Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT:

92 Fitzjohns Avenue

London

NW3 6NP

REPORT PREPARED FOR:

Ms Rachel Lord and Mr John Weston

92 Fitzjohn's Avenue

London

NW3 6NP

REPORT PREPARED BY

Adam Hollis

MSc ARB MICFor FArbor A MRICS C Env

Ref: TSS/92FJA/AIA/01c

Date: 25th February 2013

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 an inspection they will of course appear in the report.

Inherent in tree inspection 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:	Ms Rachel Lord and Mr John Weston	**Case Ref:**	TSS/92FJA/AIA/01c
Local Authority:	LB Camden	**Date:**	25th February 2013
Site Address: 92 Fitzjohns Avenue, London NW3 6NP			
Proposal: Replacement dwelling with a robust landscaping strategy			

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

Site Layout				
Site Visit	Y	Date: 07/08/12	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:	Y		On or off-site trees indirectly affected by development	Y

Trees with the potential to be affected

Trees felled on-site to facilitate development: T 26, 35, 36, 40, 42– 44
Trees felled as part of landscape/tree quality improvement scheme: T13 - 23
On-site: Low RPA impacts to T12 & T37
Crown-lift to T12 for access.
Off-site: RPA impacts to T29 (category 'B') and T30 (category 'C').
Pruning/crown lifts to T3, T10, T31 & T37.

Comments

T41 recommended felling for good arboricultural practice.

Recommendations

1	Proposal will mean the loss of important trees (TPO/CA)	N
2	Proposal has sufficient amelioration for tree loss	Y
3	Proposals provide adequate tree protection measures	Y
4	Specialist demolition / construction techniques required	Y
5	The Proposal will result in significant root damage to retained trees	N
6	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 92 Fitzjohn's Avenue, London NW3 6NP, reviewing any conflicts between the proposals and material tree constraints identified in our survey.

1.2 There are 45 trees surveyed on or around the site, of which 9 are 'B' category *(Moderate Quality), 2 are C/b category (Moderate/Low Quality), 26 'C' category *(Low Quality), 6 are C/u (Low/Unsuitable for Retention) and 2 'U' category *(Unsuitable for Retention). In theory, only moderate quality trees and above are significant material constraints on development. However, the low quality trees will comprise a constraint in aggregate.

1.3 The principal primary impacts in the current proposals are the removal of 7 trees/shrubs of low quality/unsuitable for retention, including elder and cypress; their removal will have little arboricultural impact. 10 further trees/shrubs (T13 – T23) will be felled and replaced with good quality trees improving on the existing low quality (all 'C' Category). We understand that the landscape mitigation for these trees will be provided in the Design and Access Statement.

1.4 The impacts on retained, moderate quality trees comprise building/path/fencing encroachments of the theoretical RPA's of T29, T30 and T37's by 20%, 10.5% and 15% area, respectively. Further resurfacing encroachments from the drive/parking are incurred within T12 RPA's by 10.5%. The impacts to T29 and T30 occur within an existing built/paved footprint, where root activity is likely to have been limited. Similarly, those to T37 occur within existing hard standing. Thus, the primary RPA impacts are likely to be low given sufficient site investigations and mitigation. Similarly, potential above ground impacts of buildings upon canopies of T29 & 37 have been resolved through design and husbandry. The need to facilitate access along the existing route shared with St Antony's school would also require some further pruning: crown lifting of T3, T10 and T12. A low quality willow, T31, which overhangs the site by 1-2m would also need to be cut back to the boundary to facilitate construction.

1.5 In terms of mitigation, the LGF foundations would be sheet piled adjacent to T37 (the only tree impacted at this level) to avoid further battering through the RPA / closer to the tree. These piling encroachments would be pre-excavated and root-pruned by hand to 750mm depth under arboricultural supervision. The GF encroachments would employ low-invasive designs with cantilevered foundations for the utility room within T29's RPA and the gym within T37's RPA. Remaining GF encroachments will use discontinuous piles with shallow beams at flexible locations determined by trial-excavations. The potential canopy impacts to 29 & 37 from above ground construction will be reduced by design with sloping roof lines away from the crowns, and with a minor crown lift of <20% (by 2.5m) to T37. The impact of the driveway/path on T12 can be mitigated by using porous paving / no-dig construction techniques. Careful demolition of existing structures (buildings and surfaces) and replacement with soft landscape or less invasive design will also reduce net impacts. Further cultural improvements to rooting conditions can be made in the protected zones during the landscape phase

1.6 Secondary impacts or post-development juxtaposition between the new elevations and tree canopies are generally improved through development: the current conflicts revolve around 2 mature sycamores, T29 & 37. The build does move marginally closer to off-site tree, T29; however, the tree has a high ground-clearance (7m), stands to the north of the building and the principle canopy juxtaposition already pertains.

1.7 The proposals have also been specifically designed for roofs to slope away from the trees and provide high levels of light through windows. In addition to these design features, the juxtaposition with T37 will be alleviated through access facilitation pruning, with a 2.5m crown-lift above the existing garage to 5m-ground clearance. This construction requirement will reduce the potential for shading of the courtyard below.

1.8 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.

1.9 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).

1.10 The trees in question are healthy specimens of species with a good resistance to development impacts, and quite capable of tolerating these low area impacts.

1.11 "**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 area impacts that are well below the subcritical threshold – *tree health is not at stake.*

1.12 The potential impacts of development are all relatively low in terms of both quality of trees removed and also RPA encroachments (by area) of trees retained. 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. 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.

1.13 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. The replacement planting will be detailed in a landscape strategy for the garden and the roof of the new dwelling.

1.14 The proposed design has been discussed in detail with the architects to mitigate potential impacts. Mitigation has evolved as a result of these discussions and the proposal is supported by this report.

***** 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 Ms Rachel Lord and Mr John Weston to provide a survey and an arboricultural impact assessment of proposals for the site / their property: 92 Fitzjohns Avenue, London NW3 6NP. The report is to accompany a planning application.

