Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR:

Barnes Hospital

South Worple Way

Barnes

London

SW14 8SU

INSTRUCTING PARTY:

South West London and St George's Mental Health NHS Trust

61 Glenburnie Road

London

SW17 7DJ

REPORT PREPARED BY

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MSc ARB MICFor FArbor A MRICS C Env

Ref: SWG/BNH-MIX/AIA/01d

Date: 3rd December 2018

PART 1: MAIN TEXT

PART 2 - APPENDICES

PART 3 - PLANS

1. SUMMARY

1.1 There 59 trees on or adjacent to the application site that are within close proximity to the proposals and therefore need to be assessed.

1.2 Of these 59 trees, 2 are category A (High Quality), 21 are category B (Moderate Quality), 32 are category C (Low Quality) and 4 are category U (Poor Quality).

1.3 The report has assessed the impacts of the development proposals and concludes there would be a relatively low impact on the tree stock: It is necessary to remove 8 trees of which 2 are of moderate quality but small size and located internally. Impacts to trees arising from encroachments of RPAs are assessed as being low, either due to the small amounts affected or inhibiting factors on root development. The residential buildings to the south of the site have been moved northwards as far as possible to minimise post-development conflict with dual aspect fenestration also provided where possible. The SEN school will be subject to shading but the nature of its use means that conflict is inherently less likely to occur.

1.4 Notwithstanding the above assurances, the report sets out a series of recommendations prior and during construction that will ensure impacts to trees are minimised. These are detailed in sections 6.3 and 8 of this report.

1.5 In conclusion, the proposal, through following the above recommendations, will have a limited impact on the tree stock and is acceptable.

* 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	This Arboricultural Impact Assessment report has been prepared by Landmark Trees (LT) on behalf of South West London & St George's Mental Health Trust ('the Applicant'), to support a planning application submitted to London Borough of Richmond upon Thames ('LBRuT').
2.1.2	The application relates to the redevelopment of Barnes Hospital, South Worple Way, London, Barnes SW14 8SU. Specifically, permission is sought for: *"Outline planning permission for the demolition and comprehensive redevelopment (phased development) of land at Barnes Hospital to provide a mixed use development comprising a health centre (Use Class D1), a Special Educational Needs (SEN) School (Use Class D1), up to 80 new build residential units (Use class C3), the conversion of two of the retained BTMs for use for up 3no. residential units (Use Class C3), the conversion of one BTM for medical use (Use Class D1), car parking, landscaping and associated works. All matters reserved save for the full details submitted in relation to access points at the site boundaries."*
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: 2016027_BARNES HOSPITAL_SITE SURVEY_Rev A Proposals: 18002_G200_P_LG_001 & 18002_G200_P_00_001

2.3 Scope & Limitations of Survey

2.3.1 As Landmark Trees' (LT) arboricultural consultant, Andrew Dear surveyed the trees on site on 5th October 2017, 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.

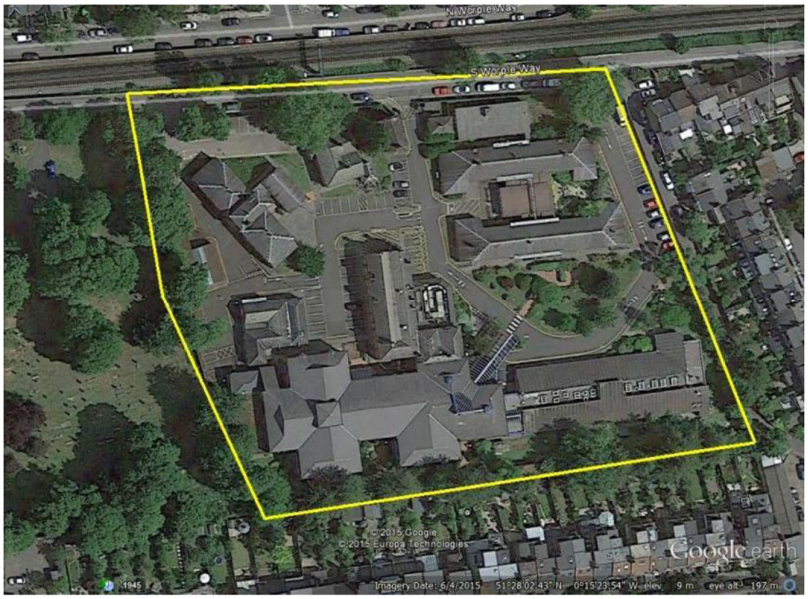
2.4 Survey Data & Report Layout

2.4.1 Detailed records of individual trees are given in the survey schedule in Appendix. General husbandry recommendations are distinguished at Appendix 2 from minimum requirements to facilitate development which form part of the planning application at Appendix 3. The former may still be relevant to providing a safe site of work, of course. Planning considerations notwithstanding, we trust these necessary recommendations are passed on to relevant parties with due diligence and the trees be managed appropriately.

2.4.2 A site plan identifying the surveyed trees, based on the Instructing Party's drawings / topographical survey is provided in Part 3 of this report. 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 Instructing Party'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: Aerial view of Barnes Hospital grounds

3.1.1	The site comprises a hospital grounds (or part thereof). It contains several buildings, access roads, carparks and landscaped areas. The grounds cover circa 3.5 acres and is generally flat with no abrupt level changes.
3.1.2	In terms of the British Geological Survey, the site overlies the London Clay Formation with Kempton Park Gravel Member superficial deposits (see indicated location on Fig.1 plan extract below). The associated soils are generally, sand and gravel, but with subsoils of highly shrinkable clay; e.g. slowly permeable seasonally waterlogged fine loam over clay. Such highly plastic subsoils are prone to movement: subsidence and heave, but their influence will depend somewhat on the actual depth of that clay (sand and gravel deposits are not shrinkable). The actual distribution of the soil series is 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.
3.1.3	Sand and gravel soils are less prone to compaction during development than clay soils, potentially reducing the threat to tree health from construction traffic. The design of foundations near problematic tree species will also need to take into consideration subsidence risk in relation to the clay subsoil and its depth. Further advice from the relevant experts on the specific soil properties can be sought as necessary.

