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TREE CONSULTANCY

Arboricultural Impact Appraisal and Method Statement

27 John Street, London

Prepared by
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Date: 7 September 2013
Ref: 13355-A[illegible]-MW

Validation statement

This report contains the supporting tree information relating to the development proposal to refurbish and extend the existing building to include a new basement level and associated landscaping at 27 John Street, London.

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

- A full tree survey compliant to the requirements of ***BS5837: (2012 Trees in relation to design, demolition and 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 one tree to be retained, 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 report

This is an arboricultural impact appraisal report describing one magnolia tree (T1) near the development area, what the impact of the development proposal will be and how any adverse impact will be mitigated. It also includes an arboricultural method statement describing how the tree 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 as part of the process of determining the planning application.

More detailed reasoning relating to the protection of the retained tree can be reviewed in section 2.4 of this report.

Report contents

It includes:

- a **tree protection plan** showing the location of the one tree, its categorisation, the location of the new development, and the tree protection measures;
- an **arboricultural impact appraisal** in Section 1, which describes the impact of the development on one tree;
- 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 providing relevant background information and more detailed guidance to supplement the explanations in Section 2.

Background administrative information

Background information on our specific instructions and how we carried them out is included as Appendix 1. One tree in the adjacent property that could be affected was inspected and its details are listed in Appendix 2. Based on this information, guidance was provided to Donald Insall Associates Ltd on the constraints this tree imposes on the use of the site.

Summary of the impact on trees and local character

There are no trees within the curtilage of the property to be developed but some minor branch pruning will be required to one magnolia tree in the adjacent property for construction access. Despite the construction activity being within the RPA of the tree, there is a substantial boundary wall that is likely to be restricting its root growth on one side. As a precautionary measure, careful investigations should be undertaken to ensure no significant roots from the tree are present. However, if there are roots found then careful root pruning can be done without adversely affecting the tree's health. On this basis, the development proposal is unlikely to have a significant impact on the contribution of this tree to local amenity or character.

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Explanatory notes for the tree protection plan

The tree protection plan (our reference 13355-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 construction activity starts. Its base is the existing land survey with the proposed layout superimposed, so the two can be easily compared. It shows:

- one tree numbered which is C category and highlighted with a blue rectangle;
- the location of the construction exclusion zone (CEZ) to be protected by the existing boundary wall; and
- the location of one precautionary area where special care will be needed undertaking works.

Section 1
Arboricultural impact appraisal

This arboricultural impact appraisal describes our assessment of how the proposal will affect one tree and any impact this will have on local amenity and character. The impact on this tree is summarised at the beginning in 1.1 and more detailed explanation of this analysis is set out in 1.2.

Section 1: Arboricultural impact appraisal

1.1 IMPACT ON ONE TREE (T1)

Tree 1: From the provided layout, only one tree (T1) growing in the adjacent property is close enough to be affected by the proposed basement works. Based on its estimated stem diameter it requires a RPA radius of 3.6m or an area of soil 41m². However, the tree grows about 0.5m from the boundary wall where the foundations are likely to have restricted root growth on this side (Image 1). From my observations, I believe it is unlikely that roots from this tree have found their way beneath the wall foundations and are probably growing in the adjacent garden. If this is the case, the tree is unlikely to be affected by the works. However, if some roots have managed to find their way beneath the wall foundations, special precautions will be required to investigate whether any roots are present using hand digging techniques. If roots are encountered, then it may be possible for careful root pruning to be done but this will need specialist advice and should only be done under a supervision agreement to minimise any adverse effects on the tree's health or amenity value. There are some small low branches that are likely to be restricting access for construction works but any necessary remedial pruning can be done without adversely affecting the health or visual amenity value of the tree.

