Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT:

11 Prince Albert Road

London

NW1 7SR

REPORT PREPARED FOR:

Harrison Varma Limited

Bishops View House

98 Great North Rd

East Finchley

London N2 0NL

REPORT PREPARED BY

Adam Hollis

MSc ARB MICFor FArbor A MRICS C Env

Ref: HVL/11PAR/AIA/03a

Date: 6th July 2015

Appendices

Caveats

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

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

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

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

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

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

Tree Constraints & Protection Overview

Client:	Harrison Varma Limited	**Case Ref:**	HVL/11PA/AIA/03a
Local Authority:	LB Camden	**Date:**	06/07/15
Site Address: 11 Prince Albert Road, London NW1 7SR			
Proposal: Revised proposals for a single storey side extension at the lower ground level and internal alterations of the existing residential property			

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

Site Layout					
Site Visit	Y	Date: 17/12/13		Access Full/Partial/None	F
Trees on Site			Y	Off-site Trees	Y
Trees affected by development			Y	O/s trees affected by development	N
Tree replacement proposed:			Y	On or off-site trees indirectly affected by development	N

Trees with the potential to be affected

Felling of category C trees, T6, T7, T8 and T9.
Revised scheme has no impacts to category B tree T10
Minor tree works/tying back of T5 to facilitate construction

Comments

The felling of T2 & T3 is recommended on the grounds of sound arboricultural husbandry.

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	TBC
5	Specialist demolition / construction techniques required	N
6	The Proposal will result in significant root damage to retained trees	TBC
7	Further investigation of tree condition recommended	Y

RPA= Root Protection Area
TPP= Tree Protection Plan
AMS= Arboricultural Method Statement
AIA = Arboricultural Implication Assessment
BS5837: 2012 'Trees in relation to design, demolition and construction – Recommendations'

1. SUMMARY

1.1 This report comprises an arboricultural impact assessment of the revised proposals for 11 Prince Albert Road, London NW1 7SR, reviewing any conflicts between the revised proposals and material tree constraints identified in our survey.

1.2 There are 13 trees surveyed on or around the site, of which 2 are B category *(Moderate Quality), 10 are C category *(Low Quality) and 1 is C/U category *(Low Quality/Unsuitable for Retention). 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 This scheme is a considerable improvement in arboricultural terms, as there are no longer any primary impacts to the theoretical RPA of category B tree, T10.

1.4 The primary impacts now comprise the felling of mainly young category C trees, T6, T7, T8 and T9. The loss of these trees is rated as a low impact, with no significant effect on the visual character of the local conservation area. The replanting scheme will offer considerable enhancement and replaces the three young/one semi-mature trees with species specifically selected for the proposed site, healthy and fit-for-purpose. There will also be some very minor canopy encroachment during construction only to T5 (3m ground clearance). It is recommended that the canopy is either tied back or minor pruning works used to facilitate the construction of the LFG/GF extensions beneath the canopy.

1.5 The secondary impacts comprise some shading/organic deposition from the trees on the southern boundary. These minor impacts can be mitigated with building design adaptions, such as dual aspect windows/choice of room layout. Thus, the secondary impacts of development are minimal.

1.6 The revised proposals have ensured the site has potential for development without impacting significantly on the wider tree population or local landscape. These further investigations can then support the proposed supervision and mitigation so that the proposed scheme can be 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 Sarah Gay, of Harrison Varma Limited, to provide a survey and an arboricultural impact assessment of proposals for the site: 11 Prince Albert Road, London NW1 7SR. The report is to accompany a planning application.

2.1.2 The revised proposals are for a single storey side extension at the lower ground level and internal alterations of the existing residential property. The application follows various previously submitted applications. The proposals have been amended to take into account the advice received from the officers as well as Primrose Hill Conservation Area Advisory Committee. Previously proposed basement and upper ground floor level has been omitted, and the proposed side extension buried under the existing side garden and obscured from external views. The proposed lower ground floor will allow the reinstatement of existing gardens and provide an opportunity for landscape enhancements. This report will assess the impact on the trees and their constraints, identified in our survey. Although the proposals were known at the time of the survey, Landmark Trees endeavour to survey each site blind, working from a topographical survey, wherever possible, with the constraints plan informing their evolution.

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

2.2 Drawings supplied

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

Existing site survey: 11PAR_HV_EH_GF_SK_B50*

Proposals: 150629A-planning

*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 17th December 2013, recording relevant qualitative data in order to assess both their suitability for retention and their constraints upon the site, in accordance with British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations [BS5837:2012].

