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Land at

UPPER WARRYFIELD

Walford, Ross-on-Wye

Tree Survey, Arboricultural Constraints
Tree Impact & Protection Report

Prepared on the instructions of

Garry Thomas (Thomas Studios Ltd.)

Acting on behalf of

Mr & Mrs Scruton-Evans

Based on an inspection carried out by

J.P.Ross B.Sc. (hons). F.Arbor.A

on

21st May 2020

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The Old Pound,
Llangarron,
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CONTENTS:

1 Introduction:

1.1 The following report concerns land at Upper Warryfield, Walford, and was prepared on instructions received from Thomas Studios (Architects) acting on behalf of the owners, Mr & Mrs Scruton-Evans. It concerns a proposal to reconfigure the access drive at Warryfield House and the provision of a new garage building, as well as a small green house and certain alterations to the main house. The present report concerns those trees near to where these works will take place, its purpose being to consider what if any degree of constraint they might represent and what measures may be appropriate to avoid deleterious effects upon such trees that may be of significant value.

1.2 The tree assessment methodology used is based upon BS5837:2012, as outlined in Appendix 1 below. Appendix 2 provides explanations of the terms used and also defines the codes and abbreviations employed in the Tree Schedule. It is based on the findings of an inspection carried out by myself on21st May 2020; weather conditions were sunny and bright and visibility was quite adequate for the purposes of this investigation.

1.3 The assessments comprised brief visual inspections made from ground level only: only those features apparent at the time of the inspection could be considered and no liability can be accepted for damage or injury sustained as a result of faults in trees or their parts that were not apparent at this season or which developed subsequent to the survey. Similarly, no liability can be accepted for the condition of trees that are obscured in part or in whole (e.g. by dense Ivy or other foliage), nor for any that proved inaccessible to the inspector.

1.4 The survey area is as indicated on the accompanying Arboricultural Constraints plan and the Tree Impact & Protection plan. These are based upon a topographical survey plan and a Proposed Site Layout plan provided by the architects. Note those parts of the site well away from areas where construction works are proposed or access required have not been included in the current survey

1.5 It should be stressed that, although the health and safety of the trees is part of the assessment methodology used, this is an *arboricultural constraints* report, as defined by BS5837:2012, and as such is intended for planning purposes only; *it should not be construed as an exhaustive assessment of tree safety*. Faults may be identified and recorded as part of this study, but although measures to deal with immediate and significant hazards may be made, detailed management recommendations will *not* normally be made, not least because these should be determined by future patterns of site usage: it remains the client's responsibility to take appropriate action to maintain appropriate levels of safety.

2 General Observations

2.1 No tree preservation orders are shown as applying to the site on the Herefordshire Council online Administrative Map and neither is the site within a designated Conservation Area.

2.2 The land currently forms part of the garden of Upper Warryfield, with a well-established gravel-surfaced drive giving access off the C1274 road, leading to a parking and turning area near the house. Most of the remaining land is lawn, some parts having been recently sown with grass seed. Within and around this area are various trees, most of the more notable ones being ash (*Fraxinus excelsior*). There is a group of mature beech trees in the far north-eastern sector and a number of smaller specimens, including a rowan and several fruit trees. Two trees (numbers 12, a magnolia) and 13 (a willow) are situated outside the boundary fence.

2.3 The assessment of the ash trees presents some difficulty in that there is a strong possibility that they will be affected by 'chalara' dieback of ash, a disease caused by the fungus *Hymenoscyphus fraxineus* which has affected many thousands of ash trees, causing more or less extensive dieback and in many cases leading to their death. A number of the trees here show signs which, while not being conclusive evidence of infection, could be indicative of the disease at an early stage.

2.4 I have assessed them on the basis of their current appearance and condition, which is for the most part quite acceptable. However it must be appreciated that they may deteriorate and may turn out that their life-expectancies are considerably less than I have estimated. I For this reason I did not feel it appropriate to allocate trees showing any signs of dieback to retention category A, that being reserved for trees in good condition and with a long expected life-span. One exception is tree 19, an ash with a full crown and no significant dieback apparent at this time. However even this tree may deteriorate.

3 Arboricultural Implications of the proposed alterations

3.1 It is proposed that a new section of drive be created to form a circuit around trees 7, 8 & 9, leading to a new garage block in the south-east of the site and linking to the existing drive near the house. The existing parking and turning area would be reinstated to be converted to a gravel garden or parterre. In addition, a domestic greenhouse is to be erected in the east of the site, a new workshop and veranda is to be constructed at the east of the existing house and a new conservatory to be built at the western end. Neither of these two structures should affect or be affected by any nearby tree.

3.2 Group G1 is directly within the area proposed for the new drive and the garage block and would be lost. This comprises five alder saplings and a young cherry, none of which are significant specimens; the group has been allocated to category C (*'Minor Retention Value: Trees or groups that are not of sufficient value to be regarded as a*

significant constraint to development.'). It is also proposed that tree 10 and 11 be removed. The former is a somewhat unsightly small cluster of cherry stems, probably the regrowth from a self-sown tree felled previously and tree 11 is an alder which, although acceptable in form and condition, is small and of minor value. Both trees are also placed in retention category C. Tree 16, a small domestic plum tree, also category C, is proposed for removal to make way for the green- house.