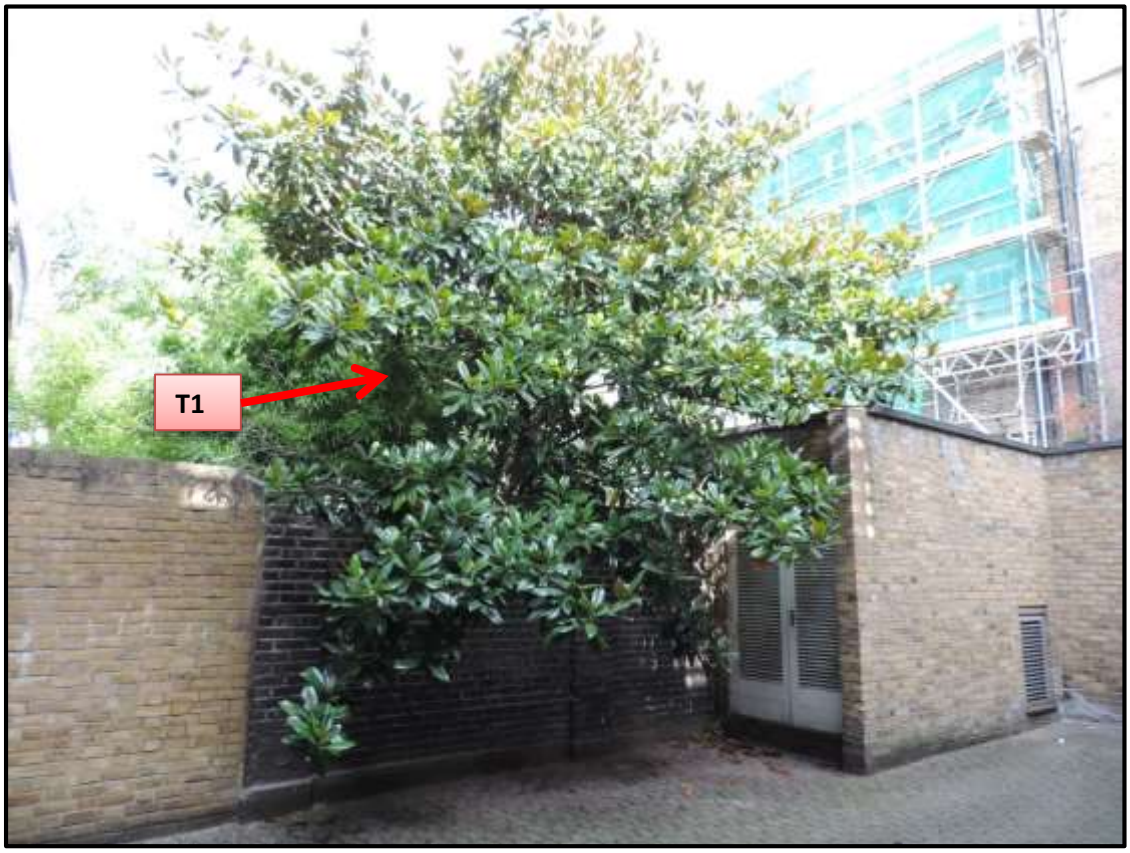


Image 1: The foundations of the boundary wall are likely to be providing a significant root barrier on the side of 27 John Street.

1.2 PROTECTION OF RETAINED TREES

The successful retention of the magnolia tree depends on the quality of pruning works and the protection during the construction works. 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 detail in section 2.

1.3 SUMMARY OF THE IMPACT ON LOCAL AMENITY

There are no trees within the curtilage of the property to be developed but some minor branch pruning will be required to one magnolia tree in the adjacent property for construction access. Despite the construction activity being within the RPA of the tree, there is a substantial boundary wall that is likely to be restricting its root growth on one side. As a precautionary measure, careful investigations should be undertaken to ensure no significant roots from the tree are present. However, if there are roots found then careful root pruning can be done without adversely affecting the tree's health. On this basis, the development proposal is unlikely to have a significant impact on the contribution of this tree to local amenity or character.

