Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT:

9 Harley Road

London

NW3 3BX

REPORT PREPARED FOR:

SHH Architects

1 Vencourt Place

Ravenscourt Park

Hammersmith

London W6 9NU

REPORT PREPARED BY

Adam Hollis

MSc ARB MICFor FArbor A MRICS C Env

Ref: SHH/9HRR/AIA/01

Date: 23rd November 2015

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PART 2 - APPENDICES

PART 3 - PLANS

Caveats

This report is primarily an arboricultural report. Whilst comments relating to matters involving built structures or soil data may appear, any opinion thus expressed should be viewed as qualified, and confirmation from an appropriately qualified professional sought. Such points are usually clearly identified within the body of the report. It is not a full safety survey or subsidence risk assessment survey. These services can be provided but a further fee would be payable. Where matters of tree condition with a safety implication are noted during a survey they will of course appear in the report.

A tree survey is generally considered invalid in planning terms after 2 years, but changes in tree condition may occur at any time, particularly after acute (e.g. storm events) or prolonged (e.g. drought) environmental stresses or injuries (e.g. root severance). Routine surveys at different times of the year and within two - three years of each other (subject to the incidence of the above stresses) are recommended for the health and safety management of trees remote from highways or busy access routes. Annual surveys are recommended for the latter.

Tree works recommendations are found in the Appendices to this report. It is assumed, unless otherwise stated ("ASAP" or "Option to") that all husbandry recommendations will be carried out within 6 months of the report's first issue. Clearly, works required to facilitate development will not be required if the application is shelved or refused. However, necessary husbandry work should not be shelved with the application and should be brought to the attention of the person responsible, by the applicant, if different. Under the Occupiers Liability Act of 1957, the owner (or his agent) of a tree is charged with the due care of protecting persons and property from foreseeable damage and injury.' He is responsible for damage and/or nuisance arising from all parts of the tree, including roots and branches, regardless of the property on which they occur. He also has a duty under The Health and Safety at Work Act 1974 to provide a safe place of work, during construction. Tree works should only be carried out with local authority consent, where applicable.

Inherent in a tree survey is assessment of the risk associated with trees close to people and their property. Most human activities involve a degree of risk, such risks being commonly accepted if the associated benefits are perceived to be commensurate.

Risks associated with trees tend to increase with the age of the trees concerned, but so do many of the benefits. It will be appreciated, and deemed to be accepted by the client, that the formulation of recommendations for all management of trees will be guided by the cost-benefit analysis (in terms of amenity), of tree work that would remove all risk of tree related damage.

Prior to the commencement of any tree works, an ecological assessment of specific trees may be required to ascertain whether protected species (e.g. bats, badgers and invertebrates etc.) may be affected.

Tree Constraints & Protection Overview

Client:	SHH Architects	Case Ref:	SHH/9HRR/AIA/01
Local Authority:	LB Camden	Date:	23rd November 2015
Site Address: 9 Harley Road, London NW3 3BX			
Proposal: Partial demolition and development of the single family dwelling			

Report Checklist	Y/N		Y/N
Arboricultural constraints on site	Y	Trees removal proposed	N
Tree Survey	Y	Topographical Survey	N
BS5837 Report	Y	Conservation Area	Y
Tree Preservation Orders	N/k		
Tree Protection Plan:	N/a	(Include in future method statement)	
Tree Constraints Plan:	Y		
Arboricultural Impact Assessment:	Y		

Site Layout				
Site Visit	Y	Date: 26/06/15	Access Full/Partial/None	F
Trees on Site	Y		Off-site Trees	Y
Trees affected by development	Y		O/s trees affected by development	Y
Tree replacement proposed:	N/a		On or off-site trees indirectly affected by development	N

Trees with the potential to be affected

Front: Category B street trees T16, T17 and off-site T15 theoretically affected by replacement hard surfaces, relocation of vehicular access and new street fence. Low invasive foundations and no-dig surfaces proposed. Street tree T16 to benefit from relocation of access.

Rear garden: Low impact from basement proposals to off-site category C tree T13. Relocation of summer house beneath canopy of category B tree T10 has potentially significant impacts – path to be relocated and summerhouse placed on low invasive foundations. Minimal encroachment to RPA of T1 from new hard landscaping – very low impact.

Comments

Recommended works for T11 regardless of development, but also pertinent to maintaining a safe work site.

Recommendations

1	Proposal will mean the loss of important trees (TPO/CA)	N/a
2	Proposal has sufficient amelioration for tree loss	N/a
3	Proposals provide adequate tree protection measures	Y
4	Proposal will mean retained trees are too close to buildings	N
5	Specialist demolition / construction techniques required	Y
6	The Proposal will result in significant root damage to retained trees	N
7	Further investigation of tree condition recommended	N

RPA= Root Protection Area TPP= Tree Protection Plan
AMS= Arboricultural Method Statement AIA = Arboricultural Implication Assessment
BS5837: 2012 'Trees in relation to design, demolition and construction – Recommendations'

1. SUMMARY

1.1 This report comprises an arboricultural impact assessment of the proposals for 9 Harley Road, London NW3 3BX, reviewing any conflicts between the proposals and material tree constraints identified in our survey.

1.2 There are 15 trees, a tree group and a shrub surveyed on or around the site, of which 8 are B category *(Moderate Quality), 7 are C category *(Low Quality) and 1 is U category *(Unsuitable for Retention). The shrub does not qualify for categorisation under BS.5837. In theory, only moderate quality trees and above are significant material constraints on development. However, the low quality trees would comprise a constraint in aggregate, in terms of any collective loss / removal, where replacement planting would be appropriate. In this instance, no such collective impact is proposed.

1.3 The principal primary impacts of the scheme involve the relocation of the summerhouse beneath the canopy of the semi-mature, category B birch tree, T10: the proposals indicate a new path adjacent to the stem of this tree, additional hard standing and the summer house structure within 27% of the theoretical RPA; the tree currently has a 2m ground clearance, therefore minor tree works would also be required to crown lift the tree to provide sufficient clearance for construction. These proposals could have potentially significant impacts upon a birch tree, but it is a relatively young specimen (rated B for future merit, rather than current stature), capable of sustaining this level of site disturbance with suitable mitigation. The indicative path should be relocated to allow a minimum area of $1m^2$ around the stem of the tree to be kept clear; the summerhouse should be built on low-invasive foundations, with any additional hard-standings constructed on a no-dig basis with porous surfaces. Subject to the proposed mitigation, and minor tree works to raise the canopy, the impacts can be rated as low for a semi-mature birch tree.

