverse effects.

3.31. Whilst the AIA should inform site layout design, it is recognised that with the competing needs of development, trees are only one factor requiring consideration. Therefore, it is essential to identify the most 'important' trees for retention and ensure that sufficient attention is given throughout the design and construction process to ensure that these can genuinely be retained in the long term.

Applying for Planning Permission

3.32. It is essential that all relevant information pertaining to the assessment of trees and landscape issues on a site is submitted with the planning application.

3.33. Where a development is likely to affect existing trees on or adjacent to a site, the applicant will be expected to give due regard to the full range of construction-related activities that have potential to cause damage to trees. In these instances, the applicant will be expected to forward all the relevant detail necessary for the Council to make an accurate assessment of the short and long-term arboricultural implications of the proposals.

3.34. Please refer to the Council's *Local Validation Requirements* for the details required prior to; validation of an application, determination of an application, or the discharge of the planning Condition relating to tree protection.

3.35. Permitted development which affects protected trees or hedgerows, may still require a formal application for consent under the Tree Preservation Order, Conservation Area or Hedgerow legislation. As part of the Council's pre-application service, the Council's officers are available to provide detailed, technical advice on such matters and it is advisable to discuss permitted development proposals with them prior to the commencement of any works.

Planning for Trees Post-Development

4.1. Trees are material considerations in the formal planning system and developers should anticipate the need to accommodate trees within a development; whether through the retention of existing trees, tree planting directly, or through the provision of sufficient private space for future occupiers to carry out their own planting.

4.2. Trees impinge on many aspects of site development. It is therefore essential that due consideration should be given to the requirements of trees by all members of the development team throughout the design stages. Developers are encouraged to produce layouts or development site master-plans for discussion, prior to the submission of details at the application stage(s). Such plans should be prepared with professionally qualified arboricultural and landscape design input.

Avoiding Damage to Existing Trees

4.3. Trees' roots are fragile; careful consideration must therefore be given to ensuring that trees and hedges, which have been identified for retention, are not directly or indirectly damaged by any proposed works. This can be done by paying attention to the Tree Survey and constraints information which enables a Construction Exclusion Zone (CEZ) to be determined based on the RPA[15].

4.4. The CEZ will be expected to remain undisturbed for the duration of the development. Site layouts should therefore be designed to avoid any construction works within the identified exclusion zones and should make adequate provision for sufficient working space and movement around the site.

4.5. Where development proposals include construction works within the identified exclusion zones, or where it is considered that a site cannot accommodate all of the operations associated with the implementation of a proposed development, without the need to intrude into the exclusion zones, the Council will request the submission of detailed construction specifications and method statements, in order to determine the likely effects of such works on the long- term health and structural stability of the trees. The Council expects full details of all such works to be submitted as supporting documentation to an application and is *unlikely* to agree to conditional approval otherwise.

4.6. Where 'minimal dig' or 'no-dig' engineering treatments, using geotextiles and/or cellular confinement systems, are proposed for new areas of hardstanding within defined exclusion zones, the Council will *usually* require a detailed site and construction-specific method statement to be submitted as part of the planning application. Where such proposals are deemed acceptable, the Council will expect provision to be made for qualified arboricultural supervision and monitoring of all works within the agreed exclusion zones.

4.7. The provision in Section 4.2 of BS 5837**:**2012 for off-setting the RPA by up to 20% in one direction, will only apply in certain specific circumstances, and should not be

[15] RPAs are calculated by multiplying the diameter of the tree in millimetres at 1.5 meters above the ground by 12 **(diameter (mm) at 1.5m height x 12)**. RPAs should be calculated by the qualified arboricultural consultant. Development should be kept out of these areas or the drip-line of the tree – whichever is greater.

taken as a generalisation. There will be a presumption against such reductions, which will only be considered when accompanied by a detailed justification, based on accepted arboricultural principles.

4.8. Where proposed construction works are deemed likely to compromise the structural stability or long-term health of trees and hedges, which are not subject to any legal controls and are situated outside the site, the applicant will be expected to liaise with the respective landowners. Removal of, or damage to such trees, may require the prior consent of the owner.

4.9. Foundation and/or superstructure designs should take account of BS 8004**:**2015 – *Code of Practice for Foundation*, and National House Building **Co**u**ncil** (NHBC) Standards**,** Chapter 4.2 (2018)[16] – *Building near Trees*.

Avoiding Damage to Existing Trees or Woodland- including its ecology.

4.10. Direct Damage is caused by the physical/mechanical damage to the crown, trunk and roots resulting from above ground physical contact, and trenching and excavation work within the RPA of a tree.

4.11. Indirect Damage may be caused by soil compaction, toxicity or changes in temperature or to hydrology, light pollution, sound pollution etc within the tree's RPA or Woodland Buffer. Soil and root compaction usually results from the driving of heavy machinery especially during wet conditions, or the stockpiling of the heaps of heavy soils or building materials upon the RPA. This may result in significant damage to the tree's rooting environment.

Damaged soil structure from the passing site vehicles within the Root Protection Zone.

[16] The standards can be found using the following hyperlink: http://www.nhbc.co.uk/builders/productsandservices/standardsplus2018/#40

4.12. Soil compaction disrupts the plant's vital function of root respiration, as required by all living organisms. Tree roots respire by the upward vertical uninterrupted diffusion of gasses from the roots through to the atmosphere via the soil's upper surface. The compaction can also kill off a trees' symbiotic relationships with mycorrhizae and other soil associates.

Tree Works

4.13. All tree work schedules and specifications should be detailed, precise and accurate; be drawn up in accordance with current arboricultural best practice and in-line with the requirements of BS 3998**:**2010 – *Recommendations for Tree Work*. They should include sufficient levels of detail for an accurate assessment of the full implications of the proposals to be made.

4.14. Tree Work Schedules must be approved by the Council, prior to implementation. In some cases, an additional Tree/Woodland Management Plan and related Method Statement may be required to be submitted for approval.

4.15. The Council expects all tree work operations to be carried out to the highest standards as set out in British Standards, and will apply planning conditions and use TPOs, where necessary, in order to ensure that such standards are upheld.

4.16. It is the responsibility of the developer appointed, qualified arboriculturist to ensure all retained trees are monitored throughout the construction period, and any changes to tree protection measures are agreed in writing by the Council's Tree Preservation Officer.

4.17. The Council recommends the use of qualified arboriculturists, with appropriate levels of expertise, qualifications and insurance cover. The Arboricultural Association is an organisation that maintains an approved list of such parties[17].

Historic TPO Black Mulberry tree safeguarding by tree protection barriers during development of Croft

[17] Copies of Directories are available from the Arboricultural Association. This can be found using the following hyperlink: https://www.trees.org.uk/Registered-Consultant-Directory

Tree Protection Measures

4.18. Trees on development sites are particularly vulnerable to disruption during the construction process, and damage is often irreparable leading to decline and premature death. Tree root systems are especially sensitive to construction damage. Such damage is not usually deliberate, but more often than not, due to a lack of understanding of how easily trees can be harmed by nearby activities.

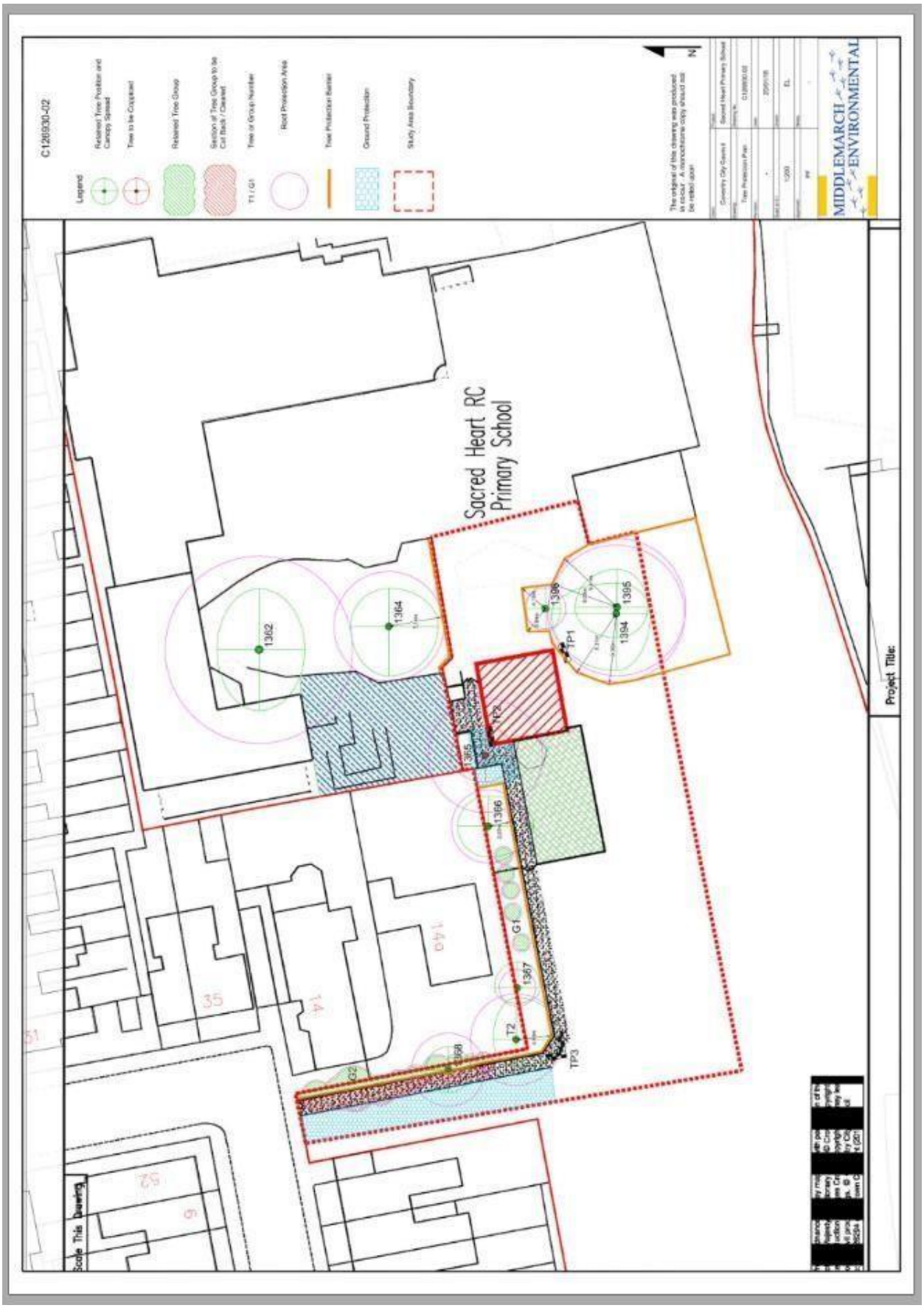
4.19. BS 5837**:**2012 provides clear guidance on the implementation of a Tree Protection Plan (TPP), and the Council expects the contents of this document to be complied with.