3.3 No other trees are directly affected by the proposed works. However the root protection area of tree 5, and to a lesser extent tree 6 extend slightly into the path of the new drive. The RPA of tree 5 also extends into the *existing* drive.

3.4 The degree to which the new drive encroaches into the RPAs of the two trees is small in terms of the proportion of the entire protection areas and provided no major excavations are carried out beyond the confines of the new drive it is not anticipated that its construction would have any significantly deleterious effect on either tree. It would nevertheless be advantageous to provide a design that would be minimally disruptive if not entirely 'no-dig'.

3.5 The garage and drive involve very minor incursions into the RPAs of trees 13 and 15; however these are considered to be insufficient to result in any significant harm.

4 Tree Protection

4.1 Trees to be retained must be protected throughout the period of construction, not only from direct damage to aerial parts but also from the damage to root systems that may result not only from severance or abrasion during excavation work but also as a result of soil compaction. To prevent such damage occurring a series of Construction Exclusion Zones must be established, within which no access by construction vehicles and personnel should be permitted. In those parts of the site likely to be close to where construction will take place in close proximity to trees, the exclusion zones will be demarcated by Tree Protection Barriers **(See APPENDIX 3A.)**

4.2 Where trees are likely to be at greatest risk, **TYPE 2** barriers are advised, comprising Weldmesh panels on rubber or concrete feet, the panels being securely joined together using a minimum of two anti-tamper couplers. Parts of exclusion zones subject to less intense pressure may be provided with Plastic Mesh Barrier Fencing, **TYPE 3** as described in Appendix 3A. The suggested extents of these barriers is indicated in the Tree Impact and Protection plan.

4.3 I understand that it is wished that the new drive should present a relatively informal appearance, ideally with a grass surface, reinforced as necessary to prevent damage and rutting and also to ensure it is adequately load-bearing. This will require the creation of a sound sub-base, which would normally be achieved by stripping the topsoil in order to lay down a substantial layer of compacted aggregate. As the excavation and compaction would be significantly disruptive and damaging to tree

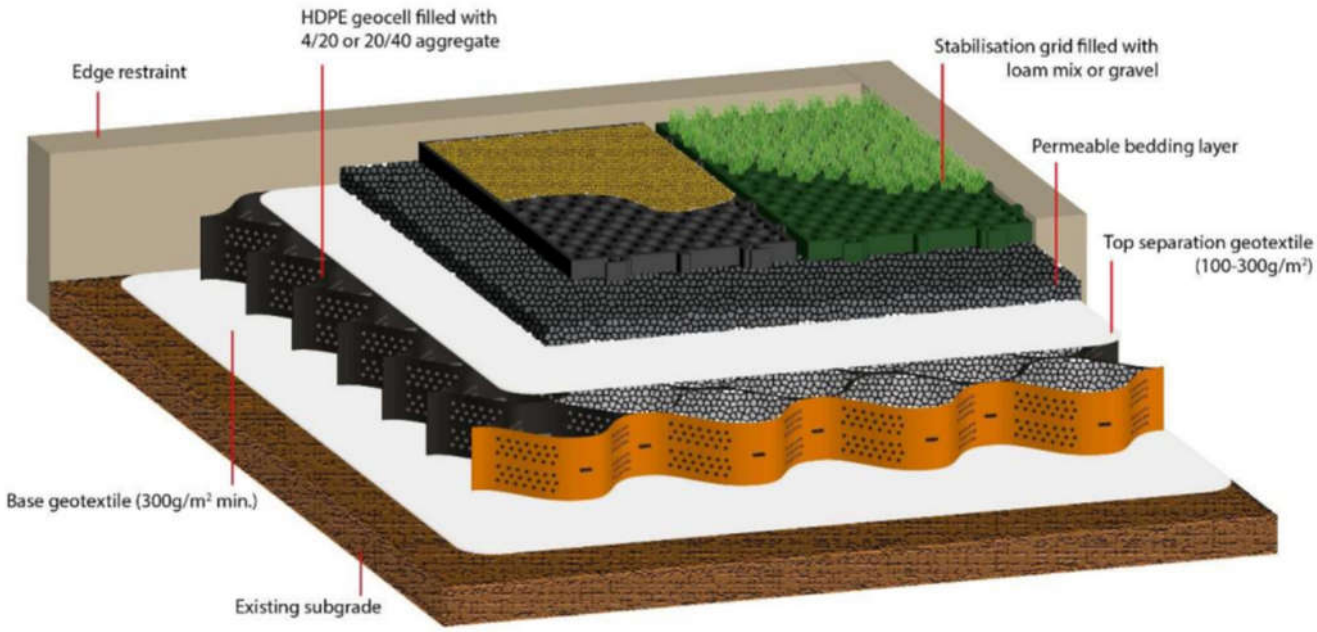
roots, where surfaces are required that pass over tree root protection areas special techniques and materials should be used.

4.4 These involve the use 'cellular confinement' systems whereby a three dimensional 'geocell' material is laid directly onto the existing surface which, when infilled with clean, angular stone, provides a load-bearing sub-base for the drive.

