M25 junction 10/A3 Wisley interchange TR010030
6.5 Environmental Statement: Appendix 7.3 Veteran trees and Arboricultural Impact Assessment

Regulation 5(2)(a)
Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

M25 junction 10/A3 Wisley interchange

The M25 junction 10/A3 Wisley interchange Development Consent Order 202[x]

6.5 ENVIRONMENTAL STATEMENT

APPENDIX 7.3 VETERAN TREES AND ARBORICULTURAL IMPACT ASSESSMENT

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010030
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Author:	M25 junction 10/A3 Wisley interchange project team, Highways England

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Appendix 7.3 Veteran trees and Arboricultural Impact Assessment

7.1 Introduction

7.1.1 Scope of assessment

7.1.1.1 Atkins Limited (Atkins) has been commissioned by Highways England to undertake a tree survey in support of an Environmental Impact Assessment (EIA) and Environmental Statement for the proposed M25 junction 10/A3 Wisley interchange (the 'Scheme'). The Scheme will be a Nationally Significant Infrastructure Project (NSIP). This means that a Development Consent Order (DCO) application is to be made to the Secretary of State under Section 37 of the Planning Act 2008 to seek authorisation to build the Scheme.

7.1.1.2 This report is an arboricultural impact assessment (AIA) that determines the impact of the scheme on the recorded trees. The tree survey also identified veteran trees, this included those trees which can be considered as ancient. As defined in the National Planning Policy Framework (NPPF) 2018, an ancient or veteran tree is "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*".

7.1.1.3 In addition to veteran trees, further trees were recorded that are in sensitive locations or those that have saproxylic habitat features, that required further assessment by an experienced entomologist to confirm the suitability or quality of such habitats for saproxylic invertebrates. Such trees were recorded in order to inform the design process and retain the trees where feasible, or to enable mitigation measures to be identified for the treatment of these trees if they require removal.

7.1.1.4 This report details the trees recorded within the DCO Boundary and those on or adjacent to this line. It includes trees within Painshill Park, RHS Wisley and other sensitive areas, or trees covered by Tree Preservation Orders (TPO) that could be impacted upon by the Scheme. These trees are in the majority of cases not veteran trees but included to determine the impacts of the Scheme to inform the DCO application and gain necessary consents where applicable.

7.1.1.5 This report also details woodland compartments within Surrey Wildlife Trust (SWT) land, where the impacts of the Scheme will require tree loss and infringement into existing woodlands.

7.1.1.6 The report forms an Appendix to the Ecology Chapter of the ES.

7.1.1.7 The trees and woodlands have been recorded in accordance with the British Standard *BS5837:2012 'Trees in Relation to Design, Demolition and Construction – Recommendations'* to report on the impacts of the proposed works. It is a scheme-wide report and is supplemented by the production of Tree Protection Plans (TPPs), which are included within Appendix C of this report.

7.1.1.8 The proposed Scheme covers works around the M25 junction 10/A3 Wisley interchange, its extents are illustrated on the TPPs.

7.1.2 Statutory Protection

7.1.2.1 Trees may be protected through a Tree Preservation Order (TPO). The law on TPOs is in Part VIII of the Town and Country Planning Act 1990 as amended and in the Town and Country Planning (Tree Preservation) (England) Regulations 2012.

7.1.2.2 A TPO is made by a local planning authority in respect of a tree(s) as the tree is considered to bring amenity value to the surrounding area. A TPO makes it an offence to cut down, uproot, lop, top, wilfully damage or wilfully destroy a protected tree without authorisation. Works permitted by an Act of Parliament are exempt from these regulations.

7.1.2.3 The TPOs within the Scheme boundary are defined on the TPPs through a green dot or green dashed outline. They correspond to the following trees:

- G035 – Painshill Park, south west of Gothic Tower;
- G41A-H – Painshill Park, south west of Gothic Tower;
- T156 – adjacent to service road running parallel to A3 on-slip at A3/A245 Painshill junction; and
- T157 – adjacent to service road running parallel to A3 on-slip at A3/A245 Painshill junction.

7.1.3 Definition of Veteran Trees and Planning policy

7.1.3.1 The National Planning Policy Framework (NPPF) was updated in July 2018 to provide greater protection for veteran trees (and subsequently updated so the latest published version is 2019). The pertinent section being paragraph 175 c) which states;

'development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused unless there are wholly exceptional reasons and a suitable compensation strategy exists'.

7.1.3.2 Footnote 58 from the same section of the NPPF references applicable exceptional reasons as being;

'for example, infrastructure projects (including nationally significant infrastructure projects, orders under the Transport and Works Act and hybrid bills), where the public benefit would clearly outweigh the loss or deterioration of habitat'.

7.1.3.3 The NPPF identifies ancient/veteran trees as:

'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'.

7.1.3.4 In relation to NSIPs, within the National Policy Statement for National Networks, paragraph 5.32 states;

"*The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of aged or veteran trees found*

outside ancient woodland, unless the national need for and benefits of the development, in that location, clearly outweigh the loss. Aged or veteran trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided. Where such trees would be affected by development proposals, the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons for this." This has a footnote stating, "*This does not prevent the loss of such trees where the decision-maker is satisfied that their loss is unavoidable*".

7.1.3.5 Further guidance on the classification of ancient and veteran trees was obtained from a number of sources.

7.1.3.6 The Forestry Commission and Natural England guidance[1] describes ancient and veteran trees as follows:

*"**Ancient trees***

*An ancient tree is exceptionally valuable. Attributes **can include** its:*

- *great age*
- *size*
- *condition*
- *biodiversity value as a result of significant wood decay and the habitat created from the ageing process*
- *cultural and heritage value*

Very few trees of any species become ancient.

Veteran trees

All ancient trees are veteran trees, but not all veteran trees are ancient. A veteran tree may not be very old, but it has decay features, such as branch death and hollowing. These features contribute to its biodiversity, cultural and heritage value".

