Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT

& OUTLINE METHOD STATEMENT:

St Peter's Vicarage

53 Belsize Square

London NW3 4HL

REPORT PREPARED FOR:

Diocese of London

C/o Johnson Naylor

13 Britton Street

London EC1M 5SX

REPORT PREPARED BY

Adam Hollis

MSc ARB MICFor FArbor A MRICS C Env

Ref: JNR/SPV/AIM/01b

Date: 25th April 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:	Diocese of London	**Case Ref:**	JNR/SPV/AIM/01b
Local Authority:	LB Camden	**Date:**	25/04/2016
Site Address: St Peter's Vicarage, 53 Belsize Square, London NW3 4HL			
Proposal: The demolition 1960's vicarage building and replacement with a terrace of properties comprising a replacement 3 bed vicarage, a 1 bed flat and 2 further 4 bedroom houses.			

Report Checklist	**Y/N**		**Y/N**
Arboricultural constraints on site	Y	Trees removal proposed	Y
Tree Survey (by AP Arboriculture & LT)	Y	Topographical Survey	Y
BS5837 Report	Y	Conservation Area	Y
Tree Preservation Orders	N		
Tree Protection Plan:	N/a	(Include in future method statement)	
Tree Constraints Plan:	Y		
Arboricultural Impact Assessment:	Y		

Site Layout				
Site Visit	Y	Date: 05/02/15 & 05/08/15	Access Full/Partial/None	P
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

Potential impacts discussed with Tree Officer Nick Bell on site (05/08/15). Felling of low quality internal site trees agreed, along with mitigation for T19 and various tree works to boundary trees to reduce canopy encroachment.

New landscape plans indicate additional encroachments with suitable mitigation for retained trees and replacement planting (see Landscape Document by Emily Erlam Studios). Rear boundary fencing to have low invasive foundations, positioned by hand-dug pits.

Comments

Recommended husbandry works 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	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 to accompany the full planning application proposals for St Peter's Vicarage, 53 Belsize Square, London, reviewing any conflicts between the proposals and material tree constraints identified in our survey.

1.2 There are 20 trees surveyed on or around the site, of which 5 are B category *(Moderate Quality) and 15 are C category *(Low Quality). In theory, only moderate quality trees and above are significant material constraints on development. However, the low quality trees would comprise a constraint in aggregate, in terms of any collective loss / removal, where replacement planting would be appropriate. In this instance, no such collective impact is proposed.

1.3 The tree constraints on this site have been considered from the outset, with the design evolving within them. The Camden Tree Officer, Nick Bell was invited to site to discuss the proposals on 05/08/15. At this meeting it was agreed that the principal primary impacts of felling the category C internal site trees T7 – 12, T14 and T17 was acceptable. In terms of the category B sycamore T6, it is important to note that the tree is a multi-stem coppice stool of c. 6 stems: at the meeting the removal of 2 northern stems was agreed in principle. A full landscaping scheme will be provided, with suitable replacement species noted in Appendix 4 of this report.

1.4 The theoretical RPA encroachments and canopy conflicts affecting the retained trees were also discussed. It was agreed that the category B tree T19 could be (re)pollarded to accommodate the elevation, with the ground floor levels raised for parking by appropriate engineering solution. This can be left to detail, but either infra web /arboraft or a discontinuously supported concrete slab would provide sufficient mitigation to enable the proposed level changes. This mitigation will also apply to the RPA encroachments for T16 and T18.

1.5 The theoretical encroachments of the new building to the RPA's of the on-site tree T18, in addition to the off-site trees T13 and T15 have been considered in detail. The existing root colonisation of T18 is likely to have been significantly reduced by the retaining wall and concrete hard standing. The root colonisation of T13 and T15 will be less constrained; therefore it is proposed that the line of the new foundations is hand excavated to 750mm, with pre-emptive root pruning. The canopy encroachment of all three trees was discussed on site with Nick Bell and was considered acceptable. However, it may be preferable to consider the replacement of T13 and T15 with a columnar species that will require less maintenance in the future; this would also provide landscape enhancement by replacing low quality trees with poor structure (T13) and a suppressed crown (T15).

1.6 Where the proposals encroach the theoretical RPAs of T1 – T6, low invasive foundations are proposed to the single storey wings. The piles will be strategically located using trial pits on the party wall lines, with beams spanning between and a ventilated void between the ground and underside of building.

1.7 The recent Landscape document by Emily Erlam Studios provides for replacement planting. The new landscape plans also that indicate any additional encroachments, including new hard surfacing/level rises/drainage and hedge planting) includes suitable mitigation for retained trees. This mitigation includes porous surfaces and the retention of gravel dressings around the tree stems. Where there ground levels are to be raised to create lawn areas (T13, T15 and T16), it is essential that course granular materials (e.g. pebbles) and suitable replacement soils are used. This also applies to the soils and level raising to the rear of the site (T1 – T6). The proposed rear boundary fencing should have low invasive foundations 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.

1.8 Secondary impacts from the new elevation require pruning to maintain convenient canopy clearance. These requirements are similar to those that exist today for T19. It is likely that the pruning requirements for the boundary trees to the south of the site (T1 – T6) will be minimal following the initial pruning to facilitate construction. The proposed green roof and other mitigation techniques will ensure that the secondary impacts of honeydew / litter deposition and partial shade on this site are minimised.

1.9 As agreed with the Tree Officer Nick Bell, 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 Diocese of London, C/o Johnson Naylor to provide a survey and an arboricultural impact assessment of proposals for the site: St Peter's Vicarage, 53 Belsize Square, London. The report is to accompany a planning application.

2.1.2 The proposals include the demolition of an existing 1960's vicarage building which is in poor condition and in need of significant renovation or replacement. The resulting land would then be utilised to build replacement with a terrace of properties comprising a replacement 3 bed vicarage, a 1 bed flat and 2 further 4 bedroom houses.

2.1.3 This report will assess the impact on the trees and their constraints, identified in our survey. Although the proposals were known at the time of the survey, Landmark Trees endeavour to survey each site blind, working from a topographical survey, wherever possible, with the constraints plan informing their evolution.

2.1.4 I am a Registered Consultant and Fellow of the Arboricultural Association and a Chartered Forester, with a Masters Degree in Arboriculture and 25 years' experience of the landscape industry - including the Forestry Commission and Agricultural Development and Advisory Service. I am a UK Registered Expert Witness, trained in single and joint expert witness duties. I am also Chairman of the UK & I Regional Plant Appraisal Committee, inaugurated to promote international standards of valuation in arboriculture.

2.2 Drawings Supplied

2.2.1 The drawings supplied by the client and relied upon by Landmark Trees in the formulation of our survey plans are:

Existing site survey: Tree Constraints Plan - St Peter's Vicarage, Belsize Square, London NW3 4HJ (originally prepared by AP Arboriculture)*

Proposals: 1984-01-IP-01-Proposed

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

2.3 Scope of Survey

2.3.1 The trees on site were originally surveyed by Andrew Pinchin of AP Arboriculture on the 19th May 2014 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]. As Landmark Trees' (LT) arboricultural consultant, I have reviewed the survey, without full access to the site on 5th February 2015 and held a site meeting with the LB Camden Tree Officer Nick Bell on 5th August 2015.

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. The original survey has been updated in accordance with the above LT site visits.

2.4.2 A site plan identifying the surveyed trees, based on the client's drawings / topographical survey is provided in Part 3 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 Part 3. General observations and discussion follow, below.

3.0 OBSERVATIONS

3.1 Site Description

Photograph 1: Aerial view of St Peter's Vicarage, 53 Belsize Square, London

3.1.1	The site is situated in Belsize Square and forms part of the existing vicarage, which was built in the 1960's. The original vicarage was demolished and replaced in 1915 and is currently used as a nursery; this building is situated to the south east of the site alongside the Belsize Square Synagogue. To the west is the grade II listed St Peter's Church (1869) and the adjoining Church Hall.
3.1.2	The site sits 1.5m below pavement level to the north, although is relatively level across the rear garden to the south.
3.1.3	In terms of the British Geological Survey, the site overlies the London Clay Formation (see indicated location on Fig.1 plan extract below). The associated soils are generally, highly shrinkable clay; e.g. slowly permeable seasonally waterlogged fine loam over clay. Such highly plastic soils are prone to movement: subsidence and heave. 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	Clay soils are prone to compaction during development with damage to soil structure potentially having a serious impact on tree health. The design of foundations near problematic tree species will also need to take into consideration subsidence risk. Further advice from the relevant experts on the specific soil properties can be sought as necessary.