4.5 In this case the geocells could be overlaid with a proprietary modular 'stabilisation grid' constructed of enclosed cells that not only reinforce the surface but also retain gravel or topsoil. When filled with soil, grass seed may be sown to provide a stable grassed surfaces. (ome manufacturers supply units with pre-grown grass - see for example http://www.geosyn.co.uk/?p=310)

4.6 A section illustrating this kind of construction is shown below

STABILISATION GRID WEARING COURSE FILLED WITH SOIL OR GRAVEL



Appendix 3D should also be referred to, where further detail on the Design and Installation of 'no-dig' Geocell systems is provided .

4.7 If so wished, those parts of the driveway likely to be subject to more intense traffic, such as the 'apron' of the garage, might have the stabilisation grid infilled with gravel with only the less trafficked parts put to grass.

4.8 The depth (thickness) of the geocell material should be determined in accordance with the bearing capacity of the soil and the loading that it will have to bear. Advice from the manufacturers should be sought, but I anticipate that 100mm material will be more than adequate. In combination with a suitable wearing course this should be

capable of bearing the loads imposed by domestic vehicles and light vans without risk of settlement or rutting.

4.9 Being intended to be installed directly onto the existing surface to provide a true 'no-dig' system, the system involves an increase in finished ground level. Because the land generally slopes down from west to east, it should be possible to accommodate this over most of the site. However there is a slight bank immediately to the east of the existing drive, where the new drive is to branch off and in order that the finished surface of the new drive matches the level of the existing drive, some minor excavation is likely to be required in a small area in the north-west sector of the RPA of tree 5. However there may be some scope to minimize this by raising the surface height of the existing drive and slightly increasing the gradient of the entrance into the site.

4.10 Construction using geocells may be used throughout the new drive, although the no-dig aspect (and hence the requirement for the geocell sub-base) is only critical in the southern arm of the new drive, where it passes close to trees 4, 6 and 9. If so wished, standard compacted aggregate sub-base would be acceptable elsewhere, provided all workings involved in its construction are accomplished within the limits of its footprint without disturbing the land near other trees or straying into the Construction Exclusion Zones as indicated on the accompanying tree protection plan.

TREE SCHEDULE

[*See Appendix 2 for Terms & Abbreviations used in the Schedule*]

ID	*Species*	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	*Observations*	Retention CATEGORY	Protection Radius (m)	RPA (m^2)
					N	E	S	W	Mean	Lowest ove site + Direction								
1	Pear	1	660	11	3.5	4	4	2.5	1.8	-	LM	Fair	Fair	M	Old fruit tree; some dead wood etc. but an acceptable and characterful specimen with some veteran characteristics	B	7.9	196
2	Apple	1	115	3.5	2.5	3	2	2	0	-	Y	Good	Fair	M	Small fruit tree with leaning stem; good but of minor significance	C	1.4	6
3	Cherry	1	140	6	2	2	2	2	1.5	-	Y	Good	Good	M	Good young fruit tree	C+	1.7	9
4	Yew	1	115	3.5	2	2	1.5	2	0	-	Y	Good	Good	L	Good but small/young and currently of minor significance	C	1.4	6
5	Ash	1	710	17.5	10	9.5	8	9	6	4.5 NE	M	Fair	Good	L	Currently quite good, but with some dead wood; while by no means diagnostic, this could be a symptom or early-stage Chalara dieback of ash. In any event, the developing prevalence of disease amongst ashes means that the life-expectancy of this tree must be uncertain.	B	8.5	227
6	Cherry Plum	4	135 190 150 140	9	4	5	4	5	3.5	2 E	M	Fair	Fair	S	An acceptable (if somewhat untidy) specimen of this winter-flowering tree	C	3.7	43
7	Rowan	1	140	7	3	3	2	2.5	1.5	-	EM	Good	Good	M	A good but small tree	B	1.7	9
8	Ash	1	515	19.5	7.5	5	5	4	2.5	-	M	Fair	Fair	M	Forms a single canopy with tree 9. In generally good condition with some minor dead wood but no clear evidence of serious Chalara dieback at this time. (cf tree 5)	B	6.2	121

ID	*Species*	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	*Observations*	Retention CATEGORY	Protection Radius (m)	RPA (m^2)
					N	E	S	W	Mean	Lowest ove site + Direction								
9	Ash	1	435	19	2.5	3.5	6	6	3	-	M	Fair	Fair	M	Similar to tree 8, away from which it is somewhat disposed. Also as tree 8, with minor dead wood, currently not significant but which *could* be indicative of developing Chalara dieback. (cf tree 5)	B	5.2	85
10	Wild Cherry	5	275 130 110 100	10.5	1.5	4	3.5	3	4	3 SW	EM	Fair	Poor	S	Several slender stems, evidently regrowth from a formerly felled tree; rather poor.	C	4.1	53
11	Alder	2	115 70	6.5	2	1.5	0.5	1.5	2	-	Y	Good	Fair	L	Acceptable but negligible	C	1.6	8
12	Magnolia	4	#200 200 150 150	6.5	5	6	2.5	5	2	-	M	Fair	Fair	S	Overhanging site from adjacent land; ivy within canopy and overhung by larger Leyland cypress beyond resulting in a significantly asymmetric and one-sided form, but acceptable overall.	C	4.2	55
13	Crack Willow	2	#400 400	14	7	7.5	8	5	4.5	-	M	Fair	Fair	S	Growing in filed outside site and leaning and generally disposed to the SE. Debris piled around base. Of moderate value/significance	C+	6.8	145
14	Plum	4	150 85 135 100	8	2.5	3	3	3.5	2.5	-	LM	Poor	Poor	S	Poor form; some decay. Note elder, part-uprooted and leaning into tree. Generally poor.	C-	2.9	26
15	Ash	1	580	13.7	6	7	7	6	3.5	2 N	M	Fair	Fair	S	Showing some dieback and beginning to develop the somewhat patchy 'clumped' foliage that is typical of ash trees affected by Chalara dieback. However the symptoms are not diagnostic at this stage and currently the tree remains in acceptable condition.	C+	7	154