7.1.3.7 The Ancient Tree Guide No.4[2], 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*'.

7.1.3.8 The Ancient Tree Hunt[3] defines an ancient tree as having all or some of the following characteristics: 1. Biological, aesthetic or cultural interest, because of its great age; 2. A growth stage that is described as ancient or post-mature; 3. A chronological age that is old relative to others of the same species.

7.1.3.9 It is during the ancient stages of the life of a tree that conditions are favourable for progressive colonisation by fungi that can change 'the nature and condition of wood material and dead dysfunctional woody tissue accumulate'[4]. It is also during this time of advanced age that the continued natural damage and

[1] Forestry Commission and Natural England (2018). Guidance. Ancient woodland, ancient trees and veteran trees: protecting them from development. https://www.gov.uk/guidance/ancient-woodland-and-veteran-trees-protection-surveys-licences. Accessed: 12/06/2019
[2] ATF (2008). Ancient Tree Guide No. 4: What are ancient, veteran and other trees of special interest? Ancient Tree Forum, c/o The Woodland Trust, Grantham, UK, 7 pp. Available at: http://www.ancienttreeforum.co.uk/wp-content/uploads/2015/02/ancient-tree-guide-4-definitions.pdf
[3] Owen, K. & Alderman, D. (2008). Ancient Tree Hunt: The minimum girth of ancient trees – a guide for verifiers. Ancient Tree Hunt (Ancient Tree Forum, Woodland Trust, Tree Register of the British Isles), 30 pp.
[4] Neville Fay's 'Defining and surveying veteran and ancient trees', March 2007.

progression of wood decay fungi that attributes to the formation of 'veteran features'[3]. These features being trunk hollowing, branch cavities, live stubs, shattered branch ends, loose bark, sap runs and a range of rot types[3].

7.1.3.10 The features provide a range of unique deadwood habitat specific to a range of invertebrates including saproxylic invertebrates. This will include specific wood decay, i.e. different types of rot, which will provide niche habitat for invertebrates. The perpetuation of such habitat enables resilience and sustainability in the population development of such specialised and rare invertebrates, particularly in view of their limited mobility.

7.1.3.11 The term veteran '*describes qualities associated with particular habitats in trees, principally associated with dead wood*'[3]. So, a veteran tree is also one that '***mimics the quality and quantity***'[3] of associated veteran features that are typically found on an ancient tree. The features need to exhibit or allow for a diversity of wood decay. It is also recognised that the longer these features are in-situ the greater the diversity of colonising species.

7.2 Survey

7.2.1 General

7.2.1.1 The tree survey works have been undertaken by qualified and experienced arboriculturists. An experienced entomologist also assisted in the classification of veteran trees.

7.2.1.2 The approach to the survey involved ground level walked assessments to record and confirm the presence of veteran trees, and to record additional trees in line with the scope of the assessment including the different woodland compartments within SWT land.

7.2.1.3 Potential veteran specimens and a sample of the standing dead trees recorded were then re-surveyed by an experienced entomologist to ascertain their value for saproxylic invertebrates[5]. This additional survey effort was focused on determining whether the trees provided exceptional value for saproxylic invertebrates, which is a key consideration for assessing the biodiversity value of a veteran/ancient tree[6] or trees offering veteran habitat features.

7.2.1.4 The locations of individual trees and the start and end points of groups/woodlands were, where possible, plotted using proprietary GIS data capture software on Trimble hand-held mobile mappers. These locations were verified using available aerial imagery.

7.2.1.5 This report has been undertaken in accordance with the British Standard *BS5837:2012 "Trees in Relation to Design, Demolition and Construction – Recommendations",* and supplemented by Natural England's 'Veteran Trees Initiative: Specialist Survey Method' and Neville Fay's 'Defining and surveying veteran and ancient trees' (Fay, 2007), to assist in the identification of veteran trees.

[5] 'Saproxylic' invertebrates are dependent on microhabitats associated with the processes of decay and damage in the bark and wood of trees.
[6] The NPPF identifies ancient or veteran trees as; 'a tree which, because of its age, size and condition, is of exceptional biodiversity, cultural or heritage value.'

7.2.1.6 The *BS5837:2012* standard gives recommendations and guidance on the relationship between trees and the design, demolition and construction process, setting out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and structures.

7.2.1.7 *BS5837:2012* does not set explicit parameters for measuring the sensitivity of an arboricultural resource; nor does it assess the magnitude of impact of a proposed development on trees (other than by providing a record of the number of trees that would need to be removed to facilitate the development). Rather, the British Standard provides parameters which enable the arboriculturist to assess the quality of the trees that may be affected by the development that is proposed.

7.2.1.8 Whilst the BS categories are open to varied interpretation, the guidelines in the cascade chart of *BS5837:2012* (see insert A.1 in Appendix A of this AIA) provide details on how to determine tree qualities and can be used to inform the design process to retain those trees of higher quality where possible.

7.2.1.9 The *BS5837:2012* states that where veteran trees are recorded and if ancient or entering the ancient age classification, these trees will almost always be included in the highest category of A3.

7.2.2 Spatial scope

7.2.2.1 The survey has targeted trees within and around the DCO Boundary. The woodland survey has been limited to SWT land, given this is area is the main location for the woodland infringement.

7.2.2.2 The TPPs (see Appendix C of this report) show trees that have been surveyed.

7.2.2.3 This report is targeted at the impacts on veteran trees, and those trees recoded as part of the scope of this assessment. It does not cover the subsequent impacts such tree removal would have on ecological or landscape receptors, or those trees that were not recorded as part of this assessment.

7.2.3 Data gathering

7.2.3.1 Data have been collected in accordance with *BS5837:2012*, as outlined in Appendix A of this report. The purpose of the tree categorisation method applied by the arboriculturist is to identity the quality and value (in a non-fiscal sense) of the recorded tree stock, allowing informed decisions to be made concerning which trees should be removed and which retained if development is to occur.

7.2.3.2 For a tree to qualify under any given category, it should fall within the scope of that category's definition as defined in Appendix A of this report (categories U, A, B, C) and, for trees in categories A to C, it should qualify under one or more of the three subcategories (1, 2, 3). Subcategories 1, 2 and 3 are intended to reflect arboricultural and landscape qualities, and cultural values, respectively.