4.20. Planning conditions will be used to ensure that:

- Tree protective barriers are erected prior to the commencement of any construction works, including demolition and preparatory site clearance and site set-up.
- No development or other operations will take place until all preparatory works required by the TPP are in place (except pre-development tree works, with the prior written agreement of the Council).
- All subsequent development operations are carried out in accordance with the approved scheme.
- No development operation or construction activity, which could potentially cause damage to trees or hedges, is permitted within any areas designated in the approved scheme as being fenced off or otherwise protected.
- Protective barriers are retained intact for the full duration of the development and are not re-positioned or removed without the prior written approval of the LPA.

4.21. Tree Protection Measures (TPM) will be expected to address the following issues:

- Protective barriers should be positioned so as to enclose as large an area around each tree, group of trees and hedgerows as is practicable. It must also contain at least the area of the exclusion zone previously identified by reference to the TPP of the Tree Survey.
- The type of protective barrier should be appropriate to the degree of construction activity taking place upon the site. Figure 2 of BS 5837:2012 is appropriate for most situations as it is readily available, resistant to impact, can be re-used and enables inspection of the protected area.
- The positioning of the protective barrier must ensure that the development can be implemented without intruding into the exclusion zone.



Best-practice example of a Tree Protection Plan. Reproduced with kind permission from Middlemarch Environmental ltd.

Root Protection

4.22. As the morphology of the tree crown establishes from sapling stage to maturity, it develops a more spreading crown. In ratio to this its root system modifies from its initial deep rooting taproot, to that of a more efficient spreading system of rapidly subdivided lateral woody roots comprised of dropper and sinker roots, which extend well beyond the drip line edge of the crown's outermost branch tips. These systems display a rapidly subdividing fibrous non-woody root structure.

4.23. Most of the roots of a mature tree are within the upper 600mm of the soil surface where the higher levels of moisture, oxygen and nutrients are found, for healthy growth and survival.

4.24. The health of a tree's root system is vital to its long-term well-being, and any activity which affects the soil structure may also damage or kill the fine roots or alter the balance of moisture, oxygen and nutrients within the rooting zone. This can affect the whole tree.

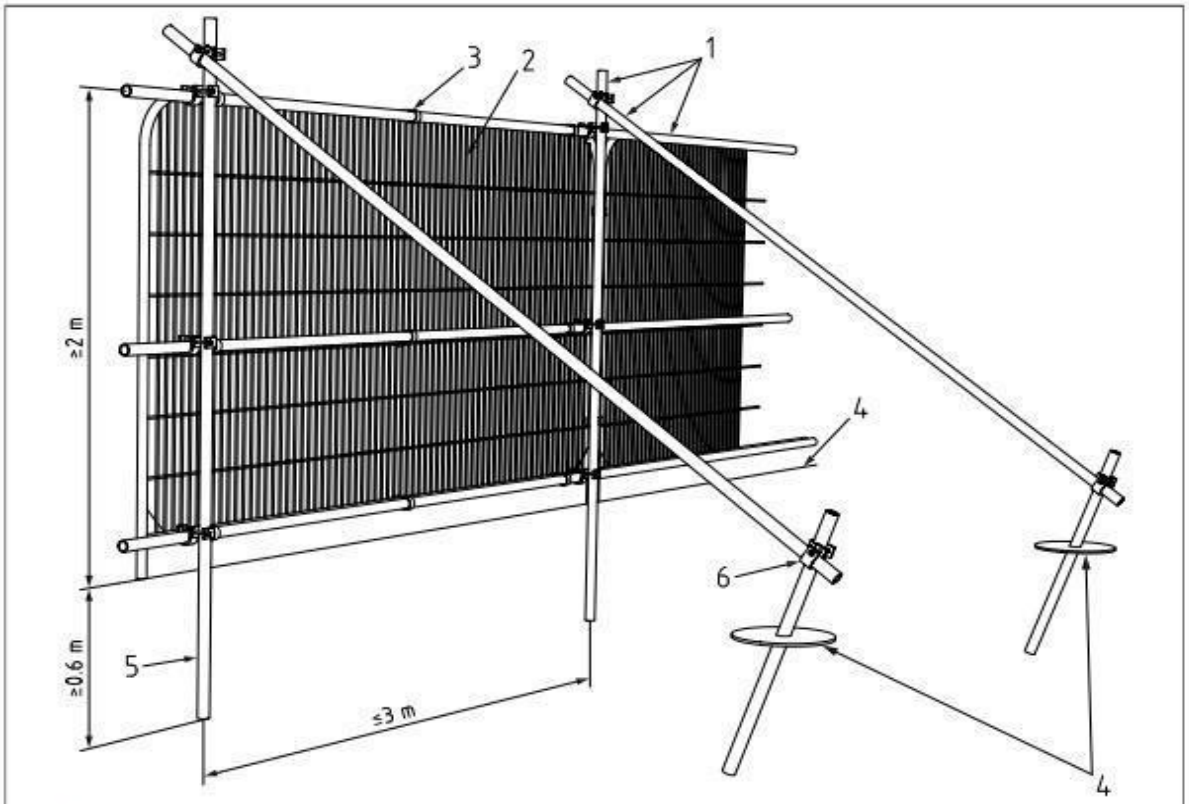
4.25. The root system is equally important in terms of structural stability. The mass of soil particles bound together by the fibrous roots create a structural counter-balance to the above ground parts of a tree. Structural stability may also be impaired by excavation within the rooting zone, even where major roots have not been severed.

4.26. Damage or severance of main structural roots, as well as killing off the distal portions of the fine root system, may also affect a trees stability rendering it dangerous by increasing its chances of structural failure.

4.27. Potentially damaging operations include;

- Excavation within the rooting zone,
- Raising or lowering of ground levels.
- Compaction of the soil by construction works, machinery or vehicles and the storage of materials and debris,
- The dumping or spillage of toxic or caustic material such as diesel, solvent or cement,
- The installation of impermeable surfacing,
- Direct damage to trunks and branches by construction vehicles, and
- Fries built closer than 20m from the outer crown.

4.28. The Council will normally require detailed TPMs to be submitted for approval if any of the above are proposed. It will be expected to make provision(s) for the retention and protection of trees, shrubs and hedges growing on or adjacent to the site. This will also include locations for new tree planting.



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

Default specification for protective barrier. Reproduced with kind permission from the British Standards Institute.

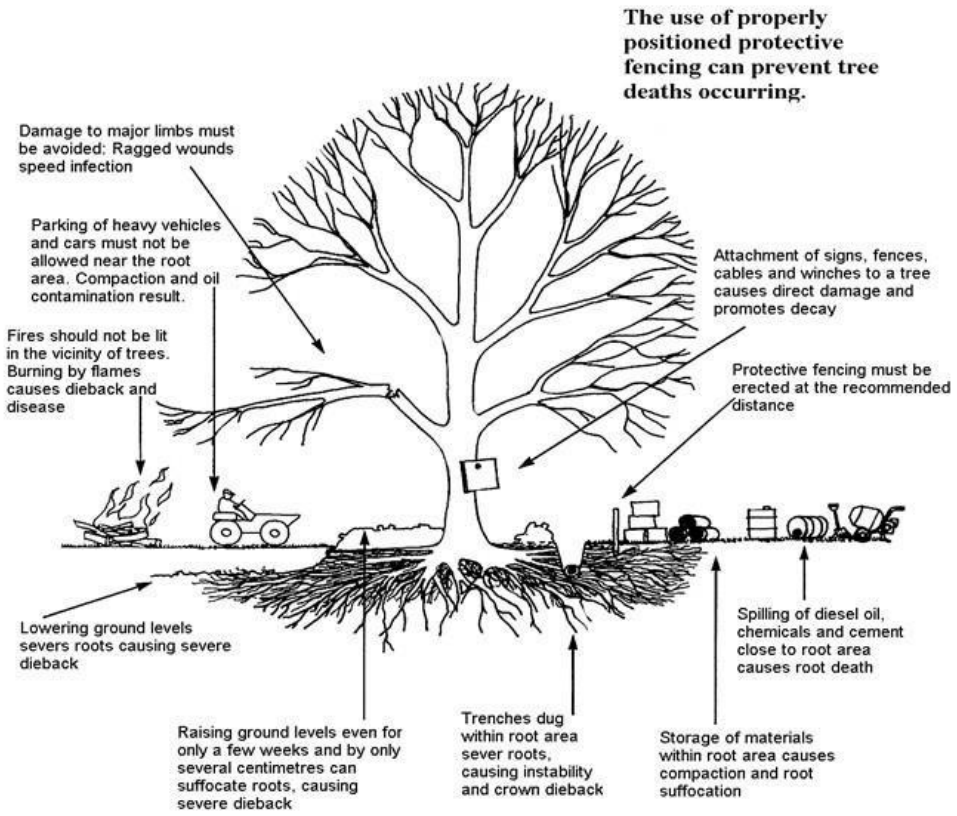
4.29. Ground protection may be required during development to avoid compaction. Where it has been agreed during the design stage and shown on the approved TPP that certain operations may take place within the RPA, ground protection will be necessary in addition to protective barriers. Refer to Figure **2** of BS 5837**:**2012 for scaffolding within the RPA.

4.30. Where trees are of TPO quality, the LPA may require site monitoring by a qualified arboriculturist. The AMS would illustrate a **Site** Monitoring Sheet (SMS) where key phases of construction are monitored and signed off by a qualified arboriculturist. This is to ensure that the tree protection pens and any ground protection have been correctly erected prior to any site activity taking place, and where they must remain in place until the end of the build phase. The final phase would be to confirm the end of this construction phase, when the tree protection pens may then be dismantled.

4.31. The long-term implications of any construction work within the exclusion zone(s) should also be carefully assessed in relation to **Table 3** of **BS 5837:2012.** New structures, drains, services, walls, paths, driveways and areas of hardstanding should be sited or designed so as to avoid direct damage from future growth of the bole and main structural roots of retained trees[18].

[18] For guidance on avoiding indirect damage by trees to structures, please see the NHBC Standards: Chapter 4.2(.3) using the following hyperlink: http://www.nhbc.co.uk/Builders/ProductsandServices/Standardsplus2018/#1

Common causes of Tree Death



Principles of Tree Planting

4.32. Quality tree planting schemes on development sites can contribute to the creation of a high level of amenity and an attractive environment, whilst maintaining a relation to the character of a site and its surroundings.

4.33. Tree planting should be recognised from the outset as an integral part of any development scheme landscape plan, and should be purposefully designed to complement the proposed features of the development and those existing features intended for retention. On sites that have no existing trees, it is especially important to plan for the planting of trees as part of the development.

4.34. Tree planting will be expected to contribute, on an effective scale, to the conservation or enhancement of the landscape, providing an overall environmental benefit in terms of public amenity and nature conservation.

4.35. Planting schemes should be appropriate for the intended use of the development and will be expected to contribute to the establishment of a well- structured framework of diverse ages, sizes and species with the potential to be managed constructively over decades or even centuries. It is very important to incorporate some large-stature, long-term trees whenever possible, but it is essential that sufficient space is allowed in the layout for their ultimate size.