2.1.2 The proposals are for the demolition of the existing dwelling, followed by the construction of a replacement dwelling with a robust landscaping strategy. The design proposes a predominantly single storey structure, which spans across the site maximising the ground level garden. 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.

2.1.3 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 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: 4170 (Topo)

Proposals: A(P)2010

2.3 Scope of survey

2.3.1 As Landmark Trees' (LT) arboricultural consultant, James Bell surveyed the trees on site on 7th August 2012, 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 inspected 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 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.

2.4.2 A site plan identifying the surveyed trees, based on the client's drawings / topographical survey is provided in Appendix 4.

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 an Arboricultural Impact Assessment Plan in Appendix 5. General observations and discussion follow, below.

3.0 OBSERVATIONS

3.1 Site description

Photograph 1: Aerial view of the site

3.1.1	The site is formed from two previously separate, though adjacent, pieces of land that have been brought under the same ownership by the client. The first plot comprises the existing house and garden at 92 Fitzjohn's Avenue, which forms a detached two-storey brick-built property, which was extensively remodeled post-war, radically altering and extending the late Victorian house to remove all traces of the original. It is arranged over a split-level ground and first floor with extensive attic areas. It has a good sized level lawn area within the garden.
3.1.2	The second plot is a car park and service area to the North Bridge House Senior School, which is now surplus to requirements. This is currently divided from the dwelling plot by a high wall. The combined plot is situated within the Hampstead NW3 district of the London Borough of Camden Hampstead Town Ward.
3.1.3	Access is currently provided by means of a private roadway running from Fitzjohn's Avenue to the site, under joint ownership with St Anthony's School.
3.1.4	In terms of the British Geological Survey, the site overlies the Claygate Formation (see indicated location on Fig.1 plan extract below). As the youngest part of the London Clay, they form a transition between the clay and the sandier Bagshot Beds above (shown in yellow). Unlike the Bagshot Beds, 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.
3.1.5	Obviously, the actual limits of soil series are not as clearly defined on the ground as on plan and there may be anomalies between them. Further advice from the relevant experts on the specific soil properties can be sought as necessary.

3.1.6	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.

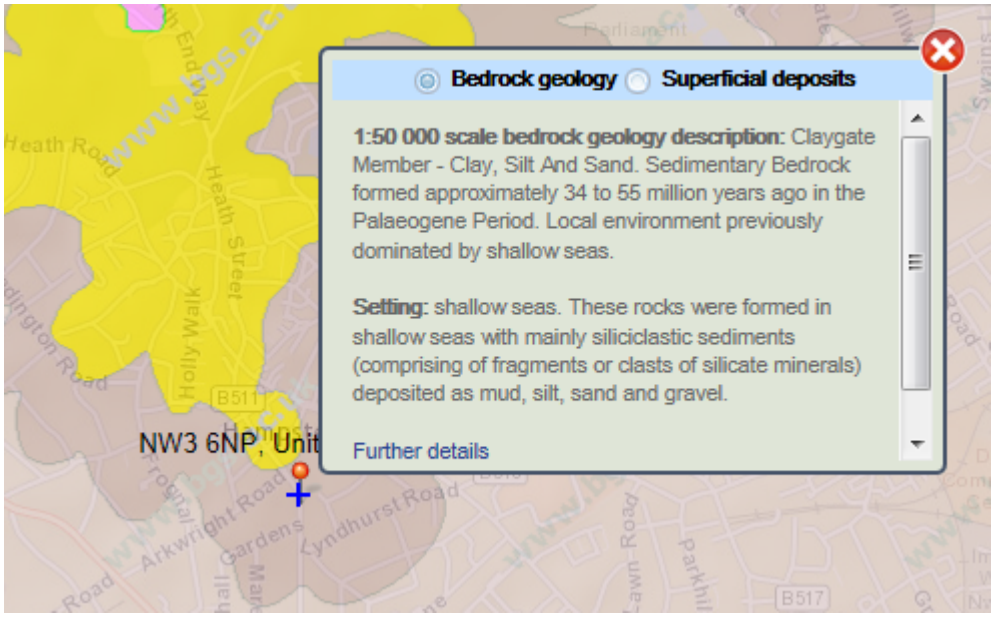

Figure 1: Extract from the BGS Geology of Britain Viewer

3.2 Subject trees

3.2.1	There are 45 trees surveyed on or around the site, of which 9 are 'B' category *(Moderate Quality), 2 are C/b category (Moderate/Low Quality), 26 'C' category *(Low Quality), 6 are C/u (Low/Unsuitable for Retention) and 2 'U' category *(Unsuitable for Retention).
3.2.2	In terms of age demographics there is a wide spread from young to mature, with the majority of the trees being semi or early mature.

3.2.3	Surveyed trees 1-11 & 27-30 stand beside (north of) the driveway and property within the grounds of Henderson Court; for these trees, a remote survey only, was undertaken. They comprise a screen of mixed broadleaves, predominantly mature, with sycamore, birch and holly present. Trees 12-23 stand on or near the western boundary of the site. Prominent among this row, is tree 12, a moderate quality, 17m tall, mature sycamore with a rounded crown of c.7m average. The remaining trees on this flank of the site are smaller broadleaves and ornamentals.

3.2.4	Tree 34 is a prominent 15m tall, mature sycamore to the rear (east) of the dwelling. Trees 37-46 stand to the east of the garage beyond a high wall. This is a mixed quality group of trees with several individuals having marked defects i.e. 40, 41, 43, 44, 45 & 46. Trees 38 & 39 stand offsite, to the north, within an adjoining property. Tree 37 is more prominent within the group, being a 15m tall, early mature, twin-stemmed sycamore.
3.2.5	The surveyed trees lend considerable amenity to this developed urban area. Trees 1-11 & 27-30 provide valuable screening to Henderson Court to the north and trees 12-23, 34, 35, 36 & 37 (principally) soften the environs of number 92.
3.2.6	See Appendix 1 for detail of surveyed trees.

