



Landmark Trees

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## ARBORICULTURAL IMPACT ASSESSMENT REPORT:

Proposed Flats  
10a Oakhill Avenue  
London  
NW3 7RE

## REPORT PREPARED FOR:

Mr Ian Rosen  
Fitzroy Group  
C/o Ad Design Concepts Ltd  
25 Grampian Gardens  
London NW2

## REPORT PREPARED BY

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**Ref:** ADC/10aOA /AIA/04

**Date:** 8<sup>th</sup> February 2015

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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.

### Tree Constraints & Protection Overview

<b>Client:</b>	Mr Ian Rosen, Fitzroy Group		<b>Case Ref:</b>	MEA/10aOA/AIA/04
<b>Local Authority:</b>	LB Camden		<b>Date:</b>	8 <sup>th</sup> February 2015
Site Address: 10a Oakhill Avenue, London NW3 7RE				
Proposal: Extension to existing property including basement to provide new residential flats.				
<b>Report Checklist</b>	<b>Y/N</b>		<b>Y/N</b>	
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/a	(Include in future method statement)		
Tree Constraints Plan:	Y			
Arboricultural Impact Assessment:	Y			
<b>Site Layout</b>				
Site Visit	Y	Date: 02/05/13	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
<b>Trees with the potential to be affected</b>				
Additional impacts to off-site category B trees T1 and T16, in addition to the absence of trial pit investigations previously required, leave the current scheme at risk of refusal. It is therefore recommended that trial pits should be undertaken to determine the limits of the developable envelope at these pinchpoints, although the expectation is that the footprint will need to be reduced in these areas.				
<b>Comments</b>				
T14 ('U' category birch) and T23 ('U' category hawthorn) to be removed for good arboricultural practice				
<b>Recommendations</b>				
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	Proposal will mean retained trees are too close to buildings			Y
5	Specialist demolition / construction techniques required			Y
6	The Proposal will result in significant root damage to retained trees			Y
7	Further investigation of tree condition recommended			Y

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 revised proposals for 10a Oakhill Avenue, London NW3 7RE, reviewing any conflicts between the revised scheme for flats and material tree constraints identified in our survey.
- 1.2 There are 27 trees surveyed on or around the site, of which 1 is category 'A' (High Quality), 10 are 'B' category \*(Moderate Quality), 13 'C' category \*(Low Quality), 1 'C/u' category (Low Quality/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, in terms of at least, replacement planting.
- 1.3 The proposed changes could have significant additional arboricultural impacts, particularly to off-site category B trees T1 and T16. The owner of the property in which T16 stands, has shown himself to take a keen interest in the protection of his trees. Furthermore, the potentially significant impacts identified in the previous proposals remain unknown, in the absence of further trial pit investigations. With the additional significant impacts to T1 and T16, the scheme is at risk of refusal. It is therefore recommended that the trial pits be undertaken to determine the limits of the developable envelope, although the expectation is that the footprint will need to be reduced in these areas by pulling back from the stems of the trees to the rear and remaining within the current developed footprint to the front of the property around T1.
- 1.4 The additional encroachments within the RPA's of on-site category B beech trees T19 and T20, in addition to the off-site category B oak T27 are not considered significant, therefore the proposed amendments to the lightwells at the rear will have a low additional impact.
- 1.5 The other primary impacts in the current proposals are very similar to the previous scheme for flats on this site. Table 1 below provides the details, with low impacts noted for 11 further trees.
- 1.6 Providing the outcome of the proposed trial pits is favourable, the canopy of T12 (a category 'C' western red cedar) will require cutting back to the boundary facilitate construction of the new elevation. The impact to the tree will be moderate, but to the public, very low.
- 1.7 Secondary impacts from the new elevation require pruning of T12 to maintain convenient canopy clearance. Other minor secondary impacts include shading and leaf deposition (particularly lightwells). The secondary impacts can be mitigated by room layout and simple cleaning maintenance. However, the current site orientation is unchanged and therefore, there is little alteration of the status quo; i.e. negligible secondary impact arising from development itself.
- 1.8 Overall, further investigations with trial pits are recommended, in order to determine the actual root colonisation from the off-site trees likely to be affected by the design revisions.

\* 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 Mr Ian Rosen of the Fitzroy Group to provide a survey and an arboricultural impact assessment of proposals for the site: 10a Oakhill Avenue, London NW3 7RE. The report is to accompany a planning application.                                                                                                                                                                                                                                                                               |
| 2.1.2 | The revised proposals are for the extension of the existing residential building including the basement to provide new residential flats. 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 | <p>The drawings supplied by the client and relied upon by Landmark Trees in the formulation of our survey plans are:</p> <p>Existing site survey: 95274- 10A OakhillAvenue-SiteSurvey</p> <p>Proposals: 150125-PLANNING DRAFT</p> |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 2.3 Scope of survey

- 2.3.1 As Landmark Trees' (LT) arboricultural consultant, I surveyed the trees on site on 2<sup>nd</sup> May 2013, recording relevant qualitative data in order to assess both their suitability for retention and their constraints upon the site, in accordance with British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations [BS5837:2012].
- 2.3.2 Our survey of the trees, the soils and any other factors, is of a preliminary nature. The trees were SURVEYED on the basis of the Visual Tree Assessment method expounded by Mattheck and Breloer (The Body Language of Trees, DoE booklet Research for Amenity Trees No. 4, 1994). LT have not taken any samples for analysis and the trees were not climbed, but inspected from ground level.
- 2.3.3 A tree survey is generally considered invalid in planning terms after 2 years, but changes in tree condition may occur at any time, particularly after acute (e.g. storm events) or prolonged (e.g. drought) environmental stresses or injuries (e.g. root severance). Routine surveys at different times of the year and within two - three years of each other (subject to the incidence of the above stresses) are recommended for the health and safety management of trees remote from highways or busy access routes. Annual surveys are recommended for the latter.
- 2.3.4 The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.