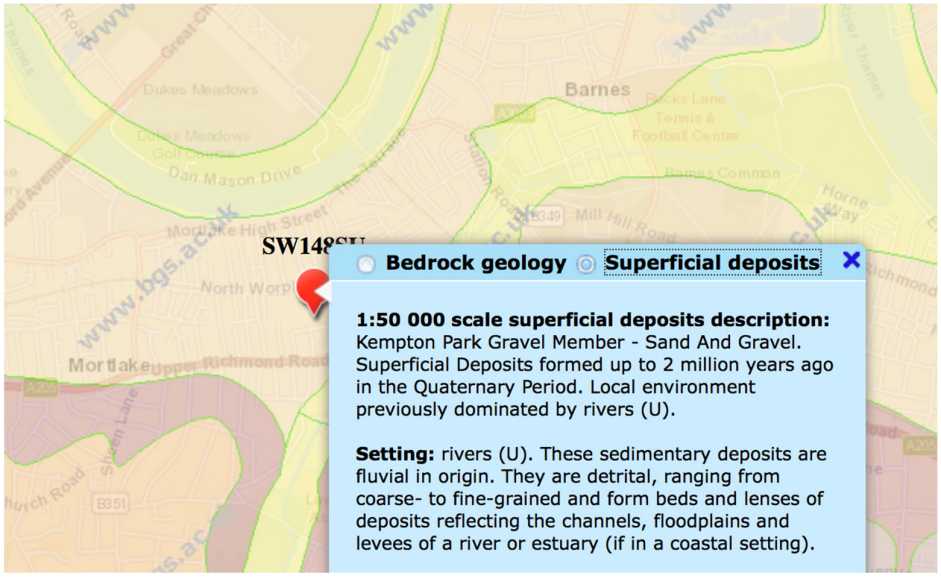


Figure 1: Extract from the BGS Geology of Britain Viewer

3.2 Subject Trees

3.2.1	Of the 59 trees surveyed, 2 are category A (High Quality), 21 are category B (Moderate Quality), 32 are category C (Low Quality) and 4 are category U (Poor Quality).
3.2.2	The tree species found on the site comprise pines, silver birch, false acacia, silver maple, common ash, horse chestnut, crab apple, common lime, London plane, holly, Lombardy poplar and bird cherry.
3.2.3	In terms of age demographic, the tree stock is dominated by mature specimens with only a few semi-mature trees present.

*page 9 of: British Standards Institute: Trees in relation to design, demolition and construction BS 5837: 2012 HMSO, London

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 for 2 trees. These are 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 adjacent to the Queens Road Mortlake 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.
3.3.2	Relevant local planning policies comprise Policy 7.21 of the London Plan 2016 and Policy 8.1.1 of LBRuT's Core Strategy and Policies DM OS5, DM HO2, DM HO3 and DM DC4 of their Development Management Plan, adopted November 2011.

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.

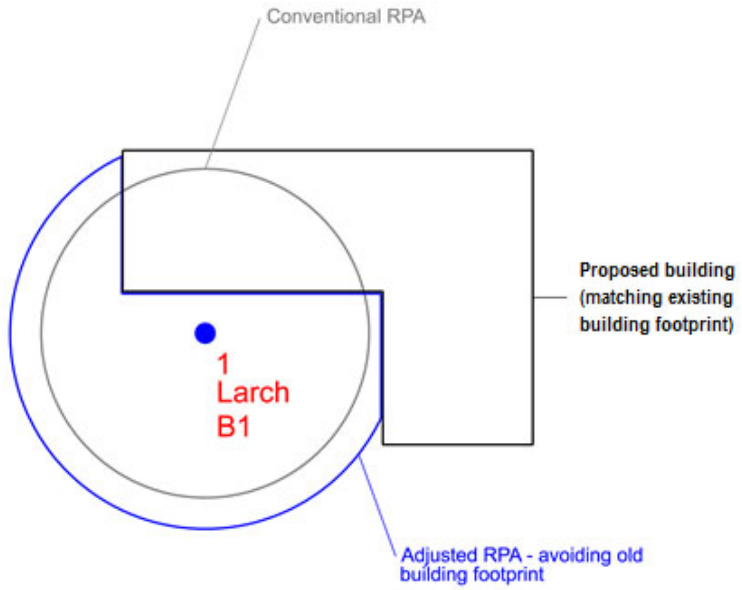


Figure 2 –

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.

4.1.4 **No *a priroi* modifications have been made in this instance, although our working assumption is that the buildings along the western boundary of the site will have significantly impeded root development from the trees within the Mortlake Burial Ground into the application site.**

4.1.5 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.

4.1.6 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."

4.1.7 Only moderate quality trees and above are significant material constraints on development. However, low quality trees comprise a constraint in aggregate, in terms of any collective loss / removal, where replacement planting is generally considered appropriate.

4.1.8 In this instance, the high and moderate quality trees present on and off the site have the potential to pose significant constraints upon development.

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.

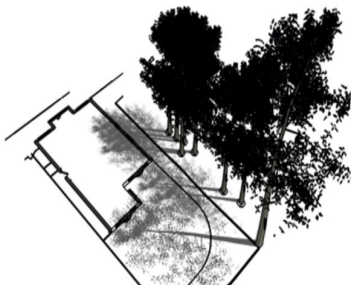


Figure 3 –
Generic Shading Constraints

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.

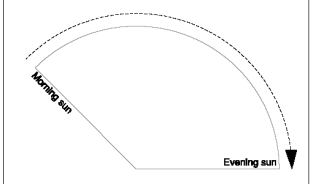


Figure 4 – Shading Arc

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- and off-site trees means they 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 which is considered below (in Sections 5 & 6). As specified by BS5837, this section (4) of the report considers only the site as it is, not in the light of pending proposals.

