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Cranbrook Basements
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28 August 2013

Our Ref: **13134-Letter1-280813-JB.docx**

Dear Mr O'Connor

Re: Tree comments on the Royal Borough of Kensington and Chelsea proposed planning policy changes relating to basements

You have instructed me to review the proposed planning policy changes recently published for comment by the Royal Borough of Kensington and Chelsea (RBKC), and to advise on the reliability of the tree related information. I have seen the Alan Baxter *Residential Basement Study Report* reissued in March 2013 and the RBKC *Basements Publication Planning Policy* dated July 2013, and I focus on these two documents.

I provide this advice based on my experience and qualifications in forestry, biology and arboriculture, a summary of which is included as Enclosure 1. Barrell Tree Consultancy is one of the largest planning based tree consultancy practices in the UK, with six Chartered professionals dealing with 400-500 projects a year. The bulk of these deal with trees in a planning context, with a significant proportion of our work centred around the London Boroughs. More details of our Practice credentials can be reviewed at www.barrelltreecare.co.uk/about-us.php.

Dealing first with the Alan Baxter Report, I have carefully studied it and note that, although there are specific and detailed comments on tree issues, there is no record of that advice being verified by a qualified tree professional or of the author having any tree-related credentials. This reduces the weight that can be given to the tree related content to that of a lay-person, rather than a tree professional. In the context that the report is introduced as a professional piece of work written by professionals, the failure to clearly set out this obvious limitation is grossly misleading, creating the impression that the tree analysis should be given the same weight as the engineering analysis, when the reality is that it has nothing like that status.

More specifically, I identify the following content in that report that could be reasonably considered as misleading as follows:

Report reference	Content	Comment
9.7.1	<p><i>“British Standard 5837, 2012 (Trees in relation to design, demolition and construction) suggests that basements should not be constructed within a distance of twelve times the diameter of the trunk of a tree.”</i></p>	<p>This is a grossly misleading statement and I reference 7.6.1 of BS 5837 to support this point: <i>“Where it is proposed to form subterranean structures, e.g. basement extensions, within the RPA, it is essential to avoid excavating down through the rootable soil if trees are to be retained. In some cases, it might be technically possible to form the excavation by undermining the soil beneath the RPA.”</i></p> <p>BS 5837 makes no reference to the depth that RPAs might extend to and so that is a matter for arboricultural interpretation and judgment for each individual set of circumstances. Indeed, BS 5837 provides specific guidance on soil assessment at 4.3.1: <i>“A soil assessment should be undertaken by a competent person to inform any decision relating to:</i></p> <ul style="list-style-type: none"> • <i>the root protection area (RPA);</i> • <i>tree protection;</i> • <i>new planting design; and</i> • <i>foundation design to take account of retained, removed and new trees.”</i> <p>BS 5837 has considered the matter of basements near trees and the advice is that it is feasible if an informed assessment of the circumstances is carried out.</p> <p><u>It is difficult to see how this advice can be reasonably interpreted as suggesting that basements should not be constructed within RPAs.</u></p>
9.7.2	<p><i>“It may be acceptable for a basement to be partially under the canopy of a tree but the method of construction adopted should not damage the tree and this needs careful consideration at the planning stage.”</i></p>	<p>Again this is misleading because the word ‘partially’ is used to create the impression that there is some limitation on how far under trees a basement could extend. There is no credible or widely published reference that limits this aspect. Provided that the rootable soil volume remains undisturbed, in principle, all the area beneath any tree could be undermined with no adverse impact on the tree.</p> <p>The supporting evidence for this is the numerous examples of mature trees being successfully moved around the world with stabilised root balls (See examples in Enclosure 2 to illustrate this point). If tree canopies could only be partially undermined, then it would not be possible to successfully move mature trees, which is patently not the case.</p> <p><u>There is a significant body of industry experience and circumstantial evidence to refute the contention that there is some sort of limitation on the extent that basements could extend beneath the canopies of trees.</u></p>

Report reference	Content	Comment
9.7.4	<p><i>“Basements which extend under trees or Root Protection Areas² at any depth should not be permitted even though it may be possible to demonstrate that it is technically feasible.”</i></p> <p>² The root protection area (RPA) is defined in BS5837:2012 as a layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree’s viability, and where the protection of the roots and soil structure is treated as a priority.</p>	<p><u>This is the personal opinion of the author and not supported by any technical tree-related reference that I am aware of.</u></p> <p>What makes this particular statement even more misleading is the inappropriate reference to BS 5837, which does not support the opinion, but is presented as though it does. As the extract opposite correctly explains, RPAs deal with areas and is a tool, not an absolute measure. It was never designed to take specific account of variations in rooting depth. The most relevant recommendation from BS 5837 that explains this point in context rather than the selection opposite is in 4.6.2 and 4.6.3 as follows:</p> <p><i>“4.6.2 The RPA for each tree should initially be plotted as a circle centred on the base of the stem. Where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced. Modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution.</i></p> <p><i>4.6.3 Any deviation in the RPA from the original circular plot should take account of the following factors whilst still providing adequate protection for the root system:</i></p> <p><i>a) the morphology and disposition of the roots, when influenced by past or existing site conditions (e.g. the presence of roads, structures and underground apparatus);</i></p> <p><i>b) topography and drainage;</i></p> <p><i>c) the soil type and structure;</i></p> <p><i>d) the likely tolerance of the tree to root disturbance or damage, based on factors such as species, age, condition and past management.”</i></p> <p><u>There is nothing in these BS 5837 recommendations that support the author’s lay opinion.</u></p>
9.7.6	<p><i>“In addition to requiring basements built outside the footprint of buildings to have a depth of topsoil with appropriate water retention and drainage arrangements for the cultivation of gardens, there has to be a limit on how much of a garden can have basement construction beneath it. This is to ensure that trees can be planted to replace existing species that die and also to provide a hydraulic connection between the surface and the perched water table, so that rainwater can enter the ground to</i></p>	<p>Whilst the thrust of this paragraph is acceptable, i.e. that sufficient rootable soil volume should be retained to allow existing and future trees to survive and thrive, the idea that <i>“there has to be a limit on how much of a garden can have basement construction beneath it.”</i> is an uninformed opinion that is not supported by any technical or factual evidence. There are numerous examples of trees growing over structures in shallow rooting depths and thriving into maturity. An obvious one is the underground line passing beneath Embankment Gardens (See images in Enclosure 3) where mature plane trees are growing on soil depths of about 1m.</p>

Report reference	Content	Comment
	<i>maintain the current status quo within the groundwater regime of the Borough."</i>	<p>In principle and practice, there is no reason why basements could not occupy a full garden area and have no adverse impact on present or future trees, provided sufficient rootable soil volume is secured. However, this would need to be assessed in the context of depth of soil above the basement roof, i.e. the greater the garden coverage, the more depth that is likely to be required.</p> <p><u>There is no tree-related technical evidence to support the contention that "there has to be a limit on how much of a garden can have basement construction beneath it."</u></p>
9.8.1	<p><i>"The size of basements built outside the footprint of an existing house has to be limited for the following reasons</i></p> <p><i>a) ...</i></p> <p><i>b) Large tree and shrub planting to maintain the character of the gardens and landscape of residential areas within the Borough."</i></p>	<p><u>Again, this is the lay opinion of an author with no tree credentials.</u></p> <p>There is no evidence to support or reasons to justify the limitation of basement areas outside a building footprint because it limits large tree and shrub planting. As for the point above, provided there is sufficient rootable soil depth, which is a matter to be assessed on a site-by-site basis, trees do not provide a defensible constraint on basement garden coverage.</p>
9.8.6	<p><i>"The other factor that will need to be considered in limiting the size of a basement under a garden is the requirement to retain the ability to plant large trees. This requires areas of gardens to be kept clear of construction. In most cases a 3m strip at the rear of the garden will be sufficient to allow trees to grow, but this may depend on the nature of the garden and of the trees themselves. Where there are large gardens, a much wider strip or further areas should be left without subterranean construction beneath them to allow for extensive tree planting."</i></p>	<p><u>Again, this is a lay statement clumsily dealing with issues beyond the author's area of expertise.</u></p> <p>It is simply not correct to imply or state that tree planting and growth will be affected by basement coverage without referencing the depth of rootable soil. Provided a sufficient depth of soil is available, in principle, any tree would be able to grow anywhere over the top of a basement. There is also no obvious link between garden size and the width of any strip, assuming that a strip is necessary in the first place, which it is not. There is also no explanation why the strip has to be at the rear; why not at the sides?</p> <p><u>This is a poorly constructed and reasoned statement that is not worthy of any significant weight.</u></p>
13.3.5	<p><i>"The requirement that provision be made for large tree and shrub planting to maintain the character of gardens in the Borough may further restrict the area of gardens which can be built under."</i></p>	<p>This statement is set in the context of site conditions that should influence the extent of basements beneath gardens. As explained above, it is not the case that the requirement for large tree planting may restrict the area of gardens that can be built under.</p> <p><u>As the area of basement coverage increases, it is the rootable volume of soil that becomes critical, not a simplistic measure of area.</u></p>
14.8	<p><i>"The location of existing trees and their species on or within 6m of the site and a description of the existing garden and</i></p>	<p>For trees off the site, BS 5837 recommends at 4.2.4 c): <i>"the position of trees with an estimated stem diameter of 75mm or more that overhang the site or are located</i></p>

Report reference	Content	Comment
	<i>paved areas of the building and adjacent properties"</i>	<i>beyond the site boundaries within a distance of up to 12 times their diameter;". Surely, this is the appropriate reference and the distance could realistically be up to 15m?</i>

Turning to the RBKC *Basements Policy Draft*, I have the following comments:

Draft reference	Content	Comment
34.3.54	<i>"The desirability to maintain 'green and leafy' gardens, flexibility to plant major trees together with the recommendations in the ABA report regarding drainage indicate substantial proportion of the garden should remain free of any development."</i>	<u>For the reasons set out above, the ABA report advice on tree matters is flawed and should not be given any significant weight in the matter of influencing the proportion of gardens that should remain free of basement development.</u>
34.3.54	<i>"Retaining at least half of each garden area will enable natural landscape and character to be maintained, give flexibility in future planting (including major trees), support biodiversity."</i>	This statement is misleading relating to trees. <u>There is no demonstrable need to leave any proportion of a garden free of basement development in order to enable flexibility in planting trees if an appropriate depth of rootable soil is retained.</u>
Footnote 13, Page 7 (RBKC Basements Publication Planning Policy July 2013)	<i>"¹³ Works should be carried out in accordance with BS 5837 2012 (with the exception that tunnelling underneath the root protection area should not be undertaken) and the Council's Trees and Development SPD."</i>	This statement is fair except for the inclusion of the phrase <i>"tunnelling underneath"</i> , which cannot be supported by any technical reference. <u>There is substantial evidence that even the biggest trees can tolerate and survive this type of activity.</u>
Appendix B 34.3.62	<i>"BS 5837 2012 indicates that tunnelling under trees can be an option. Whilst feasible, it will put the tree at risk, and the Council does not judge the benefits that may be gained from a larger basement outweigh the benefits of minimising the disturbance and risk to protected trees. This approach will therefore not be permitted."</i>	<u>There is no published evidence that tunnelling under trees will automatically put them at risk.</u> Indeed, there is plenty of practical evidence from around the world that this is not the case. RBKC appear to have based this position on lay opinion from the ABA report. If that is the case, then this should be reviewed in the context of balanced advice from professional arboriculturists.

My review of these two documents has identified an apparent failure of RBKC, through ABA, to seek professional advice on the tree issues, which has resulted in a misleading position based on lay opinion to influence the emerging policy. Whilst I do not at all suggest that my opinions represent a definitive or final position on any of the flaws exposed above, I regularly deal with precisely these matters, which places me very well to present a realistic analysis of the issues. In that context, I offer my view on the main issues, based on my experience and awareness of appropriate technical references.

There is no evidence that I am aware of to confirm or prove that tunnelling under trees automatically affects their health or stability. Indeed, there is plenty of evidence that this can be done and it is done on a regular basis in the context of moving mature trees, which is the only practical reality check that we have. Of

course, if it is not done with appropriate care and proper planning, then harm will arise, but that does not mean it cannot be achieved if the proper controls are in place. Such controls are available within the planning system and are used on a daily basis to effectively protect trees on construction sites.

It seems that the issue has been wrongly focused on whether it can be done; it can be and there is no evidence that a reasonable default is that it cannot be. Instead, the issue would have been better focused on the depth of rootable soil that is necessary to support existing trees and new trees. Of course, there is no generic or formulaically derived answer to this because of the great variability of soil conditions and individual tree growth characteristics. However, there is plenty of evidence that large trees can adapt to survive on very thin layers of soil. Furthermore, it is a matter of sensible interpretation that if there are no roots at a location in a soil profile then, provided the rootable soil is undisturbed, whatever happens beyond that is unlikely to affect adjacent trees. It may well be that depths greater than 1m are needed in some circumstances, but that would not preclude development beneath the rootable soil depth. There is no question that to build successfully beneath trees is technically challenging, but there is no evidence to support the position that it cannot be done or that it is inappropriate.

In the face of this lack of evidence that it cannot be done, it seems more appropriate to adopt a stance of placing the burden on the applicant to prove it can be done rather than dismissing the possibility outright. In this context, the onus would be on the applicant to provide the investigation details and the supporting technical analysis to demonstrate that the project is feasible. This is no different to planning for any above-ground development near trees, where careful excavations to identify the location of important roots is routinely used to inform the precise extent of new development.

For these reasons, where trees are an issue, I would favour a presumption to refuse unless it can be reasonably demonstrated that a proposal is feasible and there will be no significant adverse impact on retained trees or future tree planting. It would then be down to the experts to analyse the specific circumstances of each site and make the case, which seems much more appropriate than an outright ban based on poorly informed opinion.

If required, I would be happy to provide further clarifications on any of these points and attend any forum necessary to probe the depth of the opinions I have set out above.

Yours sincerely

Jeremy Barrell **BSc FArborA DipArb CBiol FICFor FRICS**

Enclosures: 1: Brief qualifications and experience of Jeremy Barrell
2: Images of tree moving
3: Images of trees in Victoria Embankment Gardens, Westminster

Enclosure 1: Brief qualifications and experience of Jeremy Barrell

- 1 **Formal qualifications:** I have an Honours Degree in Environmental Forestry (1978). I am a Fellow of the Institute of Chartered Foresters (1996) and a Fellow of the Royal Institution of Chartered Surveyors (2008). I am a Fellow (1989) and Registered Consultant (1994) of the Arboricultural Association (AA). I was an AA Approved Contractor from 1984–1995. I am a Chartered Forester (1980), a Chartered Biologist (1993), a Chartered Surveyor (2008) and hold the Royal Forestry Society's Professional Diploma in Arboriculture (1990). I am a Law Society 'Checked' expert witness and a founding member of the Institute of Expert Witnesses. In 2001, I was honoured with the AA Award for services to Arboriculture and, in 2010, I become the American Society of Consulting Arborists' first Registered Consulting Arborist resident in the UK.
- 2 **Practical experience:** On leaving University in 1978, I joined the Forestry Commission as a Field Surveyor and began my tree contracting business in 1980. For the next 15 years, I developed this contracting business, leaving it in 1995 to concentrate full-time on consultancy. Barrell Tree Consultancy (www.barrelltreecare.co.uk) is now a well-established advisory practice, with a focus on the legal and planning aspects of tree management.
- 3 **Professional experience:** I have been dealing with tree hazard assessment throughout my career. Between 1993 and 1996, I was a DoE tree preservation order (TPO) appeal inspectors reporting to the Secretary of State. This involved impartially assessing a whole range of tree management issues, including TPO administration and subsidence damage. I have had a long career acting as an expert witness, from Magistrates Courts to the High Court. Most recently, I was the expert for the successful Claimant in *Poll v Bartholomew* (2005), and the successful Defendants in *Atkins v Scott* (2008) and *Micklewright v Surrey County Council* (2010). I also acted for the Defendant in the recent failed criminal prosecution, where the Woodland Trust was acquitted in *HMA v The Woodland Trust*. A summary of my expert witness experience can be downloaded from www.barrelltreecare.co.uk/case-studies/barrell-legal-cases.PDF. In 2009, I attended and passed the LANTRA Professional Tree Inspection course, which is the premier tree inspection accreditation scheme in the UK.
- 4 **Continuing professional development:** I regularly lecture all over the world and have written more than 70 papers and articles on tree management (www.barrelltreecare.co.uk/resources.php), including acting as the guest contributor on arboriculture for the Horticulture Week *Opinion* column since 2009. I specialise in developing tree assessment methods that are published on a dedicated website at www.TreeAZ.com. I was on the panel that produced BS 5837 (2005) and I am currently involved in producing the new BS 8545 on tree production and planting.

Enclosure 2: Images of tree moving

The first three images provided by Adam Tom from Brisbane of moving a fig in 2004, which still survives today. Note the depth of the undercut of the whole root system to move it to a new location, which is no different in principle to excavating a basement beneath the tree.



Enclosure 2: Images of tree moving



The image below is another fig moved by Adam Tom in Brisbane. I took the photo in 2009 and the tree had been moved about six years previously. Although the circumstances of individual trees will vary, this series of images demonstrates that, in principle, trees can tolerate disturbance beneath them as long as the rootable volume of soil remains undisturbed.



Enclosure 3: Images of trees in Victoria Embankment Gardens, Westminster

A number of the mature plane trees in Victoria Embankment Gardens, Westminster, are growing in less than 1m of soil directly above the Circle line tube that runs beneath. There are many other examples of mature trees surviving and thriving on shallow depths of soil. It is indefensible to state that this is not the case in principle, although the circumstances of individual trees will vary.