## 2.4 Survey data & report layout

- 2.4.1 Detailed records of individual trees are given in the survey schedule in Appendix 1 to this report.
- 2.4.2 A site plan identifying the surveyed trees, based on the client's drawings / topographical survey is provided in Appendix 5.
- 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 6. General observations and discussion follow, below.

### 3.0 OBSERVATIONS

#### 3.1 Site description



Photograph 1: 10a Oakhill Avenue, London NW3 7RE looking Northwest (Source: Google Maps)

- |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.1.1 | The site at 10a Oakhill Avenue comprises an existing detached residential dwelling, situated on the north western side of the Avenue. Due to the local topography, the property has various level differences between the neighbouring properties and within the site itself. There is a split level front garden with two basement garage entrances and areas containing trees/scrub. The rear garden is relatively large with landscaped features including paths and hard standings.                                                 |
| 3.1.2 | The site levels vary over 2 metres in height across the site and between the neighbouring properties.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3.1.3 | In terms of the British Geological Survey, the site overlies the Claygate Member / Beds (see dark area on plan extract overleaf). 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, more typical of Hampstead Heath, 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. |
| 3.1.4 | 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.                                                                                                                                                                                                                                                                                                      |



- 3.1.5 Clay soils are prone to compaction during development. Damage to soil structure can have a serious impact on tree health. Design of foundations near problematic tree species will also need to take into consideration subsidence risk.

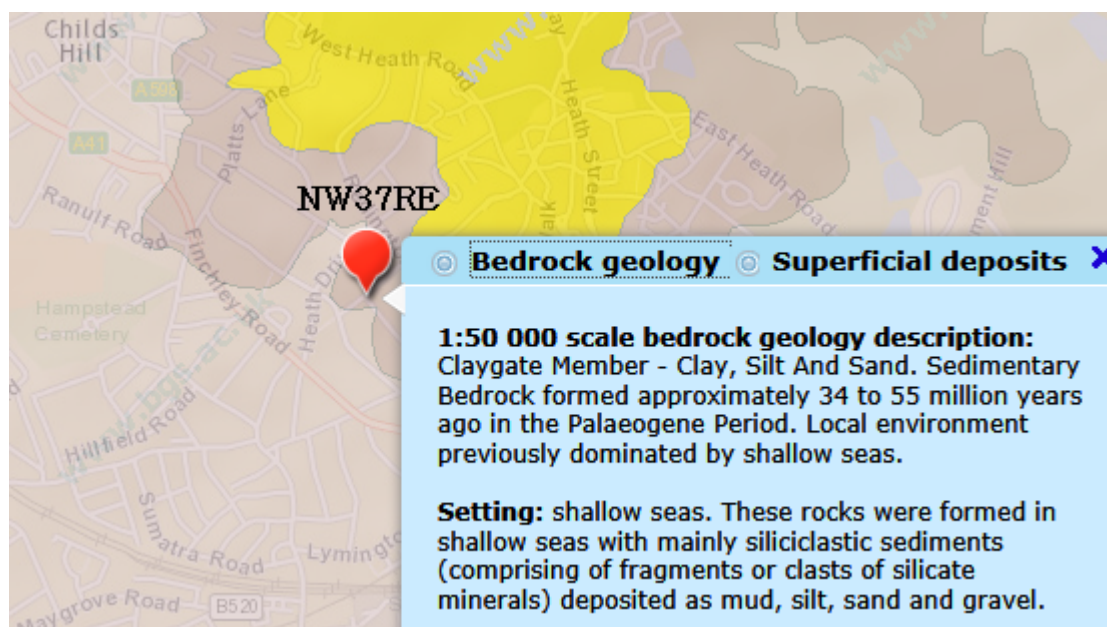


Figure 1: Extract from the BGS Geology of Britain Viewer

## 3.2 Subject trees

- 3.2.1 Of the 27 surveyed trees 1 is category 'A' (High Quality), 10 are 'B' category (Moderate Quality), 13 are 'C' category (Low Quality) trees, 1 is a 'C/u' category and 2 are 'U' category trees (Unsuitable for Retention).
- 3.2.2 The tree species found on site comprise mainly oak, beech, silver birch and cypress, with other species including hawthorn, western red cedar, laurel, ash and sycamore.
- 3.2.3 In terms of age demographics there is a preponderance of mature trees on the site with few younger, replacement trees in the population.
- 3.2.4 Full details of the surveyed trees can be found in Appendix 1 of this report.
- 3.2.5 There are some arboricultural works required within the existing tree population. These are listed in Appendix 2. It is important to note that T14 and T23 are classified as 'U' category and require felling for good arboricultural practice.