7.2.3.3 Veteran trees are specifically noted in A3 category on the cascade chart. This has been applied to this survey. However, where the trees are not ancient the number of veteran habitat features, estimated remaining life expectancy and safety issues were considered in the assigning of tree categories.

7.2.3.4 Trees were recorded as individual specimens, groups and woodlands. Where trees were recorded as groups or woodlands measurements were taken from the

largest tree within the group/woodland. The method of measuring diameters is defined in Appendix A of this report.

7.2.3.5 This level of survey meets the requirements of BS5837:2012, which states that 'trees growing as groups or woodland should be identified and assessed as such'. The standard defines the term group as 'trees that form cohesive arboricultural features either aerodynamically (e.g. trees that provide companion shelter), visually (e.g. avenues or screens) or culturally including for biodiversity (e.g. parkland or wood pasture)'.

7.2.3.6 Crown spreads of the surveyed trees were given as an average measurement where the tree's crowns were balanced. Where there was a notable difference in crown spread to a cardinal point, these were recorded. The average measurement was taken from the cardinal point relevant to the direction of the Scheme. This level of survey is deemed sufficient by the arboriculturist to establish the extent of the crown spread in the direction of any future proposals. All crown spread measurements should be taken from the tree survey schedules (see Appendix B of this report).

7.2.3.7 The trees were assessed in line with the Visual Tree Assessment (VTA) method developed by Mattheck and Breloer (1994). This method is based on the axiom of uniform stress, whereby a tree will grow in response to environmental stimuli to produce a structure that bears forces evenly across its surface. As such an internal defect, such as decay, would initiate a noticeable change in the stem's shape to accommodate the physical change.

7.2.3.8 The trees were also assessed using Neville Fay's 'Defining and surveying veteran and ancient trees' (Fay, 2007), to assist in the identification and classification of veteran trees which are ancient specimens. The relevant section of the table on tree girth has been reproduced in table 7.1. The different veteran habitat features present on each tree were also recorded and noted in the survey schedules.

Table 7.1: Girth sizes to classify ancient trees

Age Class	Tree Stem Size		
	>2.5m stem girth >795mm stem diameter	**>4.0m stem girth >1273mm stem diameter**	**>4.5m stem girth >1432mm stem diameter**
Ancient	Field maple Rowan Yew Birch Holly and other smaller trees	Oaks Ash Scots Pine Alder	Sycamore Lime Horse chestnut Sweet chestnut Elm species Poplar species Beech Willows Other pines and exotics

Insert Source: information taken from Table 1 of Neville Fay's 'Defining and surveying veteran and ancient trees', March 2007.

7.2.4 Limitations to survey

7.2.4.1 Where access was restricted due to safety concerns or third-party refusal, then these areas were not assessed.

7.2.4.2 The survey was not a full BS5837:2012 survey of all trees within the DCO boundary, it was a target approach to specific areas and the recording of veteran specimens or significant specimens as per our instructions.

7.2.4.3 Where access permitted, trees were identified and inspected from ground level only and were not climbed. No invasive examination techniques (such as increment boring, or internal decay detection) were carried out and as such no assessment of the internal condition of the wood of these trees can be given.

7.2.4.4 The tree survey undertaken is not intended to be a tree risk management survey targeting safety-related issues. However, as veteran tree features are often defects that pose a safety risk, any management recommendations that have been recorded are related to reducing the risk of harm to people or property where deemed appropriate by the arboriculturist. These are detailed within the tree survey schedules (see Appendix B of this report).

7.2.4.5 The application of veteran tree status, where it is not ancient or meeting criteria of advanced age as per available guidance, required assessment from a range of specialists to verify its veteran status. Where the tree is not classified as ancient, then the level to which the habitat features provide suitable saproxylic habitat for invertebrates, mimicking ancient trees, required detailed specialist assessment. It is only after such detailed assessment that the tree can be determined as to whether it provides habitat characteristics of sufficient quality and quantity to classify its status further as veteran. If it does not meet these criteria, then the tree was not classified as a veteran. Further considerations around the cultural and heritage value of the tree's were also considered in the classification of veteran trees.

7.2.4.6 Validity, accuracy and findings of the tree locations will relate directly to the accuracy of the available aerial imagery and the GIS data capture software being used. As such the accuracy of the tree locations is potentially open to discrepancies and their locations may need verifying. Where tree groups have been illustrated as an outline this covers the extents of the tree group. It does not always illustrate individual trees within the groups. Where individual trees were identified they were plotted separately.

7.2.4.7 The report does not comment on possible effects of trees on neighbouring properties, including in relation to subsidence or heave, or with regard to possible hazards presented by trees surveyed.

7.2.4.8 Trees are living organisms subject to changes outside human control. Trees and their environment alter with the seasons and it is as well to inspect trees whilst in full leaf and when out of leaf. Following harsh or unexpected weather conditions, or heavy storms it is also prudent to inspect trees. Changes to ground water conditions will affect the root growth of a tree. Such changes are not always the result of human influence and other factors may be involved.

7.3 Survey results

7.3.1 Veteran trees

7.3.1.1 All of the trees recorded during the surveys are detailed in sub appendix B of this report.

7.3.1.2 From the trees recorded, **41no**. individual trees qualify as veteran specimens, and **2no**. groups. These are referenced as 'Vet' within the life stage classification column of the survey schedule, and their reference numbers have a red box around them on the TPPs.

7.3.1.3 The main species recorded that were classified as veteran status was common oak. These being sporadically located within the Scheme boundary, with a concentration being within the land to the north-west of the junction specifically around Fox Warren Park and Feltonfleet School. These trees being of high aesthetic appeal given their large scales and visibility in the landscape. In terms of their heritage value they are all growing within historically treed landscapes, and details on historic land use and further heritage aspects are covered within chapters 9 and 11 of the ES. No specific reference to a specific historic person or event could be identified for any specific veteran tree during the assessment.

7.3.1.4 The preservation of these veteran trees should be seen as paramount during the development of the Scheme, especially as the majority of these trees were also in good vitality at the time of the survey.