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 Fitzjohn's/Netherhall Conservation Area (sub-area 1 Fitzjohn's), 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	*Further investigations can be made on request as time allows, for dialogue with the local authority (LB Camden).

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.

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 only 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).**

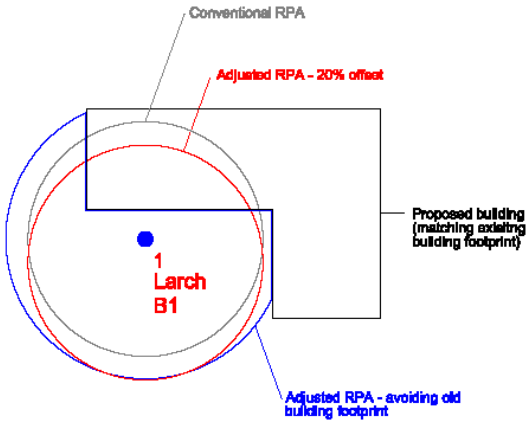

Figure 2 – BS 5837 RPA Adjustments

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. As discrete, internal trees, their removal will not affect the wooded envelope that encloses much of the site.

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 will comprise a constraint in aggregate, in terms of at least, replacement planting.

4.1.11 In this instance, the significant primary constraints upon development will be provided by the 4 category 'B' trees within the proposed development area (T12, 29, 34 & 37). Further consideration should also be given to the trees along the existing access road, which may require crown lifting to facilitate access by construction machinery. In particular, category 'B' trees T3, 10 and 12. Further constraints are likely to be provided in aggregate by the significant number of category 'C/b' and 'C' trees on site.

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 – 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.

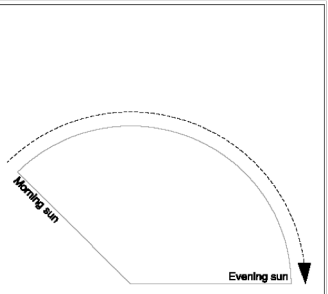

Figure 4 – Shading Arc

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 should ensure that shading constraints are minimal, with the exception of T34 (on-site). There will also be potential nuisance associated with leaf deposition and honey-dew likely.

4.2.5	The off-site trees also 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.
4.2.6	The close juxtaposition of sycamore canopies T12, 29, 34 & 37 and building elevations with its associated nuisance already pertains on site. The task for development will be not to add to these potential conflicts, but rather to manage them best through design.

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

Hide irrelevant | Show All Trees

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

Ref: TSS/92FJA/AIA/01c

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	3	Maple, Norway	Pruning/crown lifts to facilitate access.	m^2 N/A %	Mature	Normal	Moderate	Low	N/A	Remedial tree surgery (see Rec. Works)
B	10	Yew, Common	Pruning/crown lifts to facilitate access.	m^2 N/A %	Early Mature	Normal	Good	Low	N/A	Remedial tree surgery (see Rec. Works)
B	12	Sycamore	Drive Construction within RPA Boundary fence in RPA Parking within honeydew	16.5 m^2 10.48 %	Mature	Normal	Moderate	Low	N/A	No-dig construction Crown-lift for access Boundary wall secured with mini-piles
C	13	Holly	Felled to Facilitate Landscaping Scheme	m^2 N/A %	Early Mature	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy
C	14	Cherry, Wild (Gean)	Felled to Facilitate Landscaping Scheme	m^2 N/A %	Young	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy
C	15	Rowan, variety	Felled to Facilitate Landscaping Scheme	m^2 N/A %	Young	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy

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Ref: TSS/92FJA/AIA/01c

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	16	Amelanchier spp	Felled to Facilitate Landscaping Scheme	m^2 N/A %	Young	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy
C	17	Ceanothus	Felled to Facilitate Landscaping Scheme	m^2 N/A %	Mature	Moderate	N/A	N/A	Low	New planting accordance with a landscape strategy
C	18	Loquat	Felled to Facilitate Landscaping Scheme	m^2 N/A %	Semi-mature	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy
C	19/20	Privet	Felled to Facilitate Landscaping Scheme	m^2 N/A %	Early Mature	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy
C	21	Cotoneaster	Felled to Facilitate Landscaping Scheme	m^2 N/A %	Early Mature	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy
C	22	Magnolia (M. grandiflora)	Felled to Facilitate Landscaping Scheme	m^2 N/A %	Semi-mature	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy

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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	23	Olive	Felled to Facilitate Landscaping Scheme	m^2 N/A %	Semi-mature	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy
C	26	Cherry, Autumn Flowering	Felled to Facilitate Development	m^2 N/A %	Young	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy
B	29	Sycamore	50m2 GF (less existing 11m2) 20.4% Building Construction within Canopy	39 m^2 20.4 %	Mature	Normal	Moderate	Medium	N/A	Low-invasive foundation design Low-invasive roof design
C	30	Holly, variegated	Ground floor building: 7m2	7 m^2 10.49 %	Mature	Normal	Good	Low	N/A	Low-invasive foundation design
C/u	31	Willow, Sallow	Pruning/crown lifts to facilitate access.	m^2 N/A %	Semi-mature	Normal	Moderate/good	Low	N/A	Remedial tree surgery (see Rec. Works)
B	34	Sycamore	Demolition of existing house	m^2 N/A %	Mature	Normal	Moderate	Positive	N/A	Positive impact on RPA where built development removed with care.

