Landmark Trees

**ARBORICULTURAL IMPACT ASSESSMENT REPORT:**

99a Frognal,

Hampstead

London

NW3 6XR

**REPORT PREPARED FOR:**

Harrison Varma Construction Ltd

Bishops View House

98 Great North Road

London N2 0NL

**REPORT PREPARED BY**

Adam Hollis

MSc ARB MICFor FArbor A MRICS C Env

**Ref:** HVC/FRG/AIA/03

**Date:** 20th September 2013

**APPENDICES**

**Caveats**

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

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

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

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

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

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

**Tree Constraints & Protection Overview**

| | | | |
|---|---|---|---|
| **Client:** | Harrison Varma | **Case Ref:** | HVC/FRG/AIA/03 |
| **Local Authority:** | LB Camden | **Date:** | 19th September 2013 |
| Site Address: 99a Frognal, Hampstead, London NW3 6XR | | | |
| Proposal: Demolition of the existing house and construction of a new single family house (amendments to extant planning permission 2010/3202/P) | | | |

| **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 | Y | | |
| Tree Protection Plan: | N/a | (Include in future method statement) | |
| Tree Constraints Plan: | Y | | |
| Arboricultural Impact Assessment: | Y | | |

| **Site Layout** | | | | | |
|---|---|---|---|---|---|
| Site Visit | Y | Date: 22/05/13 | | 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 | N |

**Trees with the potential to be affected**

Removal of 4 trees as follows: T1 (category 'B' beech tree), three category 'C' trees (T3, T5 and T24). Two category 'U' trees to be felled (T2 and T9)*.

Low RPA impacts from proposed basement to T6 and one tree in G7.

Low RPA impacts to category 'B' trees T10 – 12 from widening drive and new paved area.

T2, 9 and T25* to be felled on the grounds of good arboricultural practice.

**Comments**

New proposal improves upon consented scheme in terms of arboricultural impacts

**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 | Proposal will mean retained trees are too close to buildings | N |
| 5 | Specialist demolition / construction techniques required | Y |
| 6 | The Proposal will result in significant root damage to retained trees | N |
| 7 | Further investigation of tree condition recommended | 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 proposals for 99a Frognal, Hampstead, London NW3 6XR, reviewing any conflicts between the current proposals and material tree constraints identified in our survey. The site has an extant planning permission granted on 1 March 2011 (2010/3202/P), to demolish the existing house and build a new modern family house. This consent allowed for the felling of T1, T2, T5 & T24, and for 11% and 10% RPA impacts to T6 & G7. The current proposals have been designed on a reduced footprint, as indicated by the plan in Appendix 6 and present an overall improvement for the trees and landscape, pulling back the building significantly from the lawn and lawn trees. The above ground building also pulls back significantly from the rear boundary trees and potential nuisance arising therefrom.

1.2 The felling impacts in the current proposals remain as per the consented scheme above, with the addition of 1 category C apple tree: a small rear garden tree with some decay in its base. Given the overall improvements for larger specimen trees; e.g. T11 hornbeam, this seems more than a fair trade-off. As previously, the loss of these low quality, interior site trees is rated as a low impact. Two category 'U' category trees T2 and T9 will also be felled, although strictly speaking, the removal of poor quality / U category trees should not be rated an impact (but a management requirement). Overall, the loss of these trees will not affect the visual character of the local Conservation Area, with new planting proposed as mitigation.

1.3 There is also a net reduction in RPA impacts to retained trees: the revised proposal has no impact on T21, T22 and T23, where the consented scheme affected all three trees; the LGF footprint on the western boundary now only encroaches the theoretical RPA of one tree within the G7 group of off-site category 'B' trees, by 10.8% - the permitted scheme affected at least 3 more trees with 5-10% impact each, and up to a maximum of 10.6%. Furthermore, only this tree will need to be cut back to the boundary to facilitate construction, as opposed to several trees within the group previously. The RPA encroachment of the category 'B' maple, T6, appears to have marginally increased from 11% to 14.7%. However, this 'increase' relates to an area of reduced levels where root colonisation is likely to be less due to the fall and intervening hard standings. In practice, the impact on T6 may well be lower, because the LGF has been pulled back to the south. Overall, the impact remains a low one.

1.4 Hard landscape proposals have been designed around the constraints of the site with the garage ramp shifted out of any RPA. The new drive has been marginally widened to facilitate access to and from the ramp, but the existing lawn levels will be retained here. A new paved area is also to be constructed in front of the proposed dwelling. The potential impacts to category 'B' trees T10 – 12 will again be low subject to mitigation, comprising no-dig construction techniques and the use of porous surfaces.

1.5 Secondary impacts from the new elevation require pruning of one tree only in G7 to maintain convenient canopy clearance. The secondary impacts from organic deposition will be minor and less than the previous scheme, although fruit fall from T21 is no longer relevant to the current proposals.

| | |
|---|---|
| 1.6 | As in the previous scheme, mitigation will comprise low-invasive basement construction within the RPA of this tree, comprising pre-emptive root pruning of the piling line / excavated footprint and use of no-dig construction and porous surfaces for driveway / paving encroachments. The demolition of the existing building is also within RPA, requiring prescribe demolition techniques to reduce the potential impact |
| 1.7 | The proposed scheme makes significant improvements upon the consented scheme. The site has potential for development without impacting significantly on the wider tree population or local landscape. |

* 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 Harrison Varma to provide a survey and an arboricultural impact assessment of proposals for the site: 99a Frognal, Hampstead, London NW3 6XR. The report is to accompany a planning application.