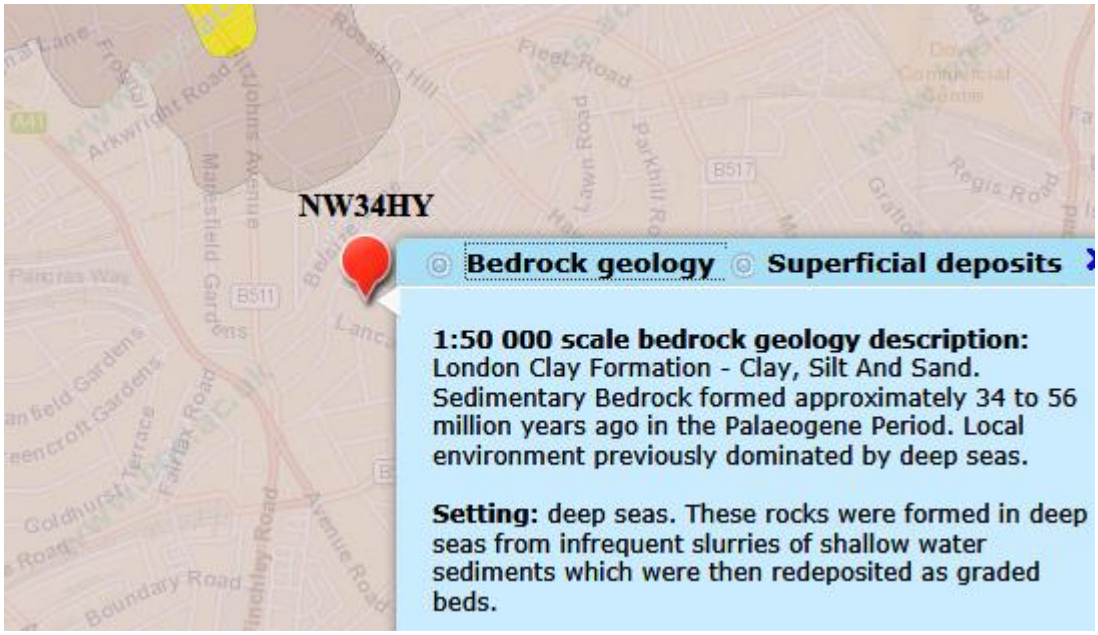


Figure 1: Extract from the BGS Geology of Britain Viewer

3.2 Subject Trees

3.2.1	Of the 20 surveyed trees 5 are B category *(Moderate Quality) and 15 are C category *(Low Quality).
3.2.2	The tree species found on site comprise predominantly sycamore, with some cherry spp., prunus spp., common lime, cultivated apple, crab apple, bay laurel, spruce and common ash.
3.2.3	In terms of age demographics there is a preponderance of mature trees on the site with a few early and semi-mature trees in the population.

3.2.4	Full details of the surveyed trees can be found in Appendix 1 of this report.
3.2.5	There are recommended husbandry works for 13 trees, comprising mainly the severance of ivy and further investigation of condition. These are listed in Appendix 2.

3.3 Planning Status

3.3.1	We are not aware of the existence of any Tree Preservation Orders, but understand the site stands within the Belsize Conservation Area, which will affect the subject trees: it is a criminal offence to prune, damage or fell such trees without permission from the local authority.

4.0 DEVELOPMENT CONSTRAINTS

4.1 Primary constraints

4.1.1 BS5837: 2012 gives Recommended Protection Areas (RPA's) for any given tree size. The individual RPA's are calculated in the Tree Schedule in Appendix 1 to this report, or rather the notional radius of that RPA, based on a circular protection zone. The prescribed radius is 12-x stem diameter at 1.5m above ground level, except where composite formulae are used in the case of multi-stemmed trees.

4.1.2 Circular RPA's are appropriate for individual specimen trees grown freely, but where there is ground disturbance, the morphology of the RPA can be modified to an alternative polygon, as shown in the diagram below (Figure 2). Alternatively, one need principally remember that RPA's are area-based and not linear – notional rather than fixed entities. **No modifications have been made in this instance (please see overleaf).**

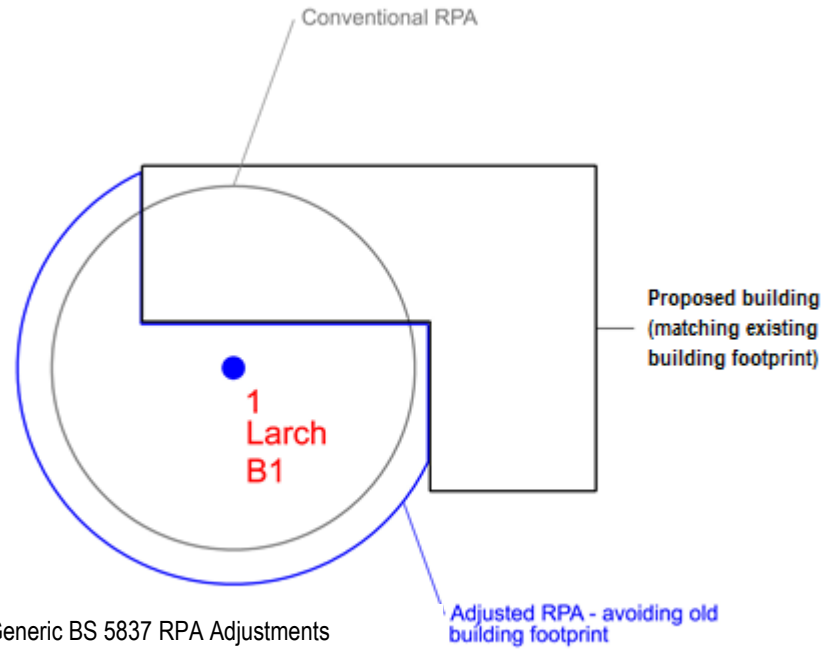


Figure 2 – Generic BS 5837 RPA Adjustments

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.

4.1.4 No a priroi modifications have been made in this instance, though further investigations are recommended, where the proposals encroach / come near RPA and their modification could have a bearing on the impact assessment.

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

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

4.1.10 In theory, only moderate quality trees and above are significant material constraints on development. However, the low quality trees would comprise a constraint in aggregate, in terms of any collective loss / removal, where replacement planting would be appropriate.

4.1.11 In this instance, the category B trees on the boundaries of the site will potentially provide significant constraints to development.

4.2 Secondary Constraints

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

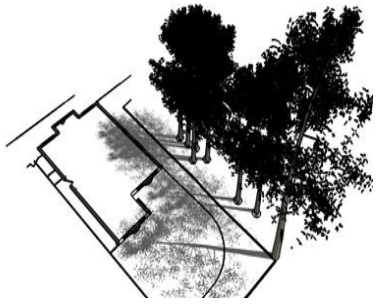


Figure 3 –
Generic Shading Constraints

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

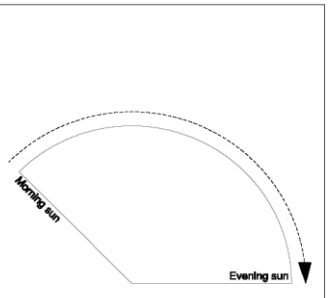


Figure 4 – Shading Arc

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

4.2.4	Assuming that they will be retained, the trees along the southern boundary in particular will have the potential to provide a variety of secondary constraints, including shading, organic deposition and the potential need to maintain crown clearance in the future. The significance of these constraints will vary depending on the location and proximity to the proposed re-development.