Section 2
Arboricultural method statement

This is an arboricultural method statement describing how one tree will be protected and managed during the development of the site. As explained in Table B1 of BS 5837, it is based on the best available information at this stage in the planning process and may need to be updated in the context of a specific planning condition when the full detail is known. Its purpose is to explain how and when the protection measures should be installed, and how the tree 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. Please note that this plan is not a 'dimensioned tree protection plan' at this stage because BS 5837 advises in Table B1 that this is not required at the planning application stage. Appendix 3 sets out further guidance to supplement the following 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 the tree; and
- referenced on site for practical guidance on how to protect the tree.

Section 2: Arboricultural method statement

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 the tree.

Additionally, the consultant will have a supervisory input into operations that could adversely affect the tree (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. In the event that a LPA representative declines to be 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 most appropriate for protecting 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 the tree and its 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 the tree:** Once the site is active, the arboricultural consultant will visit at an interval agreed at the pre-commencement site meeting. The supervision arrangement will be sufficiently flexible to allow the supervision of all sensitive works as they occur. The arboricultural consultant's 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

In overview, it is anticipated that arboricultural input is likely to be needed for the following operations:

1. Pre-commencement meeting
2. Remedial pruning of branches for construction access
3. Hand digging within RPA for root investigations
4. Careful root pruning if significant roots are encountered

The precise order and timing of some of these operations may change due to site operating requirements, but all operations that can affect the tree 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 2. These are made on the basis that the magnolia tree will be re inspected within a year of the original inspection and the management advice only remains valid for up to a year after that inspection date.

2.3.3 Protection of the CEZ by the use of the existing boundary wall

BS 5837 (3.6) describes the CEZ as the "*area based on the RPA from which access is prohibited for the duration of a project*". In practice, this can normally be done by using any combination of fencing and ground protection. However, in this case that is unlikely to be practical or necessary because the existing boundary wall will provide adequate protection.

2.3.4 **Control of activities within precautionary area**

The precautionary area is shown on the tree protection plan as a yellow filled area outside the main CEZ. It indicates where agreed activities can be carried out within the RPA, provided sufficient care is taken to ensure that any impact on the retained magnolia tree is minimised. This specifically applies to excavation, but also covers all other development operations with the potential to adversely affect the tree. **All activities within the precautionary area must be carried out in accordance with the guidance principles set out in Appendix 3 and be supervised by an arboricultural consultant.**

2.3.5 **Control of activities near the RPA**

Any risk to the magnolia tree from activities outside the RPA, 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 the RPA. Where the contours of the site create a risk of polluted water or toxic liquids running into the RPA, 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.

2.4 SPECIFIC TREE PROTECTION REQUIREMENTS

The specific tree protection operations, in roughly the order that they will be carried out, are explained in detail in the following subsections. Where appropriate, more detailed guidance is referenced in Appendix 3 to supplement the following explanations.

2.4.1 **Installation of CEZ barriers (fencing and/or ground protection)**

The CEZ boundary is shown on the tree protection plan as the heavy black dashed line. Its location is approximate because its precise position will need to be finalised on site. In this case, the existing boundary wall can be used as a barrier but if an alternative solution is required then the guidance in Appendix 3 (paragraphs 3–6) should be followed.

2.4.2 **Installation of the new basement within the RPA**

The new basement will encroach into the outer extent of the RPA for the magnolia tree (yellow filled area). However, I have reviewed the situation carefully and believe that it would be feasible to first establish the extent of root growth through exploratory digs close to the edge of the existing boundary wall and where necessary, any significant exposed roots can be carefully cut back following the guidance in Appendix 3 (paragraph 7).

Section 3

Appendices

Appendix 1: Administrative information, site visit and data collection

Administrative information

1. Instruction

We are instructed by IPG International to inspect one magnolia tree in the adjacent property that could be affected by the development proposal at 27 John Street, London, and to prepare the following information to accompany the planning submission:

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

2. Documents provided

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

- Land survey, drawing number JS27.02 P 1001 Rev X, received by email on 25 September 2013
- Layout ground level, drawing number JS27.02 P 2001 Rev A, received by email on 26 September 2013
- Layout lower ground level, drawing number drawing number JS27.02 P 2000 Rev B, received by email on 26 September 2013

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.
- **Tree assessment and management advice:** Our inspection of the tree for the purposes of assessing its condition and work requirements is made on the basis that it will be annually inspected in the future to identify any changes in condition and review the original recommendations. For these reasons, the tree assessment advice only remains valid for one year from the date that the tree was last inspected.

