Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT
& OUTLINE METHOD STATEMENT:

10 Hampstead Square
London
NW3 1AB

REPORT PREPARED FOR:

Pilgrim Limited Properties
c/o Grosvenor Trust Co Ltd
65 Front Street
Hamilton
HMR Bermuda
Bermuda

REPORT PREPARED BY

Adam Hollis
MSc ARB MICFor FArbor A MRICS C Env

Ref: SAV/10HMQ/AIM/01

Date: 2nd August 2016

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:	Pilgrim Limited Properties	Case Ref:	SAV/10HMQ/AIM/01
Local Authority:	LB Camden	Date:	02/08/16
Site Address: 10 Hampstead Square, London NW3 1AB			
Proposal: Replacement of existing garage and boundary wall replacing existing fence			

Report Checklist	Y/N		Y/N
Arboricultural constraints on site	Y	Trees removal proposed	N
Tree Survey	Y	Topographical Survey	N
BS5837 Report	Y	Conservation Area	Y
Tree Preservation Orders	Y		
Tree Protection Plan:	Y		
Tree Constraints Plan:	Y		
Arboricultural Impact Assessment:	Y		

Site Layout				
Site Visit	Y	Date: 20/07/16	Access Full/Partial/None	F
Trees on Site		Y	Off-site Trees	N
Trees affected by development		Y	O/s trees affected by development	N
Tree replacement proposed:		N/a	On or off-site trees indirectly affected by development	N

Trees with the potential to be affected

Garage building encroaches within theoretical RPA of T2 and T3 by 12.8% and 9.3% respectively – use of low invasive foundations proposed as mitigation.

New boundary wall within theoretical RPA of T3 – discontinuous footings with suspended beam proposed as mitigation.

Comments

Recommended works for T1 and T3 regardless of development, but also pertinent to maintaining a safe work site.

Recommendations

1	Proposal will mean the loss of important trees (TPO/CA)	N
2	Proposal has sufficient amelioration for tree loss	N/a
3	Proposals provide adequate tree protection measures	Y
4	Proposal will mean retained trees are too close to buildings	N
5	Specialist demolition / construction techniques required	Y
6	The Proposal will result in significant root damage to retained trees	N
7	Further investigation of tree condition recommended	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 and an outline method statement for the proposed development at 10 Hampstead Square, London NW3 1AB, reviewing any conflicts between the proposals and material tree constraints identified in our survey.

1.2 3 trees were surveyed on the site, a U category *(Unsuitable for Retention) post-mature robinia, a C category *(Low Quality) young weeping birch and a category A *(High Quality) mature copper beech. In theory, only moderate quality trees and above are significant material constraints on development.

1.3 The principal impact in the current proposals comprises the encroachment of the theoretical RPA of T2 (12.8%) and T3 (9.3%) by the new garage building. Low-invasive foundations (i.e. discontinuous footings with suspended beam(s) / raft between) will be employed, therefore affecting a fractional net area of excavation, relative to the gross footprint / RPA encroachment. Flexibility of footing placement (relative to root location) will be built into the design, with the pit locations trial-excavated by hand under supervision. Subject to these measures, the overall impact is likely to be very low for both trees.

1.4 As T1 has been assessed as being unsuitable for retention regardless of any development it does not, strictly speaking, merit consideration of any potential impact to it from development.

1.5 Where the replacement boundary wall passes within the RPA of T3, discontinuous footings shall be employed with flexibility of placement built into the design, such that trial excavated pits containing significant roots / root bundles are infilled and not used, with the footing relocated. A pad and suspended beam specification is proposed.

1.6 There will always be marginal secondary impacts of organic deposition and partial shade on this site, regardless of development. The status quo is unlikely to change with further development, which, in combination with the non-residential nature of the proposals, is the salient point for planning to consider. Thus, the secondary impacts of development are minimal.

1.7 The site has potential for development without impacting significantly on the wider tree population or local landscape. Thus, with suitable mitigation and supervision the scheme is recommended to planning.

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

2. INTRODUCTION

2.1 Terms of reference

2.1.1 LANDMARK TREES were asked by Pilgrim Limited Properties to provide a survey and an arboricultural impact assessment of proposals for the site: 10 Hampstead Square, London NW3 1AB. The report is to accompany a planning application.

2.1.2 The proposals are for the replacement of the existing garage with a new, larger structure and the removal of the boundary fence and restore it to a boundary wall. The proposed wall will follow the existing boundary, starting at the west side of the garage and curving around to the entrance gate to the front of the property. To the east of the garage, it is proposed that the fence is replaced to match the existing boundary fence.

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 20 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: Garage Plan X*

Proposals: Final design - hatch

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

2.3 Scope of survey

2.3.1 As Landmark Trees' (LT) arboricultural consultant, I surveyed the trees on site on 20th July 2016, recording relevant qualitative data in order to assess both their suitability for retention and their constraints upon the site, in accordance with British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations [BS5837:2012].

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

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

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

2.4 Survey Data & Report Layout

2.4.1 Detailed records of individual trees are given in the survey schedule in Appendix 1 to this report. General husbandry recommendations are provided within Appendix 2, if for whatever reason the development does not go ahead, our recommendations in Appendix 2 would still apply.

2.4.2 A site plan identifying the surveyed trees, based on the client's drawings / topographical survey is provided in Appendix 7 of this report.

2.4.3 This plan also serves as the Tree Constraints Plan with the theoretical Recommended Protection Areas (RPA's), tree canopies and shade constraints, (from BS5837: 2012) overlain onto it. These constraints are then overlain in turn onto the client's proposals to create a second Arboricultural Impact Assessment Plan in Appendix 87, which in turn is used to create the Tree Protection Plan in Appendix 9. General observations and discussion follow, below.

3.0 OBSERVATIONS

3.1 Site description

Photograph 1: Garage building at 10 Hampstead Square, London NW3 1AB

3.1.1	10 Hampstead Square dates from the late 19th Century and is a brick built semi-detached property with a mansard roof and dormer windows. The property is not listed, however, it is located within the Hampstead Conservation Area which benefits from a range of architectural styles ranging from different periods. The garage building itself is constructed from concrete panels with corrugate sheet roofing and is located to the north of the house.
3.1.2	The site is relatively level.
3.1.3	In terms of the British Geological Survey, the site overlies the Bagshot Sand Formation. The actual distribution of the soil series are not as clearly defined on the ground as on plan and there may be anomalies in the actual composition of clay, silt and sand content.
3.1.4	Sand and gravel soils are less prone to compaction during development than clay soils, potentially reducing the threat to tree health from construction traffic. The design of foundations near problematic tree species will also need to take into consideration subsidence risk in relation to the clay subsoil and its depth. Further advice from the relevant experts on the specific soil properties can be sought as necessary.