1.4 There are theoretically low impacts from basement proposals to the off-site, category C tree, T13, which are likely to be very low in practice, due to the foundations of the summerhouse in its current location. As a precautionary measure, it is recommended that the basement line is manually excavated to 750mm, with pre-emptive root pruning if required. Manual excavation is also proposed for the minor encroachment of additional hard landscaping within the RPA of the category B tree T1.

1.5 There are further primary impacts to the category B street trees T16, T17 and off-site T15 from the proposed new access, resurfacing and street fencing to the front of the property. These can be mitigated with low invasive foundations for the street fence and no-dig replacement surfaces. The street tree, T16, will benefit from relocation of the access, as the existing one lies adjacent to the stem.

1.6 There will be additional secondary impacts of litter deposition and partial shade to the summer house from T10, although the diffuse nature of this shading (from a birch) and the proposed new skylight will provide sufficient mitigation. In terms of the other proposals for this site, the status quo is unlikely to change with further development, which is the salient point for planning to consider. Thus, the secondary impacts of development are minimal.

1.5 Subject to the proposed mitigation for the summer house and hard standings/new street fence, the site has potential for development without impacting significantly on the wider tree population or local landscape. Thus, with suitable mitigation and supervision the scheme is recommended to planning.

* British Standards Institute: Trees in relation to design, demolition and construction BS 5837: 2012 HMSO, London

2. INTRODUCTION

2.1 Terms of Reference

2.1.1 LANDMARK TREES were asked by SHH Architects to provide a survey and an arboricultural impact assessment of proposals for the site: 9 Harley Road, London NW3 3BX. The report is to accompany a planning application.

2.1.2 The proposals are for the partial demolition and development of the single family dwelling. The works proposed comprise:

- demolition and replacement of the rear conservatory;
- creating of a new lower ground floor/basement level towards the rear of the site;
- rearrangement of the front boundary fence and vehicle access;
- relocation of summer house in the rear garden;
- change of design to front entrance portico;
- change of design to the front elevation dormer window; and
- various internal refurbishments.

2.1.3 This report will assess the impact on the trees and their constraints, identified in our survey. Although the proposals were known at the time of the survey, Landmark Trees endeavour to survey each site blind, working from a topographical survey, wherever possible, with the constraints plan informing their evolution.

2.1.4 I am a Registered Consultant and Fellow of the Arboricultural Association and a Chartered Forester, with a Masters Degree in Arboriculture and 25 years' experience of the landscape industry - including the Forestry Commission and Agricultural Development and Advisory Service. I am a UK Registered Expert Witness, trained in single and joint expert witness duties. I am also Chairman of the UK & I Regional Plant Appraisal Committee, inaugurated to promote international standards of valuation in arboriculture.

2.2 Drawings Supplied

2.2.1 The drawings supplied by the client and relied upon by Landmark Trees in the formulation of our survey plans are:

Existing site survey: 0. Ground Floor (1) *

Proposals: (680)021_PL01 Ground Floor and (680)020_PL01 Lower Ground Floor

*In the absence of a full topographical survey, tree positions may be approximate only.

2.3 Scope of Survey

2.3.1 As Landmark Trees' (LT) arboricultural consultant, I surveyed the trees on site on 26th June 2015, recording relevant qualitative data in order to assess both their suitability for retention and their constraints upon the site, in accordance with British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations [BS5837:2012].

2.3.2 Our survey of the trees, the soils and any other factors, is of a preliminary nature. The trees were SURVEYED on the basis of the Visual Tree Assessment method expounded by Mattheck and Breloer (The Body Language of Trees, DoE booklet Research for Amenity Trees No. 4, 1994). LT have not taken any samples for analysis and the trees were not climbed, but inspected from ground level.

2.3.3 A tree survey is generally considered invalid in planning terms after 2 years, but changes in tree condition may occur at any time, particularly after acute (e.g. storm events) or prolonged (e.g. drought) environmental stresses or injuries (e.g. root severance). Routine surveys at different times of the year and within two - three years of each other (subject to the incidence of the above stresses) are recommended for the health and safety management of trees remote from highways or busy access routes. Annual surveys are recommended for the latter.

2.3.4 The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.

2.4 Survey Data & Report Layout

2.4.1 Detailed records of individual trees are given in the survey schedule in Appendix 1 to this report. General husbandry recommendations are distinguished at Appendix 2 from the minimum requirements to facilitate development / form part of the planning application at Appendix 3. The former may still be relevant to providing a safe site of work, of course. Similarly, if for whatever reason the development does not go ahead, our recommendations in Appendix 2 would still apply.

2.4.2 A site plan identifying the surveyed trees, based on the client's drawings / topographical survey is provided in Part 3 of this report.

2.4.3 This plan also serves as the Tree Constraints Plan with the theoretical Recommended Protection Areas (RPA's), tree canopies and shade constraints, (from BS5837: 2012) overlain onto it. These constraints are then overlain in turn onto the client's proposals to create a second Arboricultural Impact Assessment Plan in Part 3. General observations and discussion follow, below.

3.0 OBSERVATIONS

3.1 Site Description

Photograph 1: 9 Harley Road, London NW3 3BX

3.1.1	The application site comprises a part single, part double storey, plus attic, detached house located on the north of the junction between Harley Road and Wadham Gardens. Harley Road is a predominantly residential street in the London Borough of Camden that runs in a north westerly direction between King Henry's Road and Wadham Gardens.
3.1.2	The property extends almost the full width of the eastern boundary facing Harley Road. The site boundary 'balloons' in a northerly direction moving towards the rear garden allowing for substantial private open space. A single storey extension with both flat and pitched roofs faces the rear garden accompanied by a detached single story summer house. Both the main vehicle and pedestrian access points are off Harley Road on to a paved front garden.
3.1.3	In terms of the British Geological Survey, the site overlies the London Clay Formation (see indicated location on Fig.1 plan extract below). The associated soils are generally, highly shrinkable clay; e.g. slowly permeable seasonally waterlogged fine loam over clay. Such highly plastic soils are prone to movement: subsidence and heave. The actual distribution of the soil series are not as clearly defined on the ground as on plan and there may be anomalies in the actual composition of clay, silt and sand content.
3.1.4	Clay soils are prone to compaction during development with damage to soil structure potentially having a serious impact on tree health. The design of foundations near problematic tree species will also need to take into consideration subsidence risk. Further advice from the relevant experts on the specific soil properties can be sought as necessary.