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: JNR/SPV/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
B	1	Sycamore	Development within RPA/below canopy;Tree works discussed with Nick Bell on 05/08/15 New hard landscaping & boundary fence	18 m^2 10.02 %	Mature	Normal	Moderate	Medium	N/A	Low invasive foundations Mini-rig required for piling All new hard landscaping to be porous; low-invasive foundations for new boundary
C	2	Ash, Common	Development within RPA/below canopy;Tree works discussed with Nick Bell on 05/08/15 New hard landscaping & boundary fence	m^2 N/A %	Semi-mature	Normal	Moderate	Medium	N/A	Low-invasive foundation design Remedial Tree Works (App Mini-rig required for piling All new hard landscaping to be porous; low-invasive foundations for new boundary
C	3	Cherry	Development within RPA/below canopy;Tree works discussed with Nick Bell on 05/08/15 New hard landscaping & boundary fence	24 m^2 31.56 %	Mature	Normal	Moderate	Medium	N/A	Low-invasive foundation design Remedial Tree Works (App Mini-rig required for piling All new hard landscaping to be porous; low-invasive foundations for new boundary
C	4	Apple, Crab	Development within RPA/below canopy;Tree works discussed with Nick Bell on 05/08/15 New hard landscaping & boundary fence	14.6 m^2 27.91 %	Mature	Normal	Moderate	Medium	N/A	Low-invasive foundation design Remedial Tree Works (App Mini-rig required for piling All new hard landscaping to be porous; low-invasive foundations for new boundary
C	5	Cherry	Development within RPA/below canopy;Tree works discussed with Nick Bell on 05/08/15 New hard landscaping & boundary fence	12.2 m^2 22.01 %	Mature	Normal	Moderate	Medium	N/A	Low-invasive foundation design Remedial Tree Works (App Mini-rig required for piling All new hard landscaping to be porous; low-invasive foundations for new boundary
B	6	Sycamore	Development within RPA/below canopy Removal of 2 northern stems discussed with Nick Bell on 05/08/15; New hard landscaping & boundary fence	49.4 m^2 24.06 %	Mature	Normal	Moderate	Medium	N/A	Low-invasive foundation design Remedial Tree Works (App Mini-rig required for piling All new hard landscaping to be porous; low-invasive foundations for new boundary
C	7	Apple, Cultivated	Felled to Facilitate Development Agreed with Nick Bell in 05/08/15	m^2 N/A %	Early Mature	Normal	N/A	N/A	Low	New planting / landscaping See Landscape Planning document from Emily Erlam Studios

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: JNR/SPV/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	8	Cherry	Felled to Facilitate Development Agreed with Nick Bell in 05/08/15	m^2 N/A %	Early Mature	Normal	N/A	N/A	Low	New planting / landscaping See Landscape Planning document from Emily Erlam Studios
C	9	Laurel, Bay	Felled to Facilitate Development Agreed with Nick Bell in 05/08/15	m^2 N/A %	Mature	Normal	N/A	N/A	Low	New planting / landscaping See Landscape Planning document from Emily Erlam Studios
C	10	Prunus sp	Felled to Facilitate Development Agreed with Nick Bell in 05/08/15	m^2 N/A %	Mature	Normal	N/A	N/A	Low	New planting / landscaping See Landscape Planning document from Emily Erlam Studios
C	11	Spruce	Felled to Facilitate Development Agreed with Nick Bell in 05/08/15	m^2 N/A %	Semi-mature	Normal	N/A	N/A	Low	New planting / landscaping See Landscape Planning document from Emily Erlam Studios
C	12	Prunus	Felled to Facilitate Development Agreed with Nick Bell in 05/08/15	m^2 N/A %	Early Mature	Normal	N/A	N/A	Low	New planting / landscaping See Landscape Planning document from Emily Erlam Studios
C	13	Prunus	Building Construction within RPA/Canopy - Tree works discussed with Nick Bell Landscape level raising to create grass area.	16.7 m^2 20.92 %	Mature	Normal	Moderate	Medium	N/A	Airspade / manual excavation of foundation line within RPA Remedial tree surgery (see App 3). Note: replacement with suitable species for constricted site preferable
C	14	Cherry	Felled to Facilitate Development Agreed with Nick Bell in 05/08/15	m^2 N/A %	Mature	Normal	N/A	N/A	Low	New planting / landscaping See Landscape Planning document from Emily Erlam Studios

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: JNR/SPV/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	15	Sycamore	Building Construction within RPA/Canopy - Tree works discussed with Nick Bell Landscape level raising to create grass area.	4.9 m^2 9.37 %	Early Mature	Normal	Moderate	Low	N/A	Airspade / manual excavation of foundation line within RPA Remedial tree surgery (see App 3). Note: replacement with suitable species for constricted site preferable
C	16	Sycamore	Replacement hard standings/raised levels; bicycle storage Discussed with Nick Bell on 05/08/15	10.7 m^2 12.22 %	Early Mature	Normal	Moderate	Low	N/A	Manual removal of existing hard surfacing; No-dig construction with engineering solution TBC See Landscape Planning document from Emily Erlam Studios
C	17	Sycamore	Felled to Facilitate Development	m^2 N/A %	Mature	Normal	N/A	N/A	Low	New planting / landscaping See Landscape Planning document from Emily Erlam Studios
B	18	Sycamore	Replacement hard standings/raised levels/bicycle storage(50.5m2/31%) New building (14.5m2/9%) Tree works discussed with Nick Bell on 05/08/15	50.5 m^2 31 %	Mature	Normal	Moderate	Medium	N/A	Remedial tree surgery (see App.3); pull-back demolition Manual removal of existing hard surfacing; No-dig construction with engineering solution TBC; see landscape
B	19	Lime, Common	Building Demolition/Construction within RPA/Canopy (42.9m2/17.8%) Level raising for parking/bicycle storage (82m2/34%). Discussed with Nick Bell on 05/08/15	42.9 m^2 17.79 %	Mature	Normal	Moderate	Medium	N/A	Remedial tree surgery (see App.3); pull-back demolition Manual removal of existing hard surfacing; No-dig construction with engineering solution TBC; see landscape

6.0 DISCUSSION

6.1 Rating of Primary Impacts

6.1.1 The tree constraints on this site have been considered from the outset, with the design evolving within them. The Camden Tree Officer, Nick Bell was invited to site to discuss the proposals on 05/08/15. At this meeting it was agreed that the principal primary impacts of felling the category C internal site trees T7 – 12, T14 and T17 was acceptable. In terms of the category B sycamore T6, it is important to note that the tree is a multi-stem coppice stool of c. 6 stems: at the meeting the removal of 2 northern stems was agreed in principle. A full landscaping scheme will be provided, with suitable replacement species noted in Appendix 4 of this report. The loss of these low quality, interior site trees is rated as a low impact, with no significant effect on the local conservation area.

6.1.2 The theoretical RPA encroachments and canopy conflicts affecting the retained trees were also discussed. It was agreed that the category B tree T19 could be (re)pollarded to accommodate the elevation, with the ground floor levels raised for parking by appropriate engineering solution. This can be left to detail, but either InfraWeb/Arboraft or a discontinuously supported concrete slab would provide sufficient mitigation to enable the proposed level changes. This mitigation will also apply to the RPA encroachments for T16 and T18.

6.1.3 The theoretical encroachments of the new building to the RPA's of the on-site tree T18, in addition to the off-site trees T13 and T15 have been considered in detail. The existing root colonisation of T18 is likely to have been significantly reduced by the retaining wall and concrete hard standing. The root colonisation of T13 and T15 will be less constrained; therefore it is proposed that the line of the new foundations is hand excavated to 750mm, with pre-emptive root pruning. The canopy encroachment of all three trees was discussed on site with Nick Bell and was considered acceptable. However, it may be preferable to consider the replacement of T13 and T15 with a columnar species that will require less maintenance in the future; this would also provide landscape enhancement by replacing low quality trees with poor structure (T13) and a suppressed crown (T15).

6.1.4 Where the proposals encroach the theoretical RPAs of T1 – T6, low invasive foundations are proposed to the single storey wings. The piles will be strategically located using trial pits on the party wall lines, with beams spanning between and a ventilated void between the ground and underside of building.

6.1.5 The recent Landscape document by Emily Erlam Studios provides for replacement planting. The new landscape plans also that indicate any additional encroachments, including new hard surfacing/level rises/drainage and hedge planting) includes suitable mitigation for retained trees. This mitigation includes porous surfaces and the retention of gravel dressings around the tree stems. Where there ground levels are to be raised to create lawn areas (T13, T15 and T16), it is essential that course granular materials (e.g. pebbles) and suitable replacement soils are used. This also applies to the soils and level raising to the rear of the site (T1 – T6). The proposed rear boundary fencing should have low invasive foundations 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.

6.1.6 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.

6.1.7 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.

6.1.8 "**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.*

6.2.1 Secondary impacts from the new elevation require pruning to maintain convenient canopy clearance. These requirements are similar to those that exist today for T19. It is likely that the pruning requirements for the boundary trees to the south of the site (T1 – T6) will be minimal following the initial pruning to facilitate construction. The proposed green roof and other mitigation techniques will ensure that the secondary impacts of honeydew / litter deposition and partial shade on this site are minimised.

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 within an RPA should be lifted manually with caution with the sub-base preserved and protected with additional ground protection. Where retaining walls are to be removed from around raised tree beds, arboricultural supervision will be required.