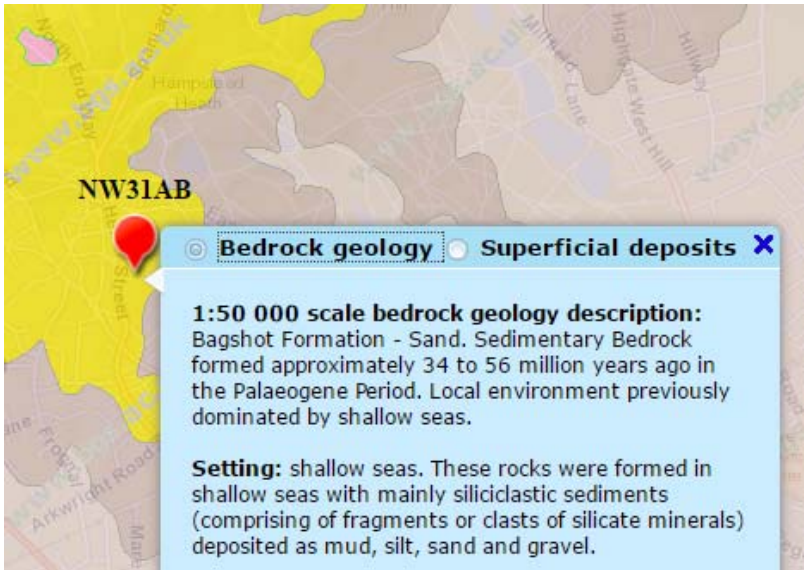

Figure 1: Extract from the BGS Geology of Britain Viewer

3.2 Subject trees

3.2.1	3 trees were surveyed on the site, a U category *(Unsuitable for Retention) post-mature robinia, a C category *(Low Quality) young weeping birch and a category A *(High Quality) mature copper beech.

3.2.4	Full details of the surveyed trees can be found in Appendix 1 of this report.
3.2.5	There are recommended works for 2 out of the 3 trees on site, including the felling of tree T1. The other works listed include the monitoring of the condition of T3. These are listed in Appendix 2.

3.3 Planning Status

3.3.1	We understand that the robinia T1 is subject to a Tree Preservation Order as is the weeping birch T2. The site also stands within the Hampstead Conservation Area, which will further 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).

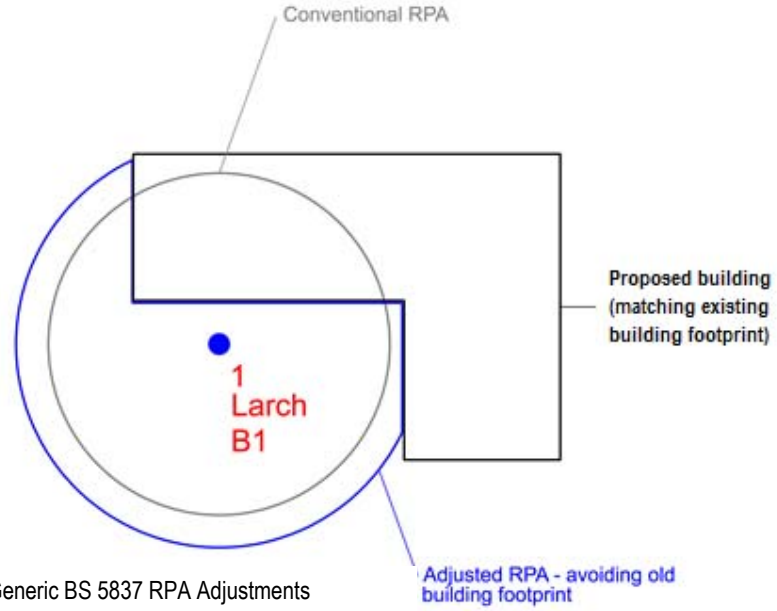

Figure 2 – Generic BS 5837 RPA Adjustments

4.1.3 In BS5837, paragraph 4.6.2 states that RPA's should reflect the morphology and disposition of the roots; where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced. Modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution. Not infrequently, LT are requested by LPA Tree Officers to modify the RPA's to reflect their assumptions that e.g. a road will have drastically limited root growth.

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

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

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

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

4.1.8 The quality of trees will also be a consideration: U Category trees are discounted from the planning process in view of their limited service life. Again, Category-C trees would not normally constrain development individually, unless they provide some external screening function. As discrete, internal trees, their removal will not affect the wooded envelope that encloses much of the site.

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

4.1.10 In theory, only moderate quality trees and above are significant material constraints on development. However, the low quality trees will comprise a constraint in aggregate, in terms of at least, replacement planting.

4.1.11 In this instance, the high quality copper beech T3 has the potential to pose significant constraints to development. It should however be noted that the light nature of construction likely to be involved in these proposals means these constraints will have a lesser impact.

4.2 Secondary Constraints

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

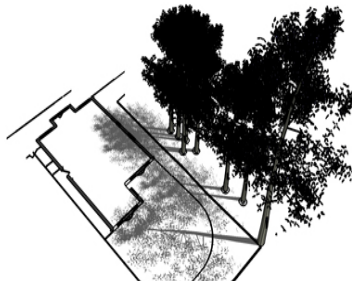

Figure 3 –
Generic Shading Constraints

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

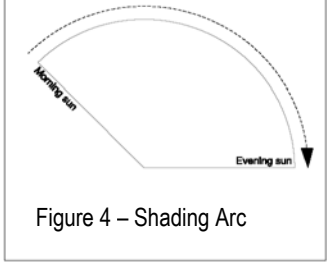

Figure 4 – Shading Arc

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

4.2.4 The non-residential nature of the proposals inherently limits the potential impacts of any secondary constraints and whilst the garage will undoubtedly be subject to organic deposition, this is no different to the *status quo*.