Note: Sections 5 & 6 below will now assess the impacts of the proposals upon constraints identified in Section 4 above. 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: SWG/BNH-MIX/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
A	1	Plane, London	Building Construction within RPA	40.7 m^2 9.56 %	Mature	Normal	Good	Very Low	Very Low	Low-invasive foundation design
B	2	Birch, Silver	Felled to Facilitate Development	m^2 N/A %	Early Mature	Normal	N/A	N/A	Very Low	New planting / landscaping
C	3	Sycamore	Felled to Facilitate Development	m^2 N/A %	Semi-mature	Moderate	N/A	N/A	Very Low	New planting / landscaping
B	4	Pine	Felled to Facilitate Development	m^2 N/A %	Early Mature	Normal	N/A	N/A	Low	New planting / landscaping
C	12	Cypress, Lawson variety	Felled to Facilitate Development	m^2 N/A %	Early Mature	Normal	N/A	N/A	Very Low	New planting / landscaping
C	13	Willow, Crack	Felled to Facilitate Development	m^2 N/A %	Mature	Normal	N/A	N/A	Very Low	New planting / landscaping
C	18	Stag's Horn Sumach	Felled to Facilitate Development	m^2 N/A %	Mature	Moderate	N/A	N/A	Very Low	New planting / landscaping

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B.S. Cat.	Tree No.	Species	Impact	Tree / RPA Affected	Age	Growth Vitality	Species Tolerance	Impact on Tree Rating	Impact on Site Rating	Mitigation
C	19	Birch, Silver	Felled to Facilitate Development	m^2 N/A %	Early Mature	Normal	N/A	N/A	Very Low	New planting / landscaping
B	26	Pine	Building Construction within RPA	4.2 m^2 3.3 %	Mature	Normal	Moderate	Very Low	Very Low	Low-invasive foundation design
C	30	Pine	Building Construction within RPA	14.4 m^2 8.02 %	Mature	Moderate	Moderate	Very Low	Very Low	Low-invasive foundation design
B	33	Pine	Building Construction within RPA	8.1 m^2 4.66 %	Mature	Normal	Moderate	Very Low	Very Low	Low-invasive foundation design
B	34	Plane, London	Building Construction within RPA	58.4 m^2 17.45 %	Mature	Normal	Good	Low	Very Low	Low-invasive foundation design
B	39	Pine	Basement Construction within RPA	1.3 m^2 .7 %	Mature	Normal	Moderate	Very Low	Very Low	Hand dig top 750mm of basement line thro' RPA
C	50	Chestnut, Horse	Basement Construction within RPA Building Demolition within RPA	13.9 m^2 3.79 %	Mature	Normal	Moderate	Very Low	Very Low	Hand dig top 750mm of basement line thro' RPA Light plant / mini-rigs only & from outside RPA

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: SWG/BNH-MIX/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	51	Chestnut, Horse	Basement Construction within RPA Building Demolition within RPA	4.3 m^2 1.48 %	Mature	Normal	Moderate	High	High	Trial pits / further investigation Light plant / mini-rigs only & from outside RPA
B	52	Chestnut, Horse	Basement Construction within RPA Building Demolition within RPA	59.1 m^2 10.23 %	Mature	Normal	Moderate	Low	Low	Hand dig top 750mm of basement line thro' RPA Light plant / mini-rigs only & from outside RPA
C	53	Chestnut, Horse	Basement Construction within RPA Building Demolition within RPA	36.9 m^2 7.4 %	Mature	Normal	Moderate	Low	Low	Hand dig top 750mm of basement line thro' RPA Light plant / mini-rigs only & from outside RPA
B	56	Lime, Common	Parking Demolition within RPA	m^2 N/A %	Mature	Normal	Good	Low	Low	Light plant / mini-rigs only & from outside RPA
A	57	Plane, London	Building Construction within RPA Parking Demolition within RPA	8.4 m^2 2.19 %	Mature	Normal	Good	Low	Low	Airspade / manual excavation Light plant / mini-rigs only & from outside RPA
C	66	Cherry, Bird	Felled to Facilitate Development	m^2 N/A %	Mature	Moderate	N/A	N/A	Very Low	New planting / landscaping

6.0 DISCUSSION

6.1 Rating of Primary Impacts

6.1.1 The principal impacts in the current proposals comprise the removal of 8 trees of which 2 (T2 and T4) are of moderate quality and 6 (T's 3, 12, 13, 18, 19 and 66) are of low quality. The relatively small size and internal location of the category B trees means that the impact of this loss is assessed as being only of a low level and will be amply mitigated through the substantive landscaping proposed.

6.1.2 The proposed LGF access ramp encroaches across the theoretical RPAs of 4 trees within Mortlake Burial Ground by between 1.5 – 10%. Our working hypothesis is that the line of existing buildings and hard surfacing between the trees and proposed ramp will have significantly impeded root development in this direction to the extent that any impact to the trees will be minimal. This assessment stands even if outlying roots are disturbed, the distribution of an RPA below the existing buildings is in principle, unjustified: notwithstanding a reduced probability of rooting below significant structures, the principle of protecting and promoting root colonisation below vulnerable building foundations conflicts with other responsibilities of / liabilities for the council. Soil beneath and beyond the existing buildings cannot be considered a priority area to protect and, in this instance, an alternative area contiguous with the remaining RPA can be readily provided within Mortlake Burial Ground. Notwithstanding this hypothesis impacts are assessed as being low at most and it is proposed to manually excavate the outer limit of the ramp through the RPAs to a minimum depth of 750mm in conjunction with pre-emptive root pruning.

6.1.3 The encroachment of the RPA of T39 to the south of the proposed LGF level is assessed as being likely to be of negligible impact to the tree and will be mitigated through the manual excavation of the top 750mm of the piling line in conjunction with pre-emptive root pruning.

6.1.4 Residential Block A encroaches within the RPA of T57 by 2% and also marginally encroaches the RPA of T56. Given the very minor incursions into RPAs currently covered by hard surfacing, these encroachments are assessed as being likely to be of very low impact at most, Mitigation of manual excavation of the outer limits of construction in conjunction with pre-emptive root pruning is proposed.

6.1.5 The proposed SEN school encroaches within the RPA of four trees by between 3 – 17%, assessed in gross terms as being likely to be of very low-low impact. Low-invasive foundations (i.e. discontinuous footings with suspended beam(s) / raft between) will be employed, therefore affecting a fractional net area of excavation, relative to the gross footprint / RPA encroachment. Flexibility of footing placement (relative to root location) will be built into the design, with the pit locations trial-excavated by hand under supervision. Subject to these measures, the overall impact is likely to be very low/negligible for all four trees.

6.1.6	The encroachment of the RPA of T1 by the proposed Health Hub comprises approximately 9.5% of the total area, assessed as being likely to be of very low impact considering the ability of the species to tolerate root disturbance. The mitigation specified in paragraph 6.1.4 will be again be employed here.
6.1.7	The proposed refuse store within the RPA of T52 and T53 will also require the use of low-invasive foundations or potentially a no-dig solution utilising an above ground cellular confinement system as the sub-base for construction.
6.1.8	The demolition of the existing buildings along the western boundary of the site will take place within the RPA of a number of trees and it will therefore be necessary for it to be undertaken in a controlled manner. Provided this is done so, there should be only negligible impact to the adjacent trees.
6.1.9	Similarly, provided that the existing hard surfacing within the RPAs of T56 and T57 is removed in a controlled manner, this is likely to result in betterment to these trees as it is to be replaced with soft landscaping.
6.1.10	Given the amount of existing hard surfacing throughout the site, the proposed landscaping is likely to be of little impact to adjacent trees provided that the existing sub-base is retained and re-used. Where new hard surfacing is proposed over what is currently soft ground a no-dig construction method will be required.
6.1.11	The proposed cutting back of T's 1, 26, 30, 34 and 57 to provide constructional and occupational clearance will be of negligible impact to the trees provided it is carried out in accordance with good arboricultural practice.