4.36. Developers should recognise the functional role of tree planting in enhancing the physical characteristics of a development: providing shelter, screening, enclosure,

'softening' the outline of buildings, defining space, directing routes and views, or simply to enhance the visual amenity of an area. Particular attention should be given to the use of tree planting to enhance public areas within developments, and views into the site from surrounding public spaces.

4.37. In locations where nature conservation objectives are particularly important, planting schemes will be expected to maximise the benefits to wildlife, through the use of a range of native trees and shrubs suited to the ecology of the locality. Due consideration should be given to layout configuration, planting density, choice of species, species mixes, proportions and edge characteristics. Such schemes should always be prepared with input from professionally qualified ecological advisors including the authorities own Ecology Officer.

4.38. The overall principles are set out in appendix 2 and 3; and should include:

- Principles of Planting Design: where percentages of appropriate tree, shrub and herbaceous species are considered from Ancient Arden, wider native species including species to encourage wildlife and ecology, and decorative species.
- Plant as Elements of Landscape: to include prospective planting, planting as focal points, to create barriers for screening, windbreaks and mark boundaries etc.
- Planting Layout: to consider appropriate species of a tree's ultimate height, crown spread and root morphology, for open spaces, site entrances, junctions, marginal planting for internal roads dependent upon space availability from the more special boulevard planting to a site's more restricted narrow road layouts where narrow fastigiate species may be selected.

4.39. Additional information on tree planting design are available through the Council's SPD: *Urban Extension Design Guide* and *Residential Design Guide*.

Avoiding Future Conflict

4.40. As set out in PPG 'Natural Environment'; trees, as a component of green infrastructure, must provide benefits in the long-term. This should be factored into the way that proposals are designed and implemented.

4.41. Development layouts, even if not affecting trees directly, may not be acceptable if they would result in undue pressures, in the short or long term, for felling or excessive pruning of important trees by future home-owners and commercial landlords.

4.42. Site layouts which merely avoid exclusion zones may not necessarily be adequate. Other factors must be taken into account to ensure that trees, which are to remain, can reasonably be retained to maturity, thereby providing maximum amenity benefits with minimum maintenance requirements.

4.43. In considering the juxtaposition of trees and buildings, site layout designs will be expected to ensure that trees which are to remain are given adequate space, including sufficient allowance for future growth, without the need for excessive or unreasonable pruning.

4.44. Site layouts should ensure that private garden areas are of adequate size by being large enough to enable normal domestic use and can reasonably accommodate trees, including allowance for their future growth. Private garden areas should normally be sufficient to allow reasonable extension of the main dwelling and other permitted development rights without reducing the amount of usable garden space to unacceptable levels.

4.45. The predicted mature height, branch spread, and crown form of individual trees should be assessed in conjunction with site factors such as aspect, topography, soil conditions and exposure. (The ultimate mature size of any individual tree will be dependent on site specifics, and an assessment from a qualified arboricultural consultant should be sought).

Planting New Trees

4.46. Tree planting should aim to make the optimum long-term use of allocated space without causing unreasonable future inconvenience to occupiers.

4.47. In order to ensure that new trees do not interfere to such an extent that unsightly, heavy pruning or removal becomes necessary, the following factors will require attention:

- There should be careful choice of species and sitting to ensure maximum long-term amenity benefits and minimising potential future conflict.
- Decisions regarding species and siting should be taken based on an assessment of the potential dimensions and growth habit and maturity; which will give an indication of whether future pruning requirements are likely to be acceptable.
- Careful siting of new trees with reference to Table A.1 of BS 5837:2012 will ensure that future root damage to structures, drains, services, walls, paths and drives is prevented, or at the very least minimised.
- The inclusion of professional arboricultural input into the landscape design stages is highly recommended, whenever new tree planting is proposed.

4.48. Planning conditions will normally be used to ensure that planting schemes are planned, implemented and maintained to provide maximum long-term benefits. Therefore the submission of a fully informed planting scheme, in support of a planning application, will usually be required for development sites.

4.49. The Council expects sufficient information to be provided to judge the value of planting schemes. Consideration should be given to augmenting proposals with cross-sections, projections and illustrative drawings.

4.50. The minimum level of detail required for new tree planting proposals are:

- An accurate, detailed planting plan and schedule.
- A comprehensive list of species and stock specification.
- Details of planting densities and spacing.
- Individual locations of specimen trees and shrubs.
- Clear indication of existing trees specified for retention and those for removal.

4.51. The long-term aims of a scheme can only be achieved if the new planting succeeds. The Council will pay particular attention to practical measures that are proposed as

part of any scheme, to ensure successful establishment. Planting schemes are expected to include the following provisions:

- Preparation of the planting environment (including decompaction and drainage) should be at least to the standards set out in the BS 4428**:**1989 – *Code of Practice for General Landscape Operations (excluding hard surfaces)*.
- All plant material provided will be expected to comply with, and be planted, in accordance with the requirements of; The Horticultural Trades Association National Plant Specification, BS 8545**:**2014 – *Trees: from nursery to independence in the landscape – Recommendations***,** as appropriate.
- Final planting positions for new trees will be expected to take account of the requirements of BS 5837**:**2012.
- The inclusion of a management plan and detailed maintenance schedule in accordance with the requirements of BS 4428**:**1989.

Site Layout

4.52. Site layouts must also ensure that trees at maturity will not dominate buildings, which would lead inevitably to concerns about safety and ultimately to requests to fell or heavily prune. Where large, mature, aged or Veteran Trees or Ancient Woodland are located on or adjacent to the site, an adequate buffer and space must be allowed for their development and long-term physical protection and maintenance by incorporating into open space.

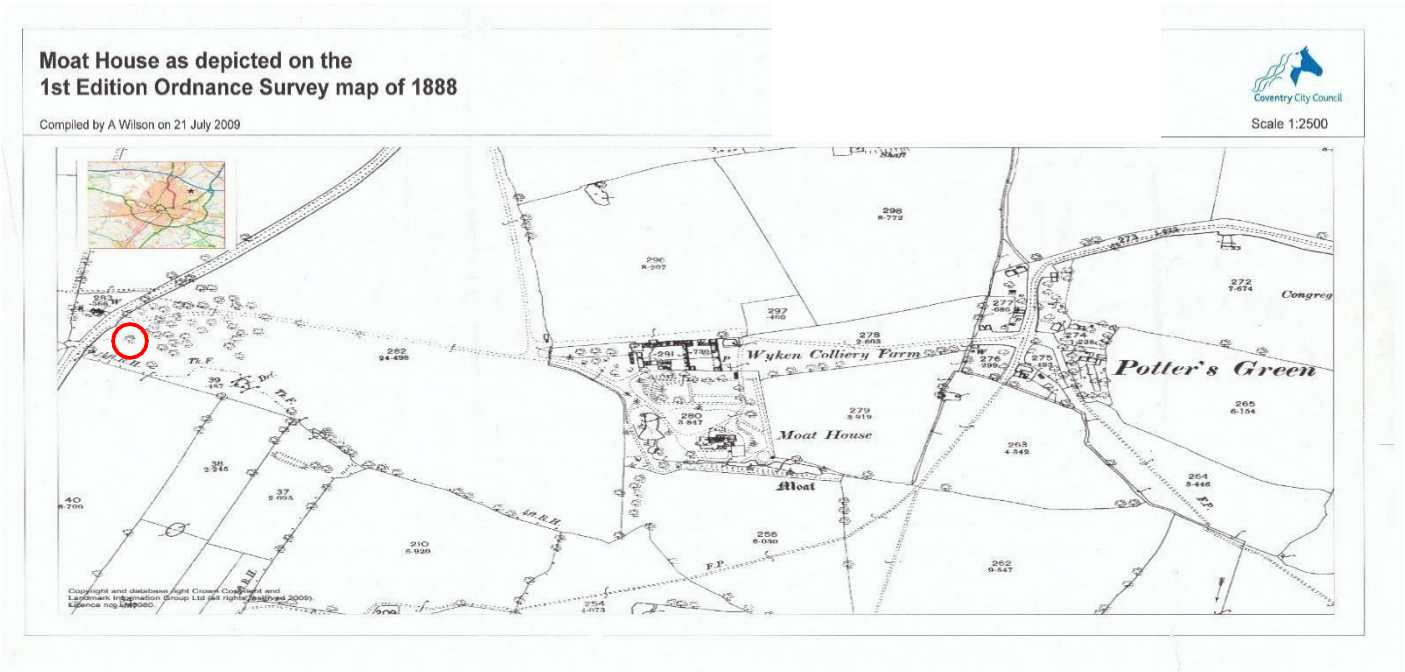
4.53. Furthermore, site layouts must ensure that trees will not cause unreasonable obstruction of direct sunlight or daylight to properties[19]. Reference should be made to the information provided on the AIA. Factors requiring detailed deliberation include; individual species characteristics (e.g. potential for future growth), and garden size and layout (e.g. the aspect of the tree from the building, building to tree clearances, building orientation, and the positioning and size of windows - especially in habitable rooms).

4.54. In addition, site layouts must ensure that due consideration is given to the pruning requirements of retained trees (full details should be included in the tree survey). Where pruning regimes, present or future, are recommended as a way of reducing the adverse effects of trees on a development, the Council will carefully assess whether such proposals are consistent with prudent arboricultural management, are likely to meet the suggested long-term objectives and whether they are reasonable, enforceable and can practically be implemented. All tree works will be expected to comply with current arboricultural best practice and meet the requirements of BS 3998**:**2010.

Site Access

4.55. The provision of permanent and temporary site access is an important part of the layout design stages and full details will normally be required in support of any planning application.

[19] The 45° 'Rule of Thumb': The sun is 45° or more above the horizon from mid-April to mid-August between approximately 11:00 and 15:00 BST. If a tree is no closer to a property than its ultimate mature height, the sun will be above the tree's canopy during these periods, and that property will receive reasonable levels of natural light.



4.56. For safety reasons, site access layouts and visibility splay clearances may require the removal or pruning of trees and hedges. Where this is likely, applicants are encouraged to liaise with the Council through the pre-application process (as appropriate) to seek clear guidance of their requirements, prior to submission of an application. Although generally, permanent and temporary site access designs will be expected to avoid tree and hedgerow removals and ensure the long-term retention of all important trees and hedges.

4.57. The need to make provision for site access on a temporary basis must also be given due consideration. Sites may require temporary access for long, wide, or high loads, and provision may be required for unusually large vehicles or machinery. The need to provide adequate operational space within the site, for specialised equipment, machinery and/or vehicles (including cranes and piling rigs), must also be considered. Any resulting short and long-term implications for trees and hedges which are to remain must be carefully assessed and full details submitted as part of any planning application.

4.58. Drainage and service layouts must be designed in such a way as to allow for installation and future maintenance without adversely affecting trees and their root systems. The provision of common service trenches may help to minimise potential conflicts.

4.59. Full details of service layouts should be submitted with any planning application. Service layout planning and installation should be carried out in accordance with methodology requirements set out within BS 5837:2012.