2.1.2 The proposals are for the demolition of the existing house and construction of a new single family house (amendments to extant planning permission 2010/3202/P). 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: 21417A-1 (Land Survey & Underground Services)

Proposals: 99aF_General Arrangement_Ground Floor Level (DP - 01.08.2013)

## 2.3 Scope of survey

2.3.1 As Landmark Trees' (LT) arboricultural consultant, I resurveyed the trees on site on 22nd 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: Existing dwelling at 99a Frognal, Hampstead, London

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|---|---|
| 3.1.1 | Frognal is a scenic residential area near Hampstead High Street within the London Borough of Camden. The house is detached in its own grounds. The grounds are terraced rising around 1 floor level to the north and west with lawn and drive at GF level. The drive and lawn slope markedly to the east. The surrounding network of gardens provides a good degree of tranquility and greenery. |
| 3.1.2 | In terms of the British Geological Survey, the site overlies the Bagshot Formation (see indicated location on Fig.1 plan extract below). The associated soils are generally fine, white, buff and sometimes crimson sands, grey when unweathered, with sporadic seams of pale pipe-clay and local beds of flint-pebble gravel. The actual distribution of the soil series are not as clearly defined on the ground as on plan and there may be anomalies in the actual composition of sand, clay and gravel content. Further advice from the relevant experts on the specific soil properties can be sought as necessary. |

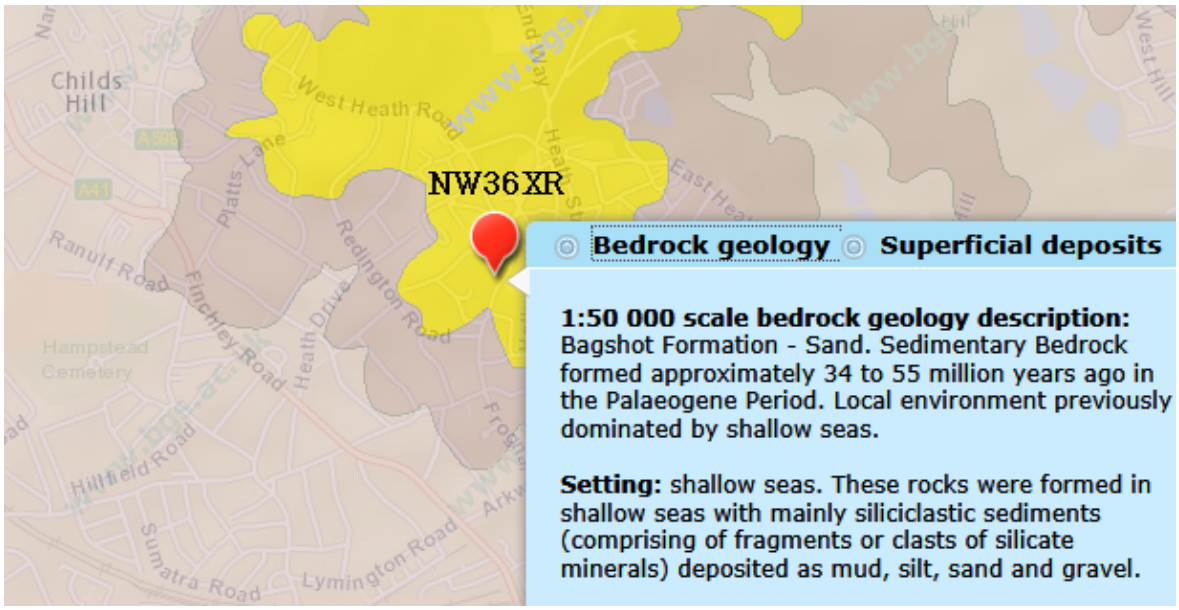


Figure 1: Extract from the BGS Geology of Britain Viewer

3.2 Subject trees

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|---|---|
| 3.2.1 | Of the 24 surveyed trees 6 are 'B' category (Moderate Quality), 16 are 'C' category (Low Quality) trees and 2 are 'U' category trees (Unsuitable for Retention). |
| 3.2.2 | There is a wide variety of native and non-native tree species found on site including fruit trees, beech, ash, sycamore, oak, Persian ironwood, Leyland cypress and holly. |
| 3.2.3 | In terms of age demographics there is a range of mature trees (from semi mature through to mature) on the site with one young tree 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 and include the felling/further investigation of the decay on the category 'C/u' and 'U' trees on site. |

3.3 Planning Status

| | |
|---|---|
| 3.3.1 | There are some protected trees at the entrance to the site but these appear to be within the grounds of The Heights and 99 Frognal rather than 99a. The site also stands within the Hampstead Conservation Area, which will affect the subject trees: it is a criminal offence to prune, damage or fell such trees without permission from the local authority. |
| 3.3.2 | Permission to demolish the existing house and build a new modern family house was granted on 1 March 2011 (2010/3202/P). The consent allowed for the felling of T1, 2, 5 & 24, and for 11% and 10% RPA impacts to T6 & G7. |