TREE SCHEDULE

[*See Appendix 2 for Terms & Abbreviations used in the Schedule*]

ID	*Species*	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	*Observations*	Retention CATEGORY	Protection Radius (m)	RPA (m^2)
					N	E	S	W	Mean	Lowest ove site + Direction								
16	Plum	1	240	6	3	2	2.5	2.5	2	-	M	Fair	Fair	S	Plum; topped at 2m. Acceptable but of minor significance	C	2.9	26
17	Apple	1	170	3.5	3	3	3	3	1	-	M	Good	Fair	M	Acceptable domestic fruit tree with low, dense crown.	C+	2	13
18	Beech	1	470	14	7.5	3	8	7.5	1.8	-	M	Good	Good	L	Good. One of a small group of beech trees (the others not included as unlikely to be affected by current proposals) This tree has some tight forks with possible bark inclusions, but no indication of significant weakness. Note the several crossing and rubbing branches, which should *not* be removed.	A	5.6	99
19	Ash	1	465	14.5	4.5	5	5	4.5	2.5	1.8 S	M	Good	Good	M	Good (no indications of dieback at this time)	A	5.6	99
GROUPS																		
G1	x6 Alder and x1 cherry	[1]	[~90]	4.5-5	Trees with ~1.5m crown radius				1.5	–	Y	Good	Good	L	A group of small young trees; in good condition but currently of very minor significance	C	[1]	[3]
G2	Elder & Plum	[1]	[~300]	6	Approx. crown spread of 3.5				2	–	M	Fair	Fair	S	Trees on far side of boundary fence, overhanging by approx. 2-3m. Quite widely infested with ivy but more or less acceptable	C	[3.5]	[38]

- The report has been framed as an 'Arboricultural Constraints Report', as defined in BS5837:2012 - *Trees in relation to design, demolition & construction-Recommendations*. Its purpose is to set out and to quantify the degree of constraint offered by existing tree cover with regard to any development or alteration in land-use that may be proposed and is intended to be used to inform feasibility studies and design options. As such it reflects the conditions *as they existed at the time of our inspections*: no account has been taken of any specific development proposals, although it has been assumed that certain unspecified alterations in site usage patterns are likely to occur, which are likely to result in an increase in site occupancy levels. Additional arboricultural input may be required at subsequent stages of design, planning and implementation in relation to the assessment & management of possible arboricultural impacts.
- The survey parameters are as set out in BS5837:2012 and based on the findings each tree or group is allocated to one of four 'Retention Categories' (see Appendix 2, p2). The factors taken into account in categorising the trees include their overall arboricultural quality, their general health and structural stability, their likely useful life-expectancy, their significance to the local landscape and general public amenity value, the degree to which they provide wildlife habitat and enhance local biodiversity and any other social or cultural values that they may embody.
- Also integral to the methodology of BS5837 is the calculation of **Root Protection Areas (RPAs)** for each of the trees in question. The RPA is defined as a "*layout design tool indicating 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."* BS5837 requires the RPA to be based on the area in square metres formed by a circle of radius (the Root Protection Radius) twelve times the stem diameter of the tree.
- It should be noted that in most cases the plan accompanying this report will show the *nominal* RPAs of the trees, indicated as circles centred upon the tree of a radius such that they enclose an area equal to the relevant RPA. In practice the distribution of roots around a tree will frequently prove to be uneven due to the presence of a variety of constraining influences. These may be physical barriers such as existing foundations etc, or the existence of localised soil conditions inhospitable to root growth, such as waterlogging or soil compaction. Conversely, soil conditions may be particularly *conducive* to root development in one quarter and this might also lead to an asymmetric distribution of roots around the tree. However in most cases the nominal circular areas as indicated will provide a reasonable guide as to where special measures will be required to protect tree roots and preserve good soil condition.
- The RPAs of the trees will provide the basis for defining **Construction Exclusion Zones (CEZs),** these being areas around all of those trees intended to be retained where access should be prevented throughout the entire process of site preparation and construction. In certain cases the CEZ will exceed the size of the RPA in order to accommodate the aerial parts of wide-spreading trees.
- Access within the CEZ should be prevented through the erection of barriers, constructed in accordance with BS5837:2012. Where access within an RPA is unavoidable, appropriate ground protection should be installed. Outline details of the design of suitable barriers and ground protection are given in Appendices A & B. These protection measures should be put in place prior to any site clearance or construction work commencing on the site and they should remain *in situ* until all works have been completed. Some activities within the CEZs may be acceptable but should not be put in hand until appropriate arboricultural advice has been sought.