7.3.2 Additional trees/woodland compartments

7.3.2.1 The remaining trees that were recorded include standing dead specimens, whose value is in the dead wood habitat they provide to the locality, important trees due to their protection status, and trees adjacent or within sensitive land areas, i.e. RHS Wisley and Painshill Park. These being recorded to inform the continued design of the Scheme, and to reduce impacts where possible.

7.3.2.2 The standing dead trees or those in significant decline were recorded to permit assessment by an experienced entomologist to ascertain their value for saproxylic invertebrates and to determine suitable mitigation measures for the removal or replacement of such habitat, also whether the trees could be classified as veteran specimens. The ability to retain dead trees or those trees with significant structural defects within falling distance of a road is limited through health and safety considerations, so the approach to their retention or management is to manage to the risk of harm to adjacent people or property, whilst still enabling their retention in some form either on the ground or as reduced specimens.

7.3.2.3 Whilst veteran tree characteristics provide habitat features, these features can often be at the expense of structural integrity of the tree as a whole, or the defective part(s). Under both the civil law and criminal law, those duty holders (the person(s) who have control of tree management along the A3 and M25 highway corridor) have responsibilities for the health and safety of those on the highway network and therefore have potential liabilities arising from the falling of a tree or branch in the tort of negligence or criminal prosecution. This duty of care is laid down in the Occupiers Liability Acts 1957 & 1984, the Highways Act 1980 (especially section 41(1) and Health & Safety at Work Act 1974. Hence, as

part of routine hazardous tree management, it is likely that some of the recorded trees would require works to reduce the risk of parts of or whole tree failure. The landowner/manager has a duty of care to ensure that the trees are managed to reduce the risk of harm or damage that the trees may present to people or property.

7.3.2.4 The survey recorded a range of different woodland compartments, these being identified through visible changes in species composition, density and structural diversity. These are listed in the survey schedule, and illustrated on the 'Vegetation removal plans' in figure 9.8 of the ES.

7.3.2.5 At the time of the survey a number of the compartments had received thinning operations, notably in SWT land. The arisings from these operations had in the main been processed, although, to the north east of the junction a large proportion of the arisings were felled and left in situ.

7.4 Arboricultural impacts

7.4.1 General

7.4.1.1 This report determines the impact of the Scheme on the recorded tree stock. It provides details on the recorded trees including their condition and in some cases suitability for retention.

7.4.1.2 The report is supplemented by the TPPs (Appendix C of this AIA) that illustrate the proposed Scheme, the DCO boundary, the recorded trees and trees that would require removal or potential removal to facilitate the Scheme.

7.4.1.3 The drawings cover the outline of the Scheme. This means a 'worst-case scenario' is currently having to be presented in terms of tree removals or potential removals, as, during further progression of the design, bespoke engineering options could be explored to retain trees where possible and in consultation with the arboriculturist. However, in view of the scale of the proposed earthworks, the ability to retain trees safely will be a significant challenge, and one which may not be possible in a lot of cases. Confirmation on tree removals will be undertaken prior to construction and detailed within an Arboricultural Method Statements (AMS), that shall also confirm protection measures for the retained trees.

7.4.1.4 Similarly, any trees which have not been previously surveyed (or areas where design changes occur during detailed design) will be assessed following the methodology detailed in BS5837:2012 and this information will feed into the AMS.

7.4.1.5 The tree survey schedules within Appendix B of this AIA cover all the trees recorded as part of this assessment in line with the *BS5837:2012* guidance. A column has been included to indicate the impact of the works.

7.4.1.6 Entries in the impact column include removal (abbreviated as REM and highlighted as red); potential removal (abbreviated as POT REM and highlighted as blue) (to be confirmed prior to construction); part removal (abbreviated as PRG and highlighted as orange); and retained (abbreviated as RET and highlighted as green). Where the trees fall outside the Scheme Boundary, the default entry is retained.

7.4.2 Root protection areas

7.4.2.1 The root protection area (RPA), as defined in the BS5837:2012, is the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority. This area should be protected from disturbance "in order to avoid unacceptable damage to the tree as a result of severance or asphyxiation of the root system."

7.4.2.2 The recommended minimum area (m^2) to avoid potentially harmful disturbance has been calculated and entered into the tree schedules (see Appendix B of this AIA) for all trees. The RPA for each individual tree has been illustrated on the TPPs as a circle centred on the tree's stem, while the RPAs of the tree groups and woodlands have not been illustrated, unless trees have specifically been recorded within the groups.

7.4.2.3 This is largely due to the tree or woodland groups within the Scheme Boundary having to be removed in their entirety given the extensive earthworks proposed, meaning the provision of RPAs is unnecessary.

7.4.2.4 The use of RPAs will become more prevalent during the detailed design process: the infringement into these areas should be reduced where possible through sympathetic engineering approaches. The current TPPs are to be used to inform the continued progression of the scheme, similarly, the survey schedules which contain RPA details for the groups recorded.

7.4.2.5 In addition to the RPAs of trees where the veteran/ancient trees or significant specimens are impacted upon by the proposals then the actual root zones of the trees could be mapped using sonic-tomography to determine extent of any root loss that could occur, and to reduce or remove works in these locations. In all cases where the tree's RPAs extend into the DCO boundary, the land that the RPAs are extending into is generally either 'disturbed' or 'made' ground, meaning the soils contain less organic material, nutrients and likely to have less mycorrhizal fungi activity – so the preservation of these areas beyond that of root retention is less of a priority.

7.4.2.6 The significant specimens outside of the veteran/ancient trees could be those within the RHS Wisley grounds or within the Heyswood Girl Guides ancient woodland area.

7.4.3 Arboricultural impacts – veteran trees

7.4.3.1 The impacts of the work have been assessed, and table 7.2 covers the veteran trees that are currently directly impacted upon by the Scheme, further veteran trees are located beyond the direct footprint of the works within compensation land and areas of land previously within the DCO boundary of the Scheme, these are not included within the table below as these are to be retained.