## 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).**

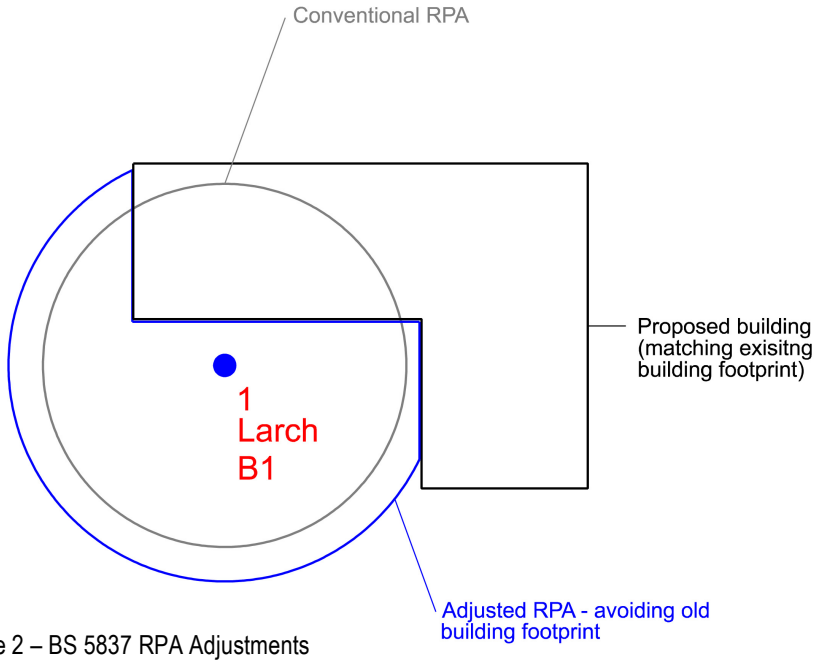


Figure 2 – BS 5837 RPA Adjustments

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.

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 Most of the moderate quality trees are located off site in the neighbouring garden to the west and on the eastern boundary around the driveway entrance, affecting little if any constraint on redevelopment of the existing footprint. The exceptions would be T4, 6 & 11, which are internal site trees. T11 is the key specimen tree on the site and the others are of less value. T4 is also an attractive specimen, but is too close to the property to be sure of reaching maturity.

4.1.12 The remaining trees are generally of indifferent quality / public value, though T15-19, collectively serve a useful screening function on the eastern boundary. The most likely constraint amongst these lower quality trees is the bay tree T5, which stands next to the existing western elevation. This tree may well need to be removed for any demolition works. However, the tree has no public merit as an internal, C category specimen with a significant defect (loss of third multi-stem). The tree has already outgrown its existing courtyard setting, providing a fair degree of shade. Removal should be acceptable.

## 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.

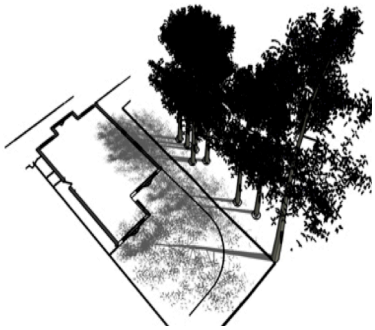

Figure 3 – Shading Constraints

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.

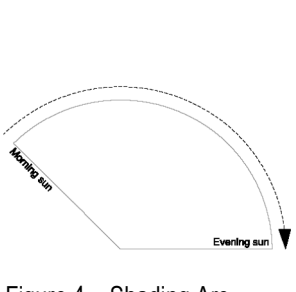


Figure 4 – Shading Arc

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 principal secondary constraint would be shading on to the site from trees along the south and west boundaries. However, the constraint is slight compared to the overall developable area. Leaf deposition and honey-dew is likely to remain as it is today. |

*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 for Retained Trees

Hide irrelevant | Show All Trees

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

**Ref: HCV/FRG/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 | Beech, Dawyck | Felled to Facilitate Development | $m^2$<br>N/A % | Semi-mature | Normal | N/A | N/A | Low | New planting / landscaping |
| U | 2 | Elder, Box | Felled to Facilitate Development<br><br>Removal of U category trees not rated an impact | $m^2$<br>N/A % | Semi-mature | Poor | N/A | N/A | N/A | New planting / landscaping |
| C | 3 | Apple, Crab | Felled to Facilitate Development<br><br>LGF impact - 2.5m2 | 2.5 $m^2$<br>17.05 % | Semi-mature | Moderate | N/A | N/A | Low | New planting / landscaping |
| C | 5 | Laurel, Bay | Felled to Facilitate Development | $m^2$<br>N/A % | Mature | Normal | N/A | N/A | Very Low | New planting / landscaping |
| B | 6 | Maple, Norway | LGF: 20m2 of which 2m2 is existing<br><br>Levels raised & landscape within RPA | 18 $m^2$<br>14.71 % | Mature | Normal | Moderate | Low | N/A | Hand dig / prune top 750mm of path thru.RPA<br><br>Levels to meet T6 planter Manual working |
| B | G7 | Ash, Common & Sycamore | Approximately 6m2 impact to 1 tree<br><br>Basement Construction within Canopy | 6 $m^2$<br>10.83 % | Mature | Moderate | Moderate | Low | N/A | Hand dig / prune top 750mm of path thru.RPA<br><br>Remedial tree surgery (see Rec. Works) |

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Hide irrelevant | Show All Trees

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

**Ref: HCV/FRG/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 | 8 | Sycamore | Replacement landscaping | $m^2$<br>N/A % | Semi-mature | Moderate | Moderate | Very Low | N/A | Manual working<br>No-dig construction |
| U | 9 | False Acacia | Drive Construction within RPA<br><br>Removal already advisable good arboricultural practice | $m^2$<br>N/A % | Semi-mature | Dead | N/A | N/A | N/A | New planting / landscaping |
| B | 10 | Sycamore | Widening of drive | 18 $m^2$<br>14.71 % | Mature | Moderate | Moderate | Low | N/A | No-dig construction<br>Maintain lawn soil level |
| B | 11 | Hornbeam | New driveway | 11 $m^2$<br>12.01 % | Mature | Normal | Moderate | Low | N/A | Arboricultural supervision<br>Manual working<br><br>No-dig construction & pre-emptive root pruning |
| B | 12 | Beech, Common | Widening of drive<br><br>Verify drawing | 25 $m^2$<br>21.84 % | Mature | Normal | Moderate/poor | Medium | N/A | No-dig construction<br>Maintain lawn soil level |
| C | 24 | Cherry, Flowering | Felled to Facilitate Development | $m^2$<br>N/A % | Young | Normal | N/A | N/A | Very Low | New planting / landscaping |

## 6.0 DISCUSSION

6.1 Rating of Primary Impacts

6.1.1 The current proposals have been designed on a reduced footprint, as indicated by the plan in Appendix 6 and present an overall improvement for the trees and landscape, pulling back the building significantly from the lawn and lawn trees. The above ground building also pulls back significantly from the rear boundary trees and potential nuisance arising therefrom.