APPENDIX 2: Terms & Definitions
(including codes & abbreviations used in Tree Schedule)

DIMENSIONS :

- **STEM-No.** indicates the number of main stems (i.e. whether the trunk divides at or below 1.5m; (Used in the calculation of RPA.) "m-s" = Multi-stemmed.
- **DIAMETER** (in millimetres (rounded to the nearest 5mm), obtained from the girth measured at approx.1.5m. For trees with 2 to 5 sub-stems, a notional figure is derived from the sum of their cross-sectional areas. For multi-stemmed trees the notional diameter may be estimated on the basis of the average stem size x the number of stems. (Diameters may be estimated where direct measurement is not possible.)
- **HEIGHT**, estimated and expressed in metres.
- The **CROWN SPREAD** is expressed in terms of the crown radii estimated at the four cardinal points (or as otherwise specified) and given in metres.
- **CLEARANCES** are indicated as an estimate of the *mean, overall* height of the canopy above ground level with an additional figure for the height above ground of the *lowest significant branch* within the site, together with the direction of its growth.

LIFE STAGE is defined as follows:

P recently Planted; sapling: A tree that is still establishing and which would be relatively easy to replace or even transplant. Likely to be vulnerable to damage from (e.g.) strimmers, mowing equipment, drought, vandals, etc. (Easily replaced thus a negligible constraint).

Y Young, establishing trees. Should be growing fast, usually primarily increasing in height more than spread, but as yet making limited impact upon the landscape.

EM Early-mature. Established young trees, normally of good vigour and still increasing in height, but beginning to spread laterally. Beginning to make an impact upon the local landscape & environment.

M Mature: Well-established trees, still growing with some vigour, but tending to fill out and increase spread. Bark may be beginning to crack & fissure. In the middle half of their safe, useful life-expectancies.

LM Late-Mature: In full maturity. Still retaining some vigour but growth slowing.

O Old: Fully mature with vigour declining. Likely to possess features that could be regarded as potential faults, such as large, ponderous branches, old wounds etc. etc., but also likely to be of high amenity value.

A Ancient: Old trees can survive for very many years with healthy growth continuing although the tree may be of low vigour. Crown size usually becomes reduced, either through natural branch-loss or through management (e.g. pollarding). Decay is usually present. Such trees may embody certain hazards but they are also likely to be of considerable conservation value (i.e. "Veteran" trees).

HEALTH & VIGOUR: Essentially a snapshot of the general health of the tree based upon its general appearance, its apparent vigour and the presence or absence of symptoms associated with poor health, physiological stress etc. (Fungal infections may be recorded here but *decay giving rise to structural weakness* would be recorded under 'Structural Condition' – see next parameter):

Good no significant health issues; normal shoot extension growth.

Fair indications of slight stress or minor disease (e.g. the presence of minor dieback/deadwood, reduced shoot extension growth or the presence of epicormic shoots)

Poor Significant stress or disease noted; larger areas of dieback than above

Bad Severe decline; widespread dieback and/or severe stress; life-threatening disease.

Dead (or Moribund)

STRUCTURAL CONDITION: Defects affecting the structural stability of the tree, including decay, significant dead wood, root-plate instability or significant damage to structural roots, weak forks (e.g. those where bark is included between the members) etc. etc. Classified as:

Good No obvious structural defects: basically sound

Fair Minor, potential or incipient defects

Poor Significant defect(s) likely to lead to actual failure in the medium to long-term

Bad Defects liable to cause significant failure in the short term, or to lead to a major or total collapse in the foreseeable future

Severe Tree that has already suffered or is at imminent risk of a major collapse.

REMAINING USEFUL LIFE EXPECTANCY: An estimate of the length of time in years that a tree might be expected to continue to make a useful contribution to the locality at an acceptable level of risk (based on an assumption of continued routine maintenance)

V - very short: less than 10 years

S - short: 10-20 years

M - moderate: 20-40 years

L - long: 40 or more years

RETENTION CATEGORY:

Trees are placed into one of four basic categories using the letter codes **A, B**, **C or U**, as recommended in BS5837:2012, supplemented where appropriate by a Plus [+] or Minus [-] suffix. The categories indicate the surveyor's assessment of the 'Retention Value' of each tree, how much importance should be placed on its retention or conversely, how much or how little would it be missed if it was to be removed.

It would normally be presumed that trees in categories A and B should be retained wherever possible, but with the highest priority given to category A. Category U trees may be lost without significant detriment while category C trees are intermediate, potentially retainable but not of *major* significance in terms of their importance to the site or the wider locality. The Plus [+] and Minus [-] suffixes denote trees that do not fall easily into one or other of the categories but are intermediate between two. A+ and U- have special meaning, defined below.