### 3.3 Planning Status

3.3.1 We are not aware of the existence of any Tree Preservation Orders, although it is recommended that confirmation is sort from the Tree Preservation Team in Camden Council. The site stands within the Redington and Frognal 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.

## 4.0 DEVELOPMENT CONSTRAINTS

### 4.1 Primary constraints

- 4.1.1 BS5837: 2012 gives Recommended Protection Areas (RPA's) for any given tree size. The individual RPA's are calculated in the Tree Schedule in Appendix 1 to this report, or rather the notional radius of that RPA, based on a circular protection zone. The prescribed radius is 12-x stem diameter at 1.5m above ground level, except where composite formulae are used in the case of multi-stemmed trees.
- 4.1.2 Circular RPA's are appropriate for individual specimen trees grown freely, but where there is ground disturbance, the morphology of the RPA can be modified to an alternative polygon, as shown in the diagram below (Figure 2). Alternatively, one need principally remember that RPA's are area-based and not linear – notional rather than fixed entities. **No modifications have been made in this instance (please see overleaf).**

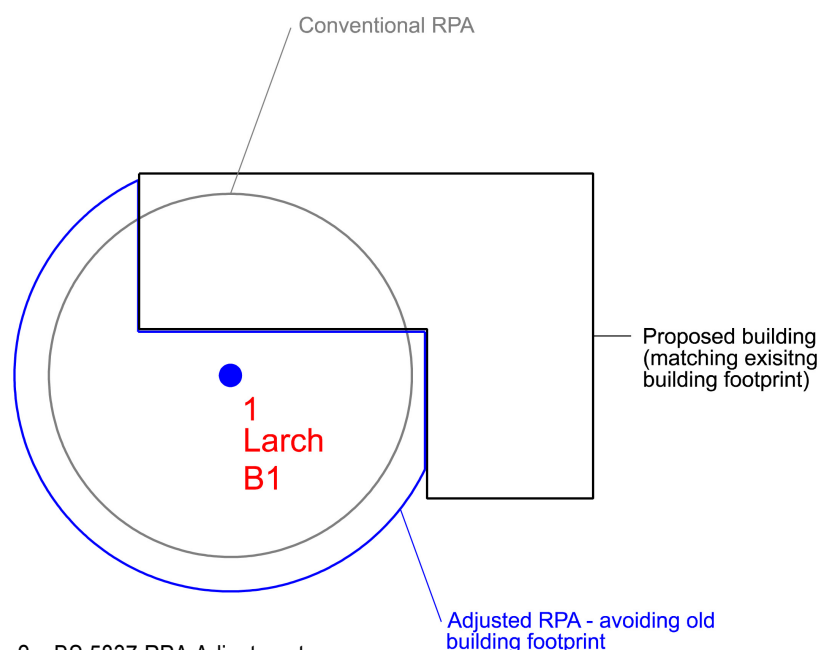


Figure 2 – BS 5837 RPA Adjustments

- 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, there are potentially significant primary constraints from on-site and off-site trees. The varying site levels, existing hardstanding and drainage will have an impact on the significance of these constraints, as these factors will have affected the rooting distribution across the 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.

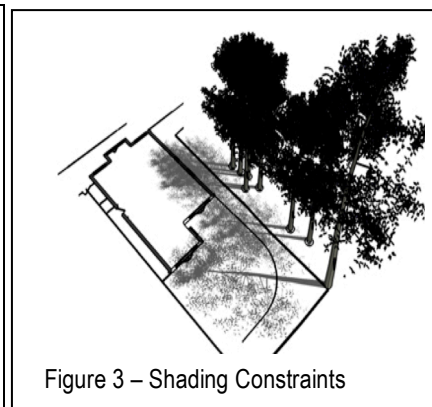


Figure 3 – Shading Constraints

- 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.