7.4.3.2 Suggested mitigation options are set out in table 7.2, but these will be subject to further refinement in detailed design and follow the hierarchy of mitigation as highlighted within the ES. Any mitigation strategy shall

Table 7.2: Veteran trees potentially impacted by the Scheme

Tree ID	Tree Species	Location	Summary of value	Potential impact	Suggested mitigation
T006	Sweet chestnut	Wisley Common, south of the M25 and west of the A3, adjacent to road	The tree has reached an ancient age class. Despite this it appears healthy and has no obvious dead wood features or significant value for saproxylic invertebrates.	**Removal.**	None possible. Tree should be felled at the base and the trunk/significant limbs should be left intact (or in large sections) within the woodland to rot and provide a dead wood source. Position in the same/or a similar aspect, ideally in a sunny location.
T017	Oak	South of M25, Clearmount Footbridge	The tree has reached an ancient age class. Standout specimen in row of trees at 8m spacings beside mud track; decay in western buttress area; 10% deadwood in crown; 200mm diameter hanging deadwood in southern crown; historically severed ivy; 12.5m to motorway fence. Recommendation: Arbortom investigation to determine scale of basal decay if tree is to remain.	**Removal.**	None possible. Tree should be felled at the base and the trunk/significant limbs should be left intact (or in large sections) within the woodland to rot and provide a dead wood source. Position in the same/or a similar aspect, ideally in a sunny location.
T085	Sweet chestnut	Adjacent to the Elm Lane	The tree has reached an ancient age class. Standard tree growing on historic earth mound. Formerly three stems from 2.5m, south stem failed, large diameter wound remaining. Central stem elongated wound to west side, potentially lightning strike scar. Hollow main stem. Dead wood in lower crown to south. Habitat holes on main stem.	Potential removal/impact Resurfacing of Elm Lane could impact tree roots.	Bespoke mitigation measures required to limit impact, e.g. no-dig construction approach.
T086	Common Oak	Adjacent to the Elm Lane.	The tree has reached an ancient age class. Twinstem	Potential removal/impact	Bespoke mitigation measures required to limit

Tree ID	Tree Species	Location	Summary of value	Potential impact	Suggested mitigation
			tree adjacent to Elm Lane forking at 1500mm; crown suppression to north; frequent deadwood stubs not exceeding 100m diameter; neighbouring tree close to north, fusing at base.	Resurfacing of Elm Lane could impact tree roots.	impact, e.g. no-dig construction approach.
T108	Oak	Adjacent to the A3, within Feltonfleet School.	The tree has reached an ancient age class. It has extensive dead wood and red rot is likely to be present (important for saproxylic invertebrates). This tree is part of a series of three adjacent trees (T106/107/108) with a range of size classes, and at varying stages of decay, forming a joint long-term resource for saproxylic invertebrates.	Potential removal/impact Approximately 50% of the RPA is within the DCO boundary. The tree is currently shown on design drawings as positioned at the edge of the A3 slip road embankments.	Undertake detailed design options to limit/avoid encroachment into RPA. Undertake root zone mapping using sonic-tomography to ascertain actual root spread of the tree, to inform the layout of the proposals and to retain identified roots. The requirements for arboricultural mitigation measures would need to be defined within an Arboricultural Method Statement.
T109	Common oak	Adjacent to the A3, within Feltonfleet School (south-west corner).	The tree has reached an ancient age class. Despite this it does not have extensive dead wood features or significant value for saproxylic invertebrates.	Potential removal/impact Approximately 50% of the RPA is within the DCO boundary. The tree is currently shown on design drawings as positioned at the edge of the A3 slip road embankments.	Undertake detailed design options to limit/avoid encroachment into RPA. Undertake root zone mapping using sonic-tomography to ascertain actual root spread of the tree, to inform the layout of the proposals and to retain identified roots. The requirements for arboricultural mitigation measures would need to be defined within an Arboricultural Method Statement.
T110	Common oak	Adjacent to the A3, within Feltonfleet School (south-west corner).	The tree has reached an ancient age class. It has extensive rot (5-10m^2) and dead	Potential removal/impact Approximately 50% of the RPA is within	Undertake detailed design options to limit/avoid encroachment into RPA. Undertake root zone mapping using sonic-

Tree ID	Tree Species	Location	Summary of value	Potential impact	Suggested mitigation
			wood features (red rot is likely in second stem) and it is in an open (sunlit) setting. All these factors increase its value for saproxylic invertebrates.	the DCO boundary. The tree is currently shown on design drawings as positioned at the edge of the A3 slip road embankments.	tomography to ascertain actual root spread of the tree, to inform the layout of the proposals and to retain identified roots. The requirements for arboricultural mitigation measures would need to be defined within an Arboricultural Method Statement.
T111	Common oak	Adjacent to the A245, within Feltonfleet School (north-west corner).	The tree has reached an ancient age class. Large stem circumference. Despite this it does not have extensive dead wood features or significant value for saproxylic invertebrates.	Potential removal/impact Approximately 50% of the RPA is within the DCO boundary. The tree is currently shown on design drawings as positioned at the edge of the new road off the A245.	Undertake detailed design options to limit/avoid encroachment into RPA. Undertake root zone mapping using sonic-tomography to ascertain actual root spread of the tree, to inform the layout of the proposals and to retain identified roots. The requirements for arboricultural mitigation measures would need to be defined within an Arboricultural method statement.
T130	Oak	South of the A3, close to the existing gas compound, located in the corner of pasture.	The tree has reached an ancient age class. There are extensive dead wood features, including crown die-back which suggests heartwood rot may be developing. It is located in an open (sunlit) setting in the corner of pasture. All these factors increase its value for saproxylic invertebrates.	Potential removal/impact A proposed balancing pond south of the A3 is positioned on top of the tree location.	Undertake detailed design options to limit/avoid encroachment into RPA. Undertake root zone mapping using sonic-tomography to ascertain actual root spread of the tree, to inform the layout of the proposals and to retain identified roots. The requirements for arboricultural mitigation measures would need to be defined within an Arboricultural method statement. The balancing pond could be designed to enable the retention of the tree on the edge of the pond embankments, preferably as a live specimen but if this is not possible then a retained monolith/habitat pole in this location would still provide a dead wood resource.