Note: *These are NOT health and safety assessments: the classifications do not take into account any requirement for remedial tree care or ongoing maintenance apart from that which may affect the trees' general suitability for retention.*

A HIGH RETENTION VALUE (●) Trees or groups of such quality and significance such that their retention and protection should be given a particularly high priority within the design process. Category A trees would generally be expected to have a safe, useful life-expectancy of at least 40 years (although exceptions may be made in the case of specimens of exceptional cultural, historic or scientific value).

'A+' denotes a specimen of exceptional importance, the protection of which should be given the very highest priority. Includes Veteran[1] and champion trees, specimens of particular cultural significance and any other tree whose value and importance extends well beyond its immediate locality, county or even country-wide.

B MODERATE RETENTION VALUE (■): Trees or groups the retention of which would be highly desirable, although the selective removal of certain individuals may be acceptable provided full consideration is given to alternative courses of action and/or appropriate mitigation is provided.

Category B trees will be of generally good quality but may also show some defects or impairments where these are remediable and/or do not detract significantly from their significance or viability. Includes trees with clearly identifiable conservation or other cultural benefits.

They would generally be expected to have a safe, useful life-expectancy in excess of 20 years.

C MINOR RETENTION VALUE (▲): Trees or groups that are not of sufficient value to be regarded as a significant constraint to development.

Includes trees that are of poor quality or form; trees whose health or structural stability is deteriorating and is unlikely to be capable of effective remedial treatment, or where the cost of ongoing management would be excessive. Also trees clearly inappropriate to their location, likely to cause damage to nearby properties or to give rise to significant nuisance; trees being grossly suppressed by other nearby trees as well as those the removal of which would *benefit* better quality adjacent trees. Also included here are trees that are simply undistinguished and make little impact within the local landscape and environment.

Category C trees will normally have potential life expectancy of 10 years (although they may perhaps require attention) so, while not of a quality such as to significantly constrain development (i.e. their loss would not detract markedly from the site), they may nonetheless be retained where it proves appropriate, such as where they may be of benefit while new plantings become established.

Young, small and insignificant trees will be included here, even if of good health, on the basis that such trees can be relatively easily replaced or transplanted.

U UNSUITABLE: (★) Trees likely to prove to be unsuitable for retention for more than 10 years should any significant increase in site usage arise as a result of development: dead or moribund trees, those at risk of collapse or in terminal decline and/or with serious, irremediable defects.

Also trees that will be left unstable by other essential works (such as the necessary removal of other nearby trees); trees infected by pathogens that could materially affect other trees and low quality trees that are significantly suppressing better specimens

Some category U trees may be of significant conservation value which it might be desirable to preserve.

'U-' denotes a tree where removal or major preventative work is regarded as being required *based on the circumstances at the time of inspection and irrespective of any development proposal*.

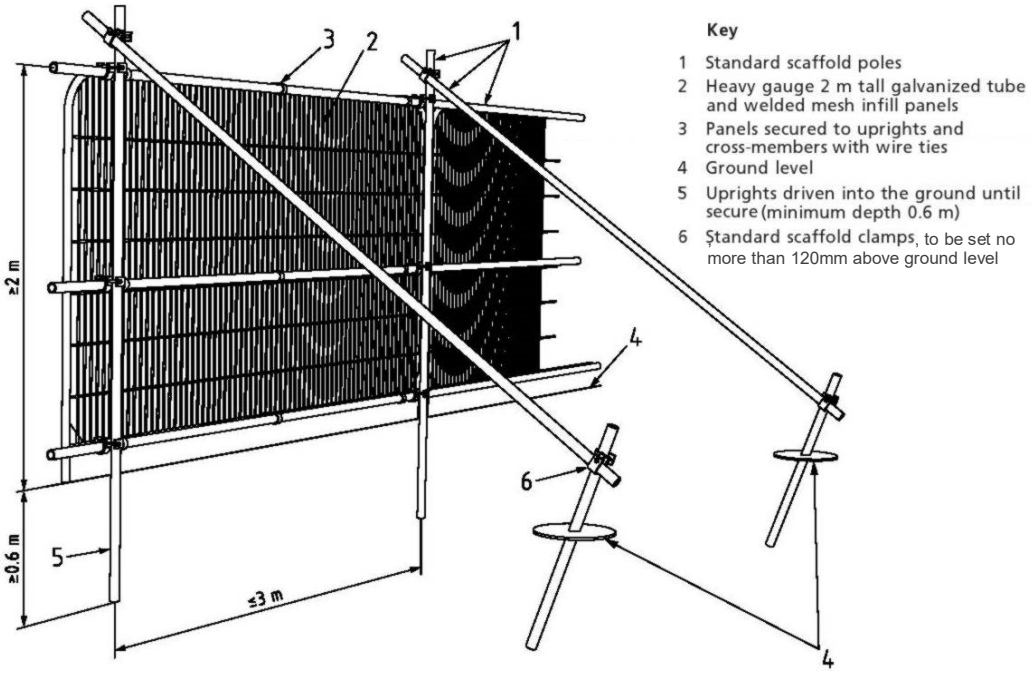
[1] A Veteran tree is one that is of exceptional age relative to others of the same species and which because of its advanced years possesses special biological, aesthetic and/or cultural interest. It should exhibit crown retrenchment and signs of decay in the trunk, branches or roots, thereby providing a range of diverse habitats for a wide variety of organisms.
[See *Ancient Tree Guide no. 4* (2008): Ancient Tree Forum, c/o The Woodland Trust, Grantham.]