6.3.2 The building encroachments will require the use of specialised foundation techniques, such as mini-piling. 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. 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. The line of the basement foundations within RPAs should be hand excavated to 750mm, with pre-emptive root pruning. Roots larger than 25mm diameter may only be cut in consultation with an arboriculturalist.

6.3.3 The proposed rear boundary fencing should have low invasive foundations 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.

6.3.4 The raising of the driveway will require a no-dig construction technique that is to be confirmed and agreed with the LPA/Tree Officer. All other level raising will require a suitable course granular material (e.g. pebbles) and suitable soil.

6.3.5 The immediate canopy encroachments can be avoided with a crown lift of lower limbs, affecting a 5-6m ground clearance for the piling operations, or cut back to provide elevational clearance.

6.3.6 Nuisance deposition will be mitigated by the proposed green roof, with further mitigation by routine maintenance, light pruning / deadwooding and the fitting of filtration traps on guttering.

6.3.7 The shading impacts can be mitigated by building design, with the provision of dual aspect windows and choice of room layout. Some minor crown reduction may be necessary, but not such as to impose a burden of frequent, repetitive management.

6.3.8 The landscape impact of tree losses will be offset by the landscape proposals (see Landscape Document by Emily Erlam Studios).

7.0 CONCLUSION

7.1	The potential impacts of development have been discussed with the Tree Officer; it was agreed that, subject to confirmation of the engineering techniques for raising the parking area, the impacts are all relatively low in terms of both quality of trees removed and also RPA encroachments of trees retained.
7.2	The full potential of the impacts can be largely mitigated through design and precautionary measures, which have been detailed in this document and the Landscape Document. These measures can be elaborated in Method Statements in the discharge of planning conditions.
7.3	The species affected are generally tolerant of root disturbance / crown reduction and the retained trees are generally in good health and capable of sustaining these reduced impacts.
7.4	The trees that are recommended for felling are of little individual significance, such that their loss will not affect the visual character of the area. Potential landscape enhancements, reduction in future maintenance and improvement to the existing tree stock would also be provided with the replacement of category C trees T13 and T15.
7.5	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, 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 the outline method statement below.

8.1.3 The replacement trees are detailed in the Landscape Document by Emily Erlam Studios which should be planted under current best practice; i.e. conforming to and planted in accordance with the following:

- BS8545: 2014 Code of Practice for Trees from Nursery to Landscape
- BS 3936:1980 Nursery Stock;
- BS 4043:1966 Transplanting Semi-Mature Trees; and
- BS 5236:1975 Cultivation and Planting of Trees in the Advanced Nursery Stock Category.
- All replacement stock should be planted and maintained as detailed in BS 4428:1989 (Section 7): Recommendations for General Landscape Operations.

9.0 METHOD STATEMENT

9.1 Outline Method Statement (to be read in conjunction with Appendix 9: Tree Protection Plan)

9.1.1 This outline method statement has been prepared for assistance with the discharge of planning conditions at 10-16 St Peter's, Belsize Square, London NW3 4HL. 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 9) 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) initial tree works: pruning for working clearances;
ii) installation of TPBs for demolition & construction;
iii) installation of underground services;
iv) installation of ground protection
(if hardstanding not retained and over new raised areas);
v) main construction;
vi) removal of TPB;
vii) 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

Nick Bell — Tel: 020 7974 5939
Arboricultural Officer
LB Camden Council
nick.bell@camden.gov.uk

Joel Geoghegan — Tel: 020 7490 8885
Architect/Project Manager
Johnson Naylor LLP
joel.geoghegan@johnsonnaylor.co.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 2 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 2.

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 2 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 2 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 2: 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 fencing and that it has been erected in accordance with AMS (S.2.2 and Tree Protection Plan in Appendix 9); • To check any pre-demolition/construction ground protection is in place. • To check any tree works have been undertaken in accordance with this AMS (S.2.1. 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.3.3).	Issue a brief report with findings to Architect, Tree Officer and Main Contractor within 5 days of site supervision visit (Site Monitoring Sheet in Appendix 5).
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 demolition/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, Tree Officer and Main Contractor within 5 days of site supervision visit (Site Monitoring Sheet in Appendix 5).
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, Tree Officer and Main Contractor within 5 days of site supervision visit. (Site Monitoring Sheet in Appendix 5).
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, Tree Officer and Main Contractor within 5 days of site supervision visit. (Site Monitoring Sheet in Appendix 5). Provide signed arboricultural checklist (see Appendix 5)

9.4 Pre- Development Site Preparation

9.4.1 The pruning works must be in accordance with British Standard 3998:2010 Tree work and any other prevailing good professional practice. Specific works recommended to facilitate development and any other husbandry works are listed in Appendices 2 and 3.

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 mainly individual boxed hoarding; steel, mesh panels 2.4m in height ('Heras') mounted on a scaffolding frame (this is also Figure 2 of BS5837: Trees in Relation to Design, Demolition and Construction in paragraph 6.2.2.2 – see below) could also be used where there is sufficient space. The position of the TPBs are shown on the TPP in Appendix 9, 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 9 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/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 or level raising 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. Where ground levels are raised, additional ground protection will be required during construction to reduce compaction within the RPAs.

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.

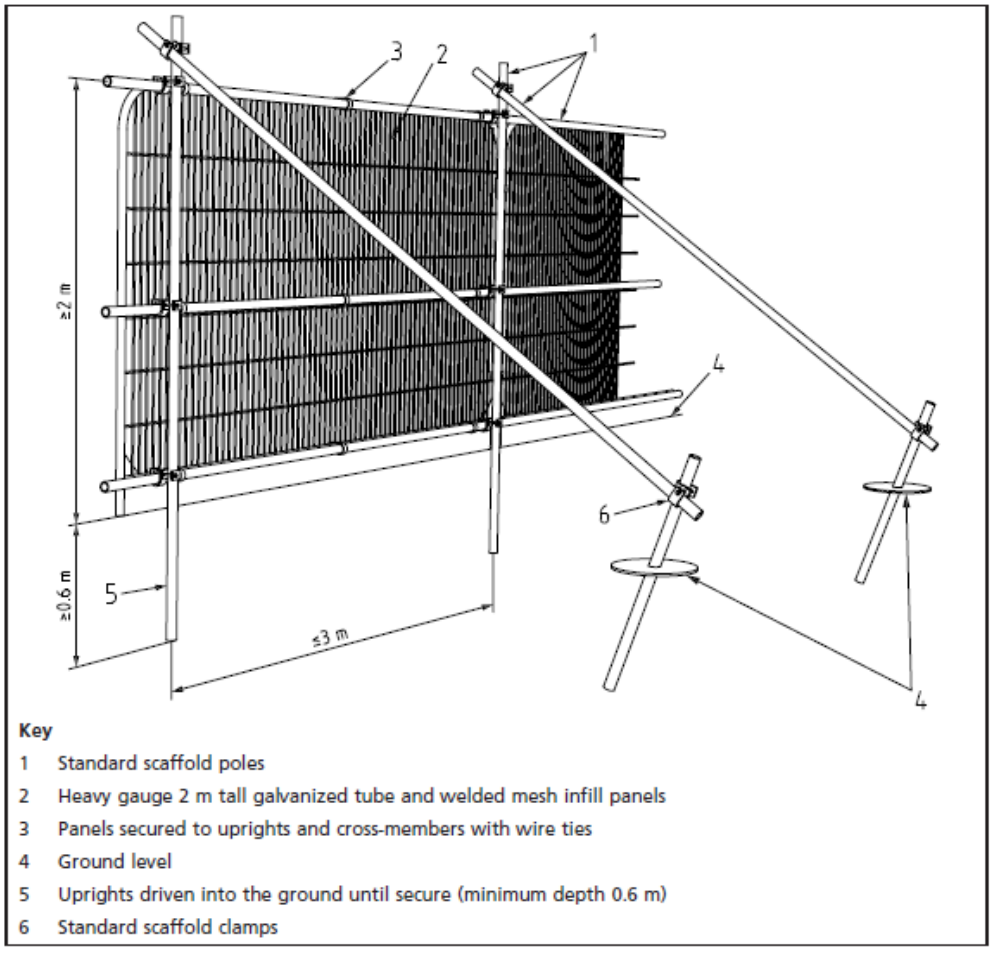


Fig. 1 Tree Protection Barrier Specification
(Source: Figure 2 from BS5837 - Default specification for protective barrier)

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 2. 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 5 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 existing hardstandings as necessary. If the paving stones are removed, the new sub-base can be laid as initial ground protection, with the finished paving overlaid in the landscape phase.

9.5.4 The existing pedestrian access will be retained.

9.5.5 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.