Tree ID	Tree Species	Location	Summary of value	Potential impact	Suggested mitigation
T148	Common oak	In the northern part of the Ockham Park junction construction compound, north of the A3.	The tree has reached an ancient age class. It has extensive dead wood features (important for saproxylic invertebrates).	Potential removal/impact The tree is located at the edge of a construction compound area.	Tree should be retained. Standard tree protection fencing should be sufficient to ensure construction vehicles or materials do not encroach within the RPA.
T165	Sweet Chestnut	Adjacent to track within Heyswood girl guide camp site, south of A3.	The tree is an ancient specimen. It is the largest specimen within the DCO boundary. It has extensive rot and dead wood and it is in an open (sunlit) setting. All these factors increase its value for saproxylic invertebrates.	Potential removal/impact The tree is adjacent to an access track leading to a construction compound south of the A3. Impacts could occur if the existing track is widened or re-surfaced.	Tree should be retained. Any works required to the tree (e.g. pruning/limb removal) or works within the RPA (e.g. re-surfacing) will need to be agreed with an arboricultural consultant and detailed in an arboricultural method statement.

7.4.3.3 The **2no. trees identified for removal** are directly within the footprint of the proposals and there are no feasible design changes available to retain the trees. The trees should be felled at the base and the trunk/significant limbs should be left intact (or in large sections) within the adjacent woodlands to rot and provide a dead wood source. Position in the same/or a similar aspect, ideally in a sunny location for the arisings.

7.4.3.4 The remaining **9no.trees** require further assessment during the detailed design process in order to retain these specimens by reducing, removing or creating bespoke design solutions where the works cannot be avoid within their RPAs. Whilst these trees are shown for potential removal/impact, it is anticipated that in the majority of cases the works can be limited or removed from the RPAs of these trees.

7.4.4 Arboricultural impacts – remaining trees surveyed

7.4.4.1 The impacts of the Scheme have been assessed, and table 7.3 below reflects the current **tree totals** for the remaining surveyed trees required for removal or potential removal to facilitate the works:

Table 7.3: Arboricultural Impact Table – remaining trees surveyed

Type	BS Category Reference			
	Category A no./area (m^2)/m	Category B no./area (m^2)/m	Category C no./area (m^2)/m	Category U no./area (m^2)/m
Individual Tree (T) and individual trees in groups	9no.	29no.	14no.	1no.

Groups (G)	22no. from groups	4no.from groups	4no. from groups	0

7.4.4.2 These trees are currently within or closely adjacent to the footprint of the proposals. Where trees have over 20% of their RPAs severed by the works the trees have been identified for potential or actual removal depending on feasibility of re-designing certain areas or structures. The 20% figure being specifically referenced within BS5837:2012 for what is deemed potentially acceptable in terms of RPA infringement. In some cases, trees could be retained through further detailed design, and confirmation on their removal should be undertaken prior to construction.

7.4.4.3 The trees for potential removal require further assessment during the detailed design process in order to retain these specimens.

7.4.5 Arboricultural impacts – TPO trees

7.4.5.1 No TPO trees have been identified for removal, but the trees are closely adjacent to the proposals, and in some cases their RPAs extend into the works areas.

7.4.5.2 Therefore, specific working measures adjacent to the trees would need to be confirmed in order to ensure the protection of the trees during construction. Any specific working measure would need to be confirmed within an AMS.

7.4.6 Arboricultural impacts – Painshill Park

7.4.6.1 Trees were recorded around the Gothic Tower as instructed. This was due to previous design iterations showing works within this area. However, design changes have occurred and informed by the tree survey in order to move the works in this location outside of the constraints imposed by the trees.

7.4.6.2 No trees have been identified for removal within the Gothic Tower area of Painshill Park.

7.4.7 Arboricultural impacts – RHS Wisley

7.4.7.1 The impacts of the Scheme have been assessed, and at present **7no.** trees along the east boundary with the A3 could be susceptible to changes in ground level either through loss of roots or alterations in soil moisture levels and may need to be removed for long term safety reasons. Further investigations into the root spread of these trees using a technique know as sonic tomography along with further work on the design of the retaining solutions and a more detailed survey of ground levels would be carried out in the detailed design phase to definitively establish the effect on the trees. The trees would be retained if at all possible.

7.4.7.2 The trees are listed below and include their RHS Wisley tree tag references where observed.

- T197 - Cultivar x canadensis 'Gaver', ref W903152-A;
- T192 - Populus x generosa 'Beaupre', ref W903156-B;
- T185 – Turkey Oak, no tag fixed to main stem;
- T184 – Giant redwood, ref W19981903-B;
- T181 – Red oak ref W19981893-A;

- T183 - Giant redwood, ref W19981903-A; and
- T176 – Norway maple Cultivar 'Charles F. Irish', ref W-964156-A.

7.4.7.3 This judgement is based on their RPA severance currently exceeding save thresholds for the construction of a retaining wall along the A3 embankment.

7.4.7.4 Confirmation on the potential to retain these trees is to undergo further assessment by mapping the actual root zones of the trees using sonic-tomography to determine extent of any root loss that could occur, and to reduce this where feasible through detailed design options, or again if feasible undertake tree works to reduce crowns to compensate for the extent of the root loss – in order to retain some part of the effected trees.

7.4.7.5 The remaining trees recorded in this area are either outside of the footprint of the retaining wall, or the RPA infringement is approximately at or below the 20% threshold. The requirements for any facilitation pruning of tree crowns extending into the works area from these trees has not been confirmed, and would require confirmation prior to construction.

7.4.8 Arboricultural impacts – Woodlands

7.4.8.1 The impact on the woodlands shall involve blanket felling and thinning where these fall within the DCO boundary. The extents of these operations are illustrated on Figure 9.8 ‘Vegetation clearance and management – overall plan’.