Implementation, Monitoring and Review

5.1. The provisions of this SPD will be implemented through the development management process, principally the determination of planning applications which involve trees.

5.2. Whilst this document does not have the status of the Local Plan (for the purposes of Section 38 of the Planning and Compulsory Purchase Act 2004), it will be a key material consideration in determining planning applications.

5.3. The effectiveness of this SPD will be assessed periodically through the planning departments review mechanism, namely the Local Development Scheme. The Council's Tree Officer(s) will continue to monitor the impacts that this document is having on the planning process and ultimately upon trees within development. It will also help to establish whether the intended effects, as set out in the aims and objectives, are being met.

“If a tree is treated as a living organism, with an understanding of its vital functions, it will be a constant source of profit and pleasure.”

Professor N.T. Mirov, University of California

Trees & Development Guidelines Appendices

Appendix 1 – TPO Amenity Assessment Sheet

The TPO Amenity Assessment Sheet is used by the Council to assess a tree for protected status. The next page illustrates an example of such a sheet. Note, it is only an example provided and the contents of the sheet will differ depending on the tree under assessment.

TREE SURVEY FOR MAKING OF TREE PRESERVATION ORDER, VARIATION ORDER OR REVOCATION ORDER
By Individual T1, Group G1, Woodland W1, Area A1

Location: TPO
Date of Visit: 10/10/2018 Photo Taken Yes [x] No [ ]

Species:	Approx Height:	Stem Dia (dbh)	Canopy Spread (m) N,E,S & W
T001 - X	T001 - 1	T001 - 1	T001 - N:1,E:1,S:1,W:1 e

Age Class	Phys Cond:	Visual Amenity Value	Non Visual Amenity
T001 - Mature	Good	General view Screening	Local: Wildlife

Structural Conditions, Recommendations & Comments
T001

Signed by (Tree Preservation Officer)	Origin of making the Order	No objection to proposed TPO or TPO Revoke, Signed by (Planning Group Leader)
Date.....Signature.....		Date.....Signature.....

Appendix 2 – Coventry City Council TPO Making Process

Tree Preservation Order Procedures

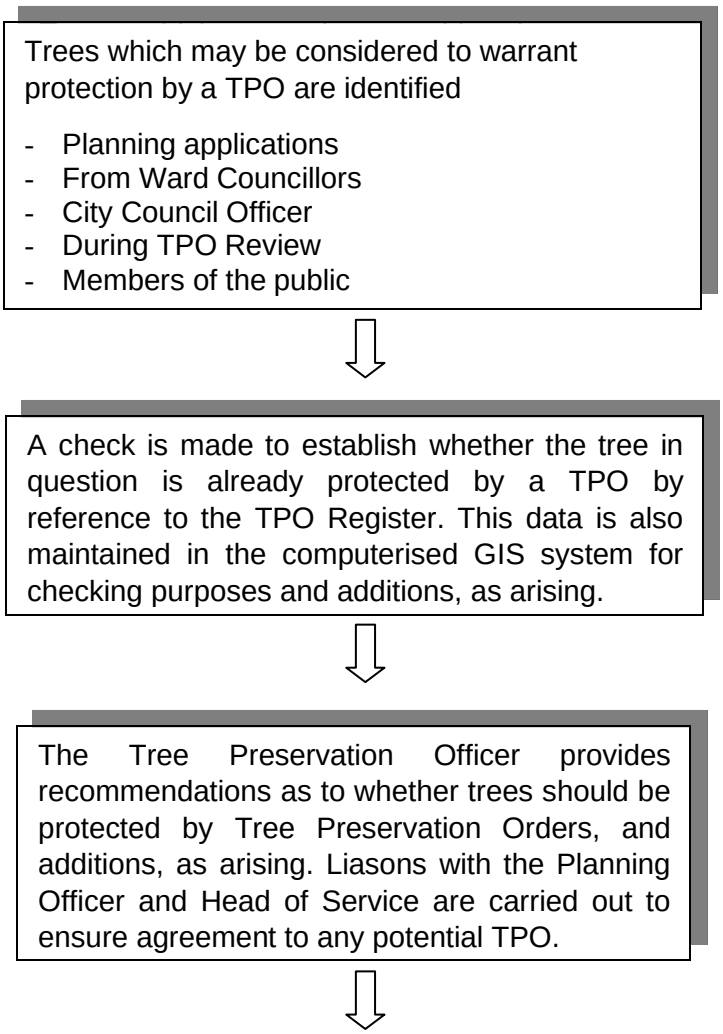
1. Scope

This process defines how Tree Preservation Orders are made and recorded.

2. Objectives

The preservation of the environment for the citizens of Coventry is a core service. The success and implementation of the process is monitored using performance indicators. Continuous improvement is reviewed through audits. Communications takes place through performance monitoring & team meetings.

3. Process



Liaison with Planning Officers ire carried out to ensure agreement to any potential TPO to be confirmed.

The Officer visits the site to complete a visual tree inspection using Government Guidelines and Considerations for:

- Amenity Values
- Expediency
- Condition
- Life expectancy
- Past management history
- Proximity to buildings, highways etc
- Future growth of tree
- Amenity threat/development etc.

Photographs are taken plus a plan to record and identify the position of the tree relative to the surroundings. Details of the inspection and assessments are recorded on the TPO amenity assessment sheet.

If it is considered to be appropriate for an Order to be made, the TPO Officer marks the tree(s) onto an ordnance survey plan, generally at 1:500 or 1:1250 scale. The plan and TPO amenity assessment sheet and plan are checked and approved.

A TPO sequential number is recorded on the drawing prior to issue. The draft TPO plan is sent with a Schedule stating the tree details and locations, address of the tree owner and adjacent landowners, and the instruction letter to Legal Services stating the order's justification.

An electronic TPO file is set up for the proposed order and is identified by a sequential number from the drawing register. The TPO file will will be appended with the information sent to Legal Services. Pending confirmation, the TPO file is stored in sequential order on the Council's internal computer system.

Legal Services issue a 28-day period of notice Regulation 6 Notice with provisional TPO, for receiving any objections or representations.

If no response or representations are received with a six month period, a confirmed TPO is sent to the original parties.

If an objection is raised during the 28-day objection period then it goes to Committee not later than six months further on. A site visit may be carried out by the committee accompanied by the TPO Officer and/or Planning Officer. If the Committee is in agreement with the officers, the order is confirmed and a Confirmed Order with or without Modifications is sent to the owner, neighbours and/or objector. There is no further right of appeal, apart from a High Court Challenge.

If the Committee do not agree with the making of the order, it is not confirmed and the decision notice is issued. Decision notices are placed on the TPO file, including any modifications.

4. Responsibility

It is the responsibility of the Tree Preservation Officer to carry out the processes listed and it is the responsibility of their line-manager to oversee, ensuring the process is carried out correctly.

In the absence of the TPO Officer and in an emergency, the line-manager is responsible for carrying out the process, with the assistance of another Council Tree Officer.

Appendix 3 – Tree Selection Guide

Sacre, K., 2018. *Species Selection: A guide to informed decision-making.* Ely: Barcham Trees. Available at: https://www.barchampro.co.uk/guide/species-selection-2/.