9.5.6	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 installation 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. The landscape drains to the rear of the site will be positioned above the existing ground level, therefore no excavations will be required.

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.
9.7.2	There are various areas of proposed ground level raising within RPAs across the site. The Landscape Document illustrates the location of these areas, noting the need to retain porous surfaces. Subject to confirmation from Engineers, where ground levels require raising this should be done with a course granular material (e.g. pebbles) and suitable soils as a future growing medium.

9.8 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	The piling rigs should be mini-rigs and operate from inside the piling line where possible, to reduce the potential for canopy encroachment. The excavation of the basement should proceed inwards in a "pull back" fashion. Hard surfacing can be lifted manually with caution working away from the trees. Any soil exposed should be protected with additional ground protection during the duration of the construction.
9.8.2	JCB to excavate to required depth. All spoil to be loaded into trucks/skips located to avoid canopy conflicts.

9.8.3 The building encroachments will require the use of specialised foundation techniques, such as mini-piling. 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. 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. Where the basement line enters an RPA, it will be manually excavated to 750mm with pre-emptive pruning as above.

9.8.4 The proposed rear boundary fencing should have low invasive foundations 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. 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.

9.8.5 Any replacement paving/hard landscaping will require porous surfaces (as noted within the Landscape Document), in addition to no-dig construction technique for the additional bicycle stores etc. The no-dig construction can either use 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 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'.

9.9.3 The final landscaping should include hand excavation for any planting pits, with repositioning where significant root bundles are found (N.B most planting will occur within the soil in raised areas, therefore no excavation will be required).

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

- Barlow JF & Harrison G. 1999. Shade By Trees, Arboricultural Practice Note 5, AAIS, Farnham, Surrey.
- British Standards Institute. 2012. Trees in Relation to Design, Demolition and Construction - Recommendations BS 5837: 2012 HMSO, London.
- Centre for Ecology & Hydrology. 2006. Tree Roots in the Built Environment, HMSO, London.
- Helliwell R (1980) Provision for New Trees; Landscape Design; July/August issue
- International Society of Arboriculture (ISA). 1994. The Landscape Below Ground. ISA, Champaign, Ilinois. USA.
- Lonsdale D 1999. Research for Amenity Trees No.7: Principles of Tree Hazard Assessment and Management, HMSO, London.
- Matheny, N; Clark, J. R.1998. Trees and Development: A Technical Guide to Preservation of Trees during Land Development. ISA, Champaign, Ilinois. USA.
- Mattheck C. & Breloer H. 1994. Research for Amenity Trees No.2: The Body Language of Trees, HMSO, London.
- Thomas P, 2000. Trees: Their Natural History, Cambridge University Press, Cambridge.
- Trowbridge J & Bassuk N (2004) Trees in the Urban Landscape: Site Assessment, Design, and Installation; J Wiley & Sons inc. NJ USA

APPENDIX 1

TREE SCHEDULE

Notes for Guidance:

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 - 16 St Peter's, Belsize Square NW3 4HJ

Date: 05 February 2015

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: JNR/SPV/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	Sycamore	17	7765	5.0	630	Mature	7.6	Normal	Fair	B	1	10+	Twin stemmed at 0.5m ht
2	Ash, Common	13	5553	2.0	250	Semi-mature	3.0	Normal	Poor	C	1	10+	Crown suppressed on western side
3	Cherry	12	5	4.0	410	Mature	4.9	Normal	Poor	C	1	10+	Twin-stemmed at 1.7m ht
4	Apple, Crab	8	7346	4.0	340	Mature	4.1	Normal	Poor	C	1	10+	Twin-stemmed at 1.6m ht; very poor structure
5	Cherry	12	7336	4.0	350	Mature	4.2	Normal	Poor	C	1	10+	Triple-stemmed at 2-2.5m ht
6	Sycamore	16	7767	5.0	674	Mature	8.1	Normal	Poor	B	1	10+	Multi-stemmed at base with ivy on stems
7	Apple, Cultivated	7	4271	2.0	200	Early Mature	2.4	Normal	Poor	C	1	10+	Very poor structure
8	Cherry	9	6355	4.0	270	Early Mature	3.2	Normal	Fair	C	1	10+	Stem colonised by ivy
9	Laurel, Bay	9	4	2.0	410	Mature	4.9	Normal	Fair	C	1	10+	Triple-stemmed at 0.5m ht

Landmark Trees

Site: 10 - 16 St Peter's, Belsize Square NW3 4HJ

Date: 05 February 2015

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: JNR/SPV/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
10	Prunus sp	10	5665	2.0	460	Mature	5.5	Normal	Poor	C	1	10+	Multi-stemmed at base with ivy on stems
11	Spruce	9	2323	2.0	150	Semi-mature	1.8	Normal	Fair	C	1	20+	Growing between Prunus trees T10 & T12
12	Prunus	9	4232	4.0	210	Early Mature	2.5	Normal	Poor	C	1	10+	Drawn crown structure with ivy on stem
13	Prunus	8	6	2.0	420	Mature	5.0	Normal	Poor	C	1	10+	Multi-stemmed at base with very poor structure; Ivy on stems
14	Cherry	11	5664	2.0	320	Mature	3.8	Normal	Fair	C	1	10+	Ivy on stem
15	Sycamore	18	4666	6.0	340	Early Mature	4.1	Normal	Fair	C	1	20+	Crown suppressed on northern side
16	Sycamore	17	6563	4.0	440	Early Mature	5.3	Normal	Poor	C	1	20+	Twin-stemmed at base with some ivy on stems
17	Sycamore	18	5667	5.0	520	Mature	6.2	Normal	Poor	C	1	10+	Twin-stemmed at 1.2m ht with poor union Ivy on stems
18	Sycamore	19	8787	5.0	600	Mature	7.2	Normal	Poor	B	1	10+	Twin-stemmed at base with ivy on stems

Landmark Trees

Site: 10 - 16 St Peter's, Belsize Square NW3 4HJ

Date: 05 February 2015

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Adam Hollis

Ref: JNR/SPV/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
19	Lime, Common	18	6	2.0	730	Mature	8.8	Normal	Poor	B	1	10+	Multi-stemmed at base with some poor unions Growing close to existing building
20	Sycamore	19	9	3.0	630	Mature	7.6	Normal	Poor	B	1	10+	Twin-stemmed at 4m ht with poor union 1 stem bifurcates again at 6m ht

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 - 16 St Peter's, Belsize Square NW3

Date: 05 February 2015

Surveyor(s): Adam Hollis

Ref: JNR/SPV/AIM

Appendix 2

Recommended Tree Works

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
4	Apple, Crab	C	8	4.0	7346	Finv	Twin-stemmed at 1.6m ht; very poor structure Recommended husbandry 2
6	Sycamore	B	16	5.0	7767	Svr Ivy	Multi-stemmed at base with ivy on stems Recommended husbandry 3
7	Apple, Cultivated	C	7	2.0	4271	Finv	Very poor structure Recommended husbandry 2
8	Cherry	C	9	4.0	6355	Svr Ivy	Stem colonised by ivy Recommended husbandry 3
10	Prunus sp	C	10	2.0	5665	Svr Ivy	Multi-stemmed at base with ivy on stems Recommended husbandry 3
12	Prunus	C	9	4.0	4232	Svr Ivy	Drawn crown structure with ivy on stem Recommended husbandry 3
13	Prunus	C	8	2.0	6	Svr Ivy	Multi-stemmed at base with very poor structure; Ivy on stems Recommended husbandry 3
14	Cherry	C	11	2.0	5664	Svr Ivy	Ivy on stem Recommended husbandry 3

Landmark Trees

Site: 10 - 16 St Peter's, Belsize Square NW3

Date: 05 February 2015

Surveyor(s): Adam Hollis

Ref: JNR/SPV/AIM

Appendix 2

Recommended Tree Works

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
16	Sycamore	C	17	4.0	6563	Svr Ivy	Twin-stemmed at base with some ivy on stems Recommended husbandry 3
17	Sycamore	C	18	5.0	5667	Svr Ivy	Twin-stemmed at 1.2m ht with poor union Ivy on stems Recommended husbandry 3
18	Sycamore	B	19	5.0	8787	Svr Ivy	Twin-stemmed at base with ivy on stems Recommended husbandry 3
19	Lime, Common	B	18	2.0	6	Finv	Multi-stemmed at base with some poor unions Growing close to existing building Recommended husbandry 3
20	Sycamore	B	19	3.0	9	Finv	Twin-stemmed at 4m ht with poor union 1 stem bifurcates again at 6m ht Recommended husbandry 3