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Ref: TSS/92FJA/AIA/01c

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	35	Cypress, Lawson variety	Felled to Facilitate Development	m^2 N/A %	Early Mature	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy
C	36	Cypress, Lawson variety	Felled to Facilitate Development	m^2 N/A %	Early Mature	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy
B	37	Sycamore	LGF/steps 16m2 additional RPA impact (15%) GF construction 14m2, but ex. garage demo=18m2	16 m^2 15.16 %	Early Mature	Normal	Moderate	Low	N/A	Pre-emptive root pruning of limits of LGF thru RPA Gym to be cantilevered & All roofs swept from crown
C/u	40	Elder	Felled to Facilitate Development	m^2 N/A %	Mature	Poor	N/A	N/A	Low	New planting accordance with a landscape strategy
U	41	Cherry	Felled for good arboricultural practice	m^2 N/A %	Semi-mature	Dead	N/A	N/A	N/A	New planting accordance with a landscape strategy
C	42	Cedar (C. deodara)	Felled to Facilitate Development	m^2 N/A %	Young	Normal	N/A	N/A	Low	New planting accordance with a landscape strategy

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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/u	43	Elder	Felled to Facilitate Development	m^2 N/A %	Mature	Moderate	N/A	N/A	Low	New planting accordance with a landscape strategy
C/u	44	Cherry, Wild (Gean)	Felled to Facilitate Development	m^2 N/A %	Semi-mature	Moderate	N/A	N/A	Low	New planting accordance with a landscape strategy

6.0 DISCUSSION

6.1 Rating of Primary Impacts

6.1.1 The principal primary impacts in the current proposals are the removal of 7 trees/shrubs of low quality/unsuitable for retention, including elder and cypress; their removal will have little arboricultural impact. 10 further trees/shrubs (T13 – T23) will be felled and replaced with good quality trees improving on the existing low quality (all 'C' Category). We understand that landscape mitigation will be provided in the Design and Access Statement.

6.1.2 The impacts on retained, moderate quality trees comprise building/path/fencing encroachments of the theoretical RPA's of T29, T30 and T37's by 20%, 10.5% and 15% area, respectively. Further resurfacing encroachments from the drive/parking are incurred within T12 RPA's by 10.5%. The impacts to T29 and T30 occur within an existing built/paved footprint, where root activity is likely to have been limited. Similarly, those to T37 occur within existing hard standing. Thus, the primary RPA impacts are likely to be low given sufficient site investigations and mitigation. Similarly, potential above ground impacts of buildings upon canopies of T29 & 37 have been resolved through design and husbandry. The need to facilitate access along the existing route shared with St Antony's school would also require some further pruning: crown lifting of T3, T10 and T12. A low quality willow, T31, which overhangs the site by 1-2m would also need to be cut back to the boundary to facilitate construction.

6.1.3 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.

6.1.4 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).

6.1.5 The trees in question are healthy specimens of species with a good resistance to development impacts, and quite capable of tolerating these low area 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 area impacts that are well below the subcritical threshold – *tree health is not at stake* (pending site investigations into the proximity of the LGF excavations to T29).

6.2 Rating of Secondary impacts

6.2.1 Secondary impacts or post-development juxtaposition between the new elevations and tree canopies are generally improved through development: the current conflicts revolve around 2 mature sycamores, T29 & 37. The build does move marginally closer to off-site tree, T29; however, the tree has a high ground-clearance (7m), stands to the north of the building and the principle canopy juxtaposition already pertains.

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 building should proceed inwards in a "pull down" fashion. Existing hard surfacing within the RPA of trees, including T29 and T34, can be lifted with caution by a skilled machine operator again working away from the tree. Careful demolition of existing structures (buildings and surfaces) and replacement with soft landscape or less invasive design will also reduce net impacts

6.3.2 In terms of mitigation, the LGF foundations would be sheet piled adjacent to T37 (the only tree impacted at this level) to avoid further battering through the RPA / closer to the tree. These piling encroachments would be pre-excavated and root-pruned by hand to 750mm depth under arboricultural supervision.

6.3.3 The GF encroachments would employ low-invasive designs with cantilevered foundations for the utility room within T29's RPA and the gym within T37's RPA. Remaining GF encroachments will use discontinuous piles with shallow beams at flexible locations determined by trial-excavations, again under arboriculutral supervision. The impact of the new fencing would also be mitigated by using a low-invasive foundation design.

6.3.4	Driveway/pavement resurfacing around trees e.g. T12 will seek to retain or improve upon the existing sub-base without excavating or compacting native soil below. New paving tends to be less permeable than existing and therefore a permeable surface if not section is to be employed. A permeable paving section would be built up within RPA using no-dig construction techniques, such as a cellular confinement system with no fines aggregate for the sub-base. The finished section is likely to be 150mm above grade, depending on final specification, which will need to be factored into the overall finished site levels. The cellular confinement system with a temporary hard surface (e.g. road stone) can be used for site access during construction and the surface material replaced on completion of construction.
6.3.5	The immediate canopy encroachments will be avoided with minor crown lifts / cutting back of lower limbs, over the drive, affecting a 3-4m ground clearance and through design (sloping roof line away from canopies) in the case of the buildings below T29 and 37. A minor crown lift of <20% (c. 2.5m) is further recommended for T37.
6.3.6	Nuisance deposition can be mitigated with regular crown cleaning and filtration traps on the guttering (see Figure 5 below). The shading impacts have been further mitigated in building design, with the provision of multiple aspect windows and choice of room layout.
6.3.7	The landscape impact of tree losses will be offset by the landscape proposals. Landscape mitigation will be provided in the Design and Access Statement, which will ensure that the Category 'C' trees removed for landscape enhancement (T13 – 23) will be replaced with higher quality trees.

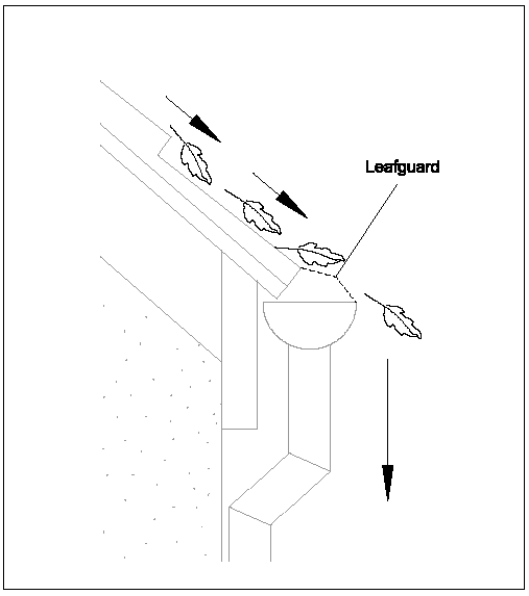

Figure 5: Filtration traps, as shown above, could be fitted on the gutters which can easily be maintained at 2-3m above ground.