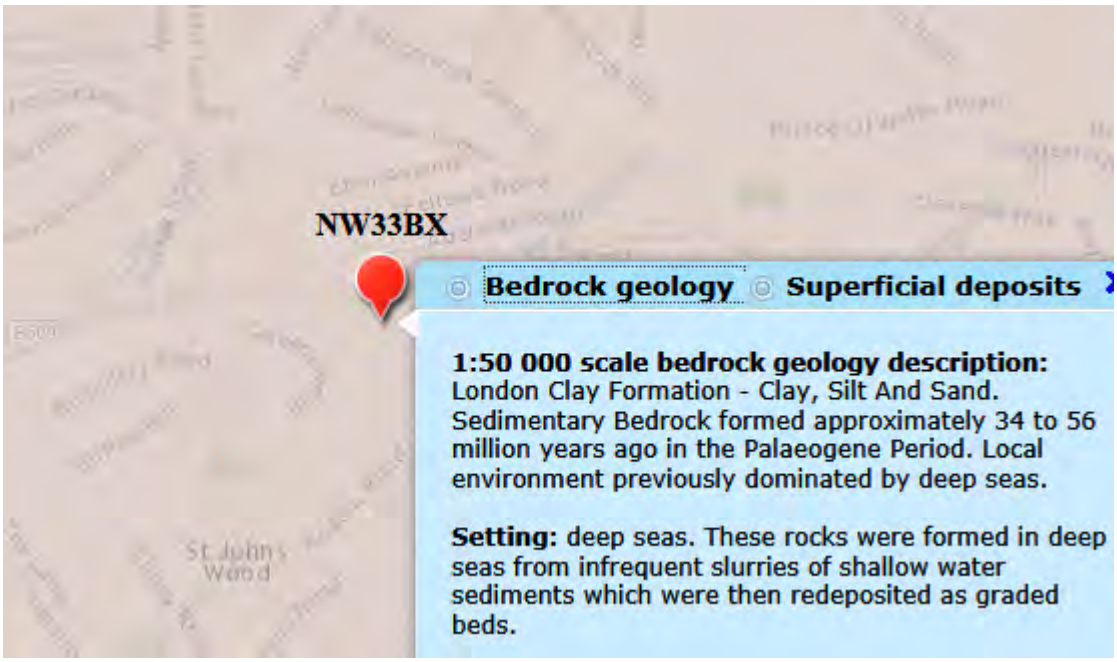

Figure 1: Extract from the BGS Geology of Britain Viewer

3.2 Subject Trees

3.2.1	Of the 15 surveyed trees, tree group and shrub surveyed on or around the site, 8 are B category *(Moderate Quality), 7 are C category *(Low Quality) and 1 is U category *(Unsuitable for Retention). The shrub does not qualify for categorisation under BS.5837.
3.2.2	The tree species found on site comprise London plane, small-leaved lime, copper beech, cultivated apple, domestic pear, wych elm, horse chestnut, silver birch, Himalayan birch, purple plum, myrobalan plum, tree of heaven, and the shrub pittosporum.
3.2.3	In terms of age demographics there is a preponderance of mature trees on the site with a few early-mature and semi-mature trees in the population.

3.2.4	Full details of the surveyed trees can be found in Appendix 1 of this report.
3.2.5	There are recommended works to fell the category U trees T5. This is listed in Appendix 2.

3.3 Planning Status

3.3.1	We are not aware of the existence of any Tree Preservation Orders, but understand the site stands within the Elsworthy Conservation Area, which will affect the subject trees: it is a criminal offence to prune, damage or fell such trees without permission from the local authority. The latest tree work application was 2014/2308/T, where the following work was permitted: REAR GARDEN: 3 x Lime - Prune back to boundary line. 1 x Tree of Heaven - Reduce and thin by 20%. Reshape. 2 x Prunus - Prune back to fence line. 1 x Silver Birch - Tip back.

4.0 DEVELOPMENT CONSTRAINTS

4.1 Primary Constraints

4.1.1 BS5837: 2012 gives Recommended Protection Areas (RPA's) for any given tree size. The individual RPA's are calculated in the Tree Schedule in Appendix 1 to this report, or rather the notional radius of that RPA, based on a circular protection zone. The prescribed radius is 12-x stem diameter at 1.5m above ground level, except where composite formulae are used in the case of multi-stemmed trees.

4.1.2 Circular RPA's are appropriate for individual specimen trees grown freely, but where there is ground disturbance, the morphology of the RPA can be modified to an alternative polygon, as shown in the diagram below (Figure 2). Alternatively, one need principally remember that RPA's are area-based and not linear – notional rather than fixed entities. No modifications have been made in this instance (please see overleaf).

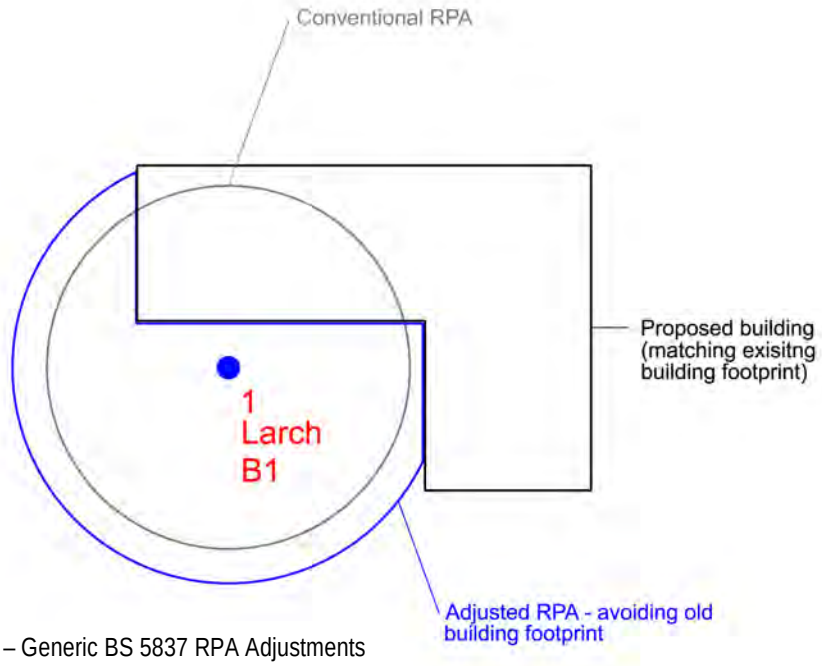

Figure 2 – Generic BS 5837 RPA Adjustments

4.1.3 In BS5837, paragraph 4.6.2 states that RPA's should reflect the morphology and disposition of the roots; 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. Not infrequently, LT are requested by LPA Tree Officers to modify the RPA's to reflect their assumptions that e.g. a road will have drastically limited root growth.

