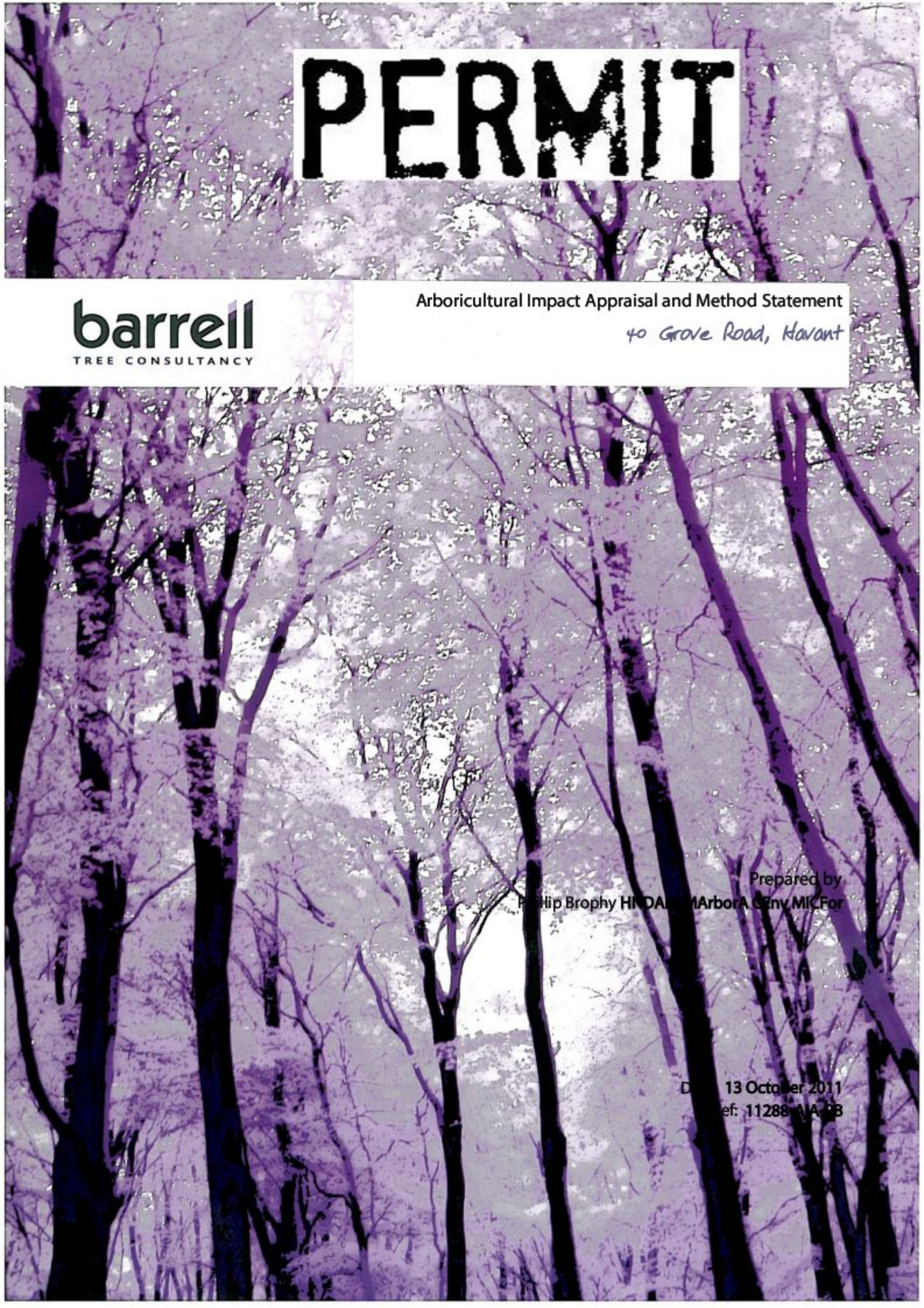

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TREE CONSULTANCY

Arboricultural Impact Appraisal and Method Statement

40 Grove Road, Havant

Prepared by
Phillip Brophy HND

Date: 13 October 2011
Ref: 11288-AIA-PB

Validation statement

This report contains the supporting tree information relating to the development proposal to construct a garage to the side of the existing dwelling at 40 Grove Road, Havant.

For Local Planning Authority (LPA) validation purposes, this report contains the following:

- A full tree survey compliant to the requirements of ***BS5837: (2005) Trees in Relation to Construction – Recommendations*** undertaken by a qualified arboriculturist
- A plan with a north point showing tree survey information, including BS 5837 categories
- An assessment of the arboricultural implications of development, detailing trees to be removed and the proposed protection measures (Section 1)
- An arboricultural method statement describing a feasible means of tree protection, its implementation and the phasing of works (Sections 2 and 3)

Summary

Purpose of this document

This is an arboricultural impact appraisal report describing the trees on and near the site, what the impact of the development proposal on those trees will be and how any adverse impact will be mitigated. It also includes an arboricultural method statement describing how trees will be protected and managed during the development. Its purpose is to provide sufficient tree information for the LPA to assess the impact of the proposal on local character in the context of local plan policy, as part of the process of determining the planning application.

The contents of this document

It includes:

- a **tree protection plan** showing the location of the trees, their categorisation, the location of the new development, the trees to be lost and the tree protection measures;
- an **arboricultural impact appraisal** in Section 1, which describes the impact of the development on trees;
- an **arboricultural method statement** in Section 2, which describes the tree protection measures, and how they will be implemented; and
- a series of **appendices** in Section 3 setting out illustrative specifications and more detailed guidance to supplement the text explanations.

Background administrative information

Background information on our specific instructions and how we carried them out is included as Appendices 1 and 2. All the trees that could be affected were inspected and their details are listed in Appendix 4. Based on this information, guidance was provided to PGP Architects on the constraints these trees impose on the use of the site.

Summary of the impact on trees and local character

This proposal will result in the loss of a small number of trees that are all low category because of their poor condition or small size. There is a possibility that works associated with the proposed changes could affect further trees if appropriate protective measures are not taken. However, if adequate precautions to protect the retained trees are specified and implemented through the arboricultural method statement included in this report, then the development proposal will have no significant impact on the contribution of trees to local amenity or character.

Phillip Brophy **HNDArb MArborA CEnv MICFor**

Explanatory notes for the tree protection plan

The tree protection plan (our reference 11288-BT1) is based on the provided information. It should only be used for dealing with the tree issues and all scaled measurements must be checked against the original submission documents. The precise location of all protective measures should be confirmed at the pre-commencement meeting before any site preparations or construction activity starts. Its base is the existing land survey with the proposed layout superimposed, so the two can be easily compared. It shows:

- the existing trees numbered, with their categorisation highlighted by blue rectangles;
- the trees to be removed indicated by a red dashed crown outline; and
- the location of the construction exclusion zone (CEZ) to be protected by barriers formed by fencing and/or ground protection

Content: 1 A3 plan

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Tree protection plan

Location of trees, categorisation and protection/management proposals at 40 Grove Road, Havant

0 Metres 5 10 15

Scale: 1:200 @ A3



- TX — BS category C — Trees **not** worthy of being a material constraint
- TX — Trees to be removed
- Construction exclusion zone (CEZ) to be protected by fencing and/or ground protection
- Proposed garage layout

Permission is granted to scale from this drawing for Local Authority Planning Approval purposes relating to tree protection measures only. Where applicable this drawing is to be read in conjunction with the arboricultural report. This drawing is the copyright of Barrell Tree Consultancy 2011. ©

This drawing to be reproduced in colour only.