APPENDIX 3

RECOMMENDED TREE WORKS TO FACILITATE DEVELOPMENT (See Table 1)

Notes for Guidance:

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

*Not generally specified following BS3998:2010

Landmark Trees

Site: 10 - 16 St Peter's, Belsize Square NW3 4HJ

Date: 20/04/16

Surveyor(s): Adam Hollis

Ref: JNR/SPV/AIM

Appendix 3

Recommended Tree Works To Facilitate Development

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
1	Sycamore	B	17	5.0	7765	CB Possible remedial surgery to facilitate construction	Twin stemmed at 0.5m ht To facilitate development
2	Ash, Common	C	13	2.0	5553	CL	Crown suppressed on western side To facilitate development
3	Cherry	C	12	4.0	5	CL Possible remedial surgery to facilitate construction	Twin-stemmed at 1.7m ht To facilitate development
4	Apple, Crab	C	8	4.0	7346	CL Possible remedial surgery to facilitate construction	Twin-stemmed at 1.6m ht; very poor structure To facilitate development
5	Cherry	C	12	4.0	7336	CL Possible remedial surgery to facilitate construction	Triple-stemmed at 2-2.5m ht To facilitate development
6	Sycamore	B	16	5.0	7767	S.Fell Fell 2 northern stems to facilitate construction	Multi-stemmed at base with ivy on stems To facilitate development
7	Apple, Cultivated	C	7	2.0	4271	Fell	Very poor structure To facilitate development

Landmark Trees

Site: 10 - 16 St Peter's, Belsize Square NW3 4HJ
Date: 20/04/16

Surveyor(s): Adam Hollis
Ref: JNR/SPV/AIM

Appendix 3

Recommended Tree Works To Facilitate Development

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
8	Cherry	C	9	4.0	6355	Fell	Stem colonised by ivy To facilitate development
9	Laurel, Bay	C	9	2.0	4	Fell	Triple-stemmed at 0.5m ht To facilitate development
10	Prunus sp	C	10	2.0	5665	Fell	Multi-stemmed at base with ivy on stems To facilitate development
11	Spruce	C	9	2.0	2323	Fell	Growing between Prunus trees T10 & T12 To facilitate development
12	Prunus	C	9	4.0	4232	Fell	Drawn crown structure with ivy on stem To facilitate development
13	Prunus	C	8	2.0	6	CR/CB Consider replacement with healthy/suitable species	Multi-stemmed at base with very poor structure; Ivy on stems To facilitate development
14	Cherry	C	11	2.0	5664	Fell	Ivy on stem To facilitate development

Landmark Trees

Site: 10 - 16 St Peter's, Belsize Square NW3 4HJ
Date: 20/04/16

Surveyor(s): Adam Hollis
Ref: JNR/SPV/AIM

Appendix 3

Recommended Tree Works To Facilitate Development

Hide irrelevant
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearance	Crown Spread	Recommended Works	Comments/ Reasons
15	Sycamore	C	18	6.0	4666	CR/CB Consider replacement with healthy/suitable species	Crown suppressed on northern side To facilitate development
17	Sycamore	C	18	5.0	5667	Fell	Twin-stemmed at 1.2m ht with poor union Ivy on stems To facilitate development
18	Sycamore	B	19	5.0	8787	CR/CB	Twin-stemmed at base with ivy on stems To facilitate development
19	Lime, Common	B	18	2.0	6	CB/CR	Multi-stemmed at base with some poor unions Growing close to existing building To facilitate development/good husbandry

APPENDIX 4: TREE SELECTION FOR URBAN LOCATIONS

Table A4.1: Small Ornamental Tree Species

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

Table A4.2: Medium Specimen Tree Species

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

Table A4.3: Larger Specimen Tree Species

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

APPENDIX 5 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 breached		Trees damaged since last visit	
Client briefed by LT			
LT briefed by Client			
LPA informed			
Remedial action required			

Comments

Recommendations

Outcome		
1		
2		
3		
4		

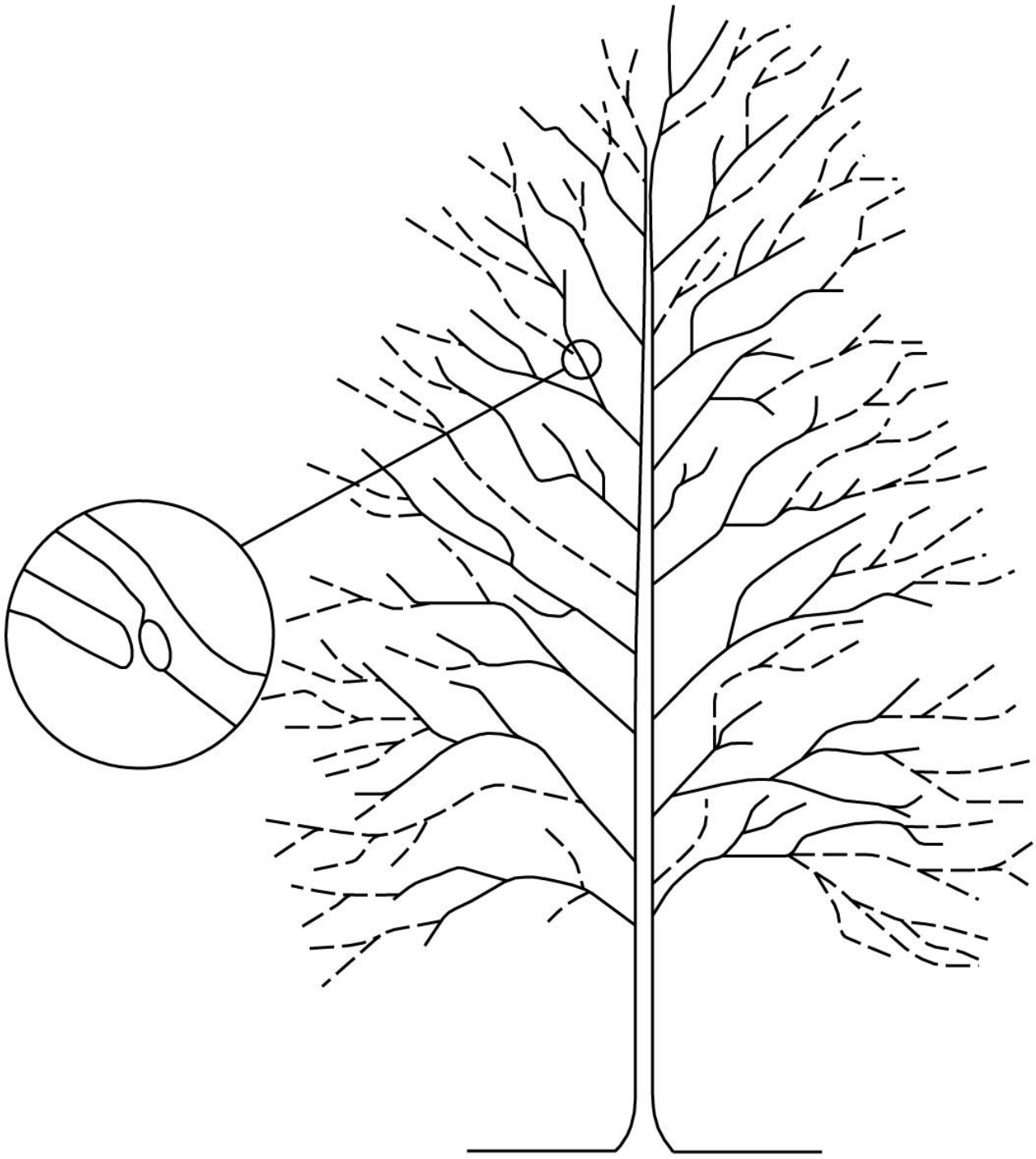
Web: www.landmarktrees.co.uk
e-mail: info@landmarktrees.co.uk
Tel: 0207 851 4544

London Office: Holden House, 4th Floor, 57 Rathbone Place London W1T 1JU
Registered Office: 15 Abbey Road, Oxford OX2 0AD