4.1.4 Such assumptions cannot be proved without prior site investigations / trial pits. Where it is not always possible to conduct site investigations (e.g. below busy roads), we can always look to the published science. There seems little support for the popular myth that roads and services will curb root growth: research for the International Society of Arboriculture by Kopinga J (ISA 1994), found that "a constant high moisture content of the soil directly underneath the pavement surface can be considered as a major soil factor in attracting the trees' roots to develop there." By contrast, grass in lawns may actively antagonise tree roots with natural pathogens. Similarly, Professor F Miller (ISA 1994) found that service trenches at > 3m distances from trees had minimal impact on growth or crown shape.

4.1.5 A key misunderstanding, even among professionals, is that we conflate the RPA with the actual root system: RPA's are *prima facie* a notion / convention / treaty and almost entirely theoretical, but readily calculable. Conversely roots are a "known unknown," spatial entity that we predict at our folly. Yet, many are quick to do so.

4.1.6 LT favour the neutrality of a circular RPA, because in a difference of opinion, the tree officer will always have the prerogative to dictate the final modification of shape. With the best will in the world, the free allowance of modifications will tend to lead to inequitable outcomes, prejudicing the applicant and the practice is in our view, best avoided. The neutral circle dispenses with this inequity.

4.1.7 Ultimately, the point of the circular RPA is to illustrate areas of concern. The purpose of this report is to consider areas of concern (not to modify them to suit our argument or findings). Therefore, no modifications are made here to the RPA's, regardless of roads etc.

4.1.8 The quality of trees will also be a consideration: U Category trees are discounted from the planning process in view of their limited service life. Again, Category-C trees would not normally constrain development individually, unless they provide some external screening function.

4.1.9 At paragraph 5.1.1. BS5837: 2012 notes that "Care should be exercised over misplaced tree preservation; attempts to retain too many or unsuitable trees on a site are liable to result in excessive pressure on the trees during demolition or construction work, or post-completion demands on their removal."

4.1.10 In theory, only moderate quality trees and above are significant material constraints on development. However, the low quality trees would comprise a constraint in aggregate, in terms of any collective loss / removal, where replacement planting would be appropriate.

4.1.11 In this instance, the category B trees to the rear of site and the category B off-site trees to the front of the property provide potentially significant primary constraints.

4.2 Secondary Constraints

4.2.1 The second type of constraint produced by trees that are to be retained is that the proximity of the proposed development to the trees should not threaten their future with ever increasing demands for tree surgery or felling to remove nuisance shading (Figure 3), honeydew deposition or perceived risk of harm.

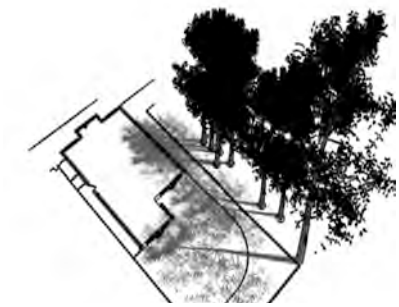

Figure 3 –
Generic Shading Constraints

4.2.2 The shading constraints are crudely determined from BS5837 by drawing an arc from northwest to east of the stem base at a distance equal to the height of the tree, as shown in the diagram opposite. Shade is less of a constraint on non-residential developments, particularly where rooms are only ever temporarily occupied.

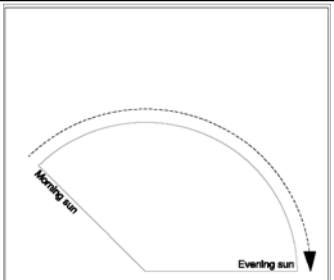

Figure 4 – Shading Arc

4.2.3 This arc (see Figure 4) represents the effects that a tree will have on layout through shade, based on shadow patterns of 1x tree height for a period May to Sept inclusive 10.00-18.00 hrs daily.

4.2.4 Assuming that they will be retained, the orientation of the on-site trees will ensure that shading constraints are minimal, with organic deposition likely to be as it is today. However, the off-site trees have the potential to provide a variety of secondary constraints, including shading, organic deposition and the potential need to maintain crown clearance in the future. The significance of these constraints will vary depending on the location and proximity to the proposed re-development.

Note: Sections 5 & 6 will now assess the impacts upon constraints identified in Section 4. Table 1 in Section 5 presents the impacts in tabular form (drawing upon survey data presented in Appendices 1 & 2). Impacts are presented in terms of whole tree removal and the effect on the landscape or partial encroachment (% of RPA) and its effect on individual tree health. Section 6 discusses the table data, elaborating upon the impacts' significance and mitigation.

5.0

Table 1: Arboricultural Impact Assessment

(Impacts assessed prior to mitigation and rated with reference to Matheny & Clark (1998))

Hide irrelevant | Show All Trees

Ref: SHH/9HRR/AIA

B.S. Cat.	Tree No.	Species	Impact	Tree / RPA Affected	Age	Growth Vitality	Species Tolerance	Impact on Tree Rating	Impact on Site Rating	Mitigation
B	1	Chestnut, Horse	Additional hard landscaping	9 m^2 2.46 %	Mature	Moderate	Moderate	Very Low	N/A	Airspade / manual excavation
B	10	Birch, Himalayan	New paving and summer house Note: paving shown adjacent to stem - to be relocated	4.4 m^2 26.94 %	Semi-mature	Normal	Moderate/ Poor	Medium	N/A	No-dig construction & low invasive foundations At least a 1m2 area to be left around the stem; minor remedial tree works
C	11	Plum, Purple	Very minor encroachment from summerhouse.	0.7 m^2 .97 %	Mature	Normal	Moderate	Very Low/ N/A	N/A	Summerhouse to be relocated on low invasive foundations for T10
C	13	Plum, Purple	Removal of existing summer house (12.3m2/13.4%) Baenent excavation within RPA (4.6m2/5m2)	4.6 m^2 5.02 %	Mature	Normal	Moderate	Low	N/A	Pull-back demolition Hand dig top 750mm of basement line thro' RPA
B	15	Beech, Copper	Removal/replacement of existing hard landscaping Relocation of vehicular access	39.4 m^2 20.61 %	Mature	Normal	Moderate/ poor	Low	N/A	No-dig construction (Rooting within site likely to be minimal) Low invasive foundations for new wall/gate posts
B	16	Plane, London	Removal/replacement of existing hard landscaping Relocation of vehicular access - benefit to T16	35.8 m^2 15.26 %	Mature	Normal	Good	Low	N/A	No-dig construction (Rooting within site likely to be minimal) Low invasive foundations for new wall/gate posts