6.1.2 The felling impacts in the current proposals remain as per the consented scheme above, with the addition of 1 category C apple tree: a small rear garden tree with some decay in its base. Given the overall improvements for larger specimen trees; e.g. T11 hornbeam, this seems more than a fair trade-off. As previously, the loss of these low quality, interior site trees is rated as a low impact. Two category 'U' category trees T2 and T9 will also be felled, although strictly speaking, the removal of poor quality / U category trees should not be rated an impact (but a management requirement). Overall, the loss of these trees will not affect the visual character of the local Conservation Area, with new planting proposed as mitigation.

6.1.3 There is also a net reduction in RPA impacts to retained trees: the revised proposal has no impact on T21, T22 and T23, where the consented scheme affected all three trees; the LGF footprint on the western boundary now only encroaches the theoretical RPA of one tree within the G7 group of off-site category 'B' trees, by 10.8% - the permitted scheme affected at least 3 more trees with 5-10% impact each, and up to a maximum of 10.6%. Furthermore, only this tree will need to be cut back to the boundary to facilitate construction, as opposed to several trees within the group previously. The RPA encroachment of the category 'B' maple, T6, appears to have marginally increased from 11% to 14.7%. However, this 'increase' relates to an area of reduced levels where root colonisation is likely to be less due to the fall and intervening hard standings. In practice, the impact on T6 may well be lower, because the LGF has been pulled back to the south. Overall, the impact remains a low one.

6.1.4 Hard landscape proposals have been designed around the constraints of the site with the garage ramp shifted out of any RPA. The new drive has been marginally widened to facilitate access to and from the ramp, but the existing lawn levels will be retained here. A new paved area is also to be constructed in front of the proposed dwelling. The potential impacts to category 'B' trees T10 – 12 will again be low subject to mitigation, comprising no-dig construction techniques and the use of porous surfaces.

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 Secondary impacts from the new elevation require pruning of one tree in G7 to maintain convenient canopy clearance. The secondary impacts from organic deposition will be minor and as the previous scheme, although fruit fall from T21 is no longer relevant to the current proposals.

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. Hard surfacing can be lifted with caution by a skilled machine operator again working away from the tree.

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

| | |
|---|---|
| 6.3.3 | The replacement drive/hard landscaping will generally require a no-dig construction technique, either using a cellular confinement system with no fines aggregate for the sub-base or simply building upon the existing sub-base without disturbing the ground below. Choice of construction method will initially depend upon root penetration within the existing sub-grade. The key principle is not to excavate in the presence of roots and to provide a porous surface to promote healthy soil water relations for future root growth. |

| | |
|---|---|
| 6.3.4 | The immediate canopy encroachment from G7 can be avoided by cutting back the existing canopies. |
| 6.3.5 | 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. |
| 6.3.6 | 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. |

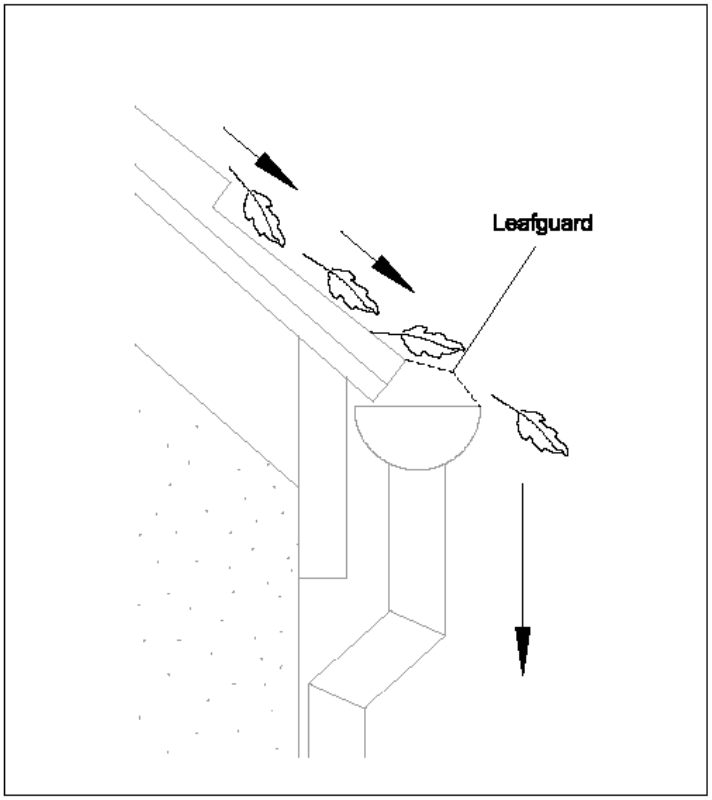


Figure 5: Filtration traps, as shown above, could be fitted on the gutters which can easily be maintained at 2-3m above ground.