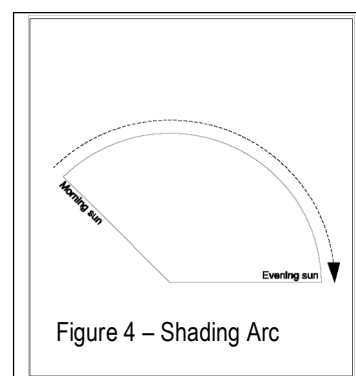


Figure 4 – Shading Arc

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

5.0 Table 1: Arboricultural Impact Assessment

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

Hide irrelevant Show All Trees

Ref: ADC/10a0A/AIA

B.S. Cat.	Tree No.	Species	Impact	Tree / RPA Affected	Age	Growth Vitality	Species Tolerance	Impact on Tree Rating	Impact on Site Rating	Mitigation
B	1	Oak, English	LGF: 64m2 (19%) of which 5m2 is undeveloped  Encroachment of scrub area within 1m of stem	64 m <sup>2</sup> 18.69 %	Mature	Normal	Moderate/ good	Very Low	N/A	Trial pits / further investigation
C	2	Cypress, Leyland	Felled to Facilitate Development	m <sup>2</sup> N/A %	Semi-mature	Normal	N/A	N/A	Low	New planting / landscaping
B	3	Oak, English	LGF: 56m2 (15%) - all exist. building. Removal of steps/ hard surface  Current planter expanded - benefit to tree if undertaken manually	0 m <sup>2</sup> 0 %	Mature	Moderate	Moderate/ good	Low	N/A	Manual excavation & pre-emptive root pruning  Porous replacement surfaces/ landscaping
C	H9	Leyland / Privet	Cut back to facilitate construction	m <sup>2</sup> N/A %	Young	Normal	Good	Very Low	N/A	Remedial tree surgery (see Rec. Works)
B	8	Oak, English	LGF: 64m2 (14%) - new 5m2 encroachment over 3.5m from stem	64 m <sup>2</sup> 14.15 %	Mature	Normal	Moderate/ good	Low	N/A	Manual excavation (note: trial pit for T1 recommended)
C	G10	Cypress, Leyland	Felled to Facilitate Development	m <sup>2</sup> N/A %	Semi-mature	Normal	N/A	N/A	Very Low	New planting / landscaping

5.0 Table 1: Arboricultural Impact Assessment

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

Hide irrelevant Show All Trees

Ref: ADC/10a0A/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
C	12	Western Red Cedar	Removal of existing hard standing/flower beds (canopy 1.5m clearance)  LGF: 4.5m2 (22%) GF: 2m2	4.5 m <sup>2</sup> 21.57 %	Semi-mature	Normal	Good	Medium	N/A	Remedial tree surgery (see Rec. Works)/manual excavation  Trial pits / further investigation
B	11	Oak, English	Demolition of existing shed/hard standing  LGF: 1m2	1 m <sup>2</sup> 1.96 %	Early Mature	Normal	Moderate/ good	Very Low	N/A	Manual demolition/excavation  Manual excavation & pre-emptive root pruning
B	16	Birch, Silver	LGF: 7m2 (including new steps)  Landscaping	7 m <sup>2</sup> 17.19 %	Semi-mature	Normal	Moderate/ poor	Low	N/A	Trial pits / further investigation
C	17	Laurel, Portugese	Steps in RPA	1 m <sup>2</sup> 4.91 %	Early Mature	Normal	Good	Low	N/A	Airspade / manual excavation
B	18	Beech, Common	Landscaping only - wall demolition within RPA  Possible ground level raising within RPA	m <sup>2</sup> N/A %	Semi-mature	Normal	Moderate	Low	N/A	Manual demolition  Course, granular material used to raise levels by hand
B	19	Beech, Common	Landscaping - wall demolition within RPA  Minor encroachment from lightwell (less than 1m2)	1 m <sup>2</sup> 1.38 %	Early Mature	Normal	Moderate	Low	N/A	Manual demolition  Airspade / manual excavation



5.0 Table 1: Arboricultural Impact Assessment

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

Hide irrelevant Show All Trees

Ref: ADC/10a0A/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	20	Beech, Common	Landscaping only - wall demolition within RPA	m <sup>2</sup> N/A %	Early Mature	Normal	Moderate	Low	N/A	Manual demolition
			Minor encroachment from lightwell (less than 1m2)							Airspade / manual excavation
A	21	Oak, Red	Landscaping only - removal of stone path 1.5m2 (0.2%)	1.5 m <sup>2</sup> .15 %	Post-Mature	Normal	Moderate/ good	Low	N/A	Manual demolition
			Possible ground level raising within RPA							Course, granular material used to raise levels by hand
C/u	25	Maple, Norway	Landscaping only: wall demolition within RPA	m <sup>2</sup> N/A %	Semi-mature	Moderate	Moderate	Low	N/A	Manual demolition
			Possible ground level raising within RPA							Course, granular material used to raise levels by hand
C	26	Cypress, Lawson variety	Landscaping only: wall demolition within RPA	m <sup>2</sup> N/A %	Young	Normal	Good	Low	N/A	Manual demolition
			Possible ground level raising within RPA							Course, granular material used to raise levels by hand
B	27	Oak, English	Landscaping: wall demo/levels raised	23 m <sup>2</sup> 5.08 %	Mature	Normal	Moderate/ good	Low	N/A	Pre-emptive root pruning Airspade / Manual demolition
			Encroachment from lightwell & steps (23m2/5%)							Airspade / manual excavation

## 6.0 DISCUSSION

### 6.1 Rating of Primary Impacts

- 6.1.1 The proposed changes could have significant additional arboricultural impacts, particularly to off-site category B trees T1 and T16. The owner of the property in which T16 stands, has shown himself to take a keen interest in the protection of his trees. Furthermore, the potentially significant impacts identified in the previous proposals remain unknown, in the absence of further trial pit investigations. With the additional significant impacts to T1 and T16, the scheme is at risk of refusal. It is therefore recommended that the trial pits be undertaken to determine the limits of the developable envelope, although the expectation is that the footprint will need to be reduced in these areas by pulling back from the stems of the trees to the rear and remaining within the current developed footprint to the front of the property around T1.
- 6.1.2 The additional encroachments within the RPA's of on-site category B beech trees T19 and T20, in addition to the off-site category B oak T27 are not considered significant, therefore the proposed amendments to the lightwells at the rear will have a low additional impact.
- 6.1.3 The other primary impacts in the current proposals are very similar to the previous scheme for flats on this site. Table 1 above provides the details, with low impacts noted for 11 further trees.
- 6.1.4 Providing the outcome of the proposed trial pits is favourable, the canopy of T12 (a category 'C' western red cedar) will require cutting back to the boundary facilitate construction of the new elevation. The impact to the tree will be moderate, but to the public, very low.