Arboricultural Supervision Sign off Checklist

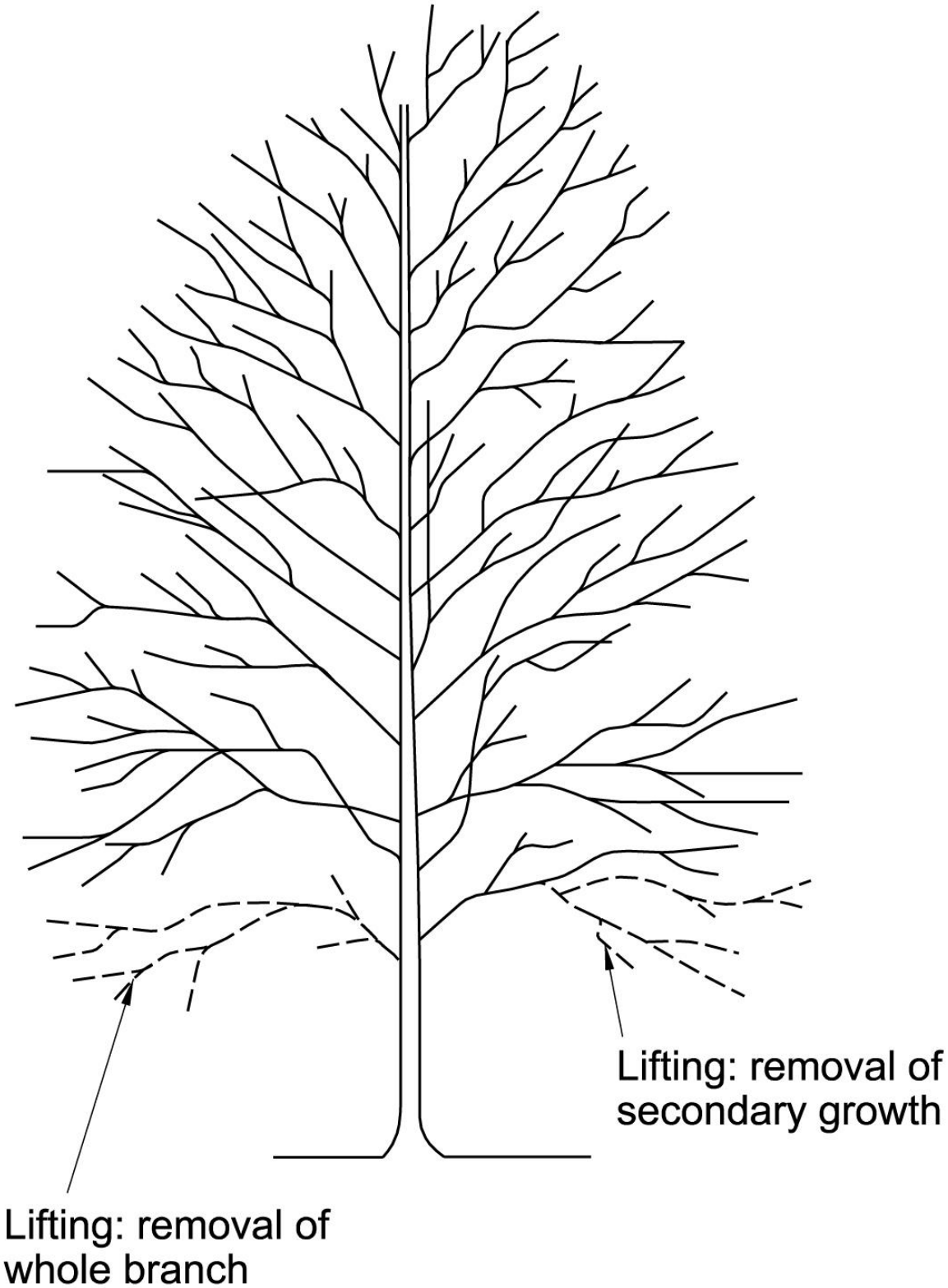
Tree No (s)	Project Phase	Task	Date Completed	Signed (Project arboriculturist)	Signed (Site Manager)
	Pre-commencement	Pre-commencement site meeting to include site manager briefing			
	Pre-commencement	Confirm the location and specification of the protective measures is in accordance with AIM & TPP			
	Pre-commencement	Confirm any tree works have been undertaken in accordance with this AIM (Appendices 2/3) 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 AIM			
	Demolition	Demolition of hard surfaces/ structures within RPA. Confirm position of any additional temporary ground protection/temporary ground protection is in accordance with AIM			
	Completion of Demolition	Sign off of the demolition phase.			
	Construction	Manual excavation of foundation pits for building and boundary wall			
	Construction	Manual excavation of basement line.			
	Construction	Installation of 'No Dig' hard surfacing			
	Construction	Ground level raising			
	Construction	Completion of ground works			
	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 6: INDICATIVE PRUNING GUIDELINES



NOTE: Branches pruned back to suitable outward pointing bud or small branch.

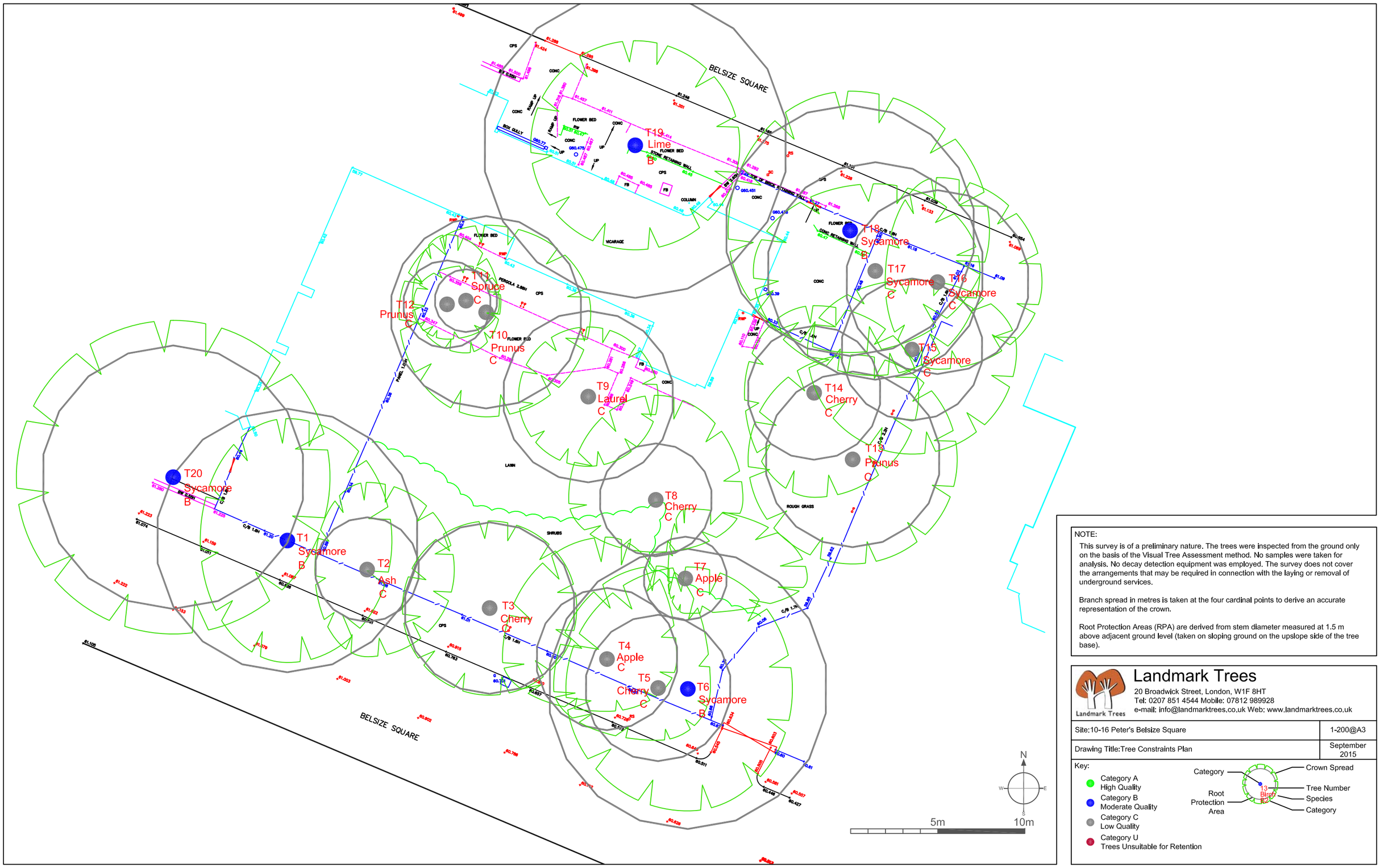
REDUCING THE CROWN



CROWN LIFTING

APPENDIX 7

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:10-16 Peter's Belsize Square	1-200@A3
Drawing Title:Tree Constraints Plan	September 2015