TREE SELECTION GUIDE

BOTANICAL NAME	COMMON NAME	FAMILY	TOLERANCES				HARDINESS ZONE			ECOSYSTEM SERVICES					ECOSYSTEM DISSERVICES		AESTHETIC AND OTHER QUALITIES			FOLIAGE			FLOWER					
			Drought	Salt	Water logging	Shade	Zone	Succession	Natural Range	Carbon Seq	Avoided Rainwater Runoff	Pollution Removal	Total Benefits Index		BVOC Emissions	Allergy Potential (F) female)	Mature Height (m)	Crown Spread (m)	Crown Shape	Deciduous	Evergreen	Autumn Colour	Monoecious	Dioecious	Colour	Period	Fruit	Ornamental Bark
Acer buergerianum	Trident Maple	Sapindaceae	Mod-tolerant		Mod-sensitive	Mod-tolerant	5-8(9)		China, Taiwan Japan	High	Medium	Medium	Low		Low	High	10-15	10	Ovoid	•					White	Late Spring	Samara	
Acer campestre	Field Maple	Sapindaceae	Mod-tolerant	Mod-tolerant	Mod-tolerant	Mod-tolerant	(4)5-8	Pioneer	Europe, Western Asia and North Africa	High	Medium	Medium	Medium		Low	Medium	10-15	5-10	Globular	•						Late Spring	Samara	
Acer cappadocicum	Caucasian Maple	Sapindaceae	Mod-tolerant		Mod-tolerant	Mod-tolerant	6-9		Caucasus, Northern Iran, Western Himalaya	High	Medium	Medium	Medium		Low	Medium	15-20	10-15	Ovoid						Yellowish	Late Spring	Samara	
Acer x freemanii	Freeman's Maple	Sapindaceae	Mod-tolerant		Mod-tolerant	Mod-tolerant	3-9	Pioneer	Eastern North America	High	Medium	Medium	Medium		Low	Medium	10-15	5-10	Ovoid	•		•			Red	Early Spring	Samara	
Acer ginnala	Amur Maple	Sapindaceae	Mod-tolerant	Mod-tolerant	Mod-tolerant	Mod-tolerant	3-8		Russia, Mongolia, China, Japan, Korea							Medium	10-15		Ovoid	•					Yellow	Late Spring	Samara	
Acer griseum	Paperbark Maple	Sapindaceae	Mod-sensitive		Mod-sensitive	Mod-tolerant	5-7(8)		Central China	High	Medium	Medium	Medium		Low	Medium	5-10											Samara	
Acer lobelii	Lobels Maple	Sapindaceae	Mod-tolerant		Mod-tolerant	Mod-tolerant	6-8		Southern Italy, Balkans								10-15											Samara	
Acer negundo	Box Elder	Sapindaceae	Mod-tolerant	Intolerant	Mod-tolerant	Mod-tolerant	3-9	Pioneer	North America							None (f)	15-20	10-15	Globular	•				•	Red	Early Spring	Samara	
Acer platanoides	Norway Maple	Sapindaceae	Mod-tolerant	Mod Tolerant	Mod-tolerant	Tolerant	4-7	Late succession	Continental Europe	High	Medium	Medium	High		Low	High	20+											Samara	
Acer pseudoplatanus	Sycamore	Sapindaceae	Mod-sensitive	Mod Tolerant	Mod-sensitive	Tolerant	4-7	Late succession	Continental Europe, parts of Western Asia	High	High	High	High		Low	High	20+	20+	Globular	•					Greenish	Late Spring	Samara	
Acer rubrum	Canadian Maple	Sapindaceae	Mod-tolerant	Intolerant	Mod-tolerant	Mod-tolerant	3-9	Pioneer	Eastern North America							Medium	20+		Ovoid	•		•	•					Samara	
Acer saccharinum	Silver Maple	Sapindaceae	Mod-tolerant	Intolerant	Mod-tolerant	Mod-tolerant	3-9		Eastern North America	Medium	Medium	Medium	Medium		Low	High	20+	15-20	Ovoid	•		•			Greenish	Early Spring	Samara	
Acer saccharum	Sugar Maple	Sapindaceae	Mod-tolerant	Intolerant	Sensitive	Tolerant	4-8		Eastern North America							Medium	20+	10	Globular	•		•			Greenish	Late Spring	Samara	
Aesculus x carnea	Red Horse Chestnut	Sapindaceae	Mod-sensitive	Mod-tolerant	Mod-sensitive	Mod-tolerant			Hybrid x between A. hippocastanum - A.pavia	High	High	High	High		Low	Medium	15-20	10-15	Globular	•					Red/pink	Late Spring	Husk (conker)	
Aesculus hippocastanum	Horse Chestnut	Sapindaceae	Mod-sensitive	Mod-tolerant	Mod-sensitive	Mod-tolerant	4-7	Late succession	Balkan peninsula	High	High	High	High		Low	Medium	20+	15-20	Globular	•					White	Late Spring	Husk (conker)	
Aesculus indica	Indian Horse Chestnut	Sapindaceae	Mod-sensitive		Mod-sensitive	Mod-tolerant	5-7		West Nepal	High	High	High	High		Low	Medium	10-15	10-15	Globular	•					White	Early Summer	Husk (conker)	
Ailanthus altissima	Tree of Heaven	Simaroubaceae	Tolerant	Quad	Mod-tolerant	Mod-tolerant	4-8	Early Succession	China, North Vietnam	High	High	High	High		Low		20+	10-15	Globular	•					Greenish	Early Summer	Samara	
Alnus cordata	Italian Alder	Betulaceae	Tolerant		Mod-tolerant	Mod-tolerant	5-7	Pioneer	Corsica, Southern Italy, Greece	High	Medium	Medium	Medium		Low	High	15-20	5-10	Conical	•			•		Catkins	Early Spring	Stalked cone	
Alnus glutinosa	Common Alder	Betulaceae	Mod-sensitive	Mod-tolerant	Tolerant	Mod-tolerant	4-7	Pioneer	Europe, Western Asia and North Africa	High	Medium	Medium	Medium		Low	High	15-20	5-10	Ovoid	•			•		Catkins	Early Spring	Stalked cone	
Alnis incana	Grey Alder	Betulaceae	Mod-sensitive	Mod-tolerant	Mod-tolerant	Mod-tolerant	2-6	Pioneer	Europe, Caucasus	High	Medium	Medium	High		Low	High	15-20	5-10	Conical	•			•		Catkins	Early Spring	Stalked cone	
Alnus spaethii	Spaeth Alder	Betulaceae	Mod-tolerant		Mod-tolerant	Mod-tolerant	4-7	Pioneer	Hybrid between A. japonica and A.subcordata	High	Low	Low	Medium		Low	High	15-20	5-10	Ovoid	•						Early Spring	Stalked cone	
Amelanchier arborea	Downey Serviceberry	Rosaceae	Mod-sensitive		Mod-tolerant	Tolerant	4-9		Eastern North America							Low	5-10	5	globular	•		•			White	Early Spring	Berry	
Amelanchier lamarkii	Serviceberry, Juneberry	Rosaceae	Mod-sensitive		Mod-sensitive	Mod-tolerant	4-9		Eastern North America							Low	5-7	5	globular	•		•			White	Early Spring	Berry	
Aralia elata	Japanese Angelica Tree	Araliaceae	Mod-sensitive		Sensitive	Mod-tolerant	3-9		Japan, Korea, China, Manchuria							Medium	5-10	5-10	Vase	•		•			White	Early Autumn	Small, round	
Arbutus unedo	Strawberry tree	Ericaceae	Tolerant		Sensitive	Mod-tolerant	7-9	Early succession	Mediterranean	High	Low	Low	Low		Low	Low	5-10	5	globular		•				White	Late Autumn	Strawberry like	
Betula albosinensis	Chinese Birch	Betulaceae	Mod-sensitive		Mod-sensitive	Mod-tolerant	5-6	Pioneer	China	High	Medium	Medium	Medium		Low	High	10-15		Ovoid	•		•	•		Catkins	Late Spring	Catkin	•
Betula ermanii	Erman's Birch	Betulaceae	Sensitive		Sensitive	Intolerant	5-6	Pioneer	Asia, North China, Russia, Korea, Japan	High	Medium	Medium	Medium		Low	High	10-15	10	globular	•		•	•		Catkins	Late Spring	Catkin	•
Betula nigra	River Birch	Betulaceae	Mod-sensitive		Mod-tolerant	Intolerant	3-9	Pioneer	Eastern North America	High	Medium	Medium	Medium		Low	High	10-15	10	Ovoid	•		•	•		Catkins	Late Spring	Catkin	•
Betula maximowicziana	Monarch Birch	Betulaceae	Mod-sensitive		Sensitive	Intolerant	5-6	Pioneer	Japan, North East Asia	High	Medium	Medium	Medium		Low	High	10-15	5-10	Ovoid	•		•	•		Catkins	Late Spring	Catkin	•
Betula papyrifera	Paper Birch	Betulaceae	Sensitive	Mod-tolerant	Sensitive	Intolerant	2-6(7)	Pioneer	North America	High	High	High	High		Low	High	10-15	5-10	Ovoid	•		•	•		Catkins	Late Spring	Catkin	•
Betula pendula	Silver Birch	Betulaceae	Sensitive	Mod-tolerant	Sensitive	Intolerant	2-6	Pioneer	Northern Europe, West Asia	High	Medium	Medium	Medium		Low	High	10-15	5-10	Columnar	•		•	•		Catkins	Late Spring	Catkin	•
Betula pubescens	Common White Birch	Betulaceae	Sensitive		Mod tolerant	Intolerant		Pioneer	Newfoundland, Europe	High	Low	Low	Low		Low	High	10-15	5-10	Conical	•		•	•		Catkins	Late Spring	Catkin	•
Betula utilis	Himalayan Birch	Betulaceae	Mod-sensitive		Mod-sensitive	Mod-tolerant	5-6	Pioneer	Himalaya, Western Nepal	High	Medium	Medium	Medium		Low	High	10-15	5.10	Ovoid	•		•	•		Catkins	Late spring	Catkin	•
Carpinus betulus	Hornbeam	Betulaceae	Mod tolerant		Sensitive	Mod-tolerant	(4)5-7	Late succession	Europe, Western Asia	High	Medium	Medium	Medium		Low	Medium	20+	10-15	Ovoid	•			•		Catkins		Dropping fruit	
Carpinus japonica	Japanese Hornbeam	Betulaceae	Mod-tolerant		Sensitive	Mod-tolerant	(4)5-7		Japan	High	Medium	Medium	Medium		Low	Medium	10-15		Vase	•		•	•		Catkins		Dropping fruit	
Carya illinoinensis	Pecan	Juglandaceae	Mod-sensitive		Mod-tolerant	Intolerant	5-9		Southern USA							High	30+	30+	Ovoid	•			•		Catkins		Nut	
Castanea sativa	Sweet Chestnut	Fagaceae	Mod-tolerant		Sensitive	Mod-tolerant	5-7		Mediterranean, Northern Turkey, Caucasus	High	High	High	High		Low	Low	25-30	20-25	Globular	•			•			Late Summer	Nut	
Catalpa bignonioides	Indian Bean Tree	Bignoniaceae	Mod-sensitive	Mod-tolerant	Sensitive	Mod-tolerant	5-9.	Pioneer	Eastern North America	High	Low	Low	Medium		Low	Medium	10-15	5-10	Irregular	•					White	Early Summer	Long seed pod	
Celtis australis	Nettle Tree	Cannabaceae	Tolerant		Mod sensitive	Mod-tolerant			Mediterranean, Balkans							Medium	20-25		Globular	•			•			Late Spring	Drupe	
Celtis occidentalis	Hackberry	Cannabaceae	Mod-tolerant		Mod-sensitive	Mod-tolerant	3-9	Pioneer	Eastern North America							Medium	30-35		Globular	•			•			Late Spring	Drupe	
Cercidiphyllum japonicum	Katsura Tree	Cercidiphyllaceae	Sensitive		Mod-sensitive	Mod-tolerant	4-9	Late succession	China, Japan, Eastern Himalayas							Low	25-30		Globular	•		•		•		Late Spring	Pod (female)	
Cercis canadensis	Redbud	Fabaceae	Mod-tolerant		Sensitive	Mod-tolerant	4-9	Pioneer	Eastern North America, Mexico	High	Medium	Medium	Medium		Low	Low			Globular								Pod	
Cercis siliquastrum	Judas Tree	Fabaceae	Tolerant		Sensitive	Mod-tolerant	(6)7-8	Pioneer	South Eastern Europe, Western Asia	High	Medium	Medium	Medium		Low	Low			Globular								Pod	
Cladastris kentukia	Yellow wood	Fabaceae	Mod-sensitive		Sensitive	Mod tolerant	4-8		Eastern North America							Medium	10-15	10	Globular	•		•			White	Early summer	Pod	
Clerodendrum trichotomum	Harlequin glorybower	Verbenaceae	Mod-tolerant		Mod-sensitive	Intolerant	(6)7-8		China,Japan, Korean peninsula, Taiwan	High	Low	Low	Low		Low	Low	10		Globular	•					White	Late summer	Berry (black)	
Corylus avellana	Hazel	Betulaceae	Mod-sensitive	Intolerant	Sensitive	Mod-tolerant	4-8	Late succession	Europe	High	Low	Medium	Medium		Low	Medium	6-5		Globular	•					Catkins	Late winter	Nut	
Corylus colurna	Turkish Hazel	Betulaceae	Mod-tolerant	Intolerant	Sensitive	Intolerant	4-7	Pioneer	South East Europe, Western Asia	High	Medium	Medium	Medium		Low	Medium	20-25		Ovoid	•		•	•		Catkins	Late winter	Nut	
Crataegus x grignonensis	Grignon Hawthorn	Rosaceae	Mod-tolerant		tolerant	Mod-tolerant	4-7		Hybrid	High	Low	Low	Low		Low	Low	5-10		Globular	•					White	Late spring	Pome	
Crataegus laevigata	Woodland Hawthorn	Rosaceae	Tolerant		Sensitive	Mod-tolerant	4-7		Hybrid	High	Low	Low	Low		Low	Low	5-10		Globular	•					White	Late spring	Pome	
Crataegus x lavallei	Lavallee Hawthorn	Rosaceae	Moderate	Mod-tolerant	Sensitive	Moderate	4-7		Hybrid							Low	5-10		Globular	•					White	Late spring	Pome	
Crataegus monogyna	Common Hawthorn	Rosaceae	Tolerant		Sensitive	Intolerant	4-7	Late succession	Europe, Northern Africa, Russia, Afganistan	High	Low	Low	Low		Low	Low	10-15		Globular	•					White	Late spring	Pome	
Crataegus monogyna Stricta		Rosaceae	Mod-tolerant		Sensitive	Mod-tolerant	4-7									Low												Pome	