Barrell Plan Ref: 11288-BT1

Provided Plan Refs: 11110 and 09/101/01 Rev B

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Section 1
Arboricultural impact appraisal

This arboricultural impact appraisal describes our assessment of how the proposal will affect trees and any impact this will have on local amenity and character. The impact on trees is summarised at the beginning in 1.1, more detailed explanation of this analysis is set out in 1.2 and the proposed mitigation measures are described in 1.3.

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Section 1: Arboricultural impact appraisal

1.1 SUMMARY OF THE IMPACT ON TREES

Development proposals can impact on trees by causing them to be removed, by adversely affecting their health through disturbance in root protection areas (RPAs) or by severe pruning. However, in many instances, disturbance to trees close to development activity can be reduced to tolerable levels through the use of precautionary measures. Our assessment of the trees that will be affected by this proposal and those that will require special precautions to protect is summarised in Table 1.

Table 1: Summary of trees that will be affected and protected

	British Standard 5837 category		
	A (High quality)	B (Moderate quality)	C (Low quality)
Trees to be removed	-	-	1, 2, 3, G4, 5

Abbreviations: G = group

1.2 DISCUSSION OF THE IMPACT ON VISUAL AMENITY

1.2.1 Trees to be removed for development (1, 2, 3, G4, 5)

Four individual ((1, 2, 3 and 5), and one group (G4) of category C trees will be removed. None of these trees are of sufficient importance to be worthy of influencing any layout due to their relative small size or their poor structural form and limited levels of sustainability. They are not important in the overall planning context and their proposed removal should not influence the determination of this application.

1.2.2 Trees to be protected through the use of special precautions

Although located at a significant distance from the proposed garage all other trees within the site will be protected from inadvertent impact by the establishment of a construction exclusion zone (defined by fencing and/or ground protection). This exclusion zone is shown on the plan and explained in the arboricultural method statement in Sections 2 and 3 of this report. If the precautions set out in this arboricultural method statement are implemented as described, then all trees within the site, but distant to the proposed garage, can be successfully retained without any adverse impact on them.

1.3 PROPOSALS TO MITIGATE ANY IMPACT

1.3.1 Protection of retained trees

The successful retention of trees depends on the quality of the protection and the administrative procedures to ensure those protective measures remain in place whilst there is an unacceptable risk of damage. An effective means of doing this is through an arboricultural method statement that can be specifically referred to in a planning condition. An arboricultural method statement for this site is set out in Sections 2 and 3 of this report. Implementation of this method statement will allow all the retained trees

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to survive without any adverse impact and allow them to continue to contribute to local amenity and character.

1.4 SUMMARY OF THE IMPACT ON VISUAL AMENITY

This proposal will result in the loss of a small number of trees that are all low category because of their poor condition or small size. There is a possibility that works associated with the proposed changes could affect further trees if appropriate protective measures are not taken. However, if adequate precautions to protect the retained trees are specified and implemented through the arboricultural method statement included in this report, then the development proposal will have no significant impact on the contribution of trees to local amenity or character.

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Section 2
Arboricultural method statement

This is an arboricultural method statement describing how trees will be protected and managed during the development of the site. Its purpose is to explain how and when the protection measures should be installed, and how they will be maintained for the duration of the development activity.

The following explanations relate specifically to this site and they should be read in conjunction with the attached plan. The Appendices (Section 3) set out illustrative specifications and general guidance to supplement the text explanations.

A copy of this report must be permanently available on site for the duration of the development activity. It can be:

- included in tendering documentation to identify and quantify the tree protection and management requirements;
- used to plan the timing of site operations to minimise the impact on trees; and
- referenced on site for practical guidance on how to protect important trees.

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2.1 ARBORICULTURAL SUPERVISION

2.1.1 General principles

An arboricultural consultant will be appointed by the developer to advise on the tree management for the site and to attend:

1. the pre-commencement meeting before any work starts;
2. regular supervision visits as agreed at the pre-commencement meeting; and
3. as needed to oversee any specific works that could affect trees.

Additionally, the consultant will have a supervisory input into operations that could adversely affect protected trees (see 2.2 below).

2.1.2 Detailed proposals

More specifically, the form and purpose of the supervision will be as follows:

- **Pre-commencement meeting:** A pre-commencement meeting will be held on site before any of the site clearance and construction work begins. This would normally be attended by the site manager, the arboricultural consultant and a LPA representative. If a LPA representative is not present, the arboricultural consultant will inform the LPA in writing of the details of the meeting. All tree protection measures detailed in this document will be fully discussed so that all aspects of their implementation and sequencing are understood by all the parties. This will include agreeing the form and location of the most appropriate combination of fencing and/or ground protection to be used as barriers for the CEZ. Any agreed clarifications or modifications to the consented details will be recorded and circulated to all parties in writing. This meeting is where the details of the programme of tree protection will be agreed and finalised, which will then form the basis of any supervision arrangements between the arboricultural consultant and the developer.

- **General site management:** It is the developer's responsibility to ensure that the details of this arboricultural method statement and any agreed amendments are known and understood by all site personnel. Copies of the agreed documents will be available on site and the site manager will brief all personnel who could have an impact on trees on the specific tree protection requirements. This will be a part of the site induction procedures and written into appropriate site management documents.

- **Ongoing supervision of operations that could affect trees:** Once the site is active, the arboricultural consultant will visit at an interval agreed at the pre-commencement site meeting. This would normally be every two to four weeks for general supervision, but could be at a longer interval if agreed between the parties. The supervision arrangement will be sufficiently flexible to allow the supervision of any sensitive works if they occur. The arboricultural consultant's

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initial role is to liaise with the developer and the LPA to ensure that protective measures are fit for purpose and in place before any works start on site. Once the site is working, that role will switch to monitoring compliance with arboricultural planning conditions and advising on any tree problems that arise or modifications that become necessary.

- **Proof of compliance to help refute liability and facilitate the discharge of planning conditions:** All supervisory visits will be formally confirmed in writing and circulated to all relevant parties, including the LPA. The purpose of these written records is firstly to provide proof of compliance that will allow the developer to robustly demonstrate adherence to best practice in the event of any disputes, and secondly to help the LPA efficiently discharge the relevant planning conditions.

2.2 PROGRAMME AND PHASING OF TREE MANAGEMENT

A programme for the arboricultural input needed at different phases of development, from start to finish, is set out in Appendix 6. The on-site arboricultural input and its anticipated order is summarised as:

1. Pre-commencement meeting
2. Preliminary tree felling
3. Installation of CEZ barriers (fencing and/or ground protection)
4. Removal of protective measures

The precise order and timing of some of these operations may change due to site operating requirements, but all operations will remain under arboricultural supervision.