5.0

Table 1: Arboricultural Impact Assessment

(Impacts assessed prior to mitigation and rated with reference to Matheny & Clark (1998))

Hide irrelevant | Show All Trees

Ref: SHH/9HRR/AIA

B.S. Cat.	Tree No.	Species	Impact	Tree / RPA Affected	Age	Growth Vitality	Species Tolerance	Impact on Tree Rating	Impact on Site Rating	Mitigation
B	17	Plane, London	Removal/replacement of existing hard landscaping New vehicular access	16.4 m^2 9.43 %	Mature	Normal	Good	Very Low	N/A	No-dig construction (Rooting within site likely to be minimal) Low invasive foundations for new wall/gate posts

6.0 DISCUSSION

6.1 Rating of Primary Impacts

6.1.1 The principal primary impacts of the scheme involve the relocation of the summerhouse beneath the canopy of the semi-mature, category B birch tree, T10: the proposals indicate a new path adjacent to the stem of this tree, additional hard standing and the summer house structure within 27% of the theoretical RPA; the tree currently has a 2m ground clearance, therefore minor tree works would also be required to crown lift the tree to provide sufficient clearance for construction. These proposals could have potentially significant impacts upon a birch tree, but it is a relatively young specimen (rated B for future merit, rather than current stature), capable of sustaining this level of site disturbance with suitable mitigation. The indicative path should be relocated to allow a minimum area of $1m^2$ around the stem of the tree to be kept clear; the summerhouse should be built on low-invasive foundations, with any additional hard-standings constructed on a no-dig basis with porous surfaces. Subject to the proposed mitigation, and minor tree works to raise the canopy, the impacts can be rated as low for a semi-mature birch tree.

6.1.2 There are theoretically low impacts from basement proposals to the off-site, category C tree, T13, which are likely to be very low in practice, due to the foundations of the summerhouse in its current location. As a precautionary measure, it is recommended that the basement line is manually excavated to 750mm, with pre-emptive root pruning if required. Manual excavation is also proposed for the minor encroachment of additional hard landscaping within the RPA of the category B tree T1. In addition, there is a small area of additional hard landscaping proposed within the RPA of the category B tree T1, which should be manually excavated and any roots lying beneath the surface pre-emptively pruned.

6.1.3 There are further primary impacts to the category B street trees T16, T17 and off-site T15 from the proposed new access, resurfacing and street fencing to the front of the property. These can be mitigated with low invasive foundations for the street fence and no-dig replacement surfaces. The street tree, T16, will benefit from relocation of the access, as the existing one lies adjacent to the stem.

6.1.4 The principal of RPA encroachment is established within BS5837:2012 and supported by the source document, National Joint Utilities Guidelines 10 / Vol. 4 1995 / 2010. NJUG introduced the x12 diameter *Precautionary Zone* for supervised working and *Prohibited Zone* at a universal 1m from the base of the tree. RPA's are frequently confused with the NJUG Prohibited Zone, when they clearly correlate with the NJUG Precautionary Zone.

6.1.5 An RPA encroachment of <20% of RPA may be considered as low impact, given the permissive references to 20% RPA relocation and impermeable paving within BS5837:2012 and other published references to healthy trees tolerating up to 30-50% root severance (Coder, Helliwell and Watson in CEH 2006). The trees in question are healthy specimens of species with a good resistance to development impacts, and quite capable of tolerating these low impacts.

6.1.6 "In practice 50% of roots can sometimes be removed with little problem, provided there are vigorous roots elsewhere. Inevitably, this degree of root loss will temporarily slow canopy growth and even lead to some dieback" (Thomas 2000). LT do not recommend annexing such high proportions of the root system; rather that within the context of the published science, planning should not be unduly concerned by impacts that are well below the subcritical threshold – *tree health is not at stake.*

6.2 Rating of Secondary Impacts

6.2.1 There will be additional secondary impacts of litter deposition and partial shade to the summerhouse from T10, although the diffuse nature of this shading (from a birch) and the proposed new skylight will provide sufficient mitigation. In terms of the other proposals for this site, the status quo is unlikely to change with further development, which is the salient point for planning to consider. Thus, the secondary impacts of development are minimal.

6.3 Mitigation of Impacts

6.3.1 All plant and vehicles engaged in any demolition works should either operate outside the RPA, or should run on a temporary surface designed to protect the underlying soil structure. The summer house should be relocated with caution, taking care not to damage the overhanging canopy of T13 or the canopy of T10. Hard surfacing can be lifted manually with caution, working away from the trees and retaining the existing sub-base.

6.3.2 The path of foundations through RPAs will be manually excavated to 750mm depth under arboricultural supervision; any roots encountered within the trenches / pits will be cleanly pruned back to an appropriate junction with a sharp pruning saw or secateurs back to a junction. Roots larger than 25mm diameter may only be cut in consultation with an arboriculturalist.

6.3.3	The replacement paving/hard landscaping will require a no-dig construction technique, either using a cellular confinement system with no fines aggregate for the sub-base or simply building upon the existing sub-base without disturbing the ground below. Choice of construction method will initially depend upon root penetration within the existing sub-grade. The key principle is not to excavate in the presence of roots and to provide a porous surface to promote healthy soil water relations for future root growth. A further consideration in the use of a more expensive cellular confinement system or similar, may be the claimed reduction in risk of possible future slab / surface displacement by roots of trees growing in paved areas.
6.3.4	The immediate canopy encroachment can be avoided with a crown lift of lower limbs of T10, affecting a 3m ground clearance.
6.3.5	Nuisance deposition can be further mitigated with routine maintenance, light pruning / deadwooding and the fitting of filtration traps on guttering (see Figure 5 below).
6.3.6	The shading impacts can be mitigated by building design, with the provision of dual aspect windows and choice of room layout. Some minor crown reduction may be necessary, but not such as to impose a burden of frequent, repetitive management.