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

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

## 6.2 Rating of Secondary impacts

6.2.1 The principal, secondary impact would be the encroachment of T12, which will need to be cut back on a routine basis following the initial works to facilitate construction. This is a negligible public impact, as the conifer is out of sight from the road.

6.2.2 In addition, shading impacts occur will occur from the on and off-site trees, particularly T1, T3 and T8. However, these constraints are similar to the situation that exists today and can be mitigated. Development will not create significant, new impacts.

6.2.3 Organic deposition will also be a factor on this site, although mitigation will minimise this secondary impact to similar levels currently experienced by the existing property.

## 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. Hard surfacing and walls, including the steps within the RPA of T3, should be lifted with caution by hand or a skilled machine operator working away from the tree.

6.3.2 Future RPA piling / foundation encroachments will be pre-emptively excavated by hand or with an Airspade under arboricultural supervision. Roots smaller than 25mm diameter may be cut cleanly 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. Trial excavation of the key encroachments is recommended prior to the works to better assess the extent of root colonisation across the site.

- 6.3.3 Any replacement paving/hard landscaping within an RPA 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. Any ground level raising will require a course granular material within the RPA of any retained tree. 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.
- 6.3.4 Nuisance deposition can be mitigated with regular crown cleaning and filtration traps on the guttering (see Figure 5 below). Alternatively, a green roof construction might be considered.
- 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.
- 6.3.6 The landscape impact of tree losses can be offset by the landscape proposals, ideally involving new planting of ornamental varieties of native species, and where appropriate with columnar or compact form. A selection of columnar tree species cultivars for constricted sites is provided in Appendix 4.

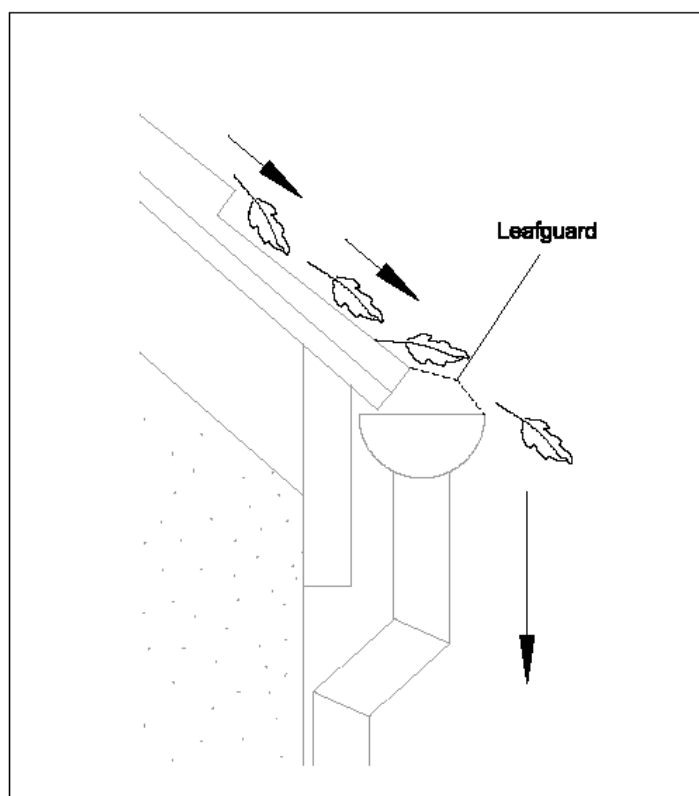


Figure 5: Filtration traps, as shown above, could be fitted on the gutters which can easily be maintained at 2-3m above ground.

## 7.0 CONCLUSION

- 7.1 The theoretically significant additional arboricultural impacts from the proposed revisions to the scheme require further investigation, particularly to off-site category B trees T1 and T16. Furthermore, the potentially significant impacts identified in the previous proposals remain without further investigations with trial pits to determine the actual impact. With the additional significant impacts to T1 and T16, the scheme is at risk of refusal.
- 7.2 It is therefore recommended that trial pits should be undertaken to determine the limits of the developable envelope, although the expectation is that the footprint will need to be reduced in these areas by pulling back from the stems of the trees to the rear and remaining within the current developed footprint to the front of the property around T1.

## 8.0 REFERENCES

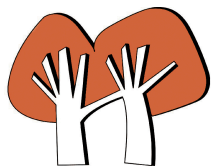
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## APPENDIX 1

### TREE SCHEDULE

#### 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 Conservation, Historic and Commemorative.
12. Useful Life is the tree's estimated remaining contribution in years.