7.5 Mitigation

7.5.1 General

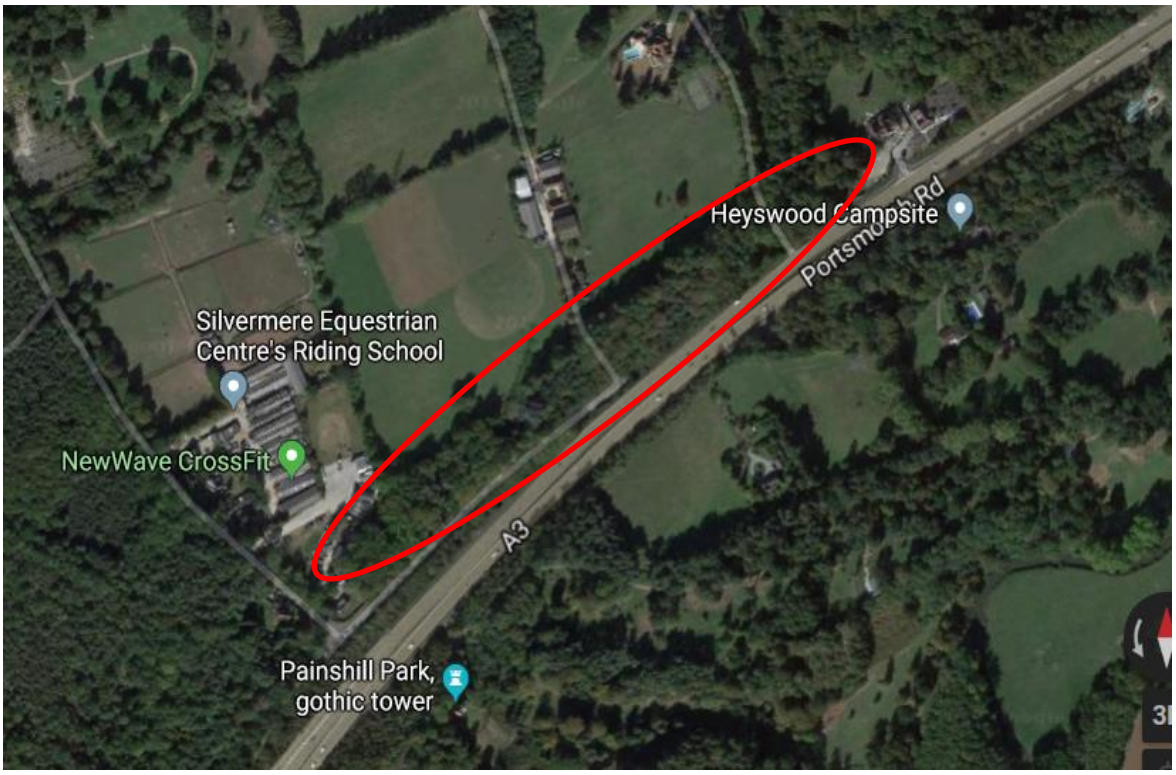
7.5.1.1 The mitigation measures will be developed during detailed design of the Scheme and approved prior to commencement of construction.

7.5.1.2 The areas of land that were not accessible will be assessed prior to the commencement of construction and surveyed in accordance with BS5837:2012 guidelines. The main areas that were not accessed during the tree survey are illustrated on the inserts below within the red outlines:

Insert 7.1 land to east of A3, adjacent to former Wisley airfields

Insert 7.1 land to east of A3, south of former Wisley airfields

Insert 7.2 land to northwest of A3, between Redhill Road and Hilton Hotel



7.5.2 Arboricultural mitigation measures

7.5.2.1 The tree survey schedules (see Appendix B of this AIA) show management recommendations for those trees which at the time of the survey were identified as requiring management intervention. Any works recorded for retained trees will be confirmed prior to construction and included within an AMS.

7.5.2.2 As part of the Scheme certain trees have been identified for retention. In some cases, trees have the 'potential' to be retained, these have blue crosses on the TPPs, and their retention shall be confirmed prior to construction. Those trees that can be retained have no red or blue cross on the TPPs.

7.5.2.3 The location of any protective fencing for retained trees would need to be confirmed prior to construction and included within updated TPPs and supplemented by an AMS.

7.5.2.4 The specification for the protective fencing should be a 'Heras'-type fencing, which should be installed to protect both the crowns and RPAs of trees and to establish a Construction Exclusion Zone (CEZ) around the trees. Site operations not permitted in the CEZ without consultation with an arboriculturist include the storage of plant, equipment or materials; vehicular or plant access; the washing down of vehicles or machinery; the handling, discharge or spillage of any substances, including cement washings. No mechanical digging, scraping or excavation shall be permitted in the CEZ and no earthworks or changes in the finished ground levels other than those agreed by an arboriculturist.

Appendices

Appendix A.Tree survey key and method for measurements and categorisation criteria

A.1 Survey Key

Tree No: Sequential reference number given to the tree or group of trees as shown on the tree survey drawings.

Species: This is the common name given to the tree. The botanical name is sometimes given.

Height (Ht): tree height from the base of the tree to its full stem height, measured in metres (m). Measurements are taken to the nearest half metre.

Stem diameter (mm): measured in accordance with figure A1 below. Measurements are rounded to the nearest 10mm.

Branch spread (m): measurement of crown spread to the four cardinal points; if the crown is balanced a single measurement is given. Crown spread plotted on the tree survey drawings. Measurements are taken to the nearest half metre.

1st significant branch and direction of growth (m): measurement of the height of the first significant branch above ground level, given in metres and direction of growth e.g. 2.4-N.

Canopy height (m): height of the canopy above ground level. Measurements are taken to the nearest half metre.

Life stage: The following abbreviations are used:

Y = Young trees <1/5 life expectancy

SM = Semi-Mature trees 1/5 – 2/5 life expectancy

EM = Early Mature trees 2/5 – 3/5 life expectancy

M = Mature trees 3/5 – 4/5 life expectancy

OM= Over-Mature trees >4/5 life expectancy

Vitality: Good, fair, poor or dead

Good – a tree with little or no obvious physiological defects; leaf density and colour is typical for the species, bud, flower and fruit production are good and there are no signs of dieback at any point throughout the crown.