6.1.12	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.
6.1.13	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 in general (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.

6.1.14 "**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 (or by extension, the *pro rata* RPA); 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.*

6.1.15 BS5837 recommends (at 5.3.a) that if operations within the RPA are proposed, the project arboriculturist should demonstrate that the tree(s) can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with its RPA. On the basis of Thomas et al, above, it is possible to demonstrate that the tree can remain viable, and on the basis that the tree will be rooting no less freely in the garden / lawn / border /pavement than within the proposed footprint, with the RPA encroachment compensated elsewhere on contiguous land. The guide also recommends (at 5.3.b) the arboriculturist propose a series of mitigation measures (to improve the soil environment that is used by the tree for growth). These are provided at 6.3 below.

6.2 Rating of Secondary Impacts

6.2.1 Whilst the residential blocks will be subject to shading from the trees within Mortlake Burial Ground and along the site's southern boundary, there will be a greater level of clearance than exists currently. It must also be considered that whilst these boundary trees may pose some nuisance, they will be equally valued for the privacy they afford and therefore the secondary impacts of the scheme are not considered significant.

6.3 Mitigation of Impacts

6.3.1 All plant and vehicles engaged in demolition works should either operate outside the RPA, or should run on a temporary surface designed to protect the underlying soil structure. The demolition of the buildings should proceed inwards in a "pull down" fashion. Hard surfacing can be lifted with caution by a skilled machine operator again working away from the tree.

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 new / 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	Nuisance deposition can be further mitigated with routine maintenance, light pruning / deadwooding and the fitting of filtration traps on guttering (see Figure 5 below).
6.3.5	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.

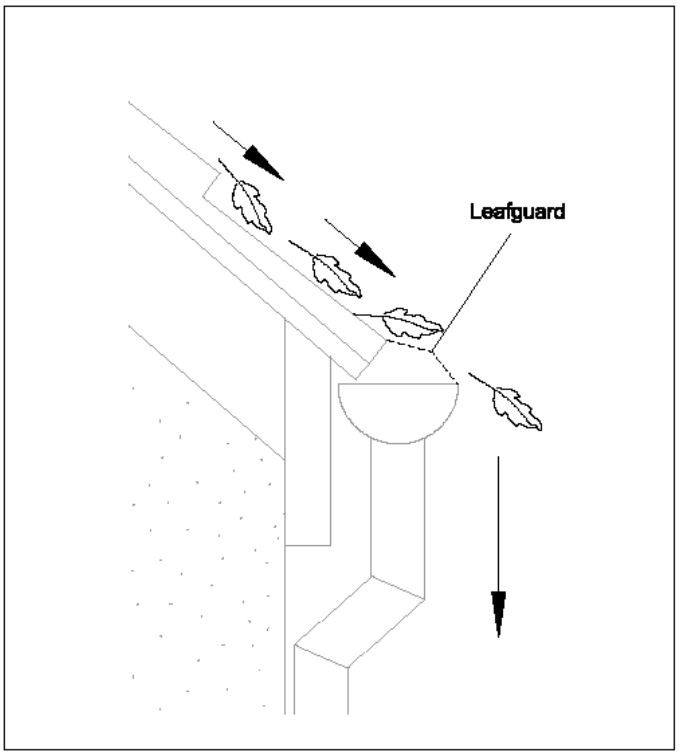

Figure 5: Filtration traps, as shown above, could be fitted on the gutters which can easily be maintained at 2-3m above ground.

7.0 CONCLUSION

7.1	The potential impacts of development are all relatively low in terms of both quality of trees removed and also RPA encroachments of trees retained.
7.2	The full potential of the impacts can be largely mitigated through design and precautionary measures. These measures can be elaborated in Method Statements in the discharge of planning conditions.
7.3	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.
7.4	The trees that are recommended for felling are of little individual significance, such that their loss will not affect the visual character of the area.
7.5	Therefore, the proposals will not have any significant impact on either the retained trees or wider landscape thereby complying with Policy 7.21 of the London Plan 2016 and LP15, 16 & 20 of LBRuT's Local Plan, adopted 2018. Thus, with suitable mitigation and supervision the scheme is recommended to planning.

8.0 RECOMMENDATIONS

8.1 Specific Recommendations

8.1.1 Tree works recommendations in Appendix 2 are not part of the current application, but requirements of general maintenance that will need to be applied for (subject to para. 3.3 of this report and any other relevant constraints in planning or leasehold) by the client separately. Consent for the current planning application does not impart any consent for the Appendix 2 maintenance works. Please note, though, the owner and / or manager of a property have a duty to maintain a safe site of work and to protect occupiers of the surrounding land / members of the public from tree hazards. Works recommended in this report should be enacted in a timely fashion by the relevant party regardless of the progress of the development.

8.1.2 Recommendations for works required to facilitate development are found in Appendix 3 and a selection of columnar tree species cultivars for constricted sites provided in Appendix 4. Any tree removals recommended within this report should only be carried out with local authority consent.

8.1.3 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.

8.1.4 Replace felled trees with native ornamental nursery stock under current best practice; i.e. conforming to and planted in accordance with the following:

- BS8545: 2014 Code of Practice for Trees from Nursery to Landscape
- BS 3936-1: 1992 Nursery stock. Specification for trees and shrubs; and
- BS 5236:1975 Cultivation and Planting of Trees in the Advanced Nursery Stock Category.
- All replacement stock should be planted and maintained as detailed in BS 4428:1989 (Section 7): Recommendations for General Landscape Operations.