*A **CONSTRUCTION EXCLUSION ZONE** should be established around all trees intended for retention, based upon the Root Protection Areas (RPAs) of those trees. These zones should be adequately protected by appropriately designed **Protective Barriers** & **Ground Protection** throughout the all demolition & construction processes.*

A: PROTECTIVE BARRIERS

- Vertical barriers should be erected and ground protection installed **before any materials or machinery are brought onto the site and before any demolition, development or stripping of soil commences**. Areas of new or retained structure planting should be similarly protected, based on the extent of the soft landscaping as shown on the approved drawings. The project arboriculturist should confirm that barriers and ground protection have been erected and set out correctly prior to the commencement of other operations, and that they are fit for purpose..
- Where required, pre-development tree work may be undertaken before the installation of tree protection, with the agreement of the project arboriculturist and the local planning authority.
- **Once erected, barriers and ground protection should be regarded as sacrosanct.** Special attention should be paid to ensure that barriers remain rigid and complete through the entire period of construction; they must not be removed or altered without prior recommendation by the project arboriculturist and approval of the local planning authority.
- Barriers should be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s); three design types are described below.
- **Type 1** barriers are the default design and should be employed in all sites where heavy plant is used and where construction activity is likely to put pressure on the available space. Illustrated below, it will be based on a scaffold framework comprising a vertical and horizontal framework, well braced to resist impacts, with vertical poles spaced at a maximum interval of 3m. Onto this, weldmesh or other sturdy panels should be securely fixed.

Specification for Type 1 protective barrier



- Where driven vertical poles are impractical due to the likelihood of causing damage to tree roots or to underground services, above-ground stabilizing systems may be specified (Refer to the project arboriculturist)
- **Type 2** barriers may be suitable on smaller construction sites where protection is only required from pedestrians, cars, vans and manually operated plant and where less pressure is anticipated. These barriers will comprise Weldmesh panels on rubber or concrete feet, the panels being securely joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence. The panels should be supported on the inner side by stabilizer struts.
- **Type 3** barriers should only be used on small, domestic projects or in locations where no significant pressures to extend the working area will occur. These may comprise split-chestnut paling or plastic mesh barriers. In all cases, however, they must be firmly fixed and maintained secure throughout the duration of all site works.
- Alternative specifications may be acceptable but should be specified in conjunction with the project arboriculturist but they must always ensure an adequate degree of protection for the conditions likely to obtain on site. It may be appropriate on some sites to use temporary site office buildings as components of the tree protection barriers.

B: GROUND PROTECTION

- Where construction working space or temporary construction access is justified within the RPA, this should be facilitated by a set-back in the alignment of the tree protection barrier. In such areas, suitable existing hard surfacing that is not proposed for re-use as part of the finished design should be retained to act as temporary ground protection during construction, rather than being removed during demolition. The suitability of such surfacing for this purpose should be evaluated by the project arboriculturist and an engineer as appropriate
- However, where the set-back of the tree protection barrier would expose unmade ground to construction damage, new temporary ground protection should be installed as part of the implementation of physical tree protection measures prior to work starting on site. Such temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.
- The ground protection might comprise one of the following:
    a) *for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;*
    b) *for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;*
    c) *for wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.*
- In all cases, the objective should be to avoid compaction of the soil, which can arise from the single passage of a heavy vehicle, especially in wet conditions, so that tree root functions remain unimpaired.

C: ADDITIONAL PRECAUTIONS OUTSIDE THE EXCLUSION ZONE:

- Once the exclusion zone has been protected by barriers and/or ground protection, construction work can commence. All weather notices should be erected on the barrier with words such as:

Construction exclusion zone – NO ACCESS

In addition the following should be addressed or avoided.

- Care should be taken when planning site operations to ensure that wide or tall loads, or plant with booms, jibs and counterweights (including drilling and piling rigs) can operate without coming into contact with retained trees. Such contact can result in serious damage to them and might make their safe retention impossible. Consequently, any transit or traverse of plant in close proximity to trees should be conducted under the supervision of a banksman to ensure that adequate clearance from trees is maintained at all times. In some circumstances it may be impossible to maintain adequate clearance thus necessitating access facilitation pruning. Local Planning Authority consent for such pruning may be required.
- Material which will contaminate the soil, e.g. concrete mixings, diesel oil and vehicle washings, should not be discharged within 10 m of the tree stem.
- Fires should be avoided on sites if at all possible. Where they are unavoidable they must not be lit in a position where heat could affect the trunk, branches or foliage of any tree. The size of the fire and the wind direction should be taken into account, and fires must be attended at all times.
- Notice boards, telephone cables or other services should not be attached to any part of the tree.
- It is essential that allowance should be made for the slope of the ground so that damaging materials such as concrete washings, mortar or diesel oil cannot run towards trees..