## 7.0 CONCLUSION

| | |
|---|---|
| 7.1 | The potential impacts of development are all relatively low in terms of both quality of trees removed and also RPA encroachments of trees retained. Furthermore, the scheme has notable reductions in the arboricultural impacts when compared to the scheme with extant planning permission. |
| 7.2 | The full potential of the impacts can be largely mitigated through design and precautionary measures. These measures can be elaborated in Method Statements in the discharge of planning conditions. |
| 7.3 | The species affected are generally tolerant of root disturbance / crown reduction and the retained trees are generally in good health and capable of sustaining these reduced impacts. |
| 7.4 | The loss of the trees that are recommended for felling will not affect the visual character of the local Conservation Area. |
| 7.5 | Therefore, the proposals will not have any significant impact on either the retained trees or wider landscape. |
| 7.6 | The proposed scheme makes significant improvements upon the consented scheme. |

## 8.0 RECOMMENDATIONS

8.1 Specific Recommendations

8.1.1 Current tree works recommendations are found in Appendix 2 to this report, with works to facilitate development in Appendix 3 and a selection of columnar tree species cultivars for constricted sites provided in Appendix 4. Any tree removals recommended within this report should only be carried out with local authority consent.

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

8.1.3 Replace felled trees with native 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.

8.2 General Recommendations

8.2.1 Any trees which are in close proximity to buildings proposed for demolition should be protected with a Tree Protection Barrier (TPB). This TPB should comprise steel, mesh panels 2.4m in height ('Heras') and should be mounted on a scaffolding frame (shown in Fig 2 of BS5837:2012). The position of the TPB can be shown on plan as part of the discharge of conditions, once the lay out is agreed with the planning authority. The TPB should be erected prior to commencement of works, remain in its original form on-site for the duration of works and removed only upon full completion of works.

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

8.2.3 The use of heavy plant machinery for building demolition, removal of imported materials and grading of surfaces should take place in one operation. The necessary machinery should be located above the existing grade level and work away from any retained trees. This will ensure that any spoil is removed from the RPAs. It is vital that the original soil level is not lowered as this is likely to cause damage to the shallow root systems.

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

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

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

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

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

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

- ensure all site operatives are aware of their responsibilities to the trees on site and the consequences of a failure to observe these responsibilities;
- make immediate contact with the local authority and/or a retained arboriculturalist in the event of any tree related problems occurring.

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

8.2.10 The sequence of works should be as follows:

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

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

**Landmark Trees Ltd**
**Tel: 020 7851 4544**

# BS5837 Tree Constraints Survey Schedule



**Site: 99a Frognal, Hampstead, London NW3 6XR**

**Surveyor(s): Adam Hollis**

**Date: 22nd May 2013**

**Ref: HVC/FRG/AIA/02**

| 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 | Beech, Dawyck | 13 | 3 | 2 | Semi-mature | 270 | 12 | 3.2 | Normal | Good | Medium | B | 1 | >40 | |
| 2 | Elder, Box | 12 | 5544 | 5 | Semi-mature | 290 | 12 | 3.5 | Poor | Fair | Low | U | 1 | <10 | Topped/lopped<br>A sparser than normal canopy<br>Dying back in S crown |
| 3 | Apple, Crab | 6 | 3214 | 2 | Semi-mature | 180 | 12 | 2.2 | Moderate | Poor | Low | C | 2 | <10 | Decay at trunk base |
| 4 | Apple, Crab | 7 | 2.5 | 2 | Early Mature | 130 | 12 | 1.6 | Moderate | Fair | Low | U | | <10 | Decay at trunk base |
| 5 | Laurel, Bay | 10 | 3 | 2 | Mature | 400 | 12 | 4.8 | Normal | Fair | Low | C | 2 | 10-20 | Multi stem weakness<br>Lost southern stem, 1 of 3<br>2 stems of 320 & 240mm dm |
| 6 | Maple, Norway | 15 | 5565 | 4 | Mature | 520 | 12 | 6.2 | Normal | Fair | Medium | B | 2 | 20-40 | Graft incompatibility (minor)<br>Co-dominant limbs<br>Topped/lopped c. 5-10 yrs ago |
| G7 | Ash, Common & Sycamore | 15 | 5 | 5 | Mature | 350 | 12 | 4.2 | Moderate | Fair | Medium | B | 2 | 20-40 | Ivy severed<br>A sparser than normal canopy |

**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 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.
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 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 Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
12. Useful Life is the tree's estimated remaining contribution in years.

**Landmark Trees Ltd**
**Tel: 020 7851 4544**

# BS5837 Tree Constraints Survey Schedule



**Site: 99a Frognal, Hampstead, London NW3 6XR**

**Surveyor(s): Adam Hollis**

**Date: 22nd May 2013**

**Ref: HVC/FRG/AIA/02**

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Sycamore | 10 | 4632 | 2.5 | Semi-mature | 300 | 12 | 3.6 | Moderate | Fair | Low | C | 2 | 20-40 | Ivy smothered |
| 9 | False Acacia | 12 | 2213 | 5 | Semi-mature | 210 | 12 | 2.5 | Dead | Hazardous | Low | U | 0 | <10 | Dead<br>Decay in trunk |
| 10 | Sycamore | 16 | 6787 | 8 | Mature | 520 | 12 | 6.2 | Moderate | Good | Medium | B | 2 | 20-40 | Constricted rooting<br>Buttresses to N; flat to S<br>Topped/lopped c. 5-10 yrs ago |
| 11 | Hornbeam | 15 | 6565 | 6 | Mature | 450 | 12 | 5.4 | Normal | Fair | Medium | B | 2 | 20-40 | Leaning (slightly) N<br>Minor stem wound @3m S |
| 12 | Beech, Common | 16 | 6 | 6 | Mature | 503 | 12 | 6.0 | Normal | Fair | Medium | B | 2 | 20-40 | Multi stem weakness<br>Missing S stem, 1 of 4<br>Topped in past<br>270, 290 & 310mm stem dm |
| 13 | Ironwood, Persian | 8 | 6 | 2 | Mature | 404 | 12 | 4.8 | Normal | Fair | Low | C | 2 | 20-40 | Multi stem weakness<br>130, 160, 180, 200, 220mm<br>Topped in past |
| 14 | Magnolia (M. X soulangiana) | 6 | 4.5 | 2 | Semi-mature | 270 | 12 | 3.2 | Normal | Fair | Low | C | 2 | 20-40 | Multi stem weakness<br>110, 110, 140, 170mm |