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

5.0

Table 1: Arboricultural Impact Assessment

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

Hide irrelevant | Show All Trees

Ref: SAV_10HMQ_AIM

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	2	Birch, Weeping	Garage Construction within RPA	0.47 m^2 12.82 %	Young	Normal	Moderate	Low	Low	Low-invasive foundation design
A	3	Beech, Copper	Garage Construction within RPA Garage Demolition within RPA	32.70 m^2 9.33 %	Mature	Normal	Moderate	Very Low	Very Low	Low-invasive foundation design Light plant / mini-rigs only & from outside RPA

6.0 DISCUSSION

6.1 Rating of Primary Impacts

6.1.1 The principal impact in the current proposals comprises the encroachment of the theoretical RPA of T2 (12.8%) and T3 (9.3%) by the new garage building. Low-invasive foundations (i.e. discontinuous footings with suspended beam(s) / raft between) will be employed, therefore affecting a fractional net area of excavation, relative to the gross footprint / RPA encroachment. Flexibility of footing placement (relative to root location) will be built into the design, with the pit locations trial-excavated by hand under supervision. Subject to these measures, the overall impact is likely to be very low for both trees.

6.1.2 As T1 has been assessed as being unsuitable for retention regardless of any development it does not, strictly speaking, merit consideration of any potential impact to it from development.

6.1.3 Where the replacement boundary wall passes within the RPA of T3, discontinuous footings shall be employed with flexibility of placement built into the design, such that trial excavated pits containing significant roots / root bundles are infilled and not used, with the footing relocated. A pad and suspended beam specification is proposed.

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

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

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

6.2 Rating of Secondary impacts

6.2.1	There will always be marginal secondary impacts of organic deposition and partial shade on this site, regardless of development. The status quo is unlikely to change with further development.

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 existing hardstanding should be retained to provide adequate protection within the RPA, reinforced if required with temporary surfaces such as Cellweb or Ground Guards.

6.3.2	The building encroachments will require the use of specialised foundation techniques, such as mini-piling or pad and raised beam. The foundation pits within the RPA should be trial-excavated by hand using a double-headed spade ("shove-holer") or similar to minimise breadth of hole required for inspection.
6.3.3	Nuisance deposition can be further mitigated with routine maintenance, light pruning / deadwooding and the fitting of filtration traps on guttering (see Figure 5 below).

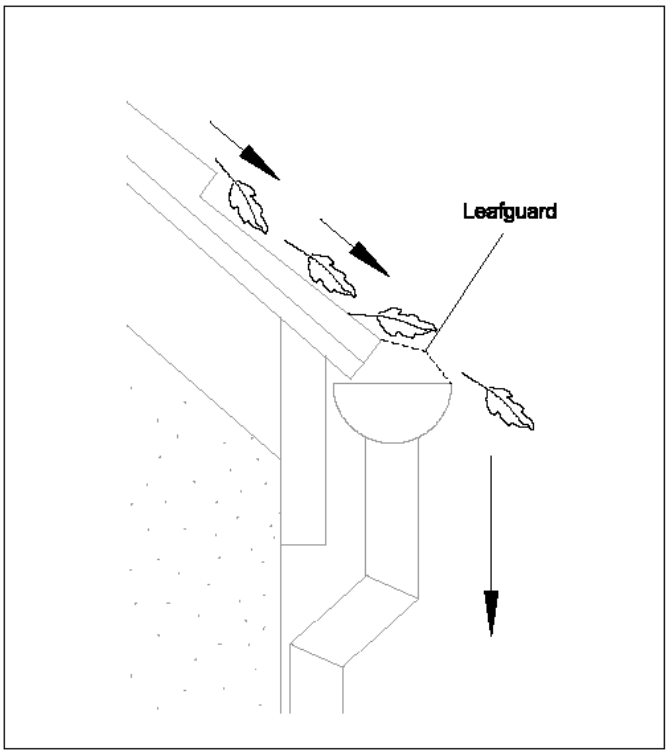

Figure 5: Filtration traps, as shown above, could be fitted on the gutters which can easily be maintained at 2-3m above ground.

7.0 CONCLUSION

7.1	The potential impacts of development are all relatively low in terms of RPA encroachments of trees retained. It is not necessary to remove any tree to facilitate development.
7.2	The full potential of the impacts can be mitigated through design and precautionary measures. These measures are provided in the Outline Method Statement in Section 9.0 of this report, to assist 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	Therefore, the proposals will not have any significant impact on either the retained trees or wider landscape. Thus, with suitable mitigation and supervision the scheme is recommended to planning.

8.0 RECOMMENDATIONS

8.1 Specific Recommendations

8.1.1	Current tree works recommendations are found in Appendix 2 to this report.
8.1.2	Excavation and construction impacts within the RPA's of trees identified in Table 1 above, will need to be controlled by the outline method statement below.

9.0 METHOD STATEMENT

9.1 Outline Method Statement (to be read in conjunction with Appendix 6: Tree Protection Plan)

9.1.1 This outline method statement has been prepared for assistance with the discharge of planning conditions at 10 Hampstead Square, London NW3 1AB. The statement will address the precautions that will be undertaken to protect the trees on and around this site during the proposed construction works.

9.1.2 This section of the report lays down the methodology for any proposed works that may have an effect upon the retained trees. It is essential within the scope of any contracts related to the development proposals that this method statement is observed and adhered to. It is recommended that this section form part of the work schedule and specification issued to the building contractors and can be used to form part of the contract.

9.1.3 Copies of this method statement and the Tree Protection Plan (see Appendix 6) will be available for inspection on site. The developer will inform the local planning authority within twenty-four hours if the arboricultural consultant is replaced.

9.2 Sequence of Works

9.2.1 The sequence of works should be as follows:

i) installation of TPB for demolition & construction;
ii) demolition of existing garage;
iii) installation of supplementary ground protection;
iv) installation of underground services;
v) installation of ground protection (if paving not retained);
vi) main construction;
vii) demolition of fence;
viii) construction of replacement fence and boundary wall;
ix) removal of TPB;
x) soft landscaping;

9.2.2 Site supervision: On this site, a site manager will be nominated to be responsible for all arboricultural matters on site. A pre-commencement site briefing/meeting between the site manager and arboricultural consultant will be held (see Table 1 below). During this meeting all the tree protection methods below will be studied and familiarization with requirements of this AMS. The site manager will also:

- be present on site for the majority of the time;
- have the authority to stop any work that is causing, or has the potential to cause harm to any tree;
- be responsible for ensuring that all site operatives are aware of their responsibilities toward trees on site and the consequences of the failure to observe these responsibilities;
- make immediate contact with the Arboricultural consultant in the event of any tree related problems occurring, whether actual or potential, in accordance with a tree protection protocol (see below).