BOTANICAL NAME	COMMON NAME	FAMILY	TOLERANCES				HARDINESS ZONE			ECOSYSTEM SERVICES				ECOSYSTEM DISSERVICES		AESTHETIC AND OTHER QUALITIES			FOLIAGE			FLOWER					
			Drought	Salt	Water logging	Shade	Zone	Succession	Natural Range	Carbon Seq	Avoided Rainwater Runoff	Pollution Removal	Total Benefits Index	BVOC Emissions	Allergy Potential (if female)	Mature Height (m)	Crown Spread (m)	Crown Shape	Deciduous	Evergreen	Autumn Colour	Monoecious	Dioecious	Colour	Period	Fruit	Ornamental Bark
Crataegus pruinifolia	Broad Leaved Cockspur Thorn	Rosaceae	Mod-tolerant		Sensitive	Mod-tolerant	4-7								Low												
Davidia involucrata	Handkerchief Tree	Davidiaceae	Mod-sensitive		Mod-sensitive	Mod-tolerant	6-7(8)		China						Low	10-15		Globular	•					White bracts	Late Spring	Drupe	
Eucommia ulmoides	Rubber Tree	Eucommiaceae	Tolerant		Mod-sensitive	Mod-tolerant	(4)5-7		In cultivation only						None (†)	15-20		Ovoid	•				•	Indistinct		Winged (female)	
Euonymous europaeus	Spindle Tree	Celastraceae	Mod-tolerant		Mod-tolerant	Mod-tolerant	4-7		Europe, Western Asia						Medium	5-10		Globular	•		•			Yellow/green	Late spring	Husk (orange)	
Fagus orientalis	Oriental Beech	Fagaceae	Mod-sensitive	Intolerant	Sensitive	Tolerant	4-7		South Eastern Europe, Western Asia,						Medium	30+		Globular	•		•	•		Indistinct	Late Spring	Nut (small)	
Fagus sylvatica	Common Beech	Fagaceae	Mod-sensitive	Intolerant	Sensitive	Tolerant	4-7	Late succession	Europe	High	High	High	High	Low	Medium	30+		Globular	•		•	•		Indistinct	Late Spring	Nut (small)	
Ficus carica	Common Fig	Moraceae	Mod-tolerant		Sensitive	Mod-tolerant	7		Western Asia, South-East Europe	High	Low	Low	Low	Low	Low	10		Globular	•			•		Indistinct		Pear shaped	
Gleditsia triacanthos	Honey locust	Fabaceae	Tolerant	Mod-tolerant	Mod-tolerant	Intolerant	4-9		Central USA	High	Low	Low	Medium	Low	Medium	30+		Ovoid	•		•	•		Indistinct	Early Summer	Pod	
Gymnocladus dioca	Kentucky Coffee Tree	Fabaceae	Mod-tolerant	Mod-tolerant	Mod-sensitive	Mod-tolerant	3-8		Eastern USA						None (†)	25-30		Globular	•		•		•	Green/white	Early Summer	Pod	
Juglans nigra	Black Walnut	Juglandaceae	Mod-sensitive		Sensitive	Intolerant	4-9	Pioneer	Eastern USA						High	30-40		Globular	•		•	•		Indistinct	Late Spring	Husk (nut)	
Juglans regia	Common Walnut	Juglandaceae	Mod-sensitive		Sensitive	Intolerant	(5)6-9		Europe, Western Asia, China	High	High	High	High	Low	High	25-30	15	Globular	•		•	•		Indistinct	Late Spring	Husk (nut)	
Koelreuteria paniculata	Pride of India	Sapindaceae	Tolerant	Mod-tolerant	Sensitive	Mod-tolerant	5-8	Pioneer	China	High	Medium	Medium	Medium	Low	Low	15-20		Globular	•		•			Yellow	Late Summer	Capsule	
Lagerstroemia indica	Crape Myrtle	Lythraceae					(6)7-9			High	Low	Low	Low	Low	Low												
Liquidamber styraciflua	Sweetgum	Altingiaceae	Mod-sensitive	Mod-tolerant	Mod-tolerant	Intolerant	5-9	Pioneer	North Eastern USA	Low	Medium	Medium	Medium	Medium	Medium	15-20		Columnar	•		•			Indistinct	Early Summer	Spikey capsule	
Liriodendron tulipifera	Tulip Tree	Sapindacea	Mod-sensitive	Intolerant	Sensitive	Mod-tolerant	4-9		North West USA	Medium	Medium	Medium	Medium	Low	Low	50-60+		Columnar	•		•			Indistinct	Summer	Winged seed	
Magnolia grandiflora	Southern Magnolia	Magnoliaceae	Mod-sensitive	Mod-tolerant	Sensitive	Tolerant	(6)7-9(10)		South East Asia	High	Medium	Medium	Medium	Medium	Low	25-30		Ovoid		•				White	Late Summer	Follicles	
Magnolia kobus	Kobushi Magnolia	Magnoliaceae	Mod-sensitive		Mod-sensitive	Mod-tolerant	4-8		Japan and South Korea	High	Medium	Medium	Medium	Low	Low	15-20	6-8	Ovoid	•					White	Early Spring	Follicles	
Malus spp		Rosaceae	Mod-sensitive	Mod-tolerant	Mod-sensitive	Mod-tolerant			Hybrid primarily	High	Low	Low	Low	Low	Low	5-6		Ovoid	•					White/pink	Late Spring	Crab apple	
Mespilus germanica	Medlar	Rosaceae	Mod-tolerant		Sensitive	Mod-tolerant	(4)5-8		Europe, Caucasus, Western Asia	High	Low	Low	Medium	Low	Low	5-8		Irregular	•					White	Late Spring	Medlar	
Morus alba	White Mulberry	Moraceae	Mod-tolerant	Mod-tolerant	Sensitive	Mod-tolerant	(4)5-8(9)		Central, North China	High	Medium	Medium	Medium	Low	None (†)	10-15		Globular	•				•	Indistinct	Late spring	Mulberry	
Morus nigra	Black Mulberry	Moraceae	Mod-tolerant		Sensitive	Mod-tolerant	5-9.		Western Asia	High	Medium	Medium	Medium	Low	None (†)	10-15		Gobular	•				•	Indistinct	Late Spring	Mulberry	
Nothofagus antartica	Antartic Beech	Fagaceae	Mod-sensitive		Mod-sensitive	Mod-tolerant			Chile, Argentina	High	Low	Low	Low	Low	Low	15		Ovoid	•			•		Indistinct	Early Summer	Nutlet	
Nyssa sylvatica	Black Tupelo	Nyssaceae	Mod-sensitive	Mod-tolerant	Mod-sensitive	Mod-tolerant	4-9		Eastern USA						None (†)	20-25		Conical	•		•		•	Greenish	Late Spring	Drupe (black)	
Ostrya carpinifolia	Hop Hornbeam	Betulaceae	Mod-tolerant		Mod-tolerant	Mod-tolerant	3-9		Southern Europe and Western Asia						Medium	15-20	10-12	Globular	•			•		Catkins	Late Spring	Husk (nutlets)	
Parrotia persica	Persian Ironwood	Hamamelidacae	Mod-tolerant		Mod-sensitive	Mod-tolerant	(4)5-8		Western Asia						Low	15-25		Irregular	•		•			Pink		Spikey capsule	
Paulownia tomentosa	Foxglove Tree	Paulowniaceae	Mod-tolerant		Sensitive	Mod-tolerant	(5)6-9	Pioneer	China						Low	15-20		Globular	•					Light purple	Late Spring	Capsule	
Platanus x hispanica	London Plane	Platanaceae	Mod-tolerant		Mod-tolerant	Mod-tolerant	(4)5-8(9)		Hybrid	High	High	High	High	Medium	High	40	25+	Globular	•			•		Indistinct	Late Spring	Plane ball	•
Platanus orientalis	Oriental Plane	Platanaceae	Mod-tolerant		Mod-tolerant	Mod-tolerant	4-9		Balkan peninsula, Western Asia	High	High	High	High	Medium	High	30	25+	Globular	•			•		Indistinct	Late Spring	Plane ball	•
Populus alba	White Poplar	Salicaceae	Mod-sensitive	Mod-tolerant	Sensitive	Mod-tolerant	3-8(9)		Central Southern Europe, North Africa, C Asia	High	Medium	Medium	Medium	Medium	None (†)	20-25		Ovoid	•				•	Indistinct	Early Spring	Capsule (female)	
Populus nigra	Black Poplar	Salicaceae	Sensitive		Mod-tolerant	Mod-tolerant	3-9		Europe, North Africa, Western Asia	High	Medium	Medium	Medium	Medium	None (†)	35-40		Ovoid	•				•	Indistinct	Early Spring	Capsule (female)	
Populus tremula	Eurasian Aspen	Salicaceae	Mod-sensitive		Mod-sensitive	Mod-tolerant	2-5		Europe, Algeria, Russia, Northern Asia	High	Medium	Medium	Medium	Medium	None (†)	35-40		Ovoid	•		•		•	Indistinct	Late Winter	Capsule (female)	
Prunus avium	Wild Cherry	Rosaceae	Mod-sensitive		Sensitive	Mod-tolerant	3-8	Pioneer	Europe, Western Asia	High	Medium	Medium	Medium	Low	Medium	20-25	8-10	Globular								Drupe (red)	
Prunus cerasifera	Cherry Plum	Rosaceae	Tolerant		Sensitive	Mod-tolerant	(4)5-8		Central Europe, Asia	High	Low	Low	Low	Low	Medium	7-9		Globular	•					White	Early Spring	Drupe (red)	
Prunus dulcis	Almond	Rosaceae	Tolerant		Sensitive	Intolerant	5-8		Likely Southern Europe						Medium	8-10	4-5	Globular	•					White	Early Spring	Drupe	
Prunus maackii	Manchurian Cherry	Rosaceae	Mod-sensitive		Sensitive	Mod-tolerant	3-6		Manchuria, Korean penninsula						Medium	10-12		Ovoid	•					White	Late Spring	Drupe (black)	•
Prunus padus	Bird Cherry	Rosaceae	Mod-sensitive		Mod tolerant	Mod-tolerant	3-6		Central Europe, Asia	High	Low	Low	Medium	Low	Medium	18-20	5-6	Ovoid	•					White	Late Spring	Drupe (black)	
Prunus sargentii	Sargent's Cherry	Rosaceae	Mod-tolerant		Sensitive	Mod-tolerant	4-7		Northern Japan, Korean peninsula						Medium	10-15		Globular	•		•			Pink	Early Spring	Drupe (black)	
Prunus serrula	Tibetan Cherry	Rosaceae	Mod-sensitive		Sensitive	Mod-tolerant	5-6		Western China						Medium	8-10		Globular	•		•			White	Late Spring	Drupe (red)	•
Pterocarya fraxinifolia	Wing nut	Juglandaceae	Mod-sensitive		Mod-tolerant	Mod-tolerant	(5)6 -8(9)	Pioneer	Western Asia, Caucasus, Northern Iran						Medium	30+	25-30	Globular	•			•		Catkins	Late Spring	Nutlets	
Pyrus calleryana Chanticleer		Rosaceae	Tolerant	Mod-tolerant	Sensitive	Intolerant	5-8(9)		China,Japan, Vietnam	High	Low	Medium	Medium	Low	Low	10-15	5-8	Ovoid	•		•			White	Late Spring	Pome (rare)	
Quercus castaniifolia	Chestnut Leaved Oak	Fagaceae	Mod-tolerant		Sensitive	Mod-tolerant		Pioneer	Western Asia, Caucasus	High	Low	Low	Medium	Medium	High	30+	20-25	Globular	•			•	•	Indistinct	Late Spring	Acorn	
Quercus cerris	Turkey Oak	Fagaceae	Tolerant		Sensitive	Mod-tolerant	5-7	Pioneer	Southern Europe, Western Asia	High	Low	Low	Medium	Medium	High	35+	25-30	Globular	•			•		Indistinct	Late Spring	Acorn	
Quercus coccinea	Scarlet Oak	Fagaceae	Tolerant		Sensitive	Mod-tolerant	4-9	Pioneer	Eastern USA							20-25	15-20	Globular	•			•		Indistinct	Late Spring	Acorn	
Quercis frainetto	Hungarian Oak	Fagaceae	Tolerant		Sensitive	Mod-tolerant	4-9	Pioneer	South eastern Europe, Balkans	High	Low	Low	Medium	Medium	High	25-30	20-25	Globular	•			•		Indistinct	Late Spring	Acorn	
Quercus ilex	Holm Oak	Fagaceae	Tolerant		Sensitive	Mod-tolerant	4-8		Mediterranean, Eastern Asia	High	Low	Low	Medium	Medium	High	25	20	Globular		•		•		Indistinct	Late Spring	Acorn	
Quercus imbricaria	Shingle Oak	Fagaceae	Mod-tolerant		Mod-sensitive	Mod-tolerant	4-8	Pioneer	Eastern USA	High	Low	Low	Medium	Medium	High	30+		Globular	•			•		Indistinct	Late Spring	Acorn	
Quercis palustris	Pin Oak	Fagaceae	Tolerant	Mod-tolerant	Mod-tolerant	Mod-tolerant	4-8	Pioneer	Eastern USA	High	Medium	Medium	Medium	High	High	20-25		Globular	•		•	•		Indistinct	Late Spring	Acorn	
Quercus petrea	Sessile Oak	Fagaceae	Mod-tolerant		Mod-tolerant	Mod-tolerant	4-8	Pioneer	Europe, Western Asia	High	Medium	Medium	Medium	High	High	35+	25-30	Globular	•			•		Indistinct	Late Spring	Acorn	
Quercus robur	English Oak	Fagaceae	Mod-sensitive	Mod-tolerant	Mod-sensitive	Mod-tolerant	4-8	Pioneer	Europe, Western Asia	High	Medium	Medium	Medium	Medium	High	35+	25-30	Globular	•			•		Indistinct	Late Spring	Acorn	
Robinia pseudoacacia	False Acacia	Fabaceae	Mod sensitive	Mod-tolerant	Sensitive	Intolerant	4-8(9)	Pioneer	Eastern USA	High	Medium	Medium	High	Low	Medium	25		Vase	•					Cream	Early Summer	Pod	
Salix alba	White Willow	Salicaceae	Sensitive		Tolerant	Intolerant	2-8(9)	Pioneer	Europe, Asia, North Africa	High	Medium	Medium	Medium	Medium	None (†)	25-30		Irregular	•				•	Indistinct	Late Spring	Capsule	
Salix babylonica	Weeping Willow	Salicaceae	Sensitive		Mod-tolerant	Intolerant	(5)6-8		China						None (†)	15-20		Weeping	•				•	Indistinct	Late Spring	Capsule	