4. Technical references

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

Appendix 1: Administrative information, site visit and data collection

- British Standards Institution (2012) BS 5837: *Trees in relation to design, demolition and construction – Recommendations*
- National Joint Utilities Group (2007) Volume 4, Issue 2: *Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees*

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 that can be reviewed at www.barrelltreecare.co.uk/about-us.php.

Site visit and data collection

6. Site visit

I visited the site on 24 September 2013. All my observations were from ground level without detailed investigations and I estimated all dimensions unless otherwise indicated. I did not have access to the magnolia tree and have confined observations of it to what was visible from within 27 John Street. The weather at the time of inspection was clear, still and dry, with good visibility. During my visit, I took photographs to illustrate specific points in this report.

7. Brief site description

John Street is located in the residential suburbs of London. Number 27 is on the western side of the road and surrounded by similar residential development. The property consists of a terraced house with mews that are enclosed by high boundary walls. There are no trees within the property but there is a medium sized magnolia in the rear garden of the adjacent property close to the north boundary wall, but it is not visible from any public viewpoints.

Image 2: The site boundaries are approximately indicated by the red outline

Appendix 1: Administrative information, site visit and data collection

8. Collection of basic data and compliance with BS 5837

The magnolia tree was inspected and its number is indicated on the tree protection plan. Information was collected on its species, height, diameter, maturity and potential for contribution to amenity in a development context. As advocated in BS 5837, it was then allocated as category C, which reflected its suitability in relation to the proposed 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. This data with explanatory notes is set out in the tree schedule included as Appendix 2 and the supporting plan information. The 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. BS 5837 (4.4.2) sets out recommendations for the collection of data and this report is fully compliant with that advice in the context of the BS 5837 Foreword, which states: "*Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.*" In that context, we will justify any deviation in this report from the strict BS 5837 recommendations on request.

9. Calculation of the RPA

Following the recommendations in Table D1 of BS 5837, the diameter of the tree was rounded up to the next 2.5cm increment, with the radius of a nominal circle and the resultant RPA taken directly from that table. This information is listed in the tree schedule in Appendix 2.

Appendix 2: Tree schedule and explanatory notes

NOTE: Colour annotation is A & B trees with green background; C & U trees with blue background.

Tree No	Species	Height (m)	Diameter (cm) @ 1.5m	Maturity	Low Branches	Category	Notes	Tree Works	RPA radius (m)	RPA area (m2)
T1	Magnolia	8	30	Maturing	-	C	Some low branches overhanging site	Remove lowest branches overhanging the site to provide a 2-3m clearance between the lowest branches and the ground level	3.6	41

Appendix 2: Tree schedule and explanatory notes

Explanatory notes for schedule

- **Abbreviations:**

  RPA : Root protection area

- **Botanical tree names:**

  Magnolia : *Magnolia* sp

- **BS 5837 (2012) compliance:** All data has been collected based on the recommendations set out in subsection 4.4 of BS 5837.

- **Future tree safety inspections:** Our assessment of the tree was carried out on the basis that a re-inspection would be carried out within a year of the assessment visit and our advice on tree condition must be reviewed annually from the date of that visit.

- **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 an indication of the size of the tree.

- **Trunk diameter:** Trunk diameter is estimated or measured and recorded in 2.5cm increments as advised in BS 5837 Table D1. 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. The point of measurement and the adjustments for stem variations are as advised in Figure C1 of BS 5837.