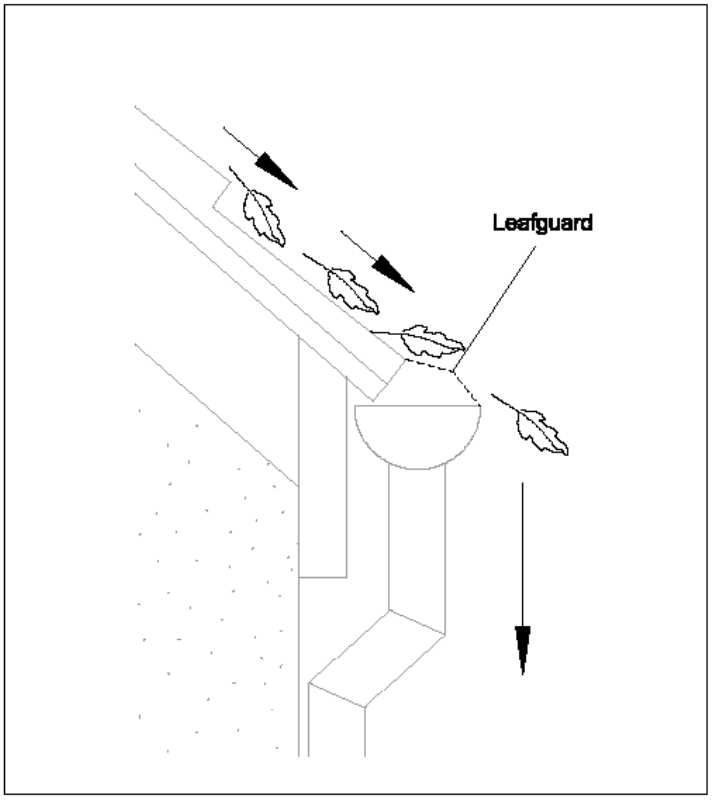

Figure 5: Filtration traps, as shown above, could be fitted on the gutters which can easily be maintained at 2-3m above ground.

7.0 CONCLUSION

7.1 The full potential of the impacts from all the proposals can be largely mitigated through design and precautionary measures. These measures can be elaborated in Method Statements in the discharge of planning conditions.

7.2 The species affected are generally tolerant of root disturbance / crown reduction and the retained trees are generally in good health and capable of sustaining these reduced impacts.

7.5 Therefore, subject to the proposed mitigation, the proposals will not have any significant impact on either the retained trees or wider landscape. Thus, with suitable mitigation and supervision the scheme is recommended to planning.

8.0 RECOMMENDATIONS

8.1 Specific Recommendations

8.1.1 Current tree works recommendations are found in Appendix 2 to this report, with works to facilitate development in Appendix 3.

8.1.2 Excavation and construction impacts within the RPA's of trees identified in Table 1 above, will need to be controlled by method statements specifying mitigation methods suggested in para 6.3 above and by consultant supervision as necessary. These method statements can be provided as part of the discharge of conditions.

8.2 General Recommendations for Sites Being Developed with Trees

8.2.1 Any trees which are in close proximity to the proposed development should be protected with a Tree Protection Barrier (TPB). Protective barrier fencing should be installed immediately following the completion of the tree works, remaining in situ for the entire duration of the development unless otherwise agreed in writing by the council. It should be appropriate for the intensity and proximity of the development, usually comprising steel, mesh panels 2.4m in height ('Heras') and should be mounted on a scaffolding frame (shown in Fig 2 of BS5837:2012). The position of the TPB can be shown on plan as part of the discharge of conditions, once the lay out is agreed with the planning authority. The TPB should be erected prior to commencement of works, remain in its original form on-site for the duration of works and removed only upon full completion of works.

8.2.2 A TPB may no longer be required during soft landscaping work but a full arboricultural assessment must be performed prior to the undertaking of any excavations within the RPA of a tree. This will inform a decision about the requirement of protection measures. It is important that all TPBs have permanent, weatherproof notices denying access to the RPA.

8.2.3 Any pruning works must be in accordance with British Standard 3998:2010 Tree work [BS3998].

8.2.4 Where sections of hard surfacing are proposed in close proximity to trees, it is recommended that "No-Dig" surfacing be employed in accordance with BS5837:2012 and 'The Principles of Arboricultural Practice: Note 1, Driveways Close to Trees, AAIS 1996 [APN1]'.

8.2.5 If the RPA of a tree is encroached by underground service routes then BS5837:2012 and NJUG VOLUME 4 provisions should be employed. If it is deemed necessary, further arboricultural advice must be sought.

8.2.6 Numerous site activities are potentially damaging to trees e.g. parking, material storage, the use of plant machinery and all other sources of soil compaction. In operating plant, particular care is required to ensure that the operational arcs of excavation and lifting machinery, including their loads, do not physically damage trees when in use.

8.2.7 To enable the successful integration of the proposal with the retained trees, the following points will need to be taken into account:

1) Plan of underground services.
2) Schedule of tree protection measures, including the management of harmful substances.
3) Method statements for constructional variations regarding tree proximity (e.g. foundations, surfacing and scaffolding).
4) Site logistics plan to include storage, plant parking/stationing and materials handling.
5) Tree works: required pruning. All works must be carried out by a competent arborist in accordance with BS3998.
6) Site supervision: the Site Agent must be nominated to be responsible for all arboricultural matters on site. This person must:
   - be present on site for the majority of the time;
   - be aware of the arboricultural responsibilities;
   - have the authority to stop work that is causing, or may cause harm to any tree;
   - ensure all site operatives are aware of their responsibilities to the trees on site and the consequences of a failure to observe these responsibilities;
   - make immediate contact with the local authority and/or a retained arboriculturalist in the event of any tree related problems occurring.

8.2.8 These points can be resolved and approved through consultation with the planning authority via their Arboricultural Officer.

8.2.9 The sequence of works should be as follows:

i) initial tree works: pruning for working clearances;
ii) installation of TPB for demolition & construction;
iii) installation of underground services;
iv) installation of ground protection;
v) main construction;
vi) removal of TPB;
vii) soft landscaping.

9.0 REFERENCES

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Landmark Trees

PART 2 – APPENDICES

APPENDIX 1

TREE SCHEDULE

Botanical Tree Names

Apple	: Malus sp
Beech, Copper	: Fagus sylvatica f. purpurea
Birch, Silver	: Betula pendula
Birch, Himalayan	: Betula utilis
Chestnut, Horse	: Aesculus hippocastanum
Elm, Wych	: Ulmus glabra
Heaven, Tree of	: Ailanthus altissima
Lime, Small-leaved	: Tilia cordata
Pear, Common	: Pyrus communis
Pittosporum	: Pittosporum sp
Plane, London	: Platanus acerifolia
Plum spp	: Prunus spp
Plum, Myrobalan	: Prunus cerasifera

Notes for Guidance:

1. Height describes the approximate height of the tree measured in metres from ground level.
2. The Crown Spread refers to the crown radius in meters from the stem centre and is expressed as an average of NSEW aspect if symmetrical.
3. Ground Clearance is the height in metres of crown clearance above adjacent ground level.
4. Stem Diameter (Dm) is the diameter of the stem measured in millimetres at 1.5m from ground level for single stemmed trees. BS 5837:2012 formula (Section 4.6) used to calculate diameter of multi-stemmed trees. Stem Diameter may be estimated where access is restricted and denoted by '#'.
5. Protection Multiplier is 12 and is the number used to calculate the tree's protection radius and area
6. Protection Radius is a radial distance measured from the trunk centre.
7. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
8. Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present.
9. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
10. B.S. Cat refers to (British Standard 5837:2012 section 4.5) and refers to tree/group quality and value; 'A' – High, 'B' - Moderate, 'C' - Low, 'U' - Unsuitable for retention. The following colouring has been used on the site plans:
    - High Quality (A) (Green),
    - Moderate Quality (B) (Blue),
    - Low Quality (C) (Grey),
    - Unsuitable for Retention (U) (Red)
11. Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
12. Useful Life is the tree's estimated remaining contribution in years.