9.0 Arboricultural Method Statement

9.1	The following comprises the Heads of Terms of an Arboricultural Method Statement in relation to the proposed development of Barnes Hospital, South Worple Way, Barnes, London SW14 8SU.
9.2	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 detailed in Appendices 2 and 3, 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, 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 is shown on the Tree Protection Plan in Part 3 of this report along with areas of unfenced RPAs to receive ground protection. The TPB should be erected prior to commencement of works, remain in its original form on-site for the duration of works and be 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	The use of heavy plant machinery for building demolition, removal of imported materials and grading of surfaces should take place in one operation. The necessary machinery should be located above the existing grade level and work away from any retained trees. This will ensure that any spoil is removed from the RPAs. It is vital that the original soil level is not lowered as this is likely to cause damage to the shallow root systems.
8.2.4	Any pruning works must be in accordance with British Standard 3998:2010 Tree work [BS3998].
8.2.5	Where sections of hard surfacing are proposed in close proximity to trees, a "no-dig" construction methodology shall be employed in accordance with BS5837:2012 and 'The Principles of Arboricultural Practice: Note 1, Driveways Close to Trees, AAIS 1996 [APN1]'.
8.2.6	If the RPA of a tree is encroached by underground service routes then BS5837:2012 and NJUG VOLUME 4 provisions should be employed. Further arboricultural advice must be sought if this is proposed.
8.2.7	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.

8.2.8 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) Full 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: felling, required pruning and new planting. 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.

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

8.2.10 The sequence of works should be as follows:

i) initial tree works: felling, stump grinding and 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.

10.0 REFERENCES

- Barlow JF & Harrison G. 1999. Shade By Trees, Arboricultural Practice Note 5, AAIS, Farnham, Surrey.
- British Standards Institute. 2012. Trees in Relation to Design, Demolition and Construction - Recommendations BS 5837: 2012 HMSO, London.
- Centre for Ecology & Hydrology. 2006. Tree Roots in the Built Environment, HMSO, London.
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- Thomas P, 2000 & 2014. Trees: Their Natural History, Cambridge University Press, Cambridge.
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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.

Landmark Trees

PART 2 – APPENDICES

APPENDIX 1

TREE SCHEDULE

Botanical Tree Names

Acacia, False (Robinia)	: Robinia Pseudoacacia	Maple, Silver	: Acer saccharinum
Apple, Crab	: Malus sylvestris	Oak, English	: Quercus robur
Ash, Common	: Fraxinus excelsior	Pear, Common	: Pyrus communis
Birch, Silver	: Betula pendula	Pine, Scots	: Pinus sp
Cherry, Bird	: Prunus padus	Plane, London	: Platanus acerifolia
Chestnut, Horse	: Aesculus hippocastanum	Poplar, Lombardy	: Populus nigra 'Italica'
Cypress, Lawson	: Chamaecyparis lawsonia	Rowan, Mountain Ash	: Sorbus aucuparia
Elder	: Sambucus nigra	Stag's Horn Sumach	: Rhus typhina
Holly, Common/English	: Ilex aquifolium	Sycamore	: Acer pseudoplatanus
Laurel, Portuguese	: Prunus lusitanica	Whitebeam, Swedish	: Sorbus aria
Lime, Common	: Tilia x europea	Willow, Crack	: Salis fragilis

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: Barnes Hospital

Date: 5/10/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Kim Dear

Ref: SWG/BNH-MIX/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	Plane, London	17	9897	4.0	970	Mature	11.6	Normal	Good	A		>40	Ivy clad
2	Birch, Silver	10	2242	2.0	190	Early Mature	2.3	Normal	Good	B		>40	
3	Sycamore	9	4323	2.5	300	Semi-mature	3.6	Moderate	Fair	C		10+	Dying back (lead stem /centre) Remote survey only (RS)
4	Pine	9	3333	1.5	410	Early Mature	4.9	Normal	Good	B		20+	
5	Apple, Crab	6	3333	2.5	225	Mature	2.7	Normal	Good	C		20+	
6	Rowan, variety	5	2232	2.0	190	Mature	2.3	Normal	Good	C		20+	

Landmark Trees

Site: Barnes Hospital

Date: 5/10/17

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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	Whitebeam, Swedish	5	3333	2.0	170	Early Mature	2.0	Normal	Good	C		20+	
10	Pine	8	3222	3.0	140	Semi-mature	1.7	Normal	Fair	C		20+	
11	Birch, Silver	10	3222	3.0	190	Semi-mature	2.3	Moderate	Fair	C		10+	Fibre buckling on stem
12	Cypress, Lawson variety	7	2212	0.5	240	Early Mature	2.9	Normal	Fair	C		20+	Remote survey only (RS)
13	Willow, Crack	11	8789	2.5	993	Mature	11.9	Normal	Fair	C		10+	Co-dominant stems Leaning (significantly) recent pollard, stem over driveway.
14	Cherry, Bird	4	3223	2.0	220	Mature	2.6	Moderate	Poor	U		<10	Decay at trunk base Leaning (significantly)

Landmark Trees

Site: Barnes Hospital

Date: 5/10/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Kim Dear

Ref: SWG/BNH-MIX/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
15	Birch, Silver	7	1112	3.0	120	Young	1.4	Normal	Fair	C		20+	
16	Pear, Domestic	7	2222	3.0	260	Mature	3.1	Normal	Good	C		20+	bark wound
17	Birch, Silver	9	1222	3.0	150	Young	1.8	Normal	Fair	C		20+	Suppressed by nearby tree
18	Stag's Horn Sumach	5	3322	2.0	219	Mature	2.6	Moderate	Fair	C		10+	Bleeding on lower stem
19	Birch, Silver	9	3122	2.0	210	Early Mature	2.5	Normal	Good	C		>40	Leaning (slightly)
20	Pear, Domestic	7	3231	3.0	310	Mature	3.7	Normal	Fair	C		10+	Ivy clad

Landmark Trees

Site: Barnes Hospital

Date: 5/10/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Kim Dear

Ref: SWG/BNH-MIX/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
21	Elder	4	2111	1.0	150	Semi-mature	1.8	Moderate	Fair	C		10+	
22	Chestnut, Horse	8	3113	3.0	310	Young	3.7	Moderate	Fair	C		20+	Multi stem weakness
23	Cypress, Lawson variety	13	2322	0.0	410	Mature	4.9	Normal	Fair	C		20+	
24	Sorbus species	7	1222	2.0	190	Semi-mature	2.3	Normal	Fair	C		20+	
25	Laurel, Portugese	5	2111	1.5	150	Semi-mature	1.8	Moderate	Fair	C		20+	
26	Pine	14	5433	2.0	530	Mature	6.4	Normal	Good	B		20+	Leaning (slightly)