- **Maturity:** In a 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 some 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/structural condition (BS 5837, 4.4.2.5h), and so these are not listed separately in the schedule. Additionally, the category accounts for the remaining contribution (BS 5837, 4.4.2.5i) as greater than 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 U trees, so this is also not listed separately in the schedule. Category A, B and C trees are automatically listed as sub-category 1 unless otherwise stated.

Appendix 2: Tree schedule and explanatory notes

- **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 the tree was of a preliminary nature and only defects visible from the ground have been identified. The tree was not inspected closely because of access difficulties and only defects visible from the inspection point have been noted. 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 The Malthouse, Stroud Green, Standish, Stonehouse, Gloucestershire GL10 3DL; 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. **Future tree inspections:** Due to the time that may elapse between the original survey and the start of development, all trees should be re-inspected as part of the standard risk management process before any works start on site.

Appendix 3: General guidance for protecting retained trees

Introduction

1. Purpose and use of this guidance

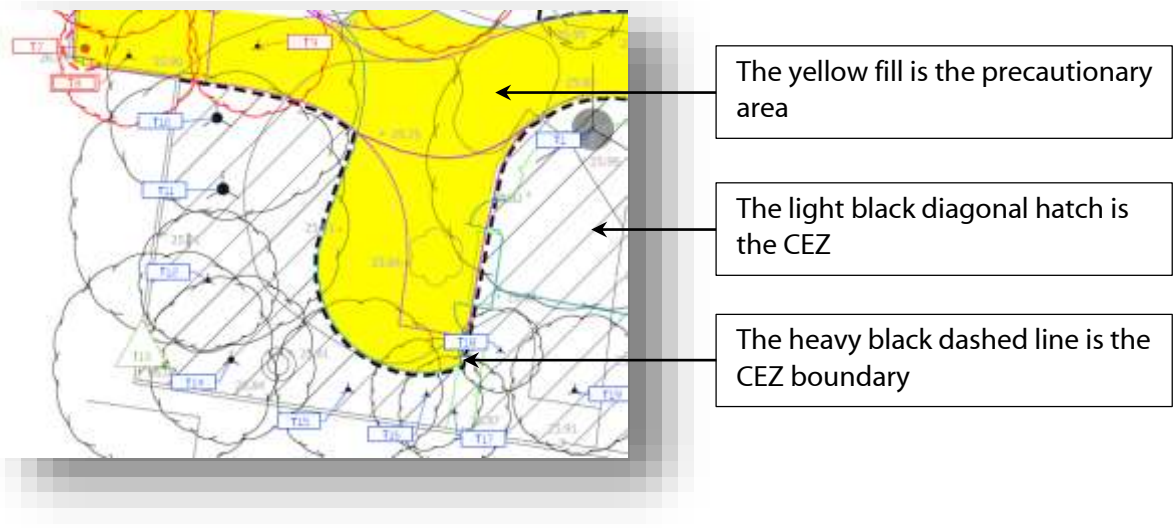
This general guidance is for construction site management to help protect trees that have been agreed for retention. It must be read in conjunction with the site-specific proposals shown on the tree protection plan and explained in the body text of this report. It supplements and expands upon the principles set out in the British Standards Institution (2012) BS 5837: *Trees in relation to design, demolition and construction – Recommendations* (www.bsigroup.com) and the National Joint Utilities Group (NJUG) (2007) Volume 4, Issue 2: *Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees* (www.njug.org.uk). More specifically, it describes useful practical precautions that can be taken when working close to retained trees and provides sources of further information. Important terms include:

- **Root protection areas (RPAs):** RPAs are the areas surrounding retained trees where disturbance must be minimised.

- **Construction exclusion zone (CEZ):** This is the RPA where no construction activity should occur and damage is prevented by either installing fencing to restrict access or installing ground protection that allows limited access above the ground, while protecting the rooting environment below.

- **Precautionary area:** This is RPA outside the CEZ where limited works are proposed, but must be carried out with care to minimise any impact on the tree rooting environment.