9.2.3 At this stage, the nominated Key Personnel are as follows:

Adam Hollis Tel: 0207 851 4544
Arboricultural Consultant
Landmark Trees
info@landmarktrees.co.uk

James Remmington Tel: 0207 974 4444
Planning Arb Officer
LB Camden
james.remmington@camden.gov.uk

9.3 Site Monitoring

9.3.1 This section provides a supervision schedule, indicating frequency and methods of site visiting and record keeping. Landmark Trees are to be retained as Arboricultural Consultants responsible for site monitoring for the duration of the development. As noted above Adam Hollis MSc (Arb) is the key contact, with monitoring occasionally undertaken by James Bell Tech Cert. (subject to any new staff intake). Site monitoring will be undertaken by a qualified and experienced arboriculturalist at pre-determined and agreed time intervals as indicated in Table 1 below. In addition to specific task monitoring, it is recommended that general tree protection monitoring be undertaken periodically based intensity of site operations, coordinated where practical with the visits detailed in Table 1.

9.3.2 The arboriculturalist will arrive at the site, check in at the site office and be safely escorted around the site by the site manager, checking the maintenance of tree protection measures. Routine visits will generally be unannounced. However, the arboriculturalist will also visit subject to advance notification and agreement to supervise any agreed works within the RPA, in accordance with table 1 below.

9.3.3 A tree protection protocol will be devised and integrated into the site induction process at a pre-commencement meeting involving the developer, the arboricultural consultant, the site manager and the Council tree officer as appropriate. In addition to the Tree Protection Plan and Arboricultural Method Statement, the protocol should contain a current contact list of the key personnel noted above (subject to any changes and confirmation of key personnel made since the writing of this AMS) and contingency plans covering actions to be taken in the event of accidents or unforeseen incidents involving or affecting retained trees.

9.3.4 The protocol will be that in the event of any unplanned incursion / accident / spillage within the RPA, the site agent should notify (by telephone) the retained arboricultural consultant immediately. The consultant will provide advice and attend site as soon as possible. This may require the stoppage of all or part of the works in the vicinity of the tree. The consultant will notify the LPA Tree Officer of the nature and extent of damage, the mitigation strategy and likely prognosis. The consultant and officer will further liaise as necessary (perhaps meeting on site) until the officer is satisfied that protection measures are again satisfactory. The action in response to incidents will be commensurate with and appropriate to the nature of any such incident. Any breach of the stipulated timescale for remediation will trigger a further monitoring report.

9.3.5 Supervision will not require the arboriculturalist to be present throughout all operations to ensure tasks are carried out as per the approved methodology, but certainly, during the key elements of proposed (and any other unplanned) incursions into the protection areas (subject to LPA agreement and for whatever reasons). Such supervision would require the arboriculturalist to attend site, if not the whole task, to ensure the arboricultural objectives were met. However, where tasks are ongoing, provided the arboriculturalist is satisfied, and after an appropriate briefing, the supervision may be reduced to telephone and email contact between the site foreman/ contractor and arboriculturalist.

9.3.6 The Local Authority will have free access to the site subject to H&S requirements; any problems will be reported directly to Arboricultural consultant, who will then visit the site and make recommendations to the developer on how best to rectify the situation and ensure implementation. As noted in Table 1 below, a final sign-off visit will be carried out at the end of the development and a formal letter sent to both the client and Local Authority indicating an end to the monitoring period. It is the client's duty to notify LT that the project has been completed, in order to facilitate such an inspection.

Table 1: Site Monitoring Visits

Supervision Visit No:	Details	Action
Visit 1: Pre-Development Site Inspection (S.2.3 of AMS)	• To included construction Site Agent briefing (S.1.5). • To confirm position of protective measures and that they have been installed in accordance with AMS (S.9.4.2 and Tree Protection Plan in Appendix 6); • To check any tree works have been undertaken in accordance with this AMS (S.9.4.1 and Appendix 1). • Determine if further tree work is required and seek required permission if necessary. • To check site facilities/access are in accordance with the AMS (S.9.5.3).	Issue a brief report with findings to Architect and Main Contractor within 5 days of site supervision visit (Site Monitoring Sheet in Appendix 3).
Visit 2: Installation of any new services within RPA (S3.4)	• Attend any excavation within RPA's where arboricultural supervision is prescribed by the AMS to ensure work is undertaken in accordance with NJUG provisions or other specification. • Date to be confirmed following formal project planning. • 2 weeks prior notice required.	
Visit 3: Demolition of hard surfaces/structures within RPA (S3.6) and Arboricultural supervision of construction within RPA	• Confirm position of any additional temporary ground protection and that temporary ground protection is in accordance with AMS. • Attend any excavation within RPAs where arboricultural supervision is prescribed by the AMS and any other unplanned incursions into the protection areas (subject to Local Authority agreement as noted above). • 2 weeks prior notice required.	Issue a brief report with findings to Architect and Main Contractor within 5 days of site supervision visit (Site Monitoring Sheet in Appendix 3).
Ongoing Monitoring Visits	• Periodically during 12 months (or longer) of entire project. • Visits will be based intensity of site operations; once a month is considered reasonable. • To be carried out before, between and after detailed visits 2 and 3 above. • Attend site to confirm protective measures are still in place. Ensure attendance is timed for any other key elements of proposed (and any other unplanned) incursions into the protection areas.	Issue a brief report with findings to Architect and Main Contractor within 5 days of site supervision visit (Site Monitoring Sheet in Appendix 3).
Final Site Visit - Completion of construction phase supervision visit (S.5)	After it has been confirmed that the construction phase is complete, allow removal of temporary ground protection and protective fencing. Specify any remedial work if necessary.	Issue a brief report with findings to Architect and Main Contractor within 5 days of site supervision visit (Site Monitoring Sheet in Appendix 3). Provide signed arboricultural checklist (see Appendix 3)