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 (by area) of trees retained.
7.2	The full potential of the impacts can be mitigated through design and precautionary measures. These measures have been elaborated in our Method Statement (TSS_92FJA_AMS_01a) in further support of the planning application.
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. The replacement planting is detailed in the Design & Access Statement for the garden and the roof of the new dwelling.
7.5	Therefore, the proposals will not have any significant impact on either the retained trees or wider landscape.

8.0 RECOMMENDATIONS

8.1 Specific Recommendations

8.1.1 Tree works recommendations are found in Appendices 2 & 3 to this report. Any tree removals or trial pits recommended within this report should only be carried out with local authority consent / assent, as applicable.

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 have been provided in our Method Statement (TSS_92FJA_AMS_01a) in further support of the planning application.

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

- BS 3936:1980 Nursery Stock;
- BS 4043:1966 Transplanting Semi-Mature Trees; 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 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.
- Helliwell R (1980) Provision for New Trees; Landscape Design; July/August issue
- International Society of Arboriculture (ISA). 1994. The Landscape Below Ground. ISA, Champaign, Ilinois. USA.
- Lonsdale D 1999. Research for Amenity Trees No.7: Principles of Tree Hazard Assessment and Management, HMSO, London.
- Matheny, N; Clark, J. R.1998. Trees and Development: A Technical Guide to Preservation of Trees during Land Development. ISA, Champaign, Ilinois. USA.
- Mattheck C. & Breloer H. 1994. Research for Amenity Trees No.2: The Body Language of Trees, HMSO, London.
- Thomas P, 2000. Trees: Their Natural History, Cambridge University Press, Cambridge.
- Trowbridge J & Bassuk N (2004) Trees in the Urban Landscape: Site Assessment, Design, and Installation; J Wiley & Sons inc. NJ USA

APPENDIX 1

TREE SCHEDULE - Notes for Guidance

Dm -	is the diameter of the trunk in millimetres at 1.5m above ground level.
Spread -	is in metres at the points of the compass relevant to the woodland boundary
Class/Colour -	refers to the retention classifications in Section 4.5 BS5837: 2012 and colouring on the site map: • High Quality (A) (Green), • Moderate Quality (B) (Blue), • Low Quality (C) (Grey), • Unsuitable for Retention (U) (Red)

Landmark Trees Ltd
Tel: 020 7851 4544

BS5837 Tree Constraints Survey Schedule

Site: 92 FitzJohn's Avenue, London NW3 6NP

Surveyor(s): James Bell

Date: 7th August 2012

Ref: TSS/92FJA/AIA/01a

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Cat	Sub Cat	Useful Life	Observations
1	Holly	13	2223	4	Mature	420e	12	5.0	Moderate	Fair?	Medium	C/b	1	20-40	Offsite
2	Sycamore	16	7377	7	Mature	530e	12	6.4	Moderate	Fair?	Medium	B	1	20-40	Offsite
3	Maple, Norway	17	6684	2	Mature	650e	12	7.8	Normal	Fair?	Medium	B	1	20-40	
4	Holly	6	2	2	Early Mature	250e	12	3.0	Normal	Fair?	Low	C	1	20-40	Offsite
5	Birch, Silver	16	4433	5	Early Mature	300e	12	3.6	Moderate	Fair?	Medium	C	1	20-40	Offsite
6	Birch, Silver	16	5	5	Early Mature	350e	12	4.2	Moderate	Fair?	Medium	C	1	20-40	Offsite
7	Birch, Silver	16	5332	5	Early Mature	320e	12	3.8	Moderate	Fair?	Medium	C	1	20-40	Mulitple pruning wounds on stem Offsite

Notes:

1. Height describes the approximate height of the tree measured in meters 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 meters of crown clearance above adjacent ground level.
4. Stem Diameter is the diameter of the stem measured in millimeters at 1.5m from ground level for single stemmed trees. See section 4.6 for detail of treatment for multistems.
5. Protection Radius is a radial distance measured from the trunk centre.
6. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
7. Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present.
8. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
9. B.S. Cat refers to (British Standard 5837:2012 Table 1) and refers to tree/group quality and value; 'A' - High, 'B' - Moderate, 'C' - Low, 'U' - Unsuitable for Retention.
11. Sub Cat refers to the retention criteria values where 1 is mainly arboricultural qualities, 2 ismainly landscape qualities and 3 is mainly cultural values including conservation.
12. Useful Life is the tree's estimated remaining contribution in years.

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8	Sycamore	17	7	6	Mature	520e	12	6.2	Normal	Fair?	Medium	B	1	20-40	Offsite; low quality elder & hazel at base
9	Walnut, Common	8	4244	2.5	Early Mature	280e	12	3.4	Normal	Fair?	Low	C	1	20-40	Offsite
10	Yew, Common	9	3	1.8	Early Mature	480	12	5.8	Normal	Fair?	Low	B	1	>40	Offsite
11	Cherry, Wild (Gean)	11	4244	4	Semi-mature	170e	12	2.0	Moderate	Fair	Low	C/u	1	10-20	Poor form Offsite
12	Sycamore	17	6866	2	Mature	590	12	7.1	Normal	Good	Medium	B	1	>40	Forks at 1.5m;4/5m clearance over garden
13	Holly	4.5	1.5	1.8	Early Mature	164	12	2.0	Normal	Good	Low	C	1	20-40	Twin stem SD=100 & 130
14	Cherry, Wild (Gean)	4.5	1.5/2.5/ 2.5/1	1.5	Young	90	12	1.1	Normal	Good	Low	C	1	20-40	