These areas are illustrated on our plans and annotated as follows:



At the planning stage, this guidance describes practical methods and examples of how trees can be protected to assist the local planning authority (LPA) in deciding whether the proposal is feasible. If the LPA issues consent, this guidance, in conjunction with the report and tree protection plan, will act as a written record for reference during the construction process. Once

work starts on site, this guidance is designed to help the site personnel implement effective tree protection. All personnel working in RPAs must be familiar with this document and be properly briefed about their responsibilities to protect important trees.

2. Arboricultural supervision

All 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 about protecting retained trees before any work starts. Ongoing work near trees must be inspected regularly by an arboriculturist and, on completion, the work must be signed off to confirm compliance by the contractor. This supervision arrangement will normally include a pre-commencement meeting, regular inspection visits and sufficient flexibility to allow for visits as necessary to deal with emerging tree protection issues.

Primary tree protection

3. Primary tree protection

The CEZ is the RPA surrounding retained trees that must be protected from any disturbance by the construction activity. In practice, this can be done by any combination of fencing and ground protection, to be finalised and agreed at the pre-commencement meeting. Whether the CEZ is protected by existing structures such as walls, temporary fencing or ground protection, all the protective measures must be installed before the start of any site works that could affect trees. No protective measures should be removed or temporarily dismantled without consulting the supervising arboriculturist. Furthermore, the condition of all the protective measures should be regularly monitored to ensure they remain fit for purpose. The main means of preventing damage to trees and their RPAs in the CEZ are fencing, barriers and ground protection.

4. Protective fencing

Various fencing options are illustrated in figure 1 and photos 2–4 below. The minimum specification for the fencing must be as described in figure 2 of BS 5837 (figure 1 below) or an equivalent design that effectively restricts access to the RPA it protects.

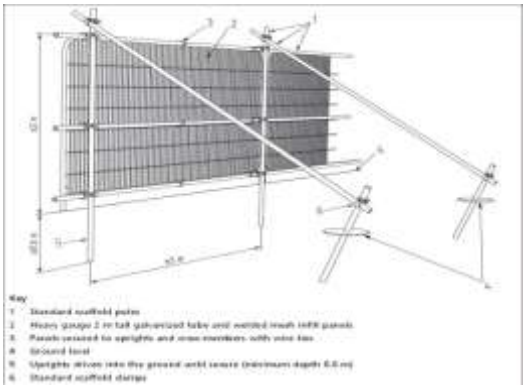


Figure 1: Recommendations taken from figure 2 of BS 5837.

Photo 2: Heras fencing wired to scaffold braced posts is a robust and effective interpretation of the BS specification.

Appendix 3: General guidance for protecting retained trees

Photo 3: Close up of bracing detail, essential for increasing the stability of the vertical framework.

Photo 4: Board specification on secure wooden posts is a suitable alternative to the standard braced scaffold design.

The precise form of the fencing can vary, provided it is fit for purpose in that it effectively restricts access and damaging activities within the RPA that it encloses. More specifically, behind the fencing, there must be no vehicular access; no fires; no storage of excavated debris, building materials or fuels; no mixing of cement; no service installation or excavation; no raising or lowering of soil levels; and no excessive cultivation for landscape planting. Any variations to these restrictions must be agreed by the supervising arboriculturist.

5. Trunk protection

Where individual trunks or branches are vulnerable to impact damage, a framework of scaffold or wood can be constructed to provide protection (photos 5 and 6).

Photo 5: A scaffold braced framework surrounding the trunk reduces the risk of accidental impact.

Photo 6: Board secured to scaffold framework adds another layer of protection for vulnerable trunks and branches.

6. Ground protection

Where it is not practical to protect the CEZ by the use of fencing alone, BS 5837 (6.2.3) allows for the fencing to be set back and the soil protected by ground protection. This allows improved access during construction, 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. 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.

Appendix 3: General guidance for protecting retained trees

Photos 7–14 illustrate a range of practical solutions that can effectively protect CEZs of retained trees.

Photo 7: Heavy-duty plywood set onto a compressible woodchip layer and pinned into position is suitable to spread the loading from pedestrian access.