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

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

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

2.4 Survey data & report layout

2.4.1 Detailed records of individual trees are given in the survey schedule in Appendix 1 to this report.

2.4.2 A site plan identifying the surveyed trees, based on the client's drawings / topographical survey is provided in Appendix 5.

2.4.3 This plan also serves as the Tree Constraints Plan with the theoretical Recommended Protection Areas (RPA's), tree canopies and shade constraints, (from BS5837: 2012) overlain onto it. These constraints are then overlain in turn onto the client's proposals to create an Arboricultural Impact Assessment Plan in Appendix 6. General observations and discussion follow, below.

3.0 OBSERVATIONS

3.1 Site description

Photograph 1: 11 Prince Albert Road, London NW1 7SR (Source: Google Maps)

3.1.1	The site comprises a semi-detached residential property, located opposite Regents Park on the northern side of Prince Albert Road. The property has hard landscaped front garden and a large rear garden with trees and grass areas.
3.1.2	The site is relatively level.
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.

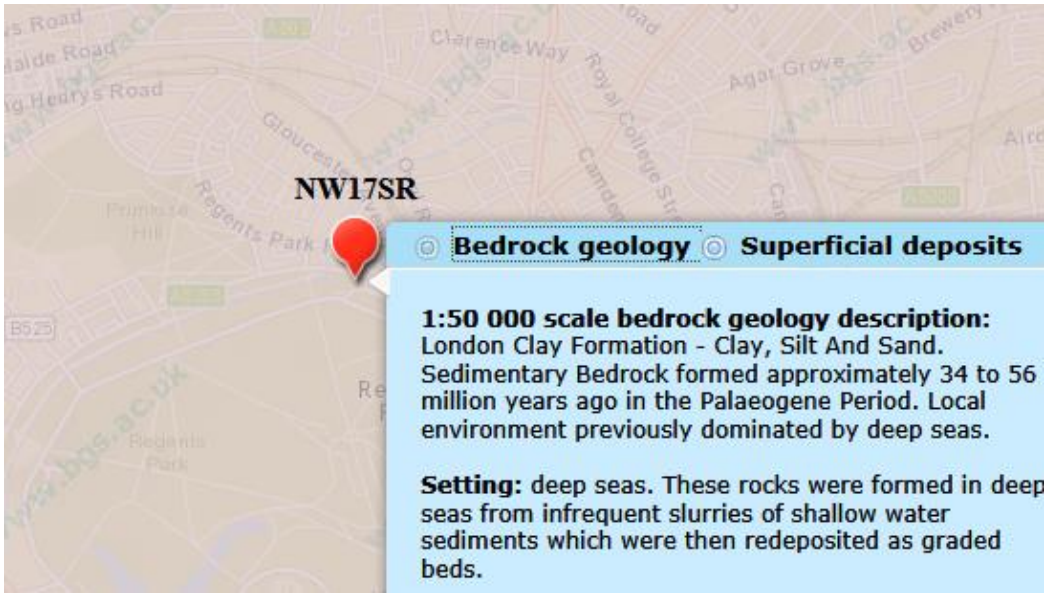


Figure 1: Extract from the BGS Geology of Britain Viewer

3.2 Subject trees

3.2.1	Of the 13 surveyed trees 2 are B category (Moderate Quality), 10 are C category (Low Quality) trees and 1 is a C/U category trees (Low Quality/Unsuitable for Retention).
3.2.2	The tree species found on site comprise 3 Honey Locust trees, 2 Lawsons Cypresses, a beech, an ornamental cherry, a laburnum, cherry laurel, weeping willow, a rowan, a common lime and a common yew.
3.2.3	In terms of age demographics around 50% of the population are young trees, with some semi/early mature and mature trees also on site.

3.2.4	Full details of the surveyed trees can be found in Appendix 1 of this report.
3.2.5	There are some arboricultural works required within the existing tree population, comprising the felling of T2 and T3 on the grounds of sound husbandry. These are listed in Appendix 2. We also understand from the client that that there has been structural damage to the building, close to T3. The tree has split out and there seems no good reason to keep it.

3.3 Planning Status

3.3.1	Camden have a record of all Tree Preservation Orders in the Borough, which unfortunately is not available on-line; in order to ascertain if any of the surveyed trees are protected, the Tree Preservation team can be contacted by telephoning 020 7974 4444 or emailing planning@camden.gov.uk. The site stands within the Primrose Hill 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), but it is possible that T10 will be rooting preferentially within the site.**