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15	Rowan, variety	4	1	2	Young	60	12	0.7	Normal	Good	Low	C	1	20-40	
16	Amelanchier spp	4	1.5	1	Young	60	12	0.7	Normal	Good	Low	C	1	20-40	
17	Ceanothus	3	2	1.3	Mature	114	12	1.4	Moderate	Fair	Low	C	1	10-20	Multi stem 3 SD=80,70 & 40; shrub
18	Loquat	2.5	1.5	1	Semi-mature	80	12	1.0	Normal	Good	Low	C	1	10-20	Garden ornamental
19/20	Privet	4	1.5	0	Early Mature	179	12	2.1	Normal	Fair	Low	C	1	10-20	Multi stem - 5 SD av = 80; shaped
21	Cotoneaster	3	1	1	Early Mature	70	12	0.8	Normal	Good	Low	C	1	10-20	
22	Magnolia (M. grandiflora)	3	1	1	Semi-mature	80	12	1.0	Normal	Fair	Low	C	1	20-40	

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23	Olive	3	1.5	1	Semi-mature	160	12	1.9	Normal	Good	Low	C	1	20-40	Shaped
24	Gingko (Maidenhair Tree)	10	2	2	Semi-mature	150e	12	1.8	Normal	Fair?	Low	C	1	>40	Offsite
25	Maple, Norway	10	4	3	Early Mature	350e	12	4.2	Normal	Good	Medium	B	1	20-40	Offsite; crimson cv
26	Cherry, Autumn Flowering	4	2.5	1	Young	60	12	0.7	Normal	Good	Low	C	1	20-40	Sapling
G27	Hazel & Elder	7	2.5	2	Early Mature	179	12	2.1	Normal	Fair	Low	C	2	10-20	Multi stem 20+ Av SD = 40
29	Sycamore	18	7477	7	Mature	650e	12	7.8	Normal	Fair?	Medium	B	1	20-40	4 trunks from 3m Fork obscured 2m clearance off ridgeline; offsite
30	Holly, variegated	12	3	2	Mature	384	12	4.6	Normal	Fair?	Medium	C	1	10-20	Multi stem - 3 Ivy smothered SD= 300e,170e & 170e; dieback in upper crown

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31	Willow, Sallow	6	1323	2	Semi-mature	113	12	1.4	Normal	Fair?	Low	C/u		10-20	Twin stem Offsite; SD=80 x 2
34	Sycamore	15	6	2	Mature	670	12	8.0	Normal	Fair?	Medium	B	1	20-40	Ivy smothered Forks at 1.7m Offsite; crown growing onto flank of building and over roof; base invisible so SD estimate is very notional
35	Cypress, Lawson variety	8	2.5	1.8	Early Mature	300	12	3.6	Normal	Good	Low	C	1	20-40	Garden ornamental
36	Cypress, Lawson variety	7	2.5	1.8	Early Mature	240	12	2.9	Normal	Good	Low	C	1	20-40	Garden ornamental
37	Sycamore	15	5546	2.5	Early Mature	483	12	5.8	Normal	Fair?	Medium	B	1	>40	Twin stem SD=400 & 270
32	Hawthorn, Common	4	1.5	2	Young	40	12	0.5	Normal	Fair	Low	C	1	20-40	

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33	Hawthorn, Common	2.5	1.5	2	Young	30	12	0.4	Normal	Fair	Low	C	1	20-40	
28	Holly	12	4	2	Mature	350e	12	4.2	Normal	Fair?	Medium	C/b	1	20-40	
38	Yew, Common	7	2.5	1.6	Semi-mature	219	12	2.6	Normal	Good	Low	C	1	>40	Twin stem SD=160e & 150e
39	Yew, Common	5	2221	1.7	Semi-mature	130e	12	1.6	Normal	Good	Low	C	1	>40	
40	Elder	7	2422	2	Mature	241	12	2.9	Poor	Fair	Low	C/u		10-20	A sparser than normal canopy Twin stem SD=180 & 160
41	Cherry	4	0322	2	Semi-mature	140		0.0	Dead	Poor	Low	U			Dead
42	Cedar (C. deodara)	4.5	1.5	0	Young	100	12	1.2	Normal	Good	Low	C	1	>40	

Notes:

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43	Elder	4	2	1.5	Mature	200	12	2.4	Moderate	Fair	Low	C/u	2	10-20	Ivy smothered
44	Cherry, Wild (Gean)	4.5	2322	2	Semi-mature	220	12	2.6	Moderate	Fair	Low	C/u	2	10-20	Ivy smothered Bacterial canker
45	Cherry, Wild (Gean)	9	1.5/5/2/2	2.5	Early Mature	390	12	4.7	Normal	Poor	Low	U		<10	Leans to SE Decay in exposed roots
46	Cherry, Wild (Gean)	8	0321	3.5	Early Mature	320e	12	3.8	Moderate	Fair	Low	C/u		10-20	Leans to SE Ivy smothered

Notes:

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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 meters of crown clearance above adjacent ground level.
4. Stem Diameter is the diameter of the stem measured in millimeters at 1.5m from ground level for single stemmed trees. See section 4.6 for detail of treatment for multistems.
5. Protection Radius is a radial distance measured from the trunk centre.
6. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
7. Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present.
8. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
9. B.S. Cat refers to (British Standard 5837:2012 Table 1) and refers to tree/group quality and value; 'A' - High, 'B' - Moderate, 'C' - Low, 'U' - Unsuitable for Retention.
11. Sub Cat refers to the retention criteria values where 1 is mainly arboricultural qualities, 2 ismainly landscape qualities and 3 is mainly cultural values including conservation.
12. Useful Life is the tree's estimated remaining contribution in years.