Photo 8: Spreading soil excavated from footings is an effective way of buffering the plywood surface from the wear of light vehicles.

Photo 9: Plywood fixed to a wood frame is another effective method of protecting soil from pedestrian compaction.

Photo 10: A scaffold framework attached to the main scaffold fencing can be used to support either scaffold planks or plywood to create an elevated platform with a gap beneath.

Photo 11: Cellular products are a very effective means of providing ground protection where heavy vehicle use is expected. Here, it is being used to temporarily widen an existing road, to be removed once the construction is finished.

Photo 12: Custom designed sectional tracks can be joined to support very heavy traffic use through sensitive areas.

Appendix 3: General guidance for protecting retained trees

Photo 13: A combination of retaining existing surfacing and using temporary construction cabin accommodation can be a very effective means of preventing damage to sensitive areas.

Photo 14: Steel plates can be an effective way of temporarily reinforcing weak surfacing over a construction access during the development activity.

Guidance for working in precautionary areas

7. Excavation and dealing with roots

Precautionary areas are RPAs outside the CEZ, i.e. they are areas where construction activity can take place, but it must be carried out with care to avoid damaging the sensitive rooting environment. BS 5837 (7.2) makes provision for excavating in RPAs, explaining that all excavation must be carried out carefully using hand-held tools and preferably by compressed air soil displacement, taking care not to damage the bark and wood of any roots (photo 15, 16 and 17).

All soil removal must be done with care to minimise the disturbance of roots beyond the immediate area of excavation. Where possible, flexible clumps of smaller 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 such as dampened hessian sacking (photo 18). If necessary, roots less than 2.5cm in diameter can be cut cleanly without consultation with the supervising arboriculturist. Roots greater than 2.5cm in diameter should be retained where possible and only cut after consultation with the supervising arboriculturist.

Appendix 3: General guidance for protecting retained trees

Photo 15: Careful hand-digging using conventional tools is acceptable for exposing roots in RPAs.

Photo 16: Air spades are very effective at exposing roots and services with minimal damage.

Photo 17: Air spades are particularly useful where roots are very dense.

Photo 18: Exposed roots must be protected from light, drying out and extremes of temperature by covering with hessian sacking and boards until they can be covered back with soil.

8. Removing hard surfacing and structures in precautionary areas

For the purposes of this guidance, the following broad definitions apply:

- **Hard 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.

9. Access

Roots frequently grow adjacent to and beneath existing surfacing and 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 and structures remain in place because they spread the load on the soil beneath and further protective measures are not normally necessary. However, once that protection is removed and the soil below is newly-exposed, the potential for damage to roots becomes an issue.

In summary, there should be no vehicular or repeated pedestrian access unless existing ground protection is retained or new protective measures are installed (photo 19). All exposed RPAs must be protected until there is no risk of damage from the development activity.

Photo 19: Ground protection must be used where repeated foot or vehicle traffic could cause compaction in sensitive RPAs. It can be as simple as plywood for pedestrians, but must be more robust for vehicles.

Photo 20: Machines with a long reach can be used to lift out heavy surfacing and structures as long as the machine sits outside the RPA and the exposed surface is protected before there is any further access.