**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 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.
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 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 Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
12. Useful Life is the tree's estimated remaining contribution in years.

**Landmark Trees Ltd**
**Tel: 020 7851 4544**

# BS5837 Tree Constraints Survey Schedule



**Site: 99a Frognal, Hampstead, London NW3 6XR**

**Surveyor(s): Adam Hollis**

**Date: 22nd May 2013**

**Ref: HVC/FRG/AIA/02**

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | Oak, Holm | 7 | 1515 | 2 | Semi-mature | 250 | 12 | 3.0 | Poor | Poor | Low | C/u | 2 | 10-20 | Poor specimen, low vitality<br>kinked stem to E<br>Bleeding canker on stem<br>sparse canopy |
| 16 | Cypress, Leyland | 15 | 3212 | 2 | Semi-mature | 380 | 12 | 4.6 | Normal | Good | Low | C | 2 | 20-40 | |
| 17 | Cypress, Leyland | 14 | 3111 | 2 | Semi-mature | 270 | 12 | 3.2 | Normal | Good | Low | C | 2 | 20-40 | |
| 18 | Cypress, Leyland | 7 | 3111 | 2 | Semi-mature | 140 | 12 | 1.7 | Normal | Good | Low | C | 2 | 20-40 | In crown of T19 |
| 19 | Sycamore, Purple | 14 | 5553 | 2 | Early Mature | 360 | 12 | 4.3 | Normal | Good | Low | C | 2 | 20-40 | Suppressed by nearby tree<br>Co-dominant limbs |
| 20 | Holly | 7 | 2222 | 2 | Early Mature | 200 | 12 | 2.4 | Moderate | Fair | Low | C | 2 | 20-40 | Ivy smothered |
| 21 | Pear, Domestic | 7 | 3314 | 2 | Early Mature | 310 | 12 | 3.7 | Moderate | Fair | Low | C | 2 | 10-20 | Pruning cavities in upper stem |

**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 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.
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 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 Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
12. Useful Life is the tree's estimated remaining contribution in years.

**Landmark Trees Ltd**
**Tel: 020 7851 4544**

# BS5837 Tree Constraints Survey Schedule



**Site: 99a Frognal, Hampstead, London NW3 6XR**

**Surveyor(s): Adam Hollis**

**Date: 22nd May 2013**

**Ref: HVC/FRG/AIA/02**

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 | Ironwood, Persian | 7 | 4343 | 2 | Early Mature | 250 | 12 | 3.0 | Normal | Fair | Low | C | 2 | 20-40 | Multi stem weakness |
| 23 | Eucalyptus | 15 | 3333 | 2 | Early Mature | 450 | 12 | 5.4 | Normal | Good | Low | C | 2 | 20-40 | |
| 24 | Cherry, Flowering | 2.5 | 2.5 | 1 | Young | 100 | 12 | 1.2 | Normal | Fair | Low | C | 2 | 10-20 | Decay at trunk base |
| 25 | Elder | 6 | 5 | 3 | Post-Mature | 500 | 12 | 6.0 | Poor | Hazardous | Low | U | | | Dying/ dead & overhangs fence |

**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 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.
5. Protection Multiplier is 12 and is the number used to calculate the tree's protection radius and area.
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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 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 Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
12. Useful Life is the tree's estimated remaining contribution in years.

## 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.

**Landmark Trees Ltd**
**Tel: 0207 851 4544**

# Recommended Tree Works

Hide irrelevant | Show All Trees

**Site: 99a Frognal, Hampstead, London NW3 6XR**

**Surveyor(s): Adam Hollis**

**Date: 22nd May 2013**

**Ref: HCV/FRG/AIA**

| Tree No. | English Name | Height | Stem Diameter | Crown Spread | Recommended Works | Comments/ Reasons |
|---|---|---|---|---|---|---|
| 3 | Apple, Crab | 6 | 180 | 3214 | Monitor | Decay at trunk base |
| 4 | Apple, Crab | 7 | 130 | 2.5 | Monitor | Decay at trunk base |
| 6 | Maple, Norway | 15 | 520 | 5565 | Monitor | Graft incompatibility (minor)<br>Co-dominant limbs<br>Topped/lopped c. 5-10 yrs ago |
| G7 | Ash, Common & Sycamore | 15 | 350 | 5 | Monitor | Ivy severed<br>A sparser than normal canopy |
| 8 | Sycamore | 10 | 300 | 4632 | Monitor | Ivy smothered |
| 9 | False Acacia | 12 | 210 | 2213 | Fell | Dead<br>Decay in trunk<br>Advisable for good arboricultural practice |
| 10 | Sycamore | 16 | 520 | 6787 | Monitor | Constricted rooting<br>Buttresses to N; flat to S<br>Topped/lopped c. 5-10 yrs ago |
| 15 | Oak, Holm | 7 | 250 | 1515 | Prop Mon<br>Fell option | Poor specimen, low vitality<br>kinked stem to E<br>Bleeding canker on stem<br>sparse canopy<br>Advisable for good arboricultural practice |
| 18 | Cypress, Leyland | 7 | 140 | 3111 | Fell<br>To benefit T19 | In crown of T19 |
| 21 | Pear, Domestic | 7 | 310 | 3314 | CR 15% | Pruning cavities in upper stem |