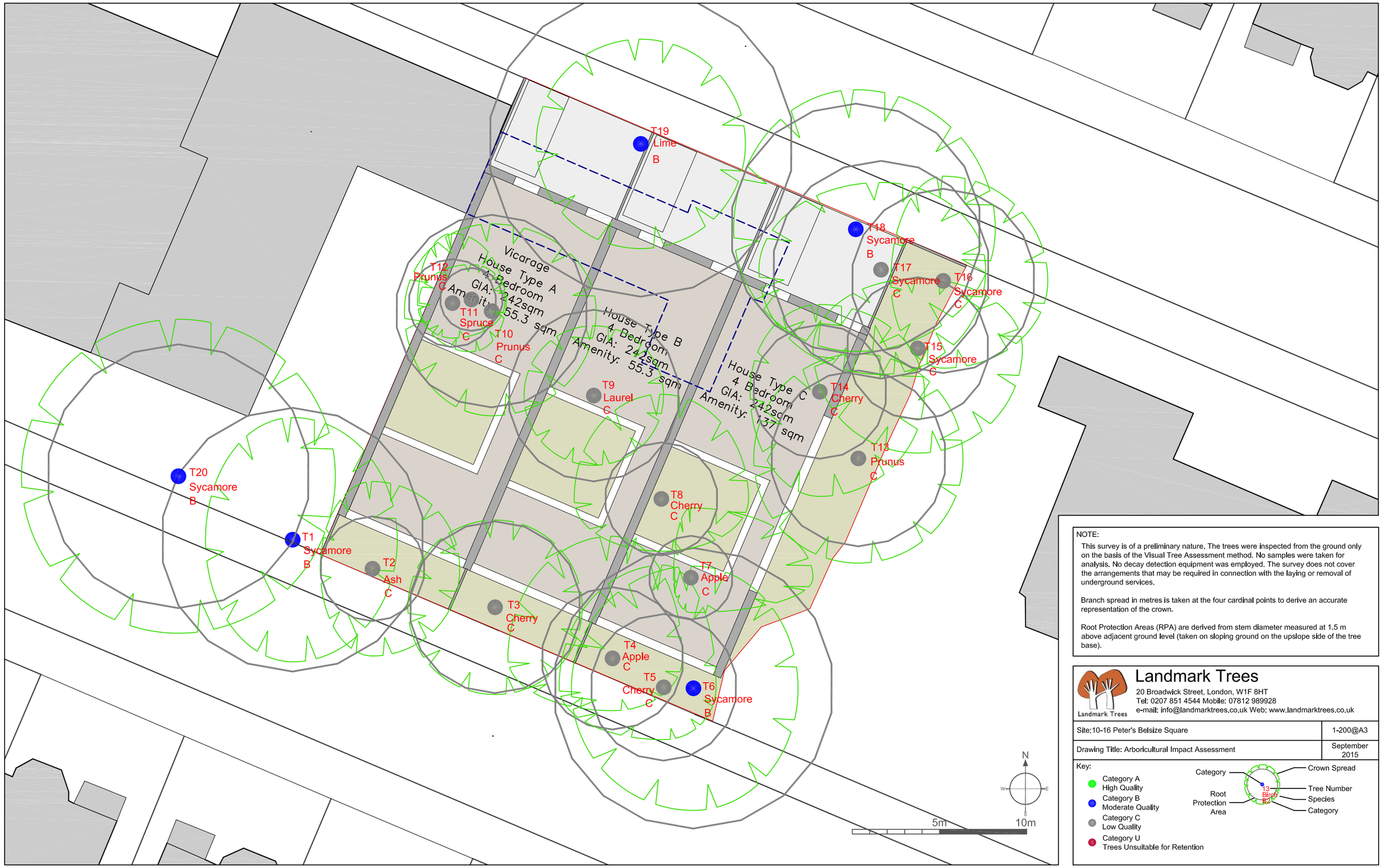
Key:

- 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 R2 — Tree Number, Species, Category

APPENDIX 8

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

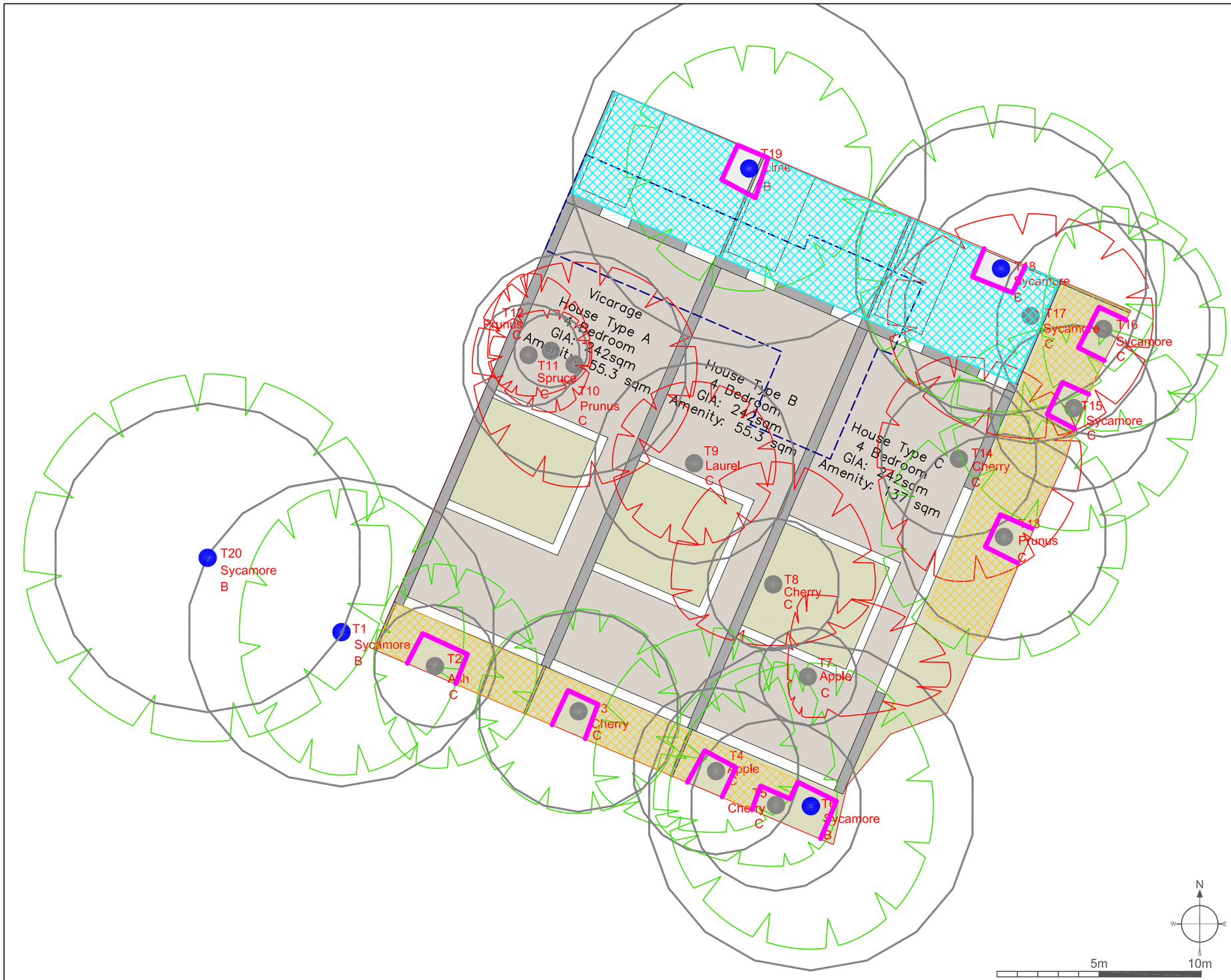
Site:10-16 Peter's Belsize Square	1-200@A3
Drawing Title: Arboricultural Impact Assessment	September 2015

Key:

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

APPENDIX 9

TREE PROTECTION 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).

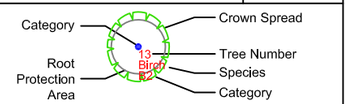
Landmark Trees

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:10-16 Peter's Belsize Square	1-200@A3
Drawing Title: Tree Protection Plan	April 2016

Key:

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



- Tree to be removed to facilitate development
- Precautionary area: ground protection required (i.e. retention of existing hard surfacing/ wood chip & boards on raised beds) during demolition and engineering solution to be provided for ground raising
- Tree Protection Fencing
- Heras Fencing
- Ground protection required until landscape phase