10. Removal of material

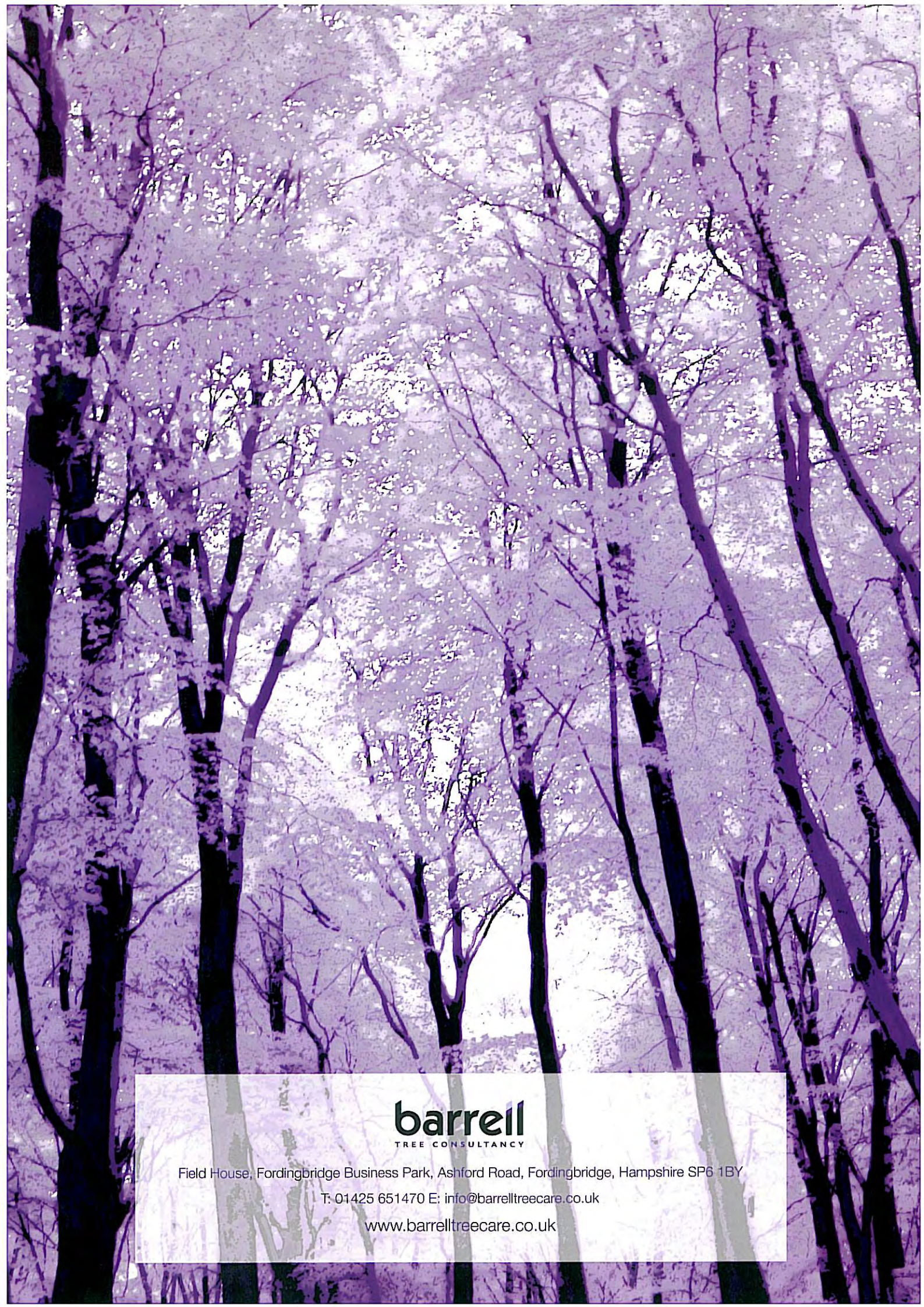
Removing existing surfacing and structures is a high-risk activity for any adjacent roots and the following guidance must be observed:

1. Appropriate tools for manually removing debris may include a pneumatic breaker, crow bar, sledgehammer, pick, mattock, shovel, spade, trowel, fork and wheelbarrow (photos 21 and 22). 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 (photo 20), but 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 (photo 20).
4. Great care must be taken throughout these operations not to damage roots as set out in paragraph 7 above.
5. If appropriate, leaving below ground structures in place should be considered if their removal may cause excessive root disturbance.

Appendix 3: General guidance for protecting retained trees

Photo 21: Careful lifting of cemented-in sets round this tree allowed them to be re-laid on a permeable sand base, improving the water input into the soil around the trunk.

Photo 22: These trees had impermeable surfacing right up to their trunks, which had to be removed by hand before installing new structures.



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