Landmark Trees

Site: Barnes Hospital
Date: 5/10/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd
020 7851 4544
Surveyor(s): Kim Dear
Ref: SWG/BNH-MIX/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
27	Ash, Common	8	1332	2.0	200	Young	2.4	Normal	Fair	C		20+	Suppressed by nearby tree
28	Oak, English	6	3201	2.0	170	Young	2.0	Moderate	Fair	C		20+	Suppressed by nearby tree
29	Laurel, Portugese	5	4321	1.0	300	Mature	3.6	Moderate	Fair	C		10+	Suppressed by nearby tree
30	Pine	11	8742	3.0	630	Mature	7.6	Moderate	Fair	C		10+	Suppressed by nearby tree raised soil level.
31	Pine	13	7564	4.0	580	Mature	7.0	Moderate	Poor	U		<10	A sparser than normal canopy Leaning (significantly) raised soil level
32	Pine	15	2333	4.0	500	Mature	6.0	Moderate	Fair	C		10+	Chlorotic foliage (yellowed) A sparser than normal canopy rs behind scrub.

Landmark Trees

Site: Barnes Hospital

Date: 5/10/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Kim Dear

Ref: SWG/BNH-MIX/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
33	Pine	16	5452	3.0	620	Mature	7.4	Normal	Good	B		>40	
34	Plane, London	15	5366	2.0	860	Mature	10.3	Normal	Good	B		>40	Pollard (Old) need scrub clearing.
37	Pine	13	3342	4.0	380	Early Mature	4.6	Normal	Good	B		>40	Leaning (slightly)
38	False Acacia	9	1133	4.0	160	Semi-mature	1.9	Moderate	Fair	C		10+	Suppressed by nearby tree
39	Pine	16	6343	5.0	640	Mature	7.7	Normal	Good	B		>40	Deadwood (minor) throughout crown
40	False Acacia	13	5234	4.0	310	Early Mature	3.7	Normal	Fair	C		20+	Stems rubbing and becoming weak

Landmark Trees

Site: Barnes Hospital

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Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

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
41	Birch, Silver	12	3211	3.0	170	Semi-mature	2.0	Normal	Fair	C		20+	Leaning (slightly)
42	Pine	14	5534	3.0	520	Mature	6.2	Normal	Good	B		>40	Leaning (slightly)
43	Pine	18	4333	4.5	500	Mature	6.0	Poor	Poor	U		<10	Dead
44	Pine	13	4343	4.0	500	Mature	6.0	Normal	Good	B		>40	roots undermined by Foxes.
45	Maple, Silver	9	3343	1.5	200	Semi-mature	2.4	Normal	Fair	C		>40	
46	Ash, Common	13	4544	4.0	345	Early Mature	4.1	Normal	Good	B		>40	

Landmark Trees

Site: Barnes Hospital

Date: 5/10/17

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Kim Dear

Ref: SWG/BNH-MIX/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
47	Chestnut, Horse	21	4655	2.5	875	Mature	10.5	Normal	Good	B		>40	
48	Chestnut, Horse	21	4746	5.5	930	Mature	11.2	Normal	Fair	B		>40	Long low lateral branch Ivy clad old pollard
49	Chestnut, Horse	8	1111	6.5	870	Mature	10.4	Poor	Poor	U		<10	Ganoderma decay fungi on stem monolithed.
50	Chestnut, Horse	20	4957	5.0	900	Mature	10.8	Normal	Fair	C		20+	Dying back (unilateral) Deadwood (minor) throughout crown major deadwood to west.
51	Chestnut, Horse	21	5765	3.0	800	Mature	9.6	Normal	Good	B		>40	epicormic
52	Chestnut, Horse	22	7678	4.5	1130	Mature	13.6	Normal	Fair	B		20+	Bleeding on lower stem

Landmark Trees

Site: Barnes Hospital

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Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Kim Dear

Ref: SWG/BNH-MIX/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
53	Chestnut, Horse	21	7756	4.0	1050	Mature	12.6	Normal	Fair	C		20+	Decay fungi present on trunk/roots early ganoderma at 3m East.
54	Chestnut, Horse	12	8868	2.0	680	Mature	8.2	Normal	Fair	B		20+	Damaging wall in neighbouring property
55	Lime, Common	12	3343	3.0	450	Early Mature	5.4	Normal	Fair	B		20+	hanging deadwood South.
56	Lime, Common	12	4445	2.5	500	Mature	6.0	Normal	Fair	B		20+	Pollard (Old)
57	Plane, London	15	8998	3.0	920	Mature	11.0	Normal	Good	A		>40	Pollard (Old)
58	Lime, Common	8	4322	2.0	330	Early Mature	4.0	Moderate	Fair	C		20+	Broken branches Suppressed by nearby tree

Landmark Trees

Site: Barnes Hospital

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Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

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
59	Lime, Common	14	4343	2.0	430	Mature	5.2	Normal	Fair	B		>40	Deadwood (minor) throughout crown Pollard (Old) thick epicormic growth
60	Holly	9	3223	1.0	220	Mature	2.6	Normal	Good	B		20+	
61	Poplar, Lombardy	19	2123	3.0	680	Mature	8.2	Normal	Good	B		20+	Deadwood (minor) throughout crown
62	Poplar, Lombardy	18	1323	2.5	700	Mature	8.4	Normal	Good	B		20+	Deadwood (minor) throughout crown
66	Cherry, Bird	6	4333	1.0	400	Mature	4.8	Moderate	Fair	C		10+	Multi stem weakness

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: Barnes Hospital
Date: 5/10/17

Surveyor(s): Kim Dear
Ref: SWG/BNH-MIX/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
14	Cherry, Bird	U	4	2.0	3223	Fell	Decay at trunk base Leaning (significantly)
31	Pine	U	13	4.0	7564	Fell	A sparser than normal canopy Leaning (significantly) raised soil level

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: Barnes Hospital
Date: 5/10/17

Surveyor(s): Kim Dear
Ref: SWG/BNH-MIX/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
1	Plane, London	A	17	4.0	9897	CB	3m	Ivy clad To facilitate development
2	Birch, Silver	B	10	2.0	2242	Fell		To facilitate development
3	Sycamore	C	9	2.5	4323	Fell		Dying back (lead stem /centre) Remote survey only (RS) To facilitate development
4	Pine	B	9	1.5	3333	Fell		To facilitate development
12	Cypress, Lawson variety	C	7	0.5	2212	Fell		Remote survey only (RS) To facilitate development
13	Willow, Crack	C	11	2.5	8789	Fell		Co-dominant stems Leaning (significantly) recent pollard, stem over driveway. To facilitate development