9.4 Pre- Development Site Preparation

9.4.1	There are no specific works recommended to facilitate development however there are husbandry works (i.e felling of T1) listed in Appendix 2.
9.4.2	The retained trees should be protected with the Tree Protection Barriers (TPB) as shown on the Tree Protection Plan (TPP) in Appendix 9. The TPBs should comprise either individual boxed hoarding 2.4m in height. The positions of the TPBs are shown on the TPP in Appendix 6, which can be used as part of the discharge of conditions.
9.4.3	These TPBs are to be erected before any work commences on site, is to remain 'in situ' undamaged for the duration of all work or each phase, and only to be removed once all work is completed. If any work is deemed necessary prior to the erection of fencing a Landmark Trees representative should be informed to enable their presence to oversee the work being carried out.
9.4.4	The only other exception is the completion of soft landscaping but if any excavations, however minor, are to be carried out as part of soft landscaping within RPAs, an arboricultural assessment must be carried out beforehand and any arboricultural protection measures incorporated. The TPBs should carry waterproof warning notices denying access within the RPA.
9.4.5	The Tree Protection Plan in Appendix 6 illustrates where the protective fencing will be located to form the boundary of the Construction Exclusion Zone (CEZ). The CEZ is an exclusion zone and suitable steps will be taken to prevent access by pedestrians and vehicles and the storage of any works materials and equipment will be located outside of the CEZ.
9.4.6	Ground outside the CEZ must be protected from site traffic and not left exposed during construction. As far as practical, existing hard surfaces should be retained as initial ground protection (where fit for purpose for anticipated loading) until the landscaping phase and / or substituted / supplemented with appropriate materials (e.g. Infraweb, Ground Guards etc.), capable of withstanding anticipated loads. NB the provision of ground protection on plan does not prohibit the consented laying of services and related works in those areas. It means that those operations should proceed under caution and protect adjacent ground to that immediately requisitioned for the work in hand.
9.4.7	Upon completion of the tree works and installation of the protection measures, the standard of work can be checked by the retained arboricultural consultant who can then liaise with the local authority. If there are any amendments to either the tree works or additional protection measures, they will be agreed at this meeting and confirmed in writing.

9.5 Development Phase

9.5.1 The following general precautions will apply:

- No fires shall be made on any part of the site, or within 20m of any tree to be retained.
- No spilling or pouring of fuels, oils, solvents, tar shall be made on any part of the site.
- No materials that are likely to have an adverse effect on tree health such as oil, bitumen or cement will be stored or discharged within 10 metres of the trunk of a tree that is to be retained.
- No spillage or discharge of wet mortar or concrete shall be made on any part of the site.
- No storage of materials shall be made within the protective fences.
- No breaching or moving of the protective fences without the approval of an arboriculturist.
- Alterations in levels within the tree protection fence areas shall be avoided.

9.5.2 The procedures for dealing with variations and incidents are detailed in S.9.2 and S.9.3, with the routine inspections, unannounced visits and supervisory visits highlighted in Table 1. It is also noted that the arboriculturist shall attend site as required by architect, or site agent, or the LPA; any breaches of tree protection measures will be the subject of a site monitoring report, which will be copied to architect, client and LPA. The site monitoring sheet in Appendix 3 will be used to provide photographic evidence (if required), indicate the remedial action required and timescales for remediation completion. The action in response to incidents will be commensurate with and appropriate to the nature of any such incident. Any breach of the stipulated timescale for remediation will trigger a further monitoring report.

9.5.3 Site access will be as existing and accommodation will make use of the garden to the east of the garage.

9.5.4 Delivery lorries will be excluded from RPA by the tree protection fencing and ground protection. Adequate allowance will be made for vehicle heights and ground clearance, where the tree canopy overhangs the access route. Any further pruning for working clearances must be discussed first with the arboriculturalist; once agreed in principle these works should be approved by the appropriate tree officer and approved in writing by the LPA. Materials can be unloaded onto protected ground within RPA's and stored throughout the interior of the site away from protected trees

9.5.5	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.

9.6 Routing & Installation of Services

9.6.1	Every effort should be made to ensure that the routing and instillation of services avoid the RPA at the design stage; however if unavoidable then it may be possible with written permission from the LPA to implement the provisions of BS5837 and NJUG VOLUME 4 (e.g. radial trenching and /or mole trenching) under arboricultural supervision.

9.7 Changes in Grade

9.7.1	The upper layer of top soil contains the majority of a tree's roots and if this is disturbed by a reduction in ground level, serious damage can be caused. If such soil is to be disturbed within the CEZ / RPA, it will be done only with hand tools and the supervising arborist will be informed if roots are exposed. If ground levels need to be marginally altered within the RPA of any tree, prior agreement must be sought from the Tree Preservation Officer and given in writing by the Planning Authority.

9.8 Demolition and Construction Measures

Detailed method statements and risk assessments will be obtained from all specialist subcontractors involved in the new build and these will be scrutinised by the site agent to ensure the AMS requirements have been considered therein.

9.8.1	Demolition of structures within what would otherwise be an RPA will proceed with due caution to avoid unnecessary damage to trees. Such measures apply in particular to T3 and both garage demolition and fence removal.
9.8.2	All plant and vehicles engaged in demolition works will either operate outside the RPA, or work from within the existing built structure and protected ground, near trees. Where trees stand adjacent to structures scheduled for demolition, it will be necessary to undertake demolition inwards within the footprint of the existing building (often referred to as "top down, pull back"). Such measures apply to T2 & 3.

9.8.3 Any existing hard standing within the tree's RPA's will be first broken up with manual power tools and then carefully removed with light plant by a skilled machine operator, either operating outside the RPA, or working from within the existing built structure and hard standing, near trees. Soil exposed beneath the structure will not be scraped away, but preserved in situ and protected immediately (not tracked over) with replacement ground protection before the continuance of operations.

9.8.4 The garage encroachments will require the use of specialised foundation techniques, i.e. a mini-piling and raft design. Flexibility of footing placement (relative to root location) will be built into the design, with the pit locations trial-excavated by hand under supervision.

9.8.5 The piles will be installed using a mini piling rig (e.g. Klemm MR701) with no more than a 3.5m working height in order to avoid any contact with tree canopies. The piling rig will stay on protected ground at all times.

9.8.6 Where the replacement boundary wall passes within the RPA of T3, discontinuous footings shall be employed with flexibility of placement built into the design, such that trial excavated pits containing significant roots / root bundles are infilled and not used, with the footing relocated. A pad and suspended beam specification is proposed.

9.8.7 During the construction phase and throughout dry periods on site regular hosing down will be carried out to control dust pollution. In the event of dust build up on trees occurring arboricultural advice will be sort and if necessary remedial measures such as hosing down the trees will be taken.

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

9.9 Removal of Ground Protection & Post Construction Landscaping & Treatment

9.9.1 The tree protection may be removed upon completion of the construction phase and when all drainage and service runs have been installed and any site machinery has been removed from the RPA.