APPENDIX 2

RECOMMENDED TREE WORKS (EXISTING TREES)

Landmark Trees Ltd
Tel: 0207 851 4544

Recommended Tree Works To Facilitate Development

Hide irrelevant | Show All Trees

Site: 92 FitzJohn's Avenue, London NW3 6NP

Surveyor(s): James Bell

Date: 7th August 2012

Ref: TSS/92FJA/AIA/01c

Tree No.	English Name	Height	Stem Diameter	Crown Spread	Recommended Works	Comments/ Reasons
41	Cherry	4	140	0322	Fell	Dead Advisable for good arboricultural practice
45	Cherry, Wild (Gean)	9	390	1.5/5/ 2/2	FInv (or apply to fell)	Leans to SE Decay in exposed roots Advisable for good arboricultural practice
46	Cherry, Wild (Gean)	8	320e	0321	Monitor	Leans to SE Ivy smothered Advisable for good arboricultural practice

Notes:

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 - Monitor ongoing condition (annually by staff / owners & every 2-3 yrs by consultant).
Svr Ivy / Clr Bs - Sever ivy / clear base and re-inspect base / stem for concealed defects.

APPENDIX 3

RECOMMENDED TREE WORKS TO FACILITATE DEVELOPMENT

Landmark Trees Ltd
Tel: 0207 851 4544

Recommended Tree Works To Facilitate Development

Hide irrelevant | Show All Trees

Site: 92 FitzJohn's Avenue, London NW3 6NP

Surveyor(s): James Bell

Date: 7th August 2012

Ref: TSS/92FJA/AMS/01a

Tree No.	English Name	Height	Stem Diameter	Crown Spread	Recommended Works	Comments/ Reasons
3	Maple, Norway	17	650e	6684	CL4m	Crown lift to facilitate access Recommended to permit development
10	Yew, Common	9	480	3	CL4m	Crown lift to facilitate access Offsite Recommended to permit development
12	Sycamore	17	590	6866	CL4m	Crown lift to facilitate access Ground protection with allowance for piling Forks at 1.5m;4/5m clearance over garden Recommended to permit development
13	Holly	4.5	164	1.5	Fell	Twin stem SD=100 & 130 Part of landscape improvement scheme
14	Cherry, Wild (Gean)	4.5	90	1.5/2.5/2.5/	Fell	Part of landscape improvement scheme
15	Rowan, variety	4	60	1	Fell	Part of landscape improvement scheme
16	Amelanchier spp	4	60	1.5	Fell	Part of landscape improvement scheme
17	Ceanothus	3	114	2	Fell	Multi stem 3 SD=80,70 & 40; shrub Part of landscape improvement scheme
18	Loquat	2.5	80	1.5	Fell	Garden ornamental Part of landscape improvement scheme

Notes:

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Pol - Pollard or re-pollard.
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Svr Ivy / Clr Bs - Sever ivy / clear base and re-inspect base / stem for concealed defects.

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Tel: 0207 851 4544

Recommended Tree Works To Facilitate Development

Hide irrelevant | Show All Trees

Site: 92 FitzJohn's Avenue, London NW3 6NP

Surveyor(s): James Bell

Date: 7th August 2012

Ref: TSS/92FJA/AMS/01a

Tree No.	English Name	Height	Stem Diameter	Crown Spread	Recommended Works	Comments/ Reasons
19/20	Privet	4	179	1.5	Fell	Multi stem - 5 SD av = 80; shaped Part of landscape improvement scheme
21	Cotoneaster	3	70	1	Fell	Part of landscape improvement scheme
22	Magnolia (M. grandiflora)	3	80	1	Fell	Part of landscape improvement scheme
23	Olive	3	160	1.5	Fell	Shaped Part of landscape improvement scheme
26	Cherry, Autumn Flowering	4	60	2.5	Fell	Sapling Recommended to permit development
31	Willow, Sallow	6	113	1323	CB1 -2	Cut back 1-2 metres to facilitate access Recommended to permit development
35	Cypress, Lawson variety	8	300	2.5	Fell	Garden ornamental Recommended to permit development
36	Cypress, Lawson variety	7	240	2.5	Fell	Garden ornamental Recommended to permit development
37	Sycamore	15	483	5546	CL5m	Ground protection with allowance for piling CL for working clearances/reduction in shading Recommended to permit development
40	Elder	7	241	2422	Fell	A sparser than normal canopy Recommended to permit development
42	Cedar (C. deodara)	4.5	100	1.5	Fell	Recommended to permit development

Notes:

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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.
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Svr Ivy / Clr Bs - Sever ivy / clear base and re-inspect base / stem for concealed defects.

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Tel: 0207 851 4544

Recommended Tree Works To Facilitate Development

Hide irrelevant | Show All Trees

Site: 92 FitzJohn's Avenue, London NW3 6NP

Surveyor(s): James Bell

Date: 7th August 2012

Ref: TSS/92FJA/AMS/01a

Tree No.	English Name	Height	Stem Diameter	Crown Spread	Recommended Works	Comments/ Reasons
43	Elder	4	200	2	Fell	Ivy smothered Recommended to permit development
44	Cherry, Wild (Gean)	4.5	220	2322	Fell	Ivy smothered Bacterial canker Recommended to permit development

Notes:

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).
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Svr Ivy / Clr Bs - Sever ivy / clear base and re-inspect base / stem for concealed defects.

APPENDIX 4:

TREE CONSTRAINTS PLAN

HENDERSON COURT

FITZJOHNS AVENUE

FITZJOHN'S PRIMARY SCHOOL

ROYAL SCHOOL HAMPSTEAD

No. 92

UNABLE TO TRACE WATER SUPPLY TO 92 FITZJOHNS AVENUE. ALL GENERATED SIGNAL JUMPS ONTO ELECTRIC & GAS ROUTES. NO FURTHER INFORMATION.