Fair – a tree with moderate physiological defects; leaf density is less than typical for the species, leaf cover is chlorotic, bud, flower or fruit production are deficient, there are signs of minor dieback within the crown, there is a moderate degree of deadwood within the crown.

Poor – a tree with major or multiple physiological defects; evidence of extensive crown thinning, bud, flower or fruit production is poor or missing, there are signs of advanced dieback throughout the crown, there is extensive or major deadwood throughout the crown.

Dead – a tree that has died due to either old age, drought, disease, pest infestation, physical damage to the main stem or rooting system, or a combination of these factors.

General observations, particularly of structural and/or physiological condition: e.g. observations of any decay and physical defect.

Preliminary management recommendations: any identified preliminary management to rectify defects recorded in general observations. These may include the need for further detailed inspection, or works to address immediate hazard to life or property.

Estimated remaining contribution, in years:

<10

10+

20+

40+

Category grading: As per BS5837:2012 chart in accordance with figure A2 below.

A – Illustrated as light green (RGB code 000-255-000)

B – Illustrated as mid blue (RGB code 000-000-255)

C – Illustrated as grey (RGB code 091-091-091)

U – Illustrated as dark red (RGB code 127-000-000)

Root Protection Area (m^2): plotted around each of the category A, B and C trees on relevant drawings, illustrating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability. The protection of the roots and soil structure is treated as of paramount importance.

Impact:

Remove – abbreviated as REM in red highlighted box

Part remove – abbreviated as PRG in orange highlighted box

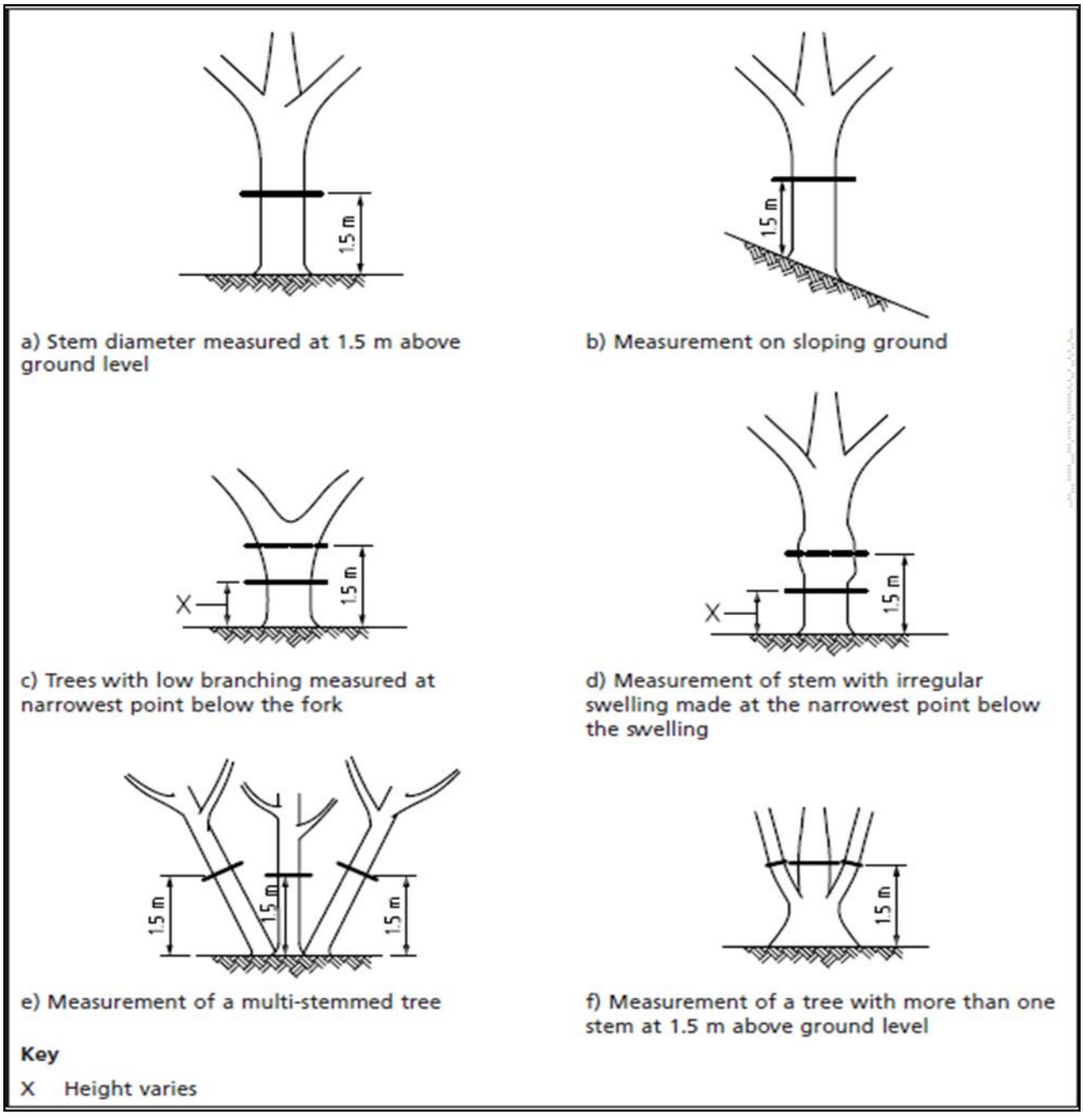
Potential remove – abbreviated as POT REM in blue highlighted box

Retain – abbreviated as RET in a green highlighted box

A.2 Measuring table

A2.1 Measurement of tree stems dependant on tree form

Insert 7.4: *BS5837:2012* measurement of tree stems dependant on tree form methods



A.3 BS5837:2012 Cascade Chart

A3.1 Cascade chart for tree quality assessment from BS5837:2012

Insert 7.5: *BS5837:2012* cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)		
Trees unsuitable for retention (see Note)			
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.*		
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**
Trees to be considered for retention			
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value

Appendix B.Tree Survey Schedule

B.1 Veteran Tree Survey Schedule (provided separately)

Appendix C.Tree Protection Plans 9.31

C.1 Tree Protection Plan Figure 9.31 (provided separately)

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