9.9.2 Any further landscaping works should avoid the changing of ground levels or deep digging. Heavy machinery should not be used in the vicinity of the retained tree.

9.9.3 If herbicides are to be used they should be appropriate to their purpose and not in such a way as to damage the retained tree or vegetation; they must be applied by a suitably qualified person i.e. a holder of a recognised 'certificate of competence'.

9.9.4	Ideally, the retained trees should remain in a shrub area as this reduces the chances of compaction and disturbance of root systems.
9.9.5	Any new planting schemes adopted should consider aspects of the site such as current design, layout and future use. Consideration should also be given to the soil type, climate and overall character of the landscape.

9.10 Completion

9.10.1	Following completion of the works listed above, a Landmark Trees consultant will meet with a local authority representative and agree upon any remedial works deemed necessary.
9.10.2	A separate LT post-development tree inspection (with specific reference to the retained tree) is recommended to facilitate a constructive meeting. Any works agreed in this meeting will be confirmed in writing and will be performed to BS 3998: 2010 Tree Works.
9.10.3	It is recommended that, in due course, acceptance of the recommendations in this report is demonstrated by, for example, the architect specifying in writing to the building contractor that tree care conditions apply in execution of the contract, and by an estimate or written undertaking from the contractor to the architect demonstrating that the practical aspects of tree protection recommendations have been priced in to the job.
9.10.4	If conflicts between any part of a tree and the building arise in the course of development these can often be resolved quickly and at little cost if a qualified arboriculturist is consulted promptly. Lack of such care is often apparent quickly and decline and death of such trees can spoil design aims and can of course affect saleability, and reflects lack of best practice. Trees that have been the recipients of careful handling during construction add considerably to the appeal and value of the finished development.

10.0 REFERENCES

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- Helliwell R (1980) Provision for New Trees; Landscape Design; July/August issue
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- Thomas P, 2000. Trees: Their Natural History, Cambridge University Press, Cambridge.
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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

Site: 10 Hampstead Square

Date: 20/07/2016

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: SAV_10HMQ_AIM

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
1	False Acacia	15	3645	4.0	1000	Post-Mature	12.0	Poor	Poor	U		<10	Laetiporus decay fungi on stem Dying back (uniform) Fungi just above main fork at 2m. Ivy-smothered crown and stem
2	Birch, Weeping	3	1333	1.5	90	Young	1.1	Normal	Good	C	1	>40	
3	Beech, Copper	18	5444	4.0	880	Mature	10.6	Normal	Fair	A	2	>40	Restricted rooting Recent root disturbance to W Old ropes occluded in bark. Minor bark dysfunction below wound S

Appendix 2

Recommended Tree Works

Notes for Guidance:

1, 2, 3 - Urgent (ASAP), Standard (within 6 months), Non-urgent (2-3 years)
CB - Cut Back to boundary/clear from structure.
CL# - Crown Lift to given height in meters.
CT#% - Crown Thinning by identified %.
CCL - Crown Clean (remove deadwood/crossing and hazardous branches and stubs)*.
CR#% - Crown Reduce by given maximum % (of outermost branch & twig length)
DWD - Remove deadwood.
Fell - Fell to ground level.
FInv - Further Investigation (generally with decay detection equipment).
Pol - Pollard or re-pollard.
Mon - Check / monitor progress of defect(s) at next consultant inspection which should be <18 months in frequented areas and <3 years in areas of more occasional use. Where clients retain their own ground staff, we recommend an annual in- house inspection and where practical, in the aftermath of extreme weather events.
Svr Ivy / Clr Bs - Sever ivy / clear base and re-inspect base / stem for concealed defects.

*Not generally specified following BS3998:2010

Landmark Trees

Site: 10 Hampstead Square
Date: 20/07/2016

Appendix 2

Recommended Tree Works

Surveyor(s): Adam Hollis
Ref: SAV_10HMQ_AIM

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
1	False Acacia	U	15	4.0	3645	Fell Pollard option, subject to further investigation of decay, but tree dying.	Laetiporus decay fungi on stem Dying back (uniform) Fungi just above main fork at 2m. Ivy-smothered crown and stem Recommended husbandry 2
3	Beech, Copper	A	18	4.0	5444	Mon Check for deadwood over playground following fence excavation.	Restricted rooting Recent root disturbance to W Old ropes occluded in bark. Minor bark dysfunction below wound S Recommended husbandry 2

Appendix 3 General Guidelines & Sample Site Monitoring Sheet with Checklist

5.1 All work must be to BS 3998:2010 - '*Recommendations for tree work*'.

5.2 Staff carrying out the work must be qualified, experienced and ideally be Arboricultural Association approved contractors, and will be covered by adequate public liability insurance.

5.3 Any defects seen by a contractor or the client that were not apparent to the consultant must be brought to the consultant's attention immediately.

5.4 No liability can be accepted by the consultant in respect of the trees unless the recommendations of this method statement are carried out under the supervision of a Landmark Trees consultant.

5.5 It is advisable to have trees inspected by a consultant regularly. On this site it is recommended that these inspections are made every year.

Landmark Trees

Site Monitoring Report Sheet

Client:		**Planning Ref:**	
Local Authority:		**Date:**	
Site Address:			
Proposal:			

Visit Checklist	**Y/N**		**Y/N**
Tree protection barrier (TPB) in place		TPB as per approved	
Ground protection (GP) in place		GP as per approved	
TPB / GP breached		Trees damaged	
Site Agent briefed by LT			
LT briefed by Site Agent			
LPA informed			
Remedial action required			