D: ROADS, DRIVEWAYS AND PATHS NEAR TREES
The Design and Installation of 3-Dimensional Cellular Confinement Geocell Systems

1. Tree roots are concentrated in the upper metre of the soil, with the great majority 300-600 mm below the soil surface. Beyond 3 or 4 metres from the trunk most of the roots are small in diameter and not readily apparent as originating from trees. They are nevertheless vital to the tree's well-being, as well as being very easily damaged by even rather shallow soil disturbance, such as may be required in establishing a path or drive.
2. The overriding principles to be adhered to in the design of hard load-bearing surfaces near trees are:
   (i) the preservation of the character of the soil in a form no more compacted or otherwise disturbed, disrupted or contaminated than it is at present;
   (ii) to maintain gaseous exchange between the upper layers of soil and the atmosphere;
   (iii) to ensure adequate (but not excessive) water supply to the soil; and
   (iv) the avoidance of damage to retained trees as a result of root severance, crushing or abrasion.
3. To avoid damage to tree roots within the area where the new drive is proposed, 'no-dig' techniques should be used, where an adequately load-bearing and hard-wearing surface is established over existing roots without carrying out any excavations and without establishing a compacted sub-base. This is achieved through the use of one of the proprietary 'geocell' cellular confinement systems[2].
4. The specification of the geocell material should be determined on the basis of advice from an engineer and/or the manufacturers of the product to be used. Its thickness (i.e. the depth of cells) should be determined in the light of the bearing capacity (CBR) of the underlying soil and the maximum anticipated loading. However under most circumstances a cell depth of 100mm with an overlay of 50mm stone should be adequate for domestic drives and parking areas although a greater depth (150mm or even 200mm) would be required if heavy vehicles are anticipated.
5. N.B. If construction traffic is intended to gain access to the site along this route then the geocells must be specified to accommodate the maximum loads that are anticipated.
6. Edge treatments must be considered at the outset. The geogrid material will require edge support but this must be achieved without any excavation below ground level. Many geocell manufacturers can supply proprietary edging designed for the purpose, but cast concrete kerbstones can be used provided they can be adequately supported without the need for excavated footings. Alternatively timber edging may be used, secured using wooden pegs or else held in place by soil graded up from the surrounding level.
7. To avoid soil compaction, no vehicles, plant or other machinery will be permitted onto the areas in question prior to the material being installed. Materials used in its construction (such as the cellular matrix itself and the stone for infilling) must be brought in by hand or deposited using vehicles positioned off-site.

[2] Suppliers of proprietary cellular confinements systems include Infragreen Solutions ('InfraWeb' TRP), Geosynthetics ('CellWeb') and Terram ('Geocell') and Greenfix ('Geoweb')

8. If necessary the surface of the land to be covered may be lightly and carefully skimmed to a depth not exceeding 50mm in order to remove turf and organic debris. Minor hollows and irregularities may be built up using clean, washed sharp sand to create a surface onto which the geogrids can be laid. (More extensive irregularities and depressions can be levelled after the application of the geogrid.).
9. As no heavy plant or machinery is to be brought onto the area, the following operations must be carried out by low ground pressure tracked vehicles, by equipment located off-site or else by hand. Whatever technique is used, care must be exercise to avoid tree roots being exposed or damaged and to prevent any significant compaction of the soil.
10. A non-woven geotextile membrane is laid onto the prepared surface, with dry joints overlapping by 300 mm. Temporarily retain the membrane using weights, stakes or similar. The geogrid material will be laid onto this.
11. The cellular geogrid is supplied in panels that must be spread to open out the cells. This is best achieved by installing a series of 12 mm diameter steel pins across the area to be covered by a single panel, positioned so that they hold the panel in an expanded state when laid over them. Each panel must secured to its neighbour using staples or otherwise, in accordance with the manufacturer's specifications.
12. Infill material must be a clean, angular no-fines stone, size 20/40 mm. (Alternatively 20 mm single size, or 20>4 mm stone may be used, but the material must be both angular and sieved to exclude fines.)
13. No vehicle is to track over any part of the root protection area until the cellular material has been infilled with stone; thus infilling must start from an edge at some distance from the trees being protected.
14. It is advisable to surcharge the cells to a depth of about 50 mm in order to protect the edges of the cellular material. If required, additional clean stone may be applied to fill depressions and create a level surface.
15. Once infilled the material should be settled by a minimum of four passes of a smooth roller (max weight of 1000kg/m width without vibration), or alternatively by several passes with a tracked excavator. The use of 'wacker' plates is not recommended.
    The in-filled cells can then provide a platform to provide access to unfilled cells.
16. A geotextile separation membrane should be laid over the infilled geogrid before applying the bedding layer onto which the stabilization grid will be laid in order to prevent soil and/or gravel migrating into and mixing with the clean stone infill
17. Particular care should be taken where surfaces supported on cellular confinement systems abut surfaces of traditional design so that no differential settlement occurs. In such cases the geocell matrix is laid to extend one or two metres beyond the area that has to be protected (i.e. beyond the limit of the RPA). While the cells within the RPA are filled with clean, angular, no-fines stone (as per the manufacturer's specification), beyond the RPA, the infill used should be type 1 road-stone, as specified in traditional designs. This should ensure that a smooth transition between the two different constructions is maintained.