Landmark Trees

Site: Barnes Hospital
Date: 5/10/17

Surveyor(s): Kim Dear
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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
18	Stag's Horn Sumach	C	5	2.0	3322	Fell		Bleeding on lower stem To facilitate development
19	Birch, Silver	C	9	2.0	3122	Fell		Leaning (slightly) To facilitate development
26	Pine	B	14	2.0	5433	CB	1m	Leaning (slightly) To facilitate development
30	Pine	C	11	3.0	8742	CB	3m	Suppressed by nearby tree raised soil level. To facilitate development
34	Plane, London	B	15	2.0	5366	CB	1m	Pollard (Old) need scrub clearing. To facilitate development
57	Plane, London	A	15	3.0	8998	CB	1-2m	Pollard (Old) To facilitate development

Landmark Trees

Site: Barnes Hospital
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Surveyor(s): Kim Dear
Ref: SWG/BNH-MIX/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
66	Cherry, Bird	C	6	1.0	4333	Fell	Multi stem weakness To facilitate development

APPENDIX 4: TREE SELECTION FOR URBAN LOCATIONS

Table A4.1: Small Ornamental Tree Species

Common Name	Species	(Columnar Form for discrete usage)
Hawthorn	Crataegus monogyna	Stricta
Cockspur	Crataegus prunifolia	Splendens
Cherry	Prunus x hillieri	Spire
Bird cherry	Prunus padus	Albertii
Rowan / Mountain ash	Sorbus aucuparia	Cardinal Royal
Swedish whitebeam	Sorbus intermedia	Brouwers
B. whitebeam	Sorbus x thuringiaca	Fastigiata

Table A4.2: Medium Specimen Tree Species

Common Name	Species	(Columnar Form for discrete usage)
Chinese red bark birch	Betula albosinensis	Fascination
Mongolian lime	Tilia mongolica	
Hornbeam	Carpinus betulus	Fastigiata Frans Fountaine
Turkish hazel	Corylus colurna	
Maidenhair tree	Gingko biloba	
Pride of India	Koelreuteria paniculata	Fastigiata
European larch	Larix decidua	Sheerwater Seedling
Tulip tree	Liriodendron tulipfera	Fastigiata

Table A4.3: Larger Specimen Tree Species

Common Name	Species	(Columnar Form for discrete usage)
English oak	Quercus robur	f. Koster
American elm	Ulmus americana Princeton	
Cedar of Lebanon	Cedrus libani	

Landmark Trees

PART 3 – PLANS

PLAN 1

TREE CONSTRAINTS PLAN

COORDINATE TABLE

STATION	DESCRIPTION	EASTING	NORTHING	LEVEL
GPS1	PK Nail	521131.029	175733.299	6.420
GPS2	PK Nail	521196.591	175738.287	6.213
STN1	PK Nail	521246.999	175743.787	6.197
STN2	PK Nail	521262.042	175718.507	6.287
STN3	PK Nail	521270.511	175692.828	6.300
STN3A	PK Nail	521286.750	175664.843	6.554
STN3B	PK Nail	521285.545	175653.916	6.325
STN3C	PK Nail	521273.995	175651.138	6.270
STN3D	PK Nail	521256.255	175651.099	6.322
STN3E	PK Nail	521230.448	175642.003	6.631
STN3F	PK Nail	521216.617	175640.254	6.517
STN3G	PK Nail	521196.073	175636.731	6.505
STN3H	PK Nail	521170.992	175633.155	6.297
STN4	PK Nail	521236.053	175678.420	6.428
STN4A	PK Nail	521227.266	175695.611	5.921
STN4B	PK Nail	521218.290	175678.907	6.343
STN5	PK Nail	521200.201	175703.520	6.250
STN5A	PK Nail	521219.416	175708.557	6.067
STN5B	PK Nail	521203.779	175727.297	6.213
STN5C	PK Nail	521204.589	175737.835	6.047
STN5D	PK Nail	521187.143	175734.490	6.291
STN5E	PK Nail	521148.084	175727.663	6.189
STN6	PK Nail	521173.266	175700.784	6.318
STN7	PK Nail	521189.411	175679.905	6.263
STN7A	PK Nail	521192.043	175667.430	6.303
STN7B	PK Nail	521199.377	175668.627	6.437
STN7C	PK Nail	521198.844	175665.127	6.526
STN8	PK Nail	521164.392	175667.322	6.286
STN9	PK Nail	521150.679	175663.455	6.155
STN10	PK Nail	521151.541	175703.638	6.292
STN10A	PK Nail	521141.556	175699.816	6.163
STN11	PK Nail	521129.363	175724.528	6.244
STN11A	PK Nail	521131.866	175709.819	6.195

NOTE:

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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: Barnes Hospital	1:200@ A1
Drawing Title: Tree Constraints Plan	October 2017

Key:

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

Category — Crown Spread — Tree Number — Species — Category — Root Protection Area (13 Birch B2)

Tree Position Approximate (not shown on original survey)

PLAN 2

ARBORICULTURAL IMPACT ASSESSMENT PLAN (S)

i. Lower Ground Floor
ii. Ground Floor

Site Boundar

SOUTH WORPLE WAY

SOUTH WORPLE AVENUE

OLD MORTLAKE BURIAL GROUND

T1 Plane A2
T2 Sycamore C2
T3 Birch B2
T4 Pine B2
T5 Apple C2
T6 Rowan C2
T7 Whitebeam C2
T8 Birch C2
T9 Pine C2
T10 Cherry U
T11 Birch C2
T12 Cypress C2
T13 Birch C2
T14 Pear C2
T15 Birch C2
T16 Birch C2
T17 Birch C2
T18 Stag's Horn Sumach C2
T19 Birch C2
T20 Peak C2
T21 Elder C2
T22 Chestnut C2
T23 Cypress C2
T24 Sorbus species C2
T25 Laurel C2
T26 Pine B2
T27 Laurel C2
T28 Ash C2
T29 Laurel C2
T30 Pine C2
T31 Pine
T32 Pine C2
T33 Pine B2
T34 Plane B2
T35 Pine B2
T36 Poplar B2
T37 Pine B2
T38 Poplar B2
T39 Pine B2
T40 Acacia C2
T41 Birch C2
T42 Pine B2
T43 Pine U
T44 Pine B2
T45 Maple C2
T46 Ash B2
T47 Chestnut B2
T48 Chestnut B2
T49 Chestnut U
T50 Chestnut B2
T51 Chestnut B2
T52 Chestnut C2
T53 Chestnut B2
T54 Chestnut B2
T55 Lime B2
T56 Lime B2
T57 Plane A2
T58 Lime C2
T59 Lime B2
T60 Holly B2
T61 Poplar B2
T62 Poplar B2
T63 Cherry C2
T64 Chestnut B2
T65 Cherry C2
T66 Cherry C2