Landmark Trees

Site: 10a Oakhill Avenue, London NW3 7RE

Date: 2nd May 2013

## BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

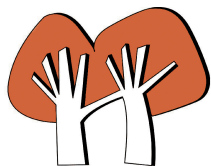
Tel: 020 7851 4544

Surveyor(s): Adam Hollis

Ref: ADC/10aOA/AIA

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Clear Stem Height	Stem Diameter	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
1	Oak, English	16	4545	12.0	10.0	870.0	Mature	10.4	Normal	Fair	B	3	>40	Pollard (Old) Cavity pockets in pruning wounds History of hard landscaping nr base; 2m retaining wall to East
2	Cypress, Leyland	6	3	1.0	1.0	300.0	Semi-mature	3.6	Normal	Fair	C	2	20-40	Pollarded
3	Oak, English	13	4536	4.0	4.0	910.0	Mature	10.9	Moderate	Poor	B	3	20-40	Pollard (Old) Cavity pockets in pruning wounds Basal cavity to 1m abg Roots against LGF garage
4	Ash, Common	8	2322	2.0	2.0	113.1	Young	1.4	Normal	Good	C	2	10-20	Unsuitable species for position RS
5	Magnolia (M. grandiflora)	6	3222	2.0	2.0	158.1	Young	1.9	Normal	Good	C	2	20-40	RS
6	Birch, Silver	12	2	2.0	2.0	120.0	Young	1.4	Normal	Good	C	2	10-20	Unsuitable species for position RS
7	Oak, English	10	4	4.0	4.0	130.0	Young	1.6	Normal	Good	C	2	>40	





Landmark Trees

Site: 10a Oakhill Avenue, London NW3 7RE

Date: 2nd May 2013

## BS5837 Tree Constraints Survey Schedule

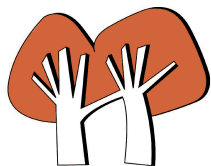
Landmark Trees Ltd

Tel: 020 7851 4544

Surveyor(s): Adam Hollis

Ref: ADC/10aOA/AIA

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Clear Stem Height	Stem Diameter	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
H9	Leyland / Privet	3	1	1.0	1.0	50.0	Young	0.6	Normal	Good	C	2	20-40	
8	Oak, English	17	6836	6.0	6.0	1000.0	Mature	12.0	Normal	Fair	B	3	>40	Pollard (Old) RS
G10	Cypress, Leyland	7	1.5	2.0	2.0	270.0	Semi-mature	3.2	Normal	Fair	C	2	20-40	Pollarded
12	Western Red Cedar	9	4	1.5	1.5	214.7	Semi-mature	2.6	Normal	Fair	C	2	20-40	RS
11	Oak, English	16	5354	6.0	6.0	335.4	Early Mature	4.0	Normal	Good	B	2	>40	RS
13	Birch, Silver	16	2	7.0	7.0	210.0	Semi-mature	2.5	Normal	Good	C	2	>40	RS
14	Birch, Silver	17	5432	6.0	4.0	310.0	Early Mature	3.7	Normal	Poor	U		<10	Break out wound with cavity in main stem / lost lead stem Pruning cavity at 5m NE



Landmark Trees

Site: 10a Oakhill Avenue, London NW3 7RE

Date: 2nd May 2013

## BS5837 Tree Constraints Survey Schedule

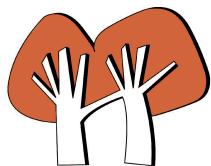
Landmark Trees Ltd

Tel: 020 7851 4544

Surveyor(s): Adam Hollis

Ref: ADC/10aOA/AIA

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Clear Stem Height	Stem Diameter	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
15	Sycamore	17	4424	4.0	4.0	300.0	Early Mature	3.6	Normal	Good	B	2	>40	RS
16	Birch, Silver	17	4321	4.0	4.0	300.0	Semi-mature	3.6	Normal	Good	B	2	20-40	Leaning (slightly) to S RS
17	Laurel, Portugese	6	3	1.0	1.0	212.1	Early Mature	2.5	Normal	Fair	C	2	20-40	Pollarded
18	Beech, Common	16	0	3.0	3.0	230.0	Semi-mature	2.8	Normal	Good	B	2	20-40	Root girdling by retaining wall Group canopy generated from T19
19	Beech, Common	18	10	5.0	10.0	400.0	Early Mature	4.8	Normal	Good	B	2	20-40	Root girdling by retaining wall Group canopy generated from T19
20	Beech, Common	18	10	5.0	4.0	420.0	Early Mature	5.0	Normal	Good	B	2	20-40	Root girdling by retaining wall Group canopy generated from T19
21	Oak, Red	19	12	5.0	3.0	1500.0	Post-Mature	18.0	Normal	Good	A	2	>40	RS



Landmark Trees

Site: 10a Oakhill Avenue, London NW3 7RE

Date: 2nd May 2013

## BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

Tel: 020 7851 4544

Surveyor(s): Adam Hollis

Ref: ADC/10aOA/AIA

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Clear Stem Height	Stem Diameter	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
G22	Laurel	12	7	2.0	4.0	300.0	Mature	3.6	Normal	Poor	C	2	10-20	Broken branches still hung-up
23	Hawthorn, Common	12	4	4.0	3.0	282.8	Mature	3.4	Dead	Poor	U			Broken branches still hung-up
24	Cypress, Lawson variety	8	2	1.0	1.0	100.0	Young	1.2	Normal	Good	C	1	>40	
25	Maple, Norway	7	4416	3.0	3.0	200.0	Semi-mature	2.4	Moderate	Poor	C/u	2	10-20	Leaning (significantly) & kinked Ivy smothered RS
26	Cypress, Lawson variety	12	1	0.0	0.0	150.0	Young	1.8	Normal	Good	C	1	>40	
27	Oak, English	14	6	5.0	5.0	1000.0	Mature	12.0	Normal	Fair	B	3	>40	Pollard (Old) RS

## APPENDIX 2

### RECOMMENDED TREE WORKS

#### Notes for Guidance:

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

- 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 - 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.