Comments

Recommendations

Outcome		
1		
2		
3		
4		

Web: www.landmarktrees.co.uk
e-mail: info@landmarktrees.co.uk
Tel: 0207 851 4544

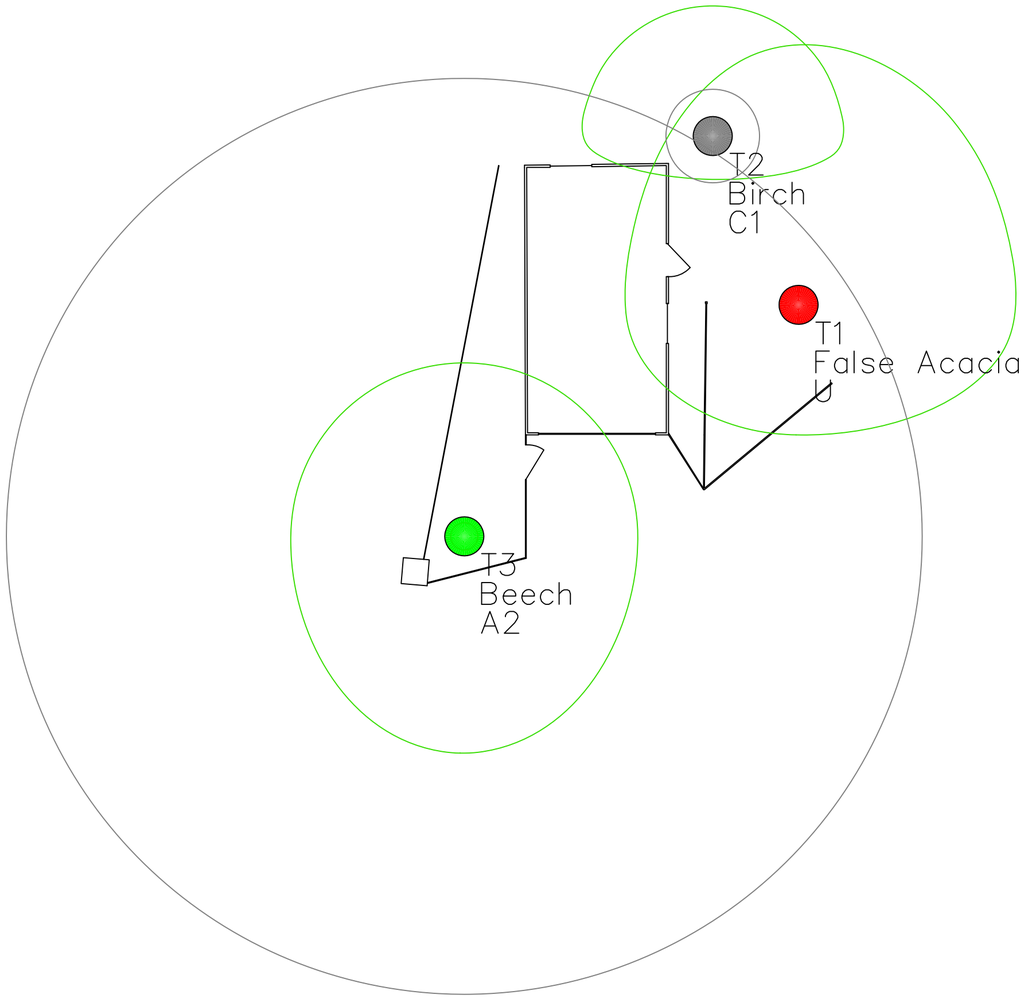
London Office: 20 Broadwick Street, W1F 8HT, London
Registered Office: Grange Cottage, All Cannings, Devizes, Wiltshire, SN10 3NR

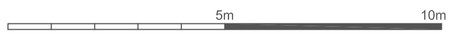
Arboricultural Supervision Sign off Checklist

Tree No (s)	Project Phase	Task	Date Completed	Signed (Project arboriculturist)	Signed (Site Manager)
	Pre-commencement	Pre-commencement site meeting to include site manager briefing (S.1.5)			
	Pre-commencement	Confirm the location and specification of the protective measures is in accordance with AMS & Tree Protection Plan (TPP)			
	Pre-commencement	Confirm any tree works have been undertaken in accordance with this AMS (S.2.1/ App 1) and determine if further tree work is required			
	Pre-commencement	Seek required permission for further tree works if necessary.			
	Installation of any new services	Attend any excavation within RPA's where arboricultural supervision is prescribed by the AMS (S3.4) to ensure work is undertaken in accordance with NJUG provisions or other specification.			
	Demolition	Demolition of hard surfaces/ structures within RPA (S3.6) Confirm position of any additional temporary ground protection and that temporary ground protection is in accordance with AMS.			
	Completion of Demolition	Sign off of the demolition phase			
	Construction	Supervised manual excavation of foundations			
	Construction	Installation of 'No Dig' hard surfacing			
	Construction	Additional excavations (if required)			
	Completion of Construction	Completion of construction			
	Post Construction	Removal of machinery and materials from site			
	Post Construction	Dismantle & removal of protective measures			
	Landscaping	Completion of Landscaping			
	Project Completion	Sign off from project arboriculturist			

APPENDIX 4

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

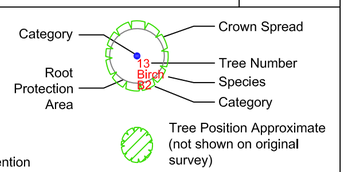
Landmark Trees

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: 10 Hampstead Square	1:100@ A2
Drawing Title: Tree Constraints Plan	July 2016

Key:

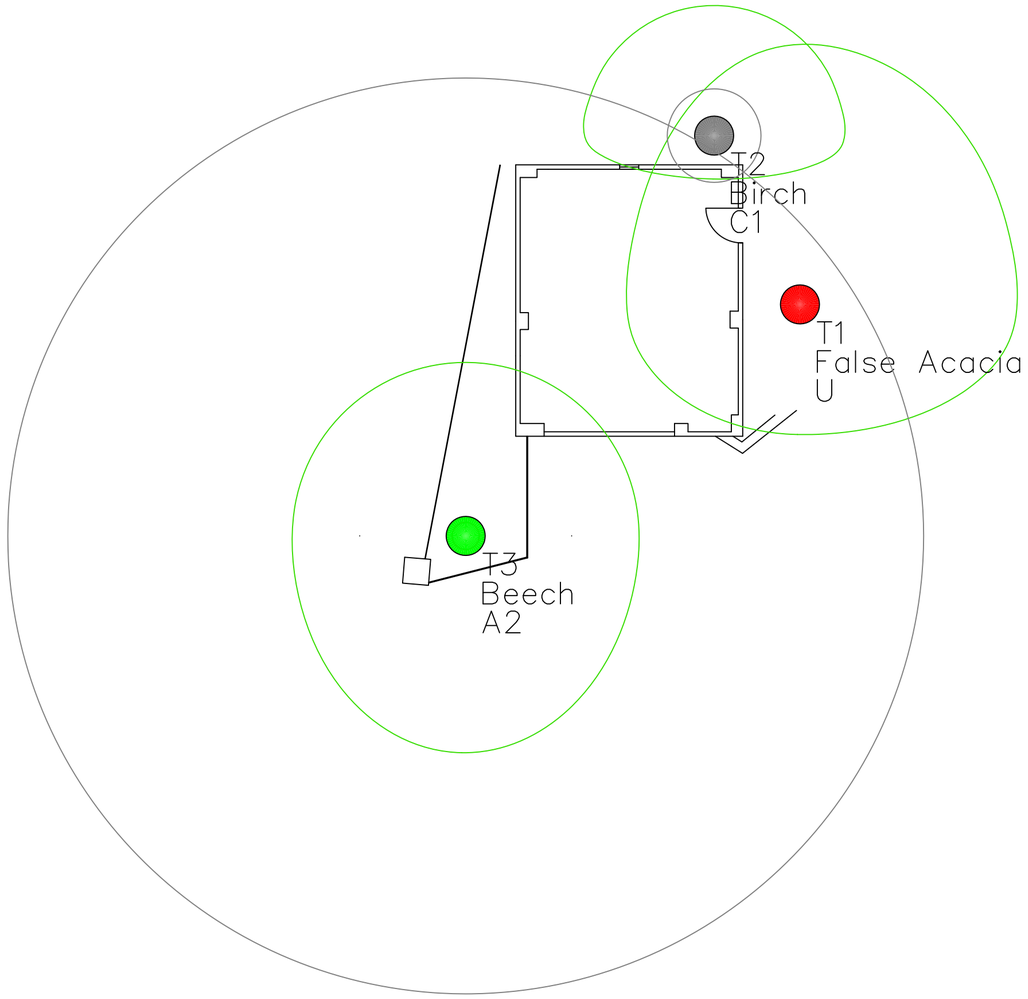
- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category U Trees Unsuitable for Retention

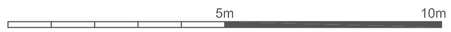


Tree Position Approximate (not shown on original survey)

APPENDIX 5

ARBORICULTURAL IMPACT ASSESSMENT PLAN





NOTE:

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

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

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

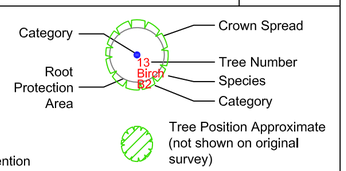
Landmark Trees

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: 10 Hampstead Square	1:100@ A2
Drawing Title: Arboricultural Impact Assessment Plan	July 2016

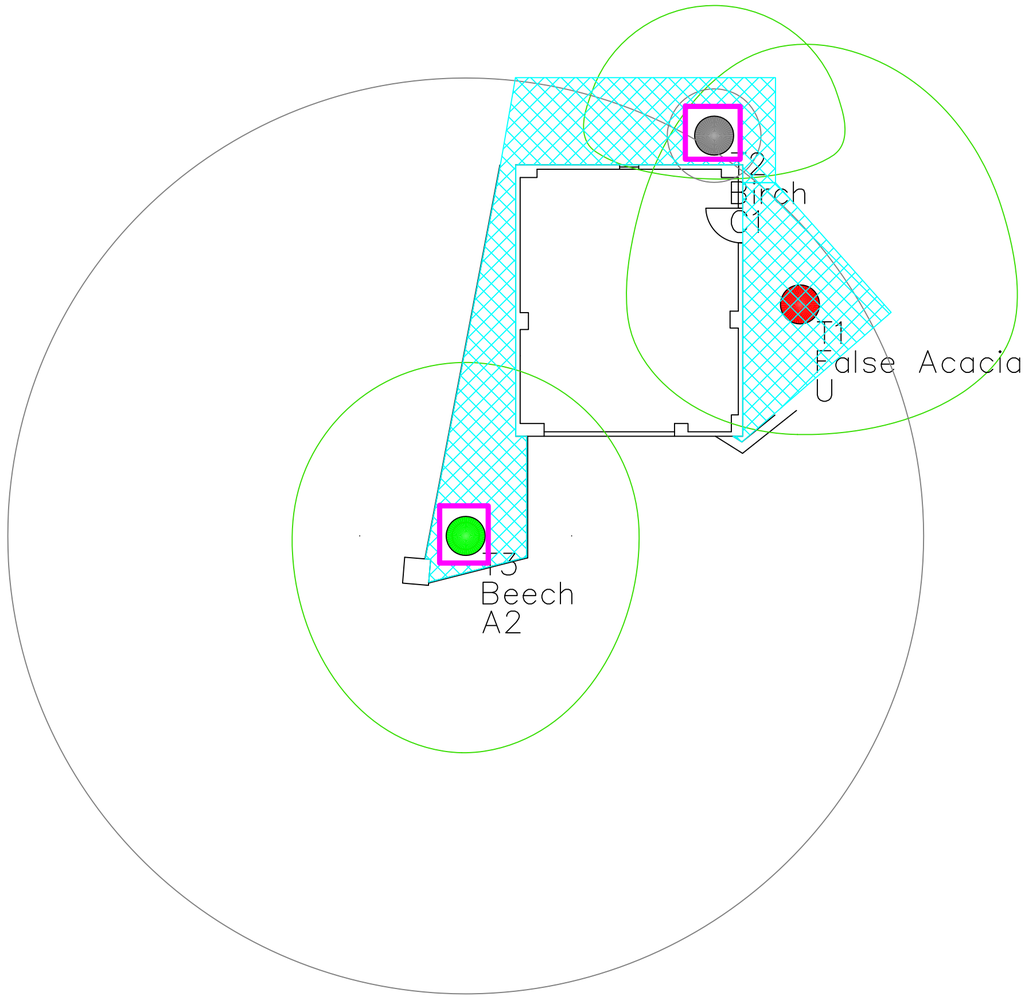
Key:

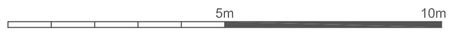
- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category U Trees Unsuitable for Retention



APPENDIX 6

TREE PROTECTION PLAN





NOTE:

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

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

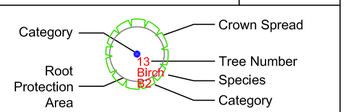
Landmark Trees

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

Site: 10 Hampstead Square	1:100@ A2
Drawing Title: Tree Protection Plan	July 2016

Key:

- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category U Trees Unsuitable for Retention
- Ground Protection: Ground Guards Multi Track Mats as ground protection



- Tree Position Approximate (not shown on original survey)
- 2.4m Tree Protection Fencing