**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.

**Landmark Trees Ltd**
**Tel: 0207 851 4544**

# Recommended Tree Works

Hide irrelevant | Show All Trees

**Site: 99a Frognal, Hampstead, London NW3 6XR**

**Surveyor(s): Adam Hollis**

**Date: 22nd May 2013**

**Ref: HCV/FRG/AIA**

| Tree No. | English Name | Height | Stem Diameter | Crown Spread | Recommended Works | Comments/ Reasons |
|---|---|---|---|---|---|---|
| 22 | Ironwood, Persian | 7 | 250 | 4343 | Monitor | Multi stem weakness |
| 25 | Elder | 6 | 500 | 5 | Fell | Dying/ dead & overhangs fence<br>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 (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 Ltd**
**Tel: 0207 851 4544**

# Recommended Tree Works

Hide irrelevant | Show All Trees

**Site: 99a Frognal, Hampstead, London NW3 6XR**

**Surveyor(s): Adam Hollis**

**Date: 22nd May 2013**

**Ref: HCV/FRG/AIA**

| Tree No. | English Name | Height | Stem Diameter | Crown Spread | Recommended Works | Comments/ Reasons |
|---|---|---|---|---|---|---|
| 1 | Beech, Dawyck | 13 | 270 | 3 | Fell | Recommended to permit development |
| 3 | Apple, Crab | 6 | 180 | 3214 | Fell | Decay at trunk base<br>Recommended to permit development |
| 5 | Laurel, Bay | 10 | 400 | 3 | Fell | Multi stem weakness<br>Lost southern stem, 1 of 3<br>2 stems of 320 & 240mm dm<br>Recommended to permit development |
| 24 | Cherry, Flowering | 2.5 | 100 | 2.5 | Fell | Decay at trunk base<br>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).
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 4: TREE SELECTION FOR CONSTRICTED SITES

Table 4: Rosaceous Tree Species for Constricted Planting Sites

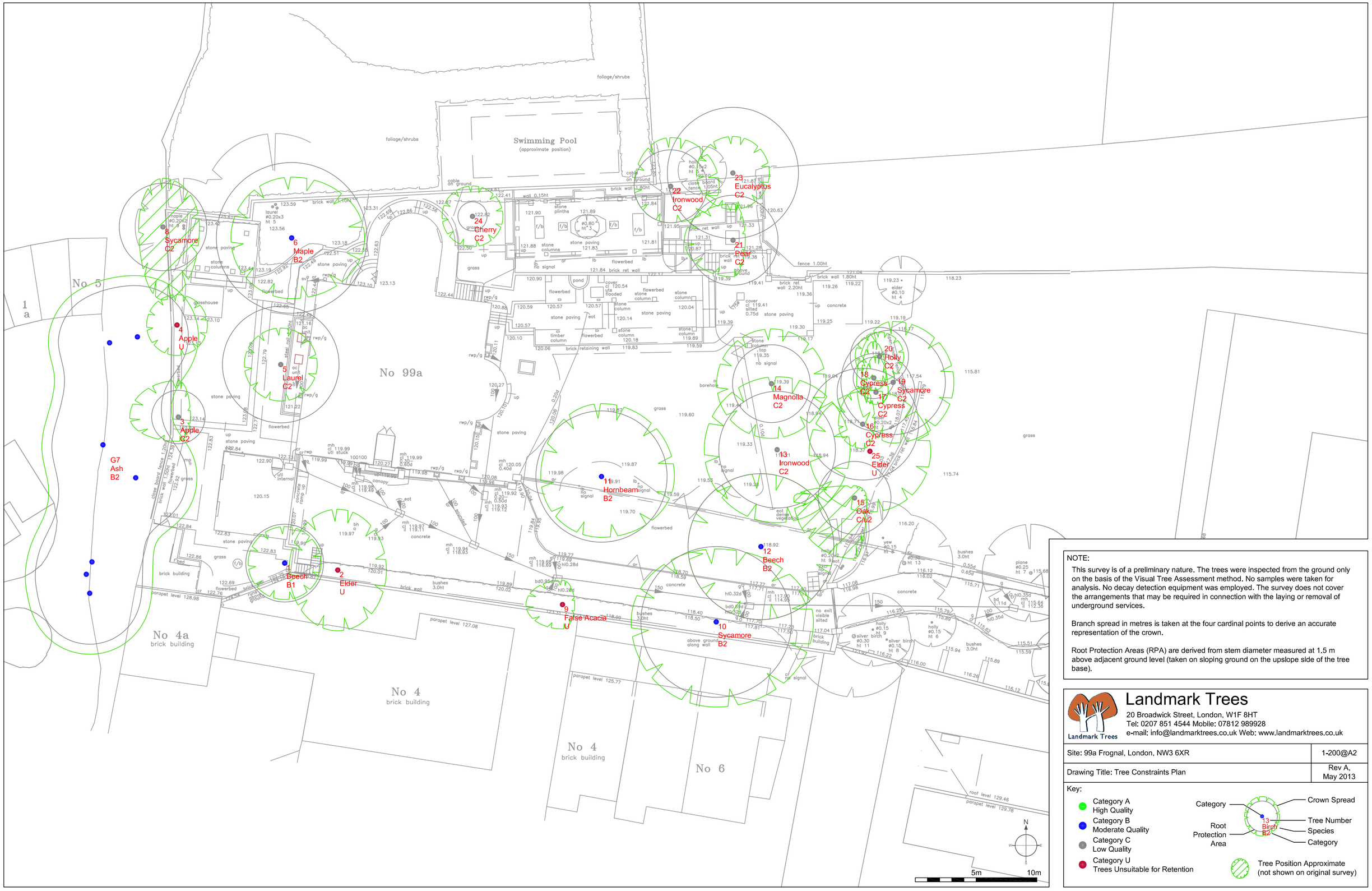
| Common Name | Species | Selected Form |
|---|---|---|
| Hawthorn | Crataegus monogyna | Stricta |
| Cockspur | Crataegus prunifolia | Splendens |
| Cherry | Prunus x hillieri | Spire |
| Bird cherry | Prunus padus | Albertii |
| Rowan / Mountain ash | Sorbus aucuparia | Cardinal Royal |
| Rowan / Mountain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