Site: 10a Oakhill Avenue, London NW3 7RE

Date: 2nd May 2013

Surveyor(s): James Bell

Ref: ADC/10aOA/AIA

## Recommended Tree Works

Show All Trees

Hide irrelevant

Tree No.	English Name	Height	Stem Diameter	Crown Spread	Recommended Works	Comments/ Reasons
1	Oak, English	16	870.0	4545	Mon	Pollard (Old) Cavity pockets in pruning wounds History of hard landscaping nr base; 2m retaining wall to East Advisable for good arboricultural practice
3	Oak, English	13	910.0	4536	FInv	Pollard (Old) Cavity pockets in pruning wounds Basal cavity to 1m abg Roots against LGF garage Advisable for good arboricultural practice
14	Birch, Silver	17	310.0	5432	Fell 3rd party tree?	Break out wound with cavity in main stem / lost lead stem Pruning cavity at 5m NE Advisable for good arboricultural practice
18	Beech, Common	16	230.0	0	Mon	Root girdling by retaining wall Group canopy generated from T19 Advisable for good arboricultural practice
19	Beech, Common	18	400.0	10	Mon	Root girdling by retaining wall Group canopy generated from T19 Advisable for good arboricultural practice
20	Beech, Common	18	420.0	10	Mon	Root girdling by retaining wall Group canopy generated from T19 Advisable for good arboricultural practice
21	Oak, Red	19	1500.0	12	Mon	RS Advisable for good arboricultural practice



Landmark Trees

Site: 10a Oakhill Avenue, London NW3 7RE

Date: 2nd May 2013

Surveyor(s): James Bell

Ref: ADC/10aOA/AIA

## Recommended Tree Works

Show All Trees

Hide irrelevant

Tree No.	English Name	Height	Stem Diameter	Crown Spread	Recommended Works	Comments/ Reasons
G22	Laurel	12	300.0	7	CCL	Broken branches still hung-up Advisable for good arboricultural practice
23	Hawthorn, Common	12	282.8	4	Fell	Broken branches still hung-up Advisable for good arboricultural practice
25	Maple, Norway	7	200.0	4416	Mon	Leaning (significantly) & kinked Ivy smothered RS Advisable for good arboricultural practice

## APPENDIX 3

### RECOMMENDED TREE WORKS TO FACILITATE DEVELOPMENT (See Table 1)

#### Notes for Guidance:

- 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.



Landmark Trees

Site: 10a Oakhill Avenue, London NW3 7RE

Date: 3rd February 2015

Surveyor(s): James Bell

Ref: ADC/10aOA/AIA

## Recommended Tree Works to Facilitate Development

Show All Trees

Hide irrelevant

Tree No.	English Name	Height	Stem Diameter	Crown Spread	Recommended Works	Comments/ Reasons
2	Cypress, Leyland	6	300.0	3	Fell	Pollarded Recommended to permit development
H9	Leyland / Privet	3	50.0	1	CB Cut back overhanging	Recommended to facilitate development
G10	Cypress, Leyland	7	270.0	1.5	Fell	Pollarded Recommended to facilitate development
12	Western Red Cedar	9	214.7	4	CL Crown-lift to 2m/cut back to boundary	RS Recommended to facilitate development