AREA VOID OF LOCATABLE SERVICES

AREA VOID OF LOCATABLE SERVICES

ELECTRIC SUPPLY TO GARAGE ATTACHED TO 92A RISER.

CR/CONDUIT TO FLT UNABLE TO TRACE.

Contractors Compound

1 Cherry C1
2 Maple B1
3 Holly C1
4 Holly C1
5 Birch C1
6 Birch C1
7 Birch C1
8 Sycamore B1
9 Walnut C1*
10 Yew B1
11 Cherry C1
12 Sycamore B1
13 Holly C1
14 Cherry C1
15 Rowan C1
16 Amelanchier spp C1
17 Ceanothus C1
18 Laurel C1
19 Privet C1
20 Olive C1
21 Cotoneaster C1
22 Magnolia C1
23 Olive C1
24 Gingko C1
25 Maple B1
26 Cherry C1
27 Sycamore B1
28 Holly C1*
29 Sycamore B1
30 Holly C1
31 Willow C1*
32 Hawthorn C1
33 Hawthorn C1
34 Sycamore B1
35 Cypress C1*
36 Cypress C1*
37 Sycamore B1
38 Yew C1
39 Yew C1
40 Elder C/u
41 Cherry U
42 Cedar C1
43 Elder C/u2
44 Cherry C/u2
45 Cherry U
46 Cherry C/u
G27 Hazel & Elder C2

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 Fitzjohns Avenue	1:200 @ A1
Drawing Title: Tree Constraints Plan	August 2012

Key:

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

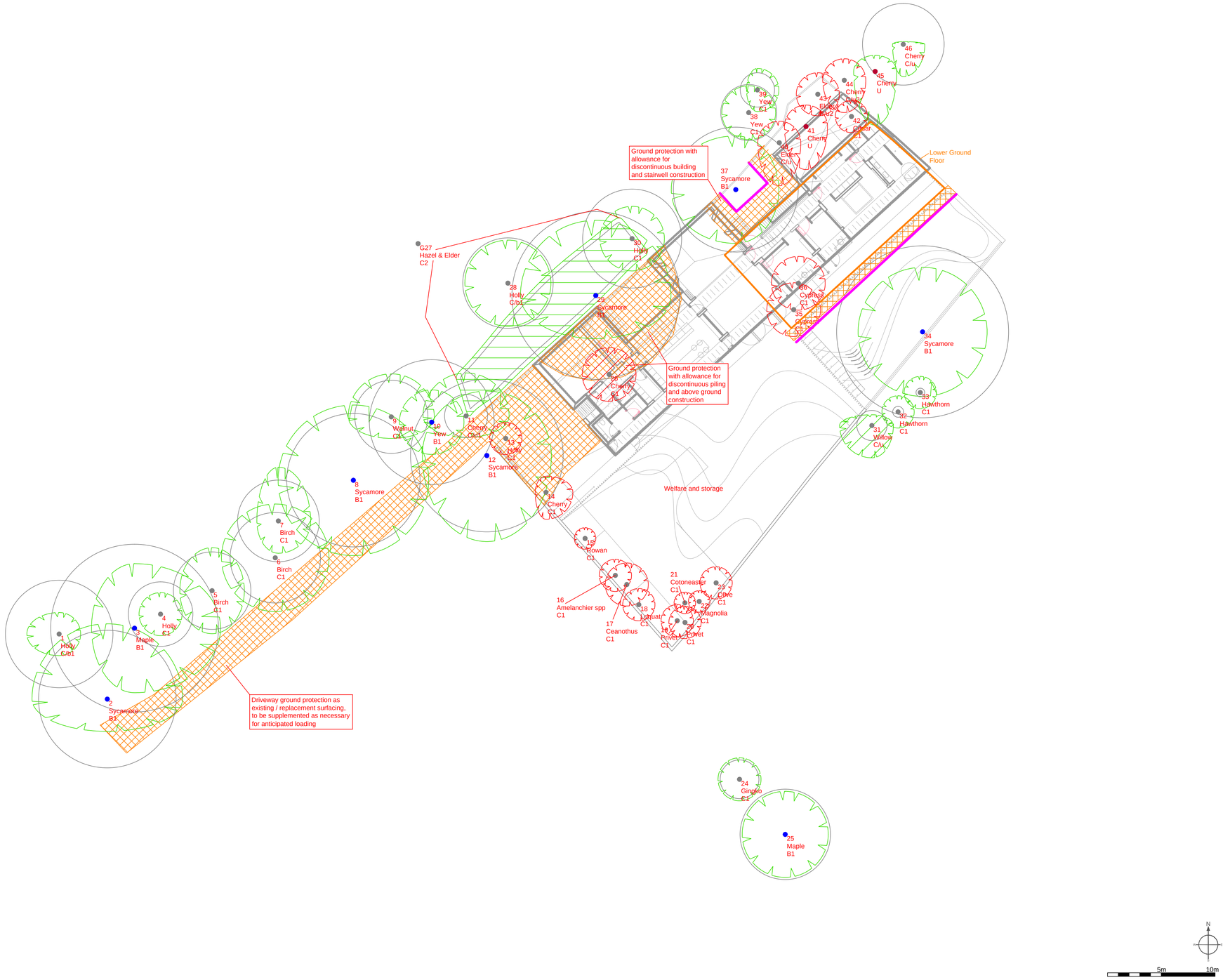
Category
Crown Spread
Root Protection Area
Tree Number
Species
Category
11 Cherry B2
Tree Position Approximate (not shown on original survey)

N

5m 10m

APPENDIX 5

ARBORICULTURAL IMPACT ASSESSMENT 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).

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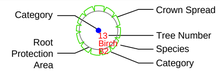
e-mail: info@landmarktrees.co.uk Web: www.landmarktrees.co.uk

Site: 92 Fitzjohns Avenue	1:200 @ A1
Drawing Title: Tree Protection Plan	Feb 2013 Rev A

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)
- Tree Protection Fencing
- Ground Protection
- Tree Proposed for Removal