Table 5: Specimen Tree Species for Constricted Planting Sites

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

**APPENDIX 5**

TREE CONSTRAINTS PLAN




NOTE:

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

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

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


# Landmark Trees

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


| | |
|---|---|
| Site: 99a Frognal, London, NW3 6XR | 1-200@A2 |
| Drawing Title: Tree Constraints Plan | Rev A, May 2013 |

Key:

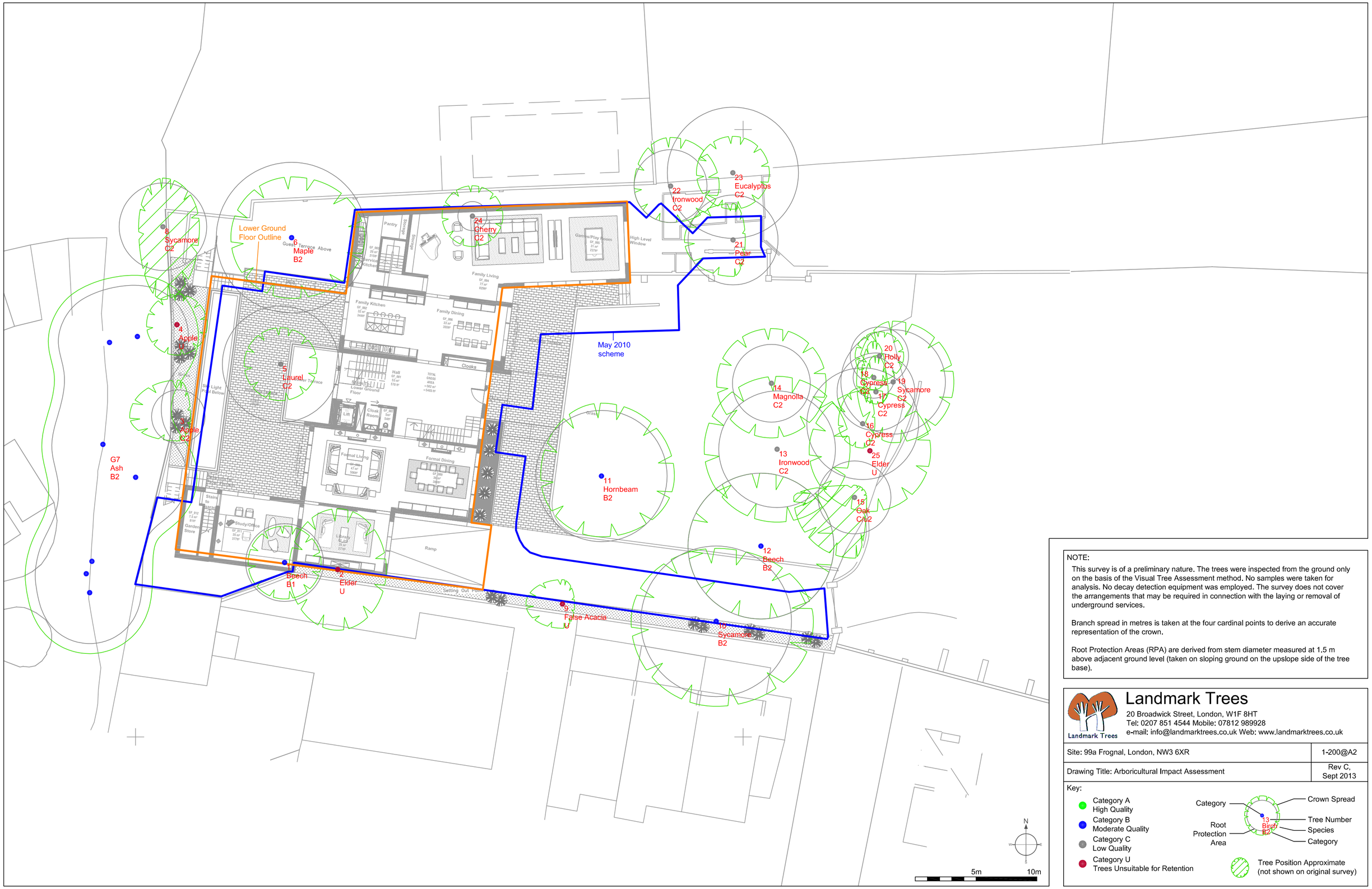
- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category U Trees Unsuitable for Retention

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

Tree Position Approximate (not shown on original survey)

**APPENDIX 6**

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.

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| | |
|---|---|
| Site: 99a Frognal, London, NW3 6XR | 1-200@A2 |
| Drawing Title: Arboricultural Impact Assessment | Rev C, Sept 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)