BOTANICAL NAME	COMMON NAME	FAMILY	TOLERANCES				HARDINESS ZONE			ECOSYSTEM SERVICES				ECOSYSTEM DISSERVICES		AESTHETIC AND OTHER QUALITIES			FOLIAGE			FLOWER					
			Drought	Salt	Water logging	Shade	Zone	Succession	Natural Range	Carbon Seq	Avoided Rainwater Runoff	Pollution Removal	Total Benefits Index	BVOC Emissions	Allergy Potential (if female)	Mature Height (m)	Crown Spread (m)	Crown Shape	Deciduous	Evergreen	Autumn Colour	Monoecious	Dioecious	Colour	Period	Fruit	Ornamental Bark
Salix caprea	Goat Willow	Salicaceae	Mod-sensitive		Mod-tolerant	Mod-tolerant	4-8	Pioneer	Europe, Asia	High	Medium	Medium	High	Medium	None (!)	10-15		Irregular	•				•	Indistinct	Late Spring	Capsule	
Salix daphnoides	Violet Willow	Salicaceae	Sensitive		Mod-tolerant	Mod-tolerant	4-8		Europe						None (!)	10-15		Ovoid	•				•	Indistinct	Late Spring	Capsule	
Sorbus aria	Whitebeam	Rosaceae	Tolerant	Mod-tolerant	Sensitive	Mod-tolerant	5		Europe	High	High	High	High	Low	Low	15-20	5-8	Oval	•					White	Late Spring	Puma (incl)	
Sorbus aucuparia	Mountain Ash	Rosaceae	Mod sensitive	Mod-tolerant	Sensitive	Mod-tolerant	3-6	Late succession	Europe	High	Low	Low	Medium	Low	Low	5-20	5-8	Oval	•		•			White	Late Spring	Puma (incl)	
Styphnolobium japonicum	Japanese Pagoda Tree	Fabaceae	Mod-tolerant		Sensitive	Mod-tolerant	4-7	Pioneer	Central and Western China, Korea						Medium	20-25	15-20	Globular	•		•			Cream	Late Spring	Pod (rare in UK)	
Tamarix tetandra	Tamarisk	Tamaricaceae	Tolerant	Mod-tolerant	Sensitive	Intolerant	3-8		South Eastern Europe						Medium	4-6		Irregular	•					Pink	Early Summer	Capsule	
Taxus baccata	Common Yew	Taxacea	Tolerant		Sensitive	Tolerant	(5)6-7	Mid succession	Europe, Western Asia, North Africa						None (!)	15-18		Irregular		•			•		Early Spring	Red Nut (female)	
Tilia americana	American Lime	Malvaceae	Mod-tolerant		Sensitive	Tolerant	3-9(1)	Late succession	Eastern USA, South eastern Canada	Medium	Medium	Medium	Medium	Low	Medium	35-40	20+	Oval	•		•			Cream	Early Summer	Nut Like (10mm)	
Tilia cordata	Small leaved Lime	Malvaceae	Mod-sensitive		Sensitive	Tolerant	3-7	Late succession	Europe, Western Asia	Medium	Medium	Medium	Medium	Low	Medium	30+	15+	Globular	•		•			Cream	Early Summer	Nut Like (5mm)	
Tilia x euchlora	Caucasian Lime	Malvaceae	Mod-sensitive		Sensitive	Mod-tolerant	3-7	Late succession	Hybrid	Medium	Medium	Medium	Medium	Low	Medium	20+	15+	Oval	•		•			Cream	Early Summer	Nut Like (sterile)	
Tilia europaea	Common Lime	Malvaceae	Mod-sensitive		Sensitive	Mod-tolerant	3-7	Late succession	Hybrid	Medium	Medium	Medium	Medium	Low	Medium	30+	15+	Oval	•		•			Cream	Early Summer	Nut Like (8mm)	
Tilia henryana		Malvaceae	Mod-sensitive		Sensitive	Mod-tolerant	3-7	Late succession	China						Eu mn	15-20	5-8	Oval	•		•			Cream	Late Summer	Nut Like (5-6mm)	
Tilia mongolica	Mongolican Lime	Malvaceae	Mod tolerant		Sensitive	Mod-tolerant	4-6	Late succession	Mongolia, China	Medium	Medium	Medium	Medium	Low	Medium	10	5-8	Oval	•		•			Cream	Late Summer	Nut Like (5-6mm)	
Tilia platyphyllos	Broad leaved Lime	Malvaceae	Mod-sensitive		Sensitive	Tolerant	4-6	Late succession	Europe, Western Asia	Medium	High	High	High	Medium	Medium	35-40	20	Oval	•		•			Cream	Early Summer	Nut Like (9mm)	
Tilia tamentosa	Silver Lime	Malvaceae	Mod-tolerant		Sensitive	Mod-tolerant	4-6	Late succession	South East Europe, Balkans, Western Asia	Medium	Medium	Medium	Medium	Low	Medium		10-15	Oval	•		•			Cream	Early Summer	Nut Like(7mm)	
Ulmus spp.	Elm	Ulmaceae	Mod-tolerant	Mod-tolerant	Mod-sensitive	Mod-tolerant	4-6		DED resistant cultivars	Medium	High	High	High	Low	Medium	20+	8-10	Variable	•					Indistinct	Early Spring	Winged Nutlets	
Zelkova serrata	Japanese Zelkova	Ulmaceae	Mod-tolerant		Sensitive	Mod-tolerant	(4)5-8		China, Japan	High	Medium	Medium	Medium	Low	High	25-30		Vase	•			•		Indistinct	Late Spring	Bruise	
CONIFERS																										
Abies fraseri	Fraser Fir	Pinaceae	Mod-sensitive		Mod-sensitive	Tolerant	4-7	Late succession	Eastern USA						Low	15-25		Columnar		•				Indistinct	Early Summer	Cone (3-6cm)	
Abies koreana	Korean Fir	Pinaceae	Mod-sensitive		Mod-sensitive	Tolerant	5-6(7)	Late succession	South Korea						Low	10-15.		Conical		•				Indistinct	Early Summer	Cone (4-9cm)	
Abies nordmaniana	Caucasian Fir	Pinaceae	Mod-sensitive		Mod-sensitive	Tolerant	4-6	Late succession	Eastern Europe/Western Asia						Low	30-50		Conical		•				Indistinct	Early Summer	Cone (10-12cm)	
Cedrus atlantica	Atlas Cedar	Pinaceae	Tolerant		Sensitive	Mod-tolerant	6-9		Morocco, Algeria	Medium	High	High	High	Medium	Low	40-50		Conical		•		•			Late Summer	Cone (5-8cm)	
Cedrus deodara	Deodar Cedar	Pinaceae	Tolerant		Sensitive	Mod-tolerant	7-9(1)		Afghanistan, Northern India, Western Nepal	Medium	High	High	High	Medium	Low	40-50		Conical		•					Late Summer	Cone (8-10cm)	
Cedrus libani	Cedar of Lebanon	Pinaceae	Tolerant		Sensitive	Mod-tolerant	5-7		Lebanon, Syria	Medium	High	High	High	Medium	Low	30-40		Conical		•					Early Autumn	Cone (8-10cm	
Chamaecyparis lawsoniana	Lawson Cypress	Cupressaceae	Mod-tolerant		Sensitive	Mod-tolerant	5-7		North Western USA						High	60-70		Conical		•		•		Indistinct	Late Spring	Cone (10mm)	
Cryptomeria japonica	Japanese Cedar	Cupressaceae	Mod-tolerant	Mod-tolerant	Mod-sensitive	Mod-tolerant	5-6	Late succession	Japan						Low	45-50		Conical		•		•		Indistinct		Cone (1-3cm)	
x Cuprocyparis leyandii	Leyland Cypress	Cupressaceae	Tolerant		Sensitive	Intolerant	6-10		Hybrid						High	25+		Columnar		•		•		Indistinct			
Cupressus macrocarpa	Monterey Cypress	Cupressaceae	Tolerant	Mod-tolerant	Sensitive	Intolerant	6-10		California	Medium	High	High	High	Medium	High	25-40		Conical		•		•		Indistinct		Cone (3-4cm)	
Gingko biloba	Maidenhair Tree	Ginkgoaceae	Tolerant		Sensitive	Mod-tolerant	4-9(1)		China						None (!)	25-30.		Ovoid	•		•		•	Indistinct	Early Spring	Bruise (female)	
Larix decidua	Common Larch	Pinaceae					3-6	Pioneer		Medium	Medium	Medium	Medium	Low	Low												
Larix x eurolepsis		Pinaceae					3-6	Pioneer		Medium	Medium	Medium	medium	Low	Low												
Larix kaempferi	Japanese Larch	Pinaceae					3-6	Pioneer		Medium	Medium	Medium	Medium	Low	Low												
Metasequoia glyptostroboides	Dawn Redwood	Cupressaceae	Mod tolerant	Intolerant	Sensitive	Mod-tolerant	(4)5-8	Pioneer		Medium	High	High	High	Medium	Low	30-35		Conical		•		•		Indistinct	Late Spring		
Pinus nigra Austriaca	Austrian Pine	Pinaceae	Tolerant	Mod-tolerant	Sensitive	Mod-tolerant	3-7	Pioneer	Central, Southern Europe	Medium	Medium	medium	Medium	Medium	Low	35-40		Conical		•				Indistinct	Late Spring	Cone	
Pinus maritima	Corsican Pine	Pinaceae		Mod-tolerant			3-7	Pioneer		Medium	Medium	Medium	Medium	Medium	Low												
Pinus pinaster	Maritime Pine	Pinaceae	Mod-tolerant		Sensitive	Intolerant	3-7		Mediterranean	Medium	Medium	Medium	Medium	Low	Low	35-40		Conical		•				Indistinct	Late Spring	Cone	
Pinus pinea	Italian Stone Pine	Pinaceae	Tolerant		Sensitive	Mod-tolerant	3-7		Iberian peninsula	Medium	Medium	Medium	Medium	Low	Low	20-25		Conical		•				Indistinct	Late Spring	Cone	
Pinus radiata	Monterey Pine	Pinaceae	Mod-tolerant		Sensitive	Mod-tolerant	3-7		California	Medium	Medium	Medium	Medium	Low	Low	35-40		Irregular		•				Indistinct	Late Spring	Cone	
Pinus strobus	Eastern White Pine	Pinaceae	Mod-sensitive	Intolerant	Sensitive	Mod-tolerant	3-7		Eastern USA, Southern Canada						Low	70-80		Conical		•				Indistinct	Late Spring	Cone	
Pinus sylvestris	Scots Pine	Pinaceae	Tolerant	Mod-tolerant	Mod-sensitive	Intolerant	3-7	Pioneer	Europe, Northern Asia	Medium	Medium	Medium	Medium	Low	Low	35-40		Conical		•				Indistinct	Late Spring	Cone	
Pinus wallichiana	Bhutan Pine	Pinaceae	Mod-sensitive		Sensitive	Intolerant	5-7		Himalayas	Medium	Medium	Medium	Medium	Low	Low	40-50		Conical		•				Indistinct	Late Spring	Cone	
Sequoiadendron giganticum	Wellingtonia	Cupressaceae	Mod-tolerant		Sensitive	Mod-tolerant	6-8	Pioneer	California USA	Medium	Medium	Medium	High	Medium	Medium	50-60		Conical		•		•		Indistinct	Late Spring	Cone (2-3cm)	
Sequoia sempervirens	Coastal Redwood	Cupressaceae	Mod-tolerant		Sensitive	Tolerant	7-9		Northern California, Southern Oregon USA	Medium	Medium	Medium	High	Medium	Medium	50-60		Conical		•		•				Cone (2-3cm)	
Taxodium distichum	Swamp Cypress	Cupressaceae	Mod-tolerant	Mod-tolerant	Mod-sensitive	Mod-tolerant	4-11		South central, south eastern USA	Medium	Medium	Medium	Medium	Medium	High	35-50		Conical	•			•		Indistinct	Early Spring	Cone (2-4cm)	