## APPENDIX 4: TREE SELECTION FOR CONSTRICTED SITES

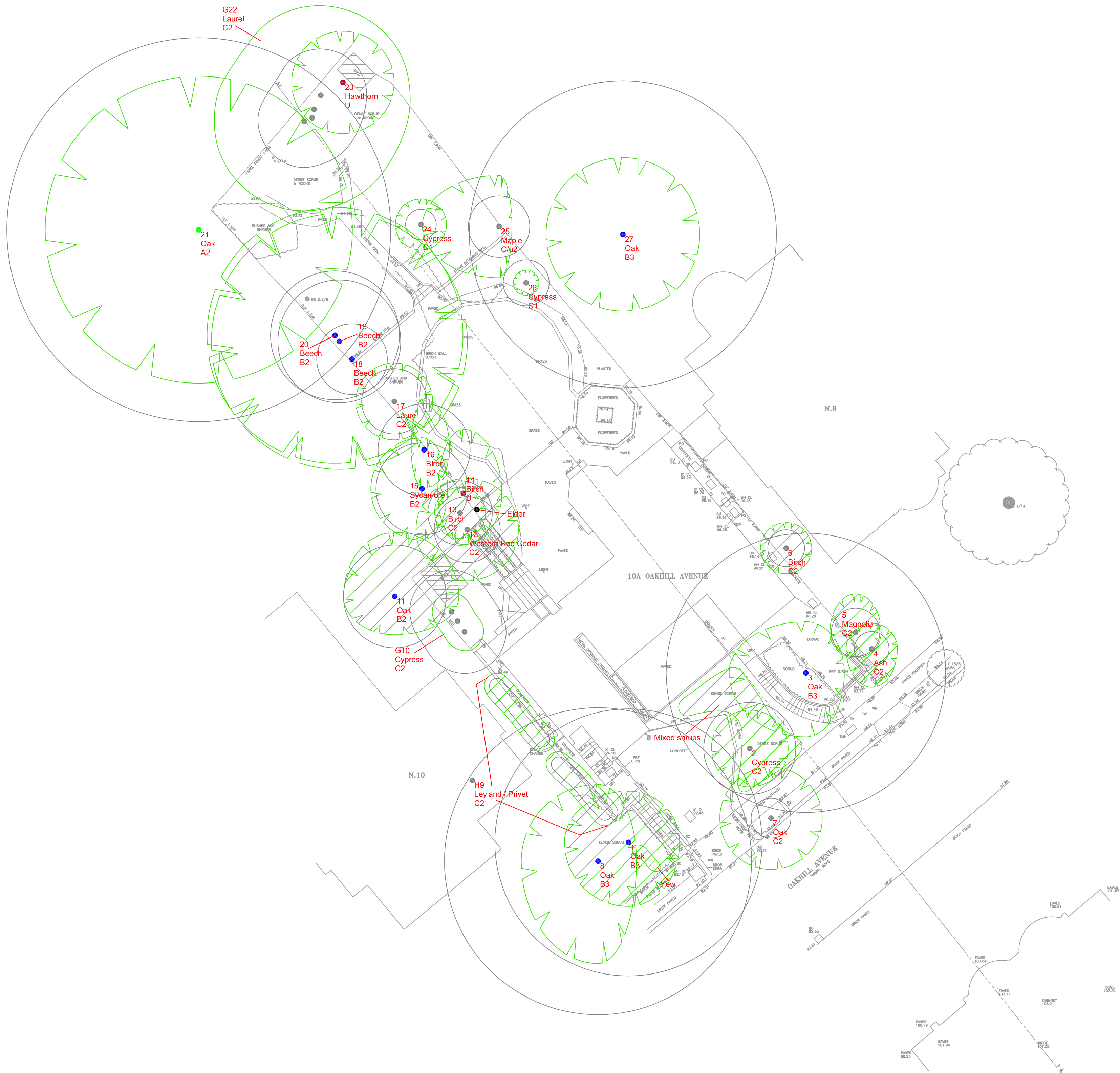
Table 4: Rosaceous Tree Species for Constricted Planting Sites

Common Name	Species	Selected Form
Hawthorn	<i>Crataegus monogyna</i>	Stricta
Cockspur	<i>Crataegus prunifolia</i>	Splendens
Cherry	<i>Prunus x hillieri</i>	Spire
Bird cherry	<i>Prunus padus</i>	Albertii
Rowan / Mountain ash	<i>Sorbus aucuparia</i>	Cardinal Royal
Rowan / Mountain ash	<i>Sorbus aucuparia</i>	Rossica Major
Rowan / Mountain ash	<i>Sorbus aucuparia</i>	Sheerwater Seedling
Swedish whitebeam	<i>Sorbus intermedia</i>	Brouwers
B. whitebeam	<i>Sorbus x thuringiaca</i>	Fastigiata


Table 5: Specimen Tree Species for Constricted Planting Sites

Common Name	Species	Selected Form
Chinese red bark birch	<i>Betula albosinensis</i>	Fascination
Swedish birch	<i>Betula pendula</i>	Dalecarlica
Hornbeam	<i>Carpinus betulus</i>	Fastigiata Frans Fountaine
Turkish Hazel	<i>Corylus colurna</i>	
Maidenhair tree	<i>Ginkgo biloba</i>	
Pride of India	<i>Koelreuteria paniculata</i>	Fastigiata
European larch	<i>Larix decidua</i>	Sheerwater Seedling
Tulip tree	<i>Liriodendron tulipifera</i>	Fastigiata

**APPENDIX 5****TREE CONSTRAINTS PLAN**



**NOTE:**  
This survey is of a preliminary nature. The trees were inspected from the ground only on the basis of the Visual Tree Assessment method. No samples were taken for analysis. No decay detection equipment was employed. The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.  
  
Branch spread in metres is taken at the four cardinal points to derive an accurate representation of the crown.  
  
Root Protection Areas (RPA) are derived from stem diameter measured at 1.5 m above adjacent ground level (taken on sloping ground on the upslope side of the tree base).



**Landmark Trees**  
20 Broadwick Street, London, W1F 8HT  
Tel: 0207 851 4544 Mobile: 07812 989928  
e-mail: [info@landmarktrees.co.uk](mailto:info@landmarktrees.co.uk) Web: [www.landmarktrees.co.uk](http://www.landmarktrees.co.uk)

Site: 10a Oakhill Avenue	1:200 @ A1
Drawing Title: Tree Constraints Plan	May 2013

**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)

**Category**

- Crown Spread
- Tree Number
- Species
- Category
- Root Protection Area

**APPENDIX 6****ARBORICULTURAL IMPACT ASSESSMENT PLAN**