Domestic Water Plant 24863792.349026
49 Bikes
Heating Plant 73797285.708936
Domestic Water Plant 17535114.117720
49 Bikes
Car Park 1353044034.359177
Domestic Water Plant 14078775.736078
Plant 1410802.204139
48 Bikes

N

Proposed Lower Ground Floor Plan

0 M 5 M 10 M

NOTE:
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Site: Barnes Hospital: Main Building	1:200@ A0
Drawing Title: Arboricultural Impacts Assessment Plan	November 2018

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

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

Note: Minor discrepancies between bases in existing and proposed plans may cause some approximation in tree locations

N

Site Bou

SOUTH WORPLE WAY

Vehicle Entrance

Pedestrian Entrance

Vehicle Entrance

Pedestrian Entrance

SOUTH WORPLE AVENUE

Residential Block A

Resi

Resi

Health Hub

Residential Block C

Residential Block B

External Amenity Space
774795970.942320

SEN School

Secondary External Amenity Space
772148176.130409

Residential Refuse Store for Collection Only

OLD MORTLAKE BURIAL GROUND

T1 Plane A2
T2 Birch B2
T3 Cherry C2
T4 Pine B2
T5 Apple C2
T6 Rowan C2
T7 Whitebeam C2
T8 Birch C2
T9 Birch C2
T10 Pine C2
T11 Birch C2
T12 Cherry C2
T13 Cherry C2
T14 Cherry C2
T15 Cherry C2
T16 Cherry C2
T17 Birch C2
T18 Stag Tatarian Sumach C2
T19 Birch C2
T20 Pear C2
T21 Cherry C2
T22 Chestnut C2
T23 Cypress C2
T24 Shrubs species C2
T25 Lime C2
T26 Pine B2
T27 Ash C2
T28 Laburnum C2
T29 Laburnum C2
T30 Pine C2
T31 Pine B2
T32 Pine C2
T33 Pine B2
T34 Plane B2
T35 Pine B2
T36 Pine C2
T37 Pine B2
T38 False Acacia C2
T39 Pine B2
T40 False Acacia C2
T41 Birch C2
T42 Pine B2
T43 Pine B2
T44 Pine B2
T45 Maple C2
T46 Pine B2
T47 Chestnut B2
T48 Chestnut B2
T49 Chestnut B2
T50 Chestnut B2
T51 Chestnut B2
T52 Chestnut B2
T53 Chestnut C2
T54 Chestnut B2
T55 Lime B2
T56 Lime C2
T57 Lime B2
T58 Lime C2
T59 Lime B2
T60 Holly B2
T61 Poplar B2
T62 Poplar B2
T63 Cherry C2

Proposed Ground Floor Plan

0 M 5 M 10 M

N

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Site: Barnes Hospital: Main Building	1:200@ A0
Drawing Title: Arboricultural Impacts Assessment Plan	November 2018

Key:

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

Category — Crown Spread, Shading Constraints, Tree Number, Species, Category

Root Protection Area

Tree Position Approximate (not shown on original survey)

Note: Minor discrepancies between bases in existing and proposed plans may cause some approximation in tree locations

PLAN 3

TREE PROTECTION PLAN

Site Bou

SOUTH WORPLE WAY

Vehicle Entrance

Pedestrian Entrance

Vehicle Entrance

Pedestrian Entrance

Residential Block A

Resi

Resi

Health Hub

Residential Block C

Residential Block B

SOUTH WORPLE AVENUE

External Amenity Space
774795970.942320

SEN School

Secondary External Amenity Space
772148176.130409

OLD MORTLAKE
BURIAL GROUND

Residential Refuse Store for Collection Only

T1 Pine A2

T2 Birch B2

T3 Cypress C2

T4 Pine B2

T5 Apple C2

T6 Rowan C2

T7 Whitebeam C2

T8 Stag Thorn Hybrid C2

T9 Cherry C2

T10 Pine C2

T11 Birch C2

T12 Cherry C2

T13 Pear C2

T14 Cherry C2

T15 Birch C2

T16 Stag Thorn Hybrid C2

T17 Birch C2

T18 Birch C2

T19 Birch C2

T20 Pear C2

T21 Cherry C2

T22 Chestnut C2

T23 Cypress C2

T24 Sorbus species C2

T25 Lime C2

T26 Pine B2

T27 Ash C2

T28 Lawson Cypress C2

T29 Lawson Cypress C2

T30 Pine C2

T31 Pine C2

T32 Pine C2

T33 Pine B2

T34 Plane B2

T35 Pine B2

T36 Pine B2

T37 Pine B2

T38 False Acacia C2

T39 Pine B2

T40 False Acacia C2

T41 Birch C2

T42 Pine B2

T43 Pine B2

T44 Pine B2

T45 Maple C2

T46 Lime B2

T47 Chestnut B2

T48 Chestnut B2

T49 Chestnut U

T50 Chestnut B2

T51 Chestnut B2

T52 Chestnut B2

T53 Chestnut C2

T54 Chestnut B2

T55 Lime B2

T56 Lime C2

T57 Lime B2

T58 Lime C2

T59 Lime B2

T60 Holly B2

T61 Poplar B2

T62 Poplar B2

T63 Plane A2

T64 Pine A2

T65 Birch B2

T66 Cherry C2

N

Proposed Ground Floor Plan

0 M 5 M 10 M

N

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

Site: Barnes Hospital: Main Building	1:200@ A0
Drawing Title: Tree Protection Plan	November 2018

Key:

- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category U Trees Unsuitable for Retention
- Ground Protection: Ground protection suitable for anticipated loading
- Root Protection Area
- Crown Spread
- Shading Constraints
- Tree Number
- Species
- Category
- Tree Position Approximate (not shown on original survey)
- Tree Protection Fencing

Note: Minor discrepancies between bases in existing and proposed plans may cause some approximation in tree locations