Appendix 4 – Ancient Woodland and Ecology

Surveys for Ancient Woodlands should include a Phase 2 Ecological Survey to include flora and fauna including birds, invertebrates and lichens. Ancient woodlands are increasing rare and venerable habitats which together with their wildlife and ecology can be easily damaged from impacts of Direct Damage within a tree's Root Protection Area, and by Indirect Damage to the woodland as a whole including its wildlife, should the Buffer not be sufficient enough. Some of the impacts are listed within the relevant PPG's and further details can be found within the following reports listed upon the Ancient woodland PPG page for further reading;- Impacts of nearby development on ancient woodland (2012) Woodland Trust; Impacts of nearby development on the ecology of ancient woodland (2008) Just Ecology; A Review of the Impact of Artificial Light on Invertebrates (2011) Buglife; Bats and artificial lighting in the UK (2018) Bat Conservation Trust; Guidelines for consideration of bats in lighting projects (2018) EUROBATS.

Appendix 5 – Arboricultural Site Monitoring Sheet

An example of an Arboricultural Site Monitoring Sheet is shown overleaf. This is an example that it used by a private contractor active within Coventry and represents a good practice example that the City Council are aware of. It is used to assist the Council to monitor the protection of trees during the construction phase of development, and to assess the trees health upon the completion of the sites building work.

Arboricultural site monitoring sheet

Client	
Project	
Inspector	
Others present	
Date	
Weather	
Sheet detail	
Sheet number	

Aspect to be monitored	Yes	No	Comments	Date	Signature
1. Has the protective fencing been installed?					
2. Are the information signs on the protective fencing in place?					
3. Has the protective fencing been moved?					
4. Have the trees sustained visible damage since the previous inspection?					
5. Has the condition of the trees altered since the previous inspection?					
6. Are there any scheduled works within the protective fencing?					
7. Have those works been agreed in writing with the local planning authority?					
8. Is the ground protection sufficient?					
9. Are any additional measures required to protect the trees?					
10. Can the protective fencing be removed?					

Notes

Appendix 6 – Copy of CAVAT Calculation

CAVAT Catalpa tree example.

CAVAT

SPREADSHEET TO CALCULATE VALUE OF INDIVIDUAL TREE STOCK (FULL METHOD)

Created by Alexandra Sleet and Phillip Handley

Only enter data in the pale-green boxes

CAVAT	Quantities you measure / look up		Calculated Values
Step 1: Basic Value			
Measured Trunk Diameter	78.00		
Unit Value Factor	15.88		
Basic Value			£75,880.40
Step 2: CTI Value			
Community Tree Index (CTI) Factor	125		
Community Tree Index (CTI) Value			£94,850.49
Step 3: Location Value			
Location Factor	100		
Location Value			£94,850.49
Step 4: Functional Crown Value part 1			
Structural Factor	80		
Structural Value			£75,880.40
Step 5: Functional Crown Value part 2			
Functional Crown Factor	90		
Functional Crown Value			£68,292.36
Step 6: Amenity Value			
Positive Attributes Factor	30		
Negative Attributes Factor	0		
Amenity Value		130	£88,780.06
Step 7: Full Value			
Life Expectancy Factor	10 - <20		
FINAL VALUE			£48,829

Appendix 7 – Contact Details of Useful Organisations, Societies and Bodies

Government & Official Bodies

Ministry of Housing Communities and Local Government
2 Marsham
Street London
SQ1P 4DF

Telephone: +44(0) 30 3444 0000
Email: newsdesk@communities.gsi.gov.uk
Website: https://www.gov.uk/government/organisations/ministry-of-housing-communities-and-local-government

The British Standards Institution
389 Chiswick High Road
London
W4 4AL

Telephone: +44(0) 20 8996 7001
Email: cservices@bsigroup.com
Website: https://www.bsigroup.com/en-GB/

Natural England
County Hall
Spetchley Road
Worcester
WR5 2NP

Telephone: +44(0) 30 0060 3900
Email: enquiries@naturalengland.org.uk
Website: https://www.gov.uk/government/organisations/natural-england

Forestry Commission
620 Bristol Business Park
Coldharbour Lane
Bristol
BS16 1EJ

Telephone: +44(0) 30 0067 4000
Email: fe.england@forestry.gsi.gov.uk
Website: https://www.forestry.gov.uk/england

Professional Associations

The Arboricultural Association
The Malthouse
Stroud Green
Standish
Stonehouse
Gloucestershire
GL10 3DL

Telephone: +44(0) 12 4252 2152
Email: admin@trees.org.uk
Website: https://www.trees.org.uk/

National Association of Tree Officers
3 Church
Street Eccles
Manchester
M30 0DF

Telephone: +44(0) 16 1870 6800
Email: admin@nato.org.uk
Website: http://nato.org.uk/

Landscape Institute
107 Grays Inn Road
London
WC1X 8TZ

Telephone: +44(0) 20 7685 2640
Email: contact@landscapeinstitute.org
Website: https://www.landscapeinstitute.org/

Institute of Chartered Foresters
59 George Street
Edinburgh
EH2 2JG

Telephone: +44(0) 13 1240 1425
Email: icf@charteredforesters.org
Website: https://www.charteredforesters.org/

Action Groups *The Tree Council* 4 Dock Offices
Surrey Quays Road
London
SE16 2XU

Telephone: +44(0) 20 7407 9992 Email: info@treecouncil.org.uk
Website: https://www.treecouncil.org.uk/

Coventry Tree Warden Network
Email: trees@ctwn.org.uk
Website: http://www.ctwn.org.uk/index.html

The Woodland Trust
Kempton Way Grantham
Lincolnshire
NG31 6LL

Telephone: +44(0) 33 0333 3300
Email: england@woodlandtrust.org.uk
Website: http://www.woodlandtrust.org.uk/

Warwickshire Wildlife Trust Brandon Marsh Nature Centre Brandon Lane
Coventry CV3
3GW

Telephone: +44(0) 24 7630 2912 Email: enquiries@wkwt.org.uk
Website: http://www.warwickshirewildlifetrust.org.uk/

Campaign to Protect Rural England
5-11 Lavington Street
London
SE1 0NZ

Telephone: +44(0) 20 7981 2800 Email: info@cpre.org.uk Website: http://www.cpre.org.uk/