Landmark Trees

Site: 9 Harley Road

Date: 26/6/15

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: SHH_9HRR_AIA

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
1	Chestnut, Horse	15	5	9.0	900	Mature	10.8	Moderate	Fair	B	2	20+	Pollarded w. stress response Remote survey only (RS)
G2	Elm, Wych	8	3	2.5	100	Semi-mature	1.2	Moderate	Fair	C	2	10+	DED? 2-3 dead leaves /tips
3	Lime, Small-leaved	10	3	3.0	361	Early Mature	4.3	Normal	Fair	B	2	>40	Pollarded with weak unions in new growth Crossing branches RS
4	Lime, Small-leaved	10	3231	3.0	400	Early Mature	4.8	Normal	Fair	B	2	>40	Pollarded Die-back (minor) RS
5	Plum, Myrobalan	5	0211	3.0	190	Mature	2.3	Poor	Hazardous	U		<10	Leaning (significantly) Cracks in stem Dying, supporting creepers, but cracked at base over path
6	Apple, Cultivated	3	0211	2.0	120	Semi-mature	1.4	Moderate	Fair	C	2	20+	A tree with insignificant defects

Landmark Trees

Site: 9 Harley Road

Date: 26/6/15

Appendix 1

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020 7851 4544

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Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
7	Apple, Cultivated	3	0112	2.0	90	Semi-mature	1.1	Moderate	Fair	C	2	20+	Entry wounds on trunk
8	Pear, Domestic	3	0211	2.0	120	Semi-mature	1.4	Moderate	Fair	C	2	20+	Entry wounds on trunk
9	Pittosporum	5	3				0.0						Shrub
10	Birch, Himalayan	11	3313	2.0	190	Semi-mature	2.3	Normal	Good	B	1	20+	Included bark in main stem unions
11	Plum, Purple	9	4	2.0	400	Mature	4.8	Normal	Fair	C	2	20+	Erratic growth habit Remote survey only (RS) Remote survey hybridised with our 2009 survey of No. 3 Wadham Gardens and adjusted for age. Comments on health remain for owners of No. 3.
13	Plum, Purple	8	3332	3.5	450	Mature	5.4	Normal	Fair	C	2	20+	Erratic growth habit Remote survey only (RS) Remote survey hybridised with our 2009 survey of No. 3 Wadham Gardens and adjusted for age. Comments on health remain for owners of No. 3.

Landmark Trees

Site: 9 Harley Road

Date: 26/6/15

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: SHH_9HRR_AIA

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
12	Tree of Heaven	18	3716	7.0	550	Mature	6.6	Normal	Good	B	1	20+	Unsuitable species for position Remote survey only (RS) Remote survey hybridised with our 2009 survey of No. 3 Wadham Gardens and adjusted for age. Comments on health remain for owners of No. 3.
14	Birch, Silver	9	1.5	1.5	126	Semi-mature	1.5	Normal	Fair	C	2	20+	A tree with insignificant defects
15	Beech, Copper	12	6	2.0	650	Mature	7.8	Normal	Fair	B	2	20+	Remote survey only (RS) Remote survey hybridised with our 2009 survey of No. 3 Wadham Gardens and adjusted for age. Comments on health remain for owners of No. 3.
16	Plane, London	14	3	9.0	720	Mature	8.6	Normal	Fair	B	1	>40	Pollarded
17	Plane, London	14	9	6.0	620	Mature	7.4	Normal	Fair	B	1	>40	Pollarded Leaning (slightly)

APPENDIX 2

RECOMMENDED TREE WORKS

Notes for Guidance:

Husbandry 1 - Urgent (ASAP), 2 - Standard (within 6 months), 3 - Non-urgent (2-3 years)

CB - Cut Back to boundary/clear from structure.
CL# - Crown Lift to given height in meters.
CT#% - Crown Thinning by identified %.
CCL - Crown Clean (remove deadwood/crossing and hazardous branches and stubs)*.
CR#% - Crown Reduce by given maximum % (of outermost branch & twig length)
DWD - Remove deadwood.
Fell - Fell to ground level.
FInv - Further Investigation (generally with decay detection equipment).
Pol - Pollard or re-pollard.
Mon - Check / monitor progress of defect(s) at next consultant inspection which should be <18 months in frequented areas and <3 years in areas of more occasional use. Where clients retain their own ground staff, we recommend an annual in- house inspection and where practical, in the aftermath of extreme weather events.
Svr Ivy / Clr Bs - Sever ivy / clear base and re-inspect base / stem for concealed defects.

*Not generally specified following BS3998:2010

Landmark Trees

Site: 9 Harley Road
Date: 26/6/15

Surveyor(s): Adam Hollis
Ref: SHH_9HRR_AIA

Appendix 2

Recommended Tree Works

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
5	Plum, Myrobalan	U	5	3.0	0211	Fell	Leaning (significantly) Cracks in stem Dying, supporting creepers, but cracked at base over path Recommended husbandry 1

APPENDIX 3

RECOMMENDED TREE WORKS TO FACILITATE DEVELOPMENT (See Table 1)

Notes for Guidance:

RP - Pre-emptive root pruning of foundation encroachments under arboricultural supervision.
CB - Cut Back to boundary/clear from structure.
CL# - Crown Lift to given height in meters.
CT#% - Crown Thinning by identified %.
CCL - Crown Clean (remove deadwood/crossing and hazardous branches and stubs)*.
CR#% - Crown Reduce by given maximum % (of outermost branch & twig length)
DWD - Remove deadwood.
Fell - Fell to ground level.
FInv - Further Investigation (generally with decay detection equipment).
Pol - Pollard or re-pollard.
Mon - Check / monitor progress of defect(s) at next consultant inspection which should be <18 months in frequented areas and <3 years in areas of more occasional use. Where clients retain their own ground staff, we recommend an annual in- house inspection and where practical, in the aftermath of extreme weather events.
Svr Ivy / Clr Bs - Sever ivy / clear base and re-inspect base / stem for concealed defects.