2.3 GENERAL TREE MANAGEMENT AND PROTECTION

2.3.1 General site operation

The day-to-day running of the site will take full account of the tree protection measures set out in this document, a copy of which will be kept on site at all times. All site personnel will be briefed on the tree protection requirements as part of the site induction procedures.

2.3.2 Tree works

The proposed tree works are set out in the work recommendations column of the tree schedule in Appendix 4. Trees to be removed are highlighted with red text in the schedule. The location of each tree by number is shown on the plan and those to be removed are indicated with a red number and a red dashed crown outline.

2.3.3 Protection of the CEZ by the use of fencing and ground protection

BS 5837 describes the CEZ as the RPA surrounding retained trees that are to be protected from any disturbance caused by construction activity. In practice, this can be

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done by any combination of fencing and ground protection, to be finalised and agreed at the pre-commencement meeting.

- **Protective fencing:** On the tree protection plan, the approximate boundary of the CEZ is shown by the black dashed line, with the diagonal black hatching indicating the enclosed CEZ. Various illustrative specifications for fencing are included in Appendix 7. The precise form of the fencing can vary, provided it is fit for purpose in that it prevents damaging activities within the CEZ that it encloses.
- **Ground protection:** Where it is not practical to protect the CEZ by the use of fencing alone, BS 5837 allows for the fencing to be set back and the soil protected by ground protection. This allows fencing to be set back to improve access, with the ground protection preventing damage to the CEZ outside the protection of the fencing. A range of methods can be used including retaining existing hard surfacing or structures that already protect the soil, installing new materials or a combination of both. Illustrative specifications for ground protection are included as Appendix 8. Whatever the choice of method, the end result must be that the underlying soil (rooting environment) remains undisturbed and retains the capacity to support existing and new roots.

All work operations in RPAs will be strictly controlled in accordance with BS 5837, as summarised in the explanatory notes of the fencing specification sheet in Appendix 7 and explained in more detail in the site guidance in Appendix 9. All barriers, whether fencing or ground protection, must remain intact and fit for purpose for the duration of any development activity that could cause damage. The barriers are intended to prevent any unsupervised activities within the protected CEZ. Additionally, once the barriers are removed, any landscaping activity must be carefully controlled in RPAs.

2.3.4 Control of activities within RPAs

Although not anticipated on this site, sometimes unexpected works are needed within fenced RPAs. **For the avoidance of doubt, all activities within RPAs must be carried out in accordance with the detailed guidance set out in Appendix 9 and be supervised by an arboricultural consultant. In particular, this guidance applies to removing surfacing and structures, installation/upgrading of new surfacing, structures and services, and soft landscaping.**

2.3.5 Control of activities near RPAs

Any risk to trees from activities outside RPAs, but close enough to have a knock-on impact, will be assessed during the day-to-day running of the site and appropriate precautions put in place to reduce that risk. More specifically, all cement mixing and washing points for equipment and vehicles will be outside RPAs. Where the contours of the site create a risk of polluted water or toxic liquids running into RPAs, a precautionary measure of using heavy-duty plastic sheeting and sandbags with the ability to contain accidental spillages will be put in place to prevent contamination.

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Section 3
Appendices

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Appendix 1: Background administrative information

A1.1 Instruction

We are instructed by Ms Garrod to inspect the significant trees that could be affected by the development proposal at 40 Grove Road, Havant, and to prepare the following information to accompany the planning submission:

- a schedule of the relevant trees to include basic data and a condition assessment
- an appraisal of the impact of the proposal on trees and any resulting impact that has on local amenity
- an arboricultural method statement dealing with the protection and management of the trees to be retained

A1.2 Documents provided

The tree protection plan is derived from the following provided information:

- Land survey, drawing number 11110, received by email on 10 October 2011
- Layout, drawing number 09/101/01 Rev B, received by email on 12 October 2011

A1.3 Limitations of this report

The following limitations apply to this report:

- **Statutory protection:** The existence of tree preservation order or conservation area protection does not automatically mean trees are worthy of being a material constraint in a planning context. Trees can be formally protected, but be in poor structural condition or in declining health, which means that they are unsuitable for retention or influencing the future use of the site. Furthermore, a planning consent automatically takes precedent over these forms of protection, which makes them of secondary importance. For these reasons, we do not check statutory protection as a matter of course in the process of preparing this report. However, if any tree works are proposed before a planning consent is given, then the existence of any statutory protection must be checked with the LPA.
- **Ecology and archaeology:** Although trees can be valuable ecological habitat and can grow in archeologically sensitive locations, we have no specialist expertise in these disciplines and this report does not consider those aspects.

A1.4 Technical references

This arboricultural method statement is based on the following primary technical references:

- British Standards Institution (2005) BS 5837: *Trees in relation to construction – Recommendations*
- National Joint Utilities Group (2007) Volume 4, Issue 1: *Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees*

A1.5 Qualifications and experience

This report is based on my site observations and the provided information, interpreted in the context of my experience. I have experience and qualifications in arboriculture and enclose a summary in Appendix 3.

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Appendix 2: Site visit, collection of data and its use in the design process

A2.1 Site visit

I visited the site on 5 October 2011. All my observations were from ground level without detailed investigations and I estimated all dimensions unless otherwise indicated. The weather at the time of inspection was dull, and dry, with average visibility.

A2.2 Brief site description

Grove Road is located in the residential suburbs of Havant. Number 40 is located on the southern side of the road at the junction with Lower Grove Road. The property consists of a large detached house to the front of a large garden that is predominately set to grass. The surrounding topography is relatively flat and the site is not particularly exposed. A brick wall borders the property's north and eastern boundary. An area of hard landscaping lies between this wall and the eastern flank of the property and several poor quality trees line are located along the inside line of the wall.

A2.3 Collection of basic data

Each tree was inspected and the numbering scheme is indicated on the tree protection plan. Obvious groups were identified where appropriate. For each individual tree and group, information was collected on species, height, diameter, maturity and potential for contribution to amenity in a development context. As advocated in BS 5837, each tree was then allocated to one of four categories (A, B, C or R), which reflected its suitability as a material constraint on development. When collecting this information, specific consideration was given to any low branches that may influence future use, age class, physiological condition, structural condition and remaining contribution. Where appropriate, crown spreads were also noted where they differed from those shown on the provided land survey. This data with explanatory notes is set out in the tree schedule included as Appendix 4 and the supporting plan information. Each tree inspection was of a preliminary nature and did not involve any climbing or detailed investigation beyond what was visible from accessible points at ground level. Subsection 4.6.6 of BS 5837 sets out recommendations for the collection of data and this report is fully compliant with that advice.

A2.4 Advanced interpretation of data

Section 5 of BS 5837 recommends that the trunk diameter measurement for each tree is used to identify a radius from the centre of the trunk that can then be used to calculate the RPA. This radius is <u>not</u> the extent of the RPA boundaries, but just a notional means of establishing the area needed for the tree to survive. In many instances, the RPA boundaries can be closer to the tree than this radius. The RPA derived from this calculation can then be interpreted to identify the design constraints and, once a layout has been consented, the exclusion zone to be protected by barriers. These interpretations with explanatory notes are set out for each tree in Appendix 5.

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Appendix 2: Site visit, collection of data and its use in the design process

A2.5 The use of the tree information in layout design

Following the inspection of the trees, the information listed in Appendices 4 and 5 was used to provide and confirm constraints guidance to the architect based on the locations of all the trees. All the category C trees were discounted because they were not considered worthy of being a material constraint. This guidance identified the estimated developable footprint of the site and was considered by the architect to confirm the submitted design. For conciseness, and because it is not a BS recommendation, this detailed constraints advice has not been included in this report, although there is a summary in Appendix 5. However, the detailed analysis can be provided if necessary.

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Appendix 3: Brief qualifications and experience of Phil Brophy

1 **Qualifications:** I am a Chartered Forester and a Chartered Environmentalist and hold the Higher National Diploma in Arboriculture obtained from the University of Central Lancashire, hosted by Myerscough Agricultural College. I am also a professional member and Registered Consultant of the Arboricultural Association.

2 **Career experience:** I have been working in arboriculture since 1993. My first post was as an arborist with the FA Bartlett Tree Expert Co in the USA, undertaken as work experience in a placement year whilst studying. On completion of my qualification, I joined Southern Tree Surgeons, a national arboricultural contracting company. My first experience of public sector arboriculture was at Leicester City Council in 1997 as tree inspector for the Highway Authority. In this post, I played a key role in the establishment of a citywide policy for sustainable tree management. In 1999, I moved to Stratford-upon-Avon District Council as assistant arboricultural officer working within a specialist heritage and design team. In that post, I gained valuable experience in the administration of tree related statutory controls against the backdrop of a rural landscape with a myriad of social economic pressures. In 2001, I took the post of senior arboriculturist for Cherwell District Council where I was responsible for the management of the council tree stock as well as ensuring the provision of a high standard of technical advice to other departments and the general public. In August 2003, I relocated to New Forest District Council as an Arboricultural Officer where my duties were primarily focused upon urban design and commercial development within what is a unique area of the British Isles, a large area of which is now a designated National Park. In 2006, I joined Barrell Treecare as a practice consultant bringing my public sector planning expertise to the private sector.

3 **Continuing professional development:** I ensure that I keep professionally current through subscription to the Arboricultural Advisory and Information Service and by regular attendance at seminars and conferences.

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Appendix 4: Tree schedule and explanatory notes

NOTE: Colour annotation is A & B trees with green background; C & R trees with blue background; trees to be removed in red text.

Tree No	Species	Height (m)	Diameter (cm) @ 1.5m	Diameter (cm) @ Base	Maturity	Low Branches	Category	Notes	Tree Works
All retained trees & hedges								Crown clean and lift to 3-4m over site as necessary. Clip to reform hedges as appropriate.	
T1	Strawberry tree	3	12	-	Maturing	-	C	Small ornamental tree	Fell
T2	Holly	8	-	33	Mature	-	C	Twin stemmed from base	Fell
T3	Holly	8	15	-	Maturing	-	C	-	Fell
G4	Bay	9	-	35	Mature	-	C	Multiple stem from ground level and bracket fungus, areas of damage and decay in stems	Fell
T5	Bay	8	-	50	Mature	-	C	Multiple stems from ground level, some areas of potential structural weakness	Fell

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Appendix 4: Tree schedule and explanatory notes

Explanatory Notes

- **Abbreviations:**

G	: Group
RPA	: Root protection area

- **Botanical tree names:**

Bay	: *Laurus nobilis*
Holly	: *Ilex aquifolium*
Strawberry tree	: *Arbutus unedo*

- **BS 5837 (2005) compliance:** All data has been collected based on the recommendations set out in subsection 4.2 of BS 5837.
- **NHBC limitations:** All data has been collected for the sole use of identifying the development constraints in the planning process. It is not intended for use in conjunction with the NHBC guidance for calculating foundation depths and should not be used for that purpose without authorisation from Barrell Tree Consultancy.
- **Site limitations:** Where there is restricted access to the base of a tree, its attributes are assessed from the nearest point of access. Climbing inspections are not carried out during a walkover tree survey and, if heavy ivy is present, tree condition is assessed from what can be seen from the ground. A separate note is recorded if further investigation may be required to clarify its status.
- **Crown spreads:** Crown spread dimensions are not listed in the tree schedule because they are illustrated on the land survey base to all the plans in this document. Where crown spreads of significant trees on site are found to deviate from those shown on the provided land survey, we have noted it in the text of the report and annotated it on our plans.
- **Dimensions:** All dimensions are estimated unless annotated with a '*'.
- **Species:** Species identification is based on visual observations. Where there is some doubt over tree identity, sp is noted after the genus name in the botanical names section above to indicate that the species cannot be reliably identified at the time of the survey. Where there is more than one species in a group, only the most frequent are noted and not all the species present may be listed.
- **Height:** Height is estimated to provide a broad indication of the size of the tree.
- **Trunk diameter:** Trunk diameter is estimated or measured and recorded in centimetres. It is measured with a diameter tape unless access is restricted, direct measurement is not possible because of ivy on the trunk or the tree is assessed as poor quality. Where diameter is estimated, it is recorded in 5cm increments. For trees with a single trunk, it is taken at 1.5m above ground level. Where trees have multiple stems or distorted trunks, it is taken immediately above the root flare.
- **Maturity:** In planning context, maturity provides a simplistic indication of a tree's ability to cope with change and its potential for further growth. For the purposes of this report, young indicates a potential to significantly increase in size and a high ability to cope with change, maturing indicates some potential to increase in size and a medium ability to cope with change, and mature indicates little potential to increase in size and limited ability to cope with change.
- **Low branches:** Any low branches that would not be feasible for removal during normal management and should be considered as a design constraint are noted here and explained in the notes.
- **Category:** Our assessment automatically considered tree physiological condition (BS 5837 4.2.6h) and structural condition (BS 5837 4.2.6i), so these are not listed separately in the schedule. Additionally, the category accounts for the remaining contribution (BS 5837 4.2.6k) as greater than

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40 years for A trees, greater than 20 years for B trees, at least 10 years for C trees and less than 10 years for R trees, so this is also not listed separately in the schedule.

- **Notes:** Only relevant features relating to physiological or structural condition and low branches that may help clarify the categorisation are recorded. If there are no notes, then the presumption should be that no relevant features were observed.

- **Tree works:** The inspection of all trees was of a preliminary nature and only defects visible from the ground have been identified. Each individual tree may not have been inspected closely because of access difficulties and only defects visible from the inspection point have been noted. In addition to tree removals for development and management reasons, further works are listed to establish acceptable levels of risk. All trees should be crown cleaned and lifted to 3–4m above the site, where appropriate. Only works in excess of this have been listed for individual trees. The following points should also be noted before carrying out any works:

  1. **Reporting during work operations:** In the context of the preliminary nature of the tree inspection, any defects that may affect tree safety discovered by the contractor when carrying out the work recommendations should be reported to the supervising officer. Modification to the schedule of works may be required because of these reports. The contractor should be specifically instructed on this point.
  2. **Implementation of works:** All tree works should be carried out to BS 3998 *Recommendations for Tree Work* as modified by more recent research. It is advisable to select a contractor from the local authority list and preferably one approved by the Arboricultural Association. Their Register of Contractors is available free from Ullenwood Court, Ullenwood, Cheltenham, Glos GL53 9QS; phone 01242 522152; website www.trees.org.uk.
  3. **Statutory wildlife obligations:** The Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way Act 2000 provides statutory protection to birds, bats and other species that inhabit trees. All tree work operations are covered by these provisions and advice from an ecologist must be obtained before undertaking any works that might constitute an offence.
  4. **Stumps:** Stumps to be removed within the RPAs of retained trees should be ground out with a stump grinder to minimise any disturbance unless otherwise authorised by the supervising officer.

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Appendix 5: Advanced interpretation of tree data and explanatory notes

Tree No	Diameter (cm) @ 1.5m	Diameter (cm) @ Base	RPA radius (m)	RPA area (m2)	Minimum barrier distance (m)	Explanation of any adjustment to the minimum barrier distance
T1	12	-	1.4	6.5	1.3	-
T2	-	33	3.3	34.2	2.9	-
T3	15	-	1.8	10.2	1.6	-
G4	-	35	3.5	38.5	3.1	-
T5	-	50	5.0	78.5	4.4	-

Explanatory notes

- **General:** The basic data listed in the first three columns above is identical to that listed in the tree schedule in Appendix 5. The data listed in columns 3–6 is derived from the basic data in columns 1–3 by simple calculation as described in BS 5837. The last column explains any adjustments that have been made to the minimum barrier distance.
- **RPA radius:** The RPA radius has been calculated by multiplying the trunk diameter by 12 if it is measured at 1.5m above the ground or by 10 if it is measured at ground level.
- **RPA area:** The RPA has been assessed according to the recommendations set out in Table 2 and section 5 of BS 5837. It is calculated by multiplying the radius squared by 3.142, derived from the area of a circle being πr^2.
- **Minimum barrier distance:** The minimum barrier distance has been assessed according to the recommendations set out in 5.2.3 of BS 5837. This advises that the basic RPA can be interpreted as a square surrounding the trunk. Based on this recommendation, the closest point to the perimeter of that square creates a minimum barrier distance that is listed in this column.
- **Explanation of any minimum barrier distance adjustment:** In clause 5.2.4 of BS 5837, it is recommended that the RPA may be changed in shape, taking into account local site factors as assessed by an arboriculturist. Where such an adjustment is appropriate and results in a reduced minimum barrier distance, it is noted in the last column of the table with a short explanation.

Figure 3: Explanatory diagram for RPA assessment

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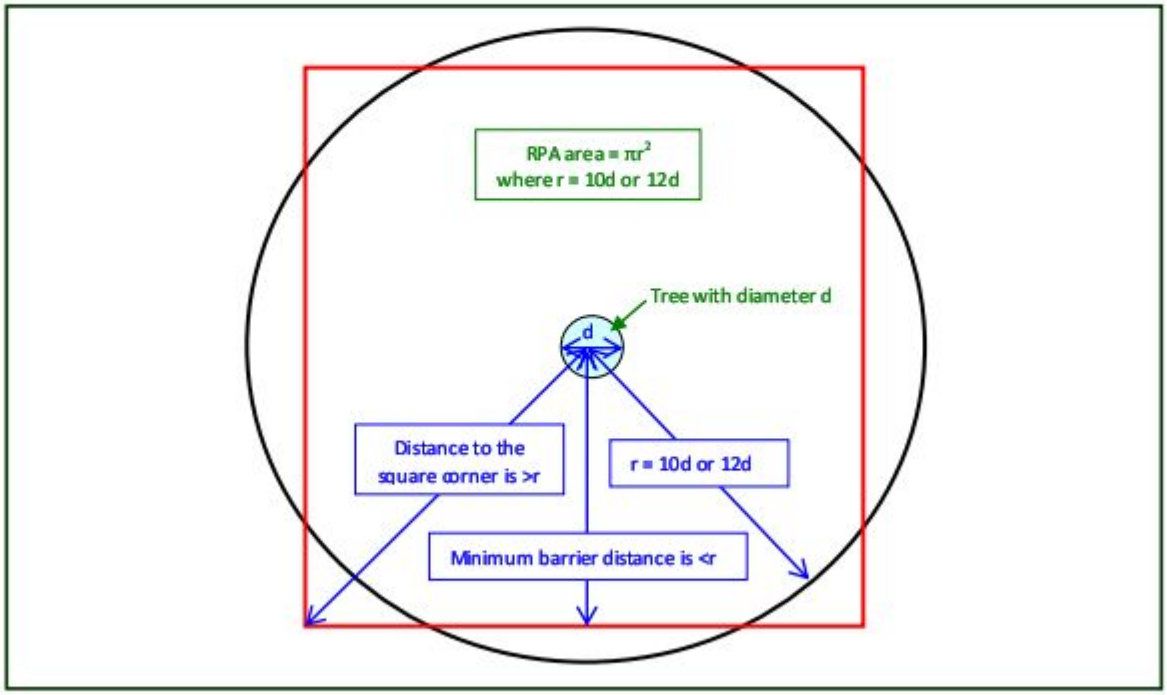
Appendix 5: Advanced interpretation of tree data and explanatory notes



In Figure 3 above, a tree with diameter d is in the centre. Its RPA radius is established by measuring its diameter (d) at 1.5m or at ground level (See Clause 5.2.2 of BS 5837) and multiplying that by 12 or 10 respectively. The RPA is calculated by multiplying the square of the radius by π (3.142), i.e. the RPA = πr^2, which is shown by the black circle above. In Clause 5.2.3 of BS 5837, it sets out that the RPA can also be represented by a square centred on the trunk of the tree as shown by the red square above. This square has the same area as the circle but, unlike the circle, where the distance to the centre remains the same for any point on the circumference, the distance of the sides from the centre vary from a minimum that is less than r to a centre-to-corner distance that is greater than r. This is why the minimum barrier distance can be less than r if there is a distance greater than r that allows the RPA to remain the same. The minimum barrier distance is calculated by finding the square root of the RPA, which gives the length of one side of the square, and dividing that by two to give the distance from the side to the centre.

CLARIFICATION NOTE ON RPA RADIUS: The RPA radius is not the automatic minimum distance of protection from the centre of the tree trunk. It is a notional figure purely for use as a means of calculating the actual area of the RPA. Relevant extracts from BS 5837 clarifying this include:

5.2.4 The RPA, for each tree as determined in Table 2, should be plotted on the TCP taking full account of the following factors, as assessed by an arboriculturist, which may change its shape but not reduce its area whilst still providing adequate protection for the root system.

7.1(c) NOTE 1 While the root protection area may be plotted as a circle on the constraints plan. the position of the barrier and any ground protection should be shown on subsequent plans as a polygon representing the actual position of the protection.

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Appendix 6: Phased project management of tree issues

Finalising tree management details after consent, but before work starts	
Action	**Arboricultural input**
Review of tree protection and any emerging design issues that may affect trees with the construction team	• Meeting/discussion with relevant members of the developer's team to explain the extent of the tree constraints • Review working space requirements to consider CEZ fencing and ground protection adjustments to improve site functionality • Review drainage proposals and identify potential conflicts with RPAs • Review any post-consent layout changes that may affect trees • Review all works within RPAs that may affect trees • Identify any potential conflicts and work towards resolutions • Preparation of working drawings, if necessary
Review consented tree protection proposals for discussion at pre-commencement meeting	If necessary: • prepare revised plans and specifications • liaise with LPA to discuss modifications
Review the construction method statement to detail how the site activities will account for the protection of trees	• If necessary, advise in its preparation / updating
Pre-commencement site meeting with supervising arboriculturist, site manager and the LPA representative (if appropriate)	• Meeting on site • Agree detail of supervision requirements, i.e. frequency of visits and reporting • Review tree protection, if already installed • Agree any changes to CEZ barrier combinations of fencing and ground protection
Site operations before demolition/construction starts on site	
Action	**Arboricultural input**
Tree works carried out	• Review the site requirements with the tree work contractor
Installation of tree protection for agreement by the LPA	• If appropriate, preparation of any revised plans and specifications for agreement by the LPA • Photographs showing relevant aspect of installed tree protective measures • Liaise with the contractor installing protection until satisfactorily completed
Site preparation	• Liaise with the contractor about tree protection
Operations within precautionary areas that could affect trees during construction	
Action	**Arboricultural input**
Installation of new services	• Meeting with contractor for briefing before work starts, with further visits as necessary at the discretion of the arboricultural consultant
Operations that could affect trees after construction is completed	
Action	**Arboricultural input**
Removal of barriers and ground protection	• Meeting with contractor for briefing before work starts, with further visits as necessary at the discretion of the arboricultural consultant • **NOTE:** This should only be authorised once there is no risk of RPA damage from the construction activity

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Appendix 7: Illustrative specification for protective fencing

Illustrative specification for fencing near trees according to BS 5837 (2005) recommendations.
Note: The final design must be site specific and detailed by an appropriately qualified expert.



Heras fencing wired to scaffold braced posts



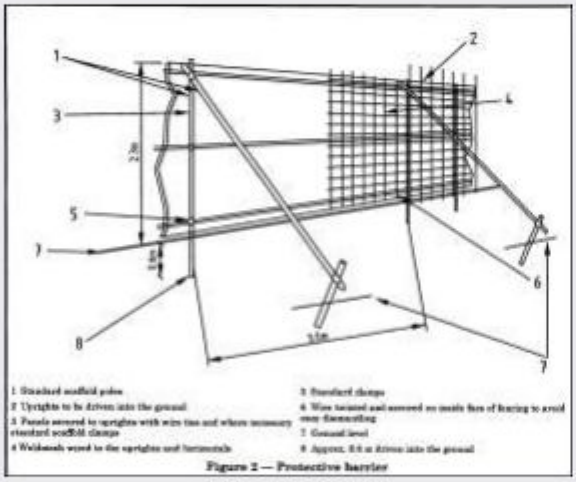
Board specification on secure wooden posts

Explanatory notes

1 Barriers should be installed at the location illustrated on the tree protection plan and agreed as acceptable in writing by the LPA before any site works start that could affect protected trees.
2 All uprights should be fixed in position for the duration of the development activity as either scaffold tubes or wooden posts banged or dug into the ground and braced sufficiently to withstand the pressures of everyday site work.
3 The framework supported by the uprights must be suitable for firmly attaching either heras panels or heavy duty ply in a way that will not allow the facing to be easily moved.
4 Minimum barrier height is 2.3m unless otherwise agreed with the LPA.
5 Inside the protective barrier, the following rules must be strictly observed:
- No vehicular access
- No fires
- No storage of excavated debris, building materials or fuels
- No mixing of cement
- No service installation or excavation without written consent of the LPA
- No excessive cultivation for landscape planting

6 No barriers should be moved or temporarily dismantled without the written permission of the LPA.
7 Barrier condition to be regularly monitored to ensure it remains effective.

Recommendations taken from Figure 2 of BS 5837



Close up of bracing detail



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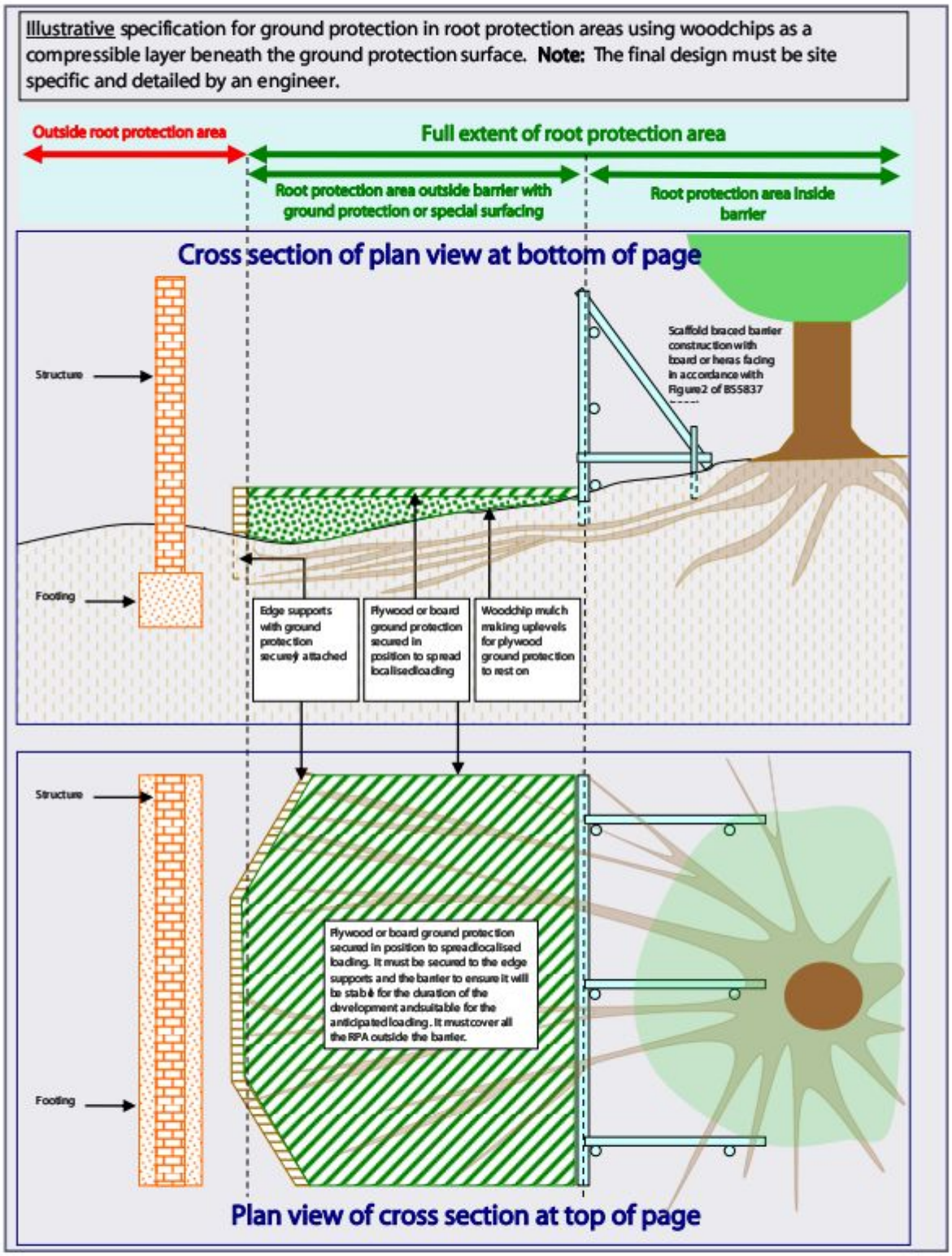
Appendix 8: Illustrative specification for ground protection



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Appendix 9: Site guidance for working in RPAs

1 GENERAL GUIDANCE FOR WORKING IN RPAs

1.1 **What is the purpose of this guidance?** This guidance sets out the general principles that must be followed when working in RPAs. Where more detail is required, it will be supplemented by illustrative specifications in other appendices in this document. Before work starts on site, the purpose of this guidance is to demonstrate to the LPA that tree protection issues have been properly considered and to provide a written record of how they will be implemented. Once the site works start, this guidance is specifically for the site personnel to help them understand what has been agreed and explain what is required to fully meet their obligations to protect trees. All personnel working in RPAs must be properly briefed about their responsibilities towards important trees based on this guidance.

1.2 **What are RPAs, CEZs and precautionary areas?** RPAs are the areas surrounding important trees where disturbance must be minimised if they are to be successfully retained. RPAs that are to be protected by barriers to prevent direct contact with the soil during construction are called Construction Exclusion Zones (CEZs). These are illustrated on our plans as the light black diagonal hatch surrounded by a heavy black dashed line. In some instances, the soil within RPAs will be disturbed due to permitted construction activity that is strictly controlled to limit the impact on trees. These are called precautionary areas and are shown on our plans by solid coloured fills as indicated on the plan key. Damage to roots or degradation of the soil through compaction and/or excavation within RPAs is likely to cause serious damage. Any work operations within RPAs must be carried out with great care if trees are to be successfully retained.

1.3 **When should this guidance be followed?** Anyone entering a RPA, which can include both the CEZ and any precautionary areas, must follow this guidance if important trees are to remain unharmed. Anyone working in a RPA must take care to minimise excavation into existing soil levels and limit any fill or covering that may affect soil permeability. There are two main scenarios where this guidance must be followed when entering and working within a RPA:

1. Removal of existing surfacing/structures and replacement with new surfacing, structures and/or landscaping.
2. Preparation and installation of new surfacing, structures and/or landscaping.

Broad definitions of surfacing, structures and landscaping are set out in the following sections.

1.4 **Where does this guidance apply?** This guidance should always be read in conjunction with the site plans illustrating the areas where specific precautions are necessary. Each area where precautions are required is annotated on the plans as identified on their keys. All plans are illustrative and intended to be interpreted in the context of the site conditions when the work is started. All protective measures should be installed according to the prevailing site conditions and agreed as satisfactory by the appropriate supervising officer before any demolition or construction work starts.

1.5 **What references is this guidance based on?** This guidance is based on the assumption that the minimum general standards for development issues are those set out in British Standards Institution (2005) BS 5837: *Trees in relation to construction – Recommendations* and the National Joint Utilities Group (2007) Volume 4, Issue 1: *Guidelines for the planning, installation*

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and maintenance of utility apparatus in proximity to trees. It is interpreted in the context of our experience of managing trees on development sites.

1.6 **Preventing adverse impact to the RPA beyond the immediate work area:** Any part of the RPA beyond the agreed work area must be isolated from the work operations by protective barriers or ground protection to at least the minimum standard described in BS 5837 for the duration of the work.

1.7 **Excavation and dealing with roots:** All excavation must be carried out carefully using spades, forks and trowels, taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using compressed air may be an appropriate alternative to hand digging, if available. All soil removal must be undertaken with care to minimise the disturbance of roots beyond the immediate area of excavation. Where possible, flexible clumps of smaller roots, including fibrous roots, should be retained if they can be displaced temporarily or permanently beyond the excavation without damage. If digging by hand, a fork should be used to loosen the soil and help locate any substantial roots. Once roots have been located, the trowel should be used to clear the soil away from them without damaging the bark. Exposed roots to be removed should be cut cleanly with a sharp saw or secateurs 10–20cm behind the final face of the excavation. Roots temporarily exposed must be protected from direct sunlight, drying out and extremes of temperature by appropriate covering. Roots greater than 2.5cm in diameter should be retained where possible. Roots 2.5–10cm in diameter should only be cut in exceptional circumstances. Roots greater than 10cm in diameter should only be cut after consultation with the appropriate supervisory officer.

1.8 **Arboricultural supervision:** Any work within RPAs requires a high level of care. Qualified arboricultural supervision is essential to minimise the risk of misunderstanding and misinterpretation. Site personnel must be properly briefed before any work starts. Ongoing work must be inspected regularly and, on completion, the work must be signed off by the arboriculturist to confirm compliance by the contractor. In the context of this guidance, an appropriate supervising officer would normally be an arboriculturist.

2 REMOVING SURFACING/STRUCTURES IN RPAs

2.1 **Definitions of surfacing and structures:** For the purposes of this guidance, the following broad definitions apply:

- **Surfacing:** Any hard surfacing used as a vehicular road, parking or pedestrian path including tarmac, solid stone, crushed stone, compacted aggregate, concrete and timber decking. This does not include compacted soil with no hard covering.
- **Structures:** Any man-made structure above or below ground including service pipes, walls, gate piers, buildings and foundations. Typically, this would include drainage structures, car-ports, bin stores and concrete slabs that support buildings.

2.2 **Access:** Roots frequently grow adjacent to and beneath existing surfacing/structures, so great care is needed during access and demolition. Damage can occur through physical disturbance of roots and/or the compaction of soil around them from the weight of machinery or repeated pedestrian passage. This is not generally a problem whilst surfacing/structures are in place because they spread the load on the soil beneath and further protective measures are not

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normally necessary. However, once they are removed and the soil below is newly-exposed, potential damage to roots becomes an issue and the following guidance must be observed:

1. No vehicular or repeated pedestrian access into RPAs unless on existing hard surfacing or custom designed ground protection.
2. Regular vehicular and pedestrian access routes must be protected from compaction with temporary ground protection as set out in BS 5837.
3. RPAs exposed by the work must be protected as set out in BS 5837 until there is no risk of damage from the development activity.

2.3 **Removal:** Removing existing surfacing/structures is a high-risk activity for any adjacent roots and the following guidance must be observed:

1. Appropriate tools for manually removing debris may include a pneumatic breaker, crow bar, sledgehammer, pick, mattock, shovel, spade, trowel, fork and wheelbarrow. Secateurs and a handsaw must also be available to deal with any exposed roots that have to be cut.
2. Machines with a long reach may be used if they can work from outside RPAs or from protected areas within RPAs. They must not encroach onto unprotected soil in RPAs.
3. Debris to be removed from RPAs manually must be moved across existing hard surfacing or temporary ground protection in a way that prevents compaction of soil. Alternatively, it can be lifted out by machines, provided this does not disturb RPAs.
4. Great care must be taken throughout these operations not to damage roots as set out in 1.7 above.
5. If appropriate, leaving below ground structures in place should be considered if their removal may cause excessive root disturbance.

3 INSTALLATION OF NEW SURFACING IN RPAs

3.1 **Basic principles:** New surfacing is potentially damaging to trees because it may require changes to existing ground levels, result in localised soil structure degradation and/or disrupt the efficient exchange of water and gases in and out of the soil. Mature and over-mature trees are much more prone to suffer because of these changes than young and maturing trees. Adverse impact on trees can be reduced by minimising the extent of these changes in RPAs. Generally, the most suitable surfacing will be relatively permeable to allow water and gas movement, load spreading to avoid localised compaction and require little or no excavation to limit direct damage. The actual specification of the surfacing is an engineering issue that needs to be considered in the context of the bearing capacity of the soil, the intended loading and the frequency of loading. The detail of product and specification are beyond the scope of this guidance and must be provided separately by the appropriate specialist.

4 INSTALLATION OF NEW STRUCTURES IN RPAs

4.1 **Basic principles:** New structures in RPAs are potentially damaging to trees because they may disturb the soil and disrupt the existing exchange of water and gases in and out of it. Mature and over-mature trees are much more prone to suffer because of these changes than young and maturing trees. Adverse impact on trees can be reduced by minimising the extent of these

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changes in RPAs. This can be done by constructing the main structures above ground level on piled supports and redirecting water to where it is needed. The detailed design and specification of such structures is an engineering issue that should be informed and guided by tree expertise.

4.2 **Services:** For the purposes of this guidance, services are considered as structures. Excavation to upgrade existing services or install new services in RPAs may damage retained trees and should only be chosen as a last resort. In the event that excavation emerges as the preferred option, the decision should be reviewed by the supervising officer before any work is carried out. If excavation is agreed, all digging should be done carefully and follow the guidance set out in 1.7 above.

5 SOFT LANDSCAPING IN RPAs

5.1 **Upgrading existing soft landscaping or replacing existing surfacing/structures with new soft landscaping:** For the purposes of this guidance, soft landscaping includes the re-profiling of existing soil levels and covering the soil surface with new plants or an organic covering (mulch). It does not include the installation of solid structures or compacted surfacing. Soft landscaping activity after construction can be extremely damaging to trees. No significant excavation or cultivation, especially by rotovators, should occur within RPAs. Where new designs require levels to be increased to tie in with new structures or the removal of an existing structure has left a void below the surrounding ground level, good quality and relatively permeable top soil should be used for the fill. It should be firmed into place but not over compacted in preparation for turfing or careful shrub planting. Ideally, all areas close to tree trunks should be kept at the original ground level and have a mulched finish rather than grass to reduce the risk of mowing damage.

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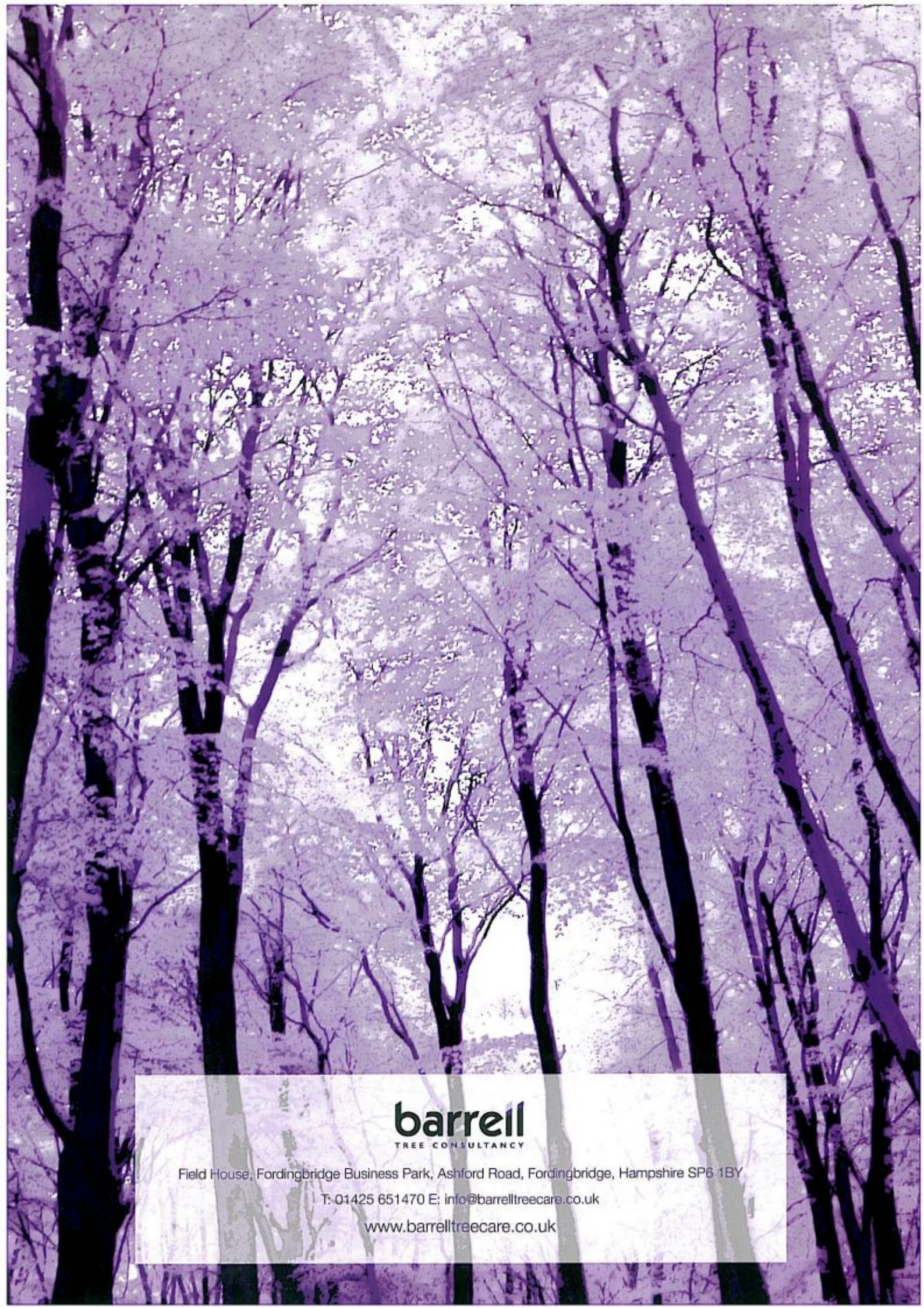

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