*Not generally specified following BS3998:2010

Landmark Trees

Site: 9 Harley Road
Date: 26/6/15

Surveyor(s): Adam Hollis
Ref: SHH/9HRR/AIA

Appendix 3

Recommended Tree Works To Facilitate Development

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
10	Birch, Himalayan	B	11	2.0	3313	CL Ground clearance currently 2m - summer house likely to require additional clearance	Included bark in main stem unions To facilitate development

Landmark Trees

PART 2 – APPENDICES

APPENDIX 5

TREE CONSTRAINTS PLAN

NOTE:

This survey is of a preliminary nature. The trees were inspected from the ground only on the basis of the Visual Tree Assessment method. No samples were taken for analysis. No decay detection equipment was employed. The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.

Branch spread in metres is taken at the four cardinal points to derive an accurate representation of the crown.

Root Protection Areas (RPA) are derived from stem diameter measured at 1.5 m above adjacent ground level (taken on sloping ground on the upslope side of the tree base).

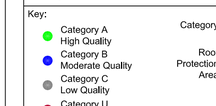
Landmark Trees

20 Broadwick Street, London, W1F 8HT
Tel: 0207 851 4544 Mobile: 07812 989928
e-mail: info@landmarktrees.co.uk Web: www.landmarktrees.co.uk

Site: 9 Harley Road	1:200@ A1
Drawing Title: Tree Constraints Plan	July 2015

Key:

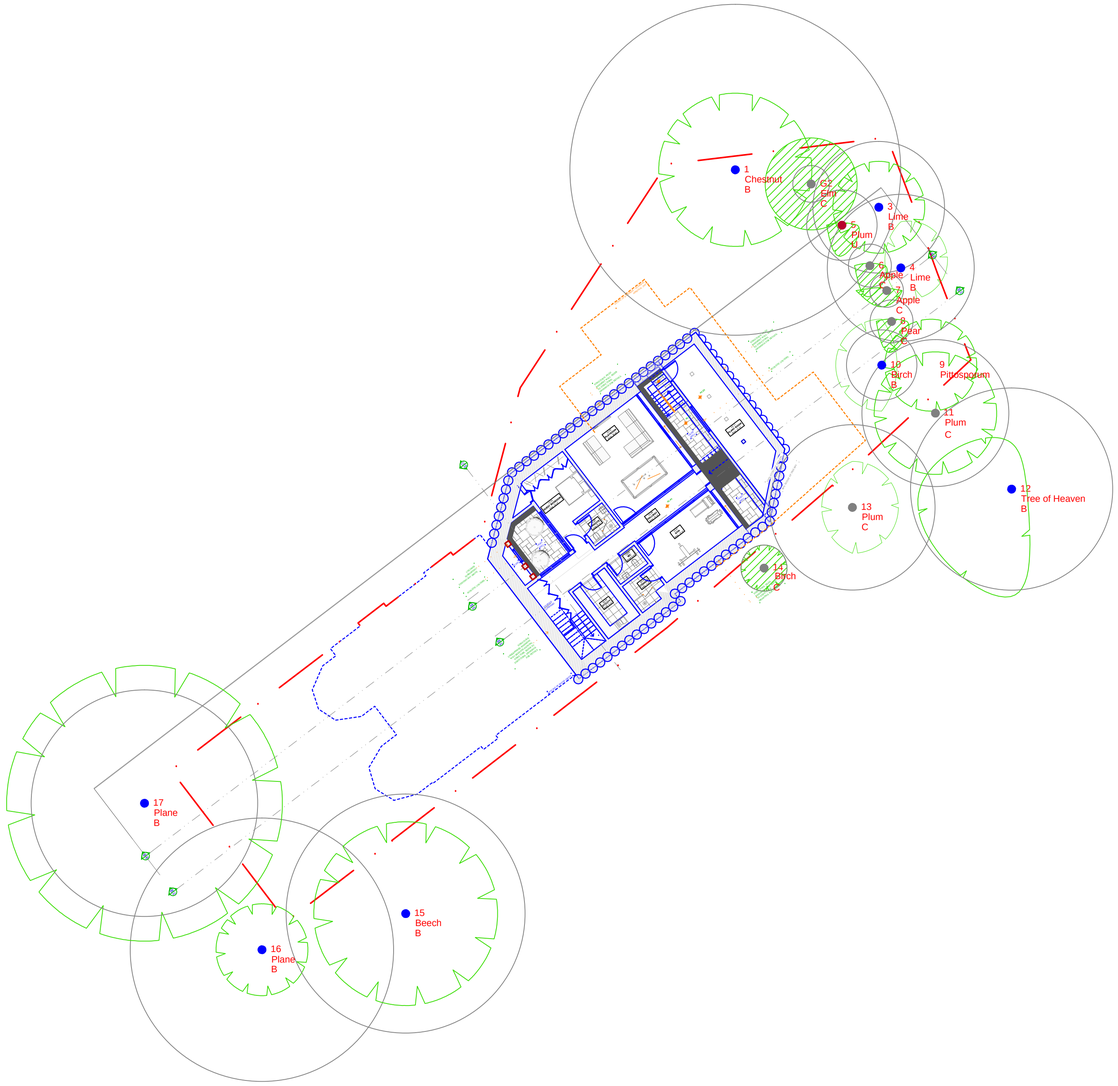
- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category U Trees Unsuitable for Retention



Tree Position Approximate (not shown on original survey)

APPENDIX 6

ARBORICULTURAL IMPACT ASSESSMENT PLAN



0 M 5 M 10 M

Proposed Lower Ground Floor Plan

N

W E S

NOTE:

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e-mail: info@landmarktrees.co.uk Web: www.landmarktrees.co.uk

Site: 9 Harley Road	1:200@ A1
Drawing Title: Arboricultural Assessment	November 2015

Key:

- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category U Trees Unsuitable for Retention

Category
Root Protection Area
13 Birch C2
Crown Spread
Tree Number
Species
Category
Tree Position Approximate (not shown on original survey)

0 M 5 M 10 M

Proposed Ground Floor Plan

NOTE:

This survey is of a preliminary nature. The trees were inspected from the ground only on the basis of the Visual Tree Assessment method. No samples were taken for analysis. No decay detection equipment was employed. The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.

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Root Protection Areas (RPA) are derived from stem diameter measured at 1.5 m above adjacent ground level (taken on sloping ground on the upslope side of the tree base).

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Drawing Title: Arboricultural Assessment	November 2015

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- Category C Low Quality
- Category U Trees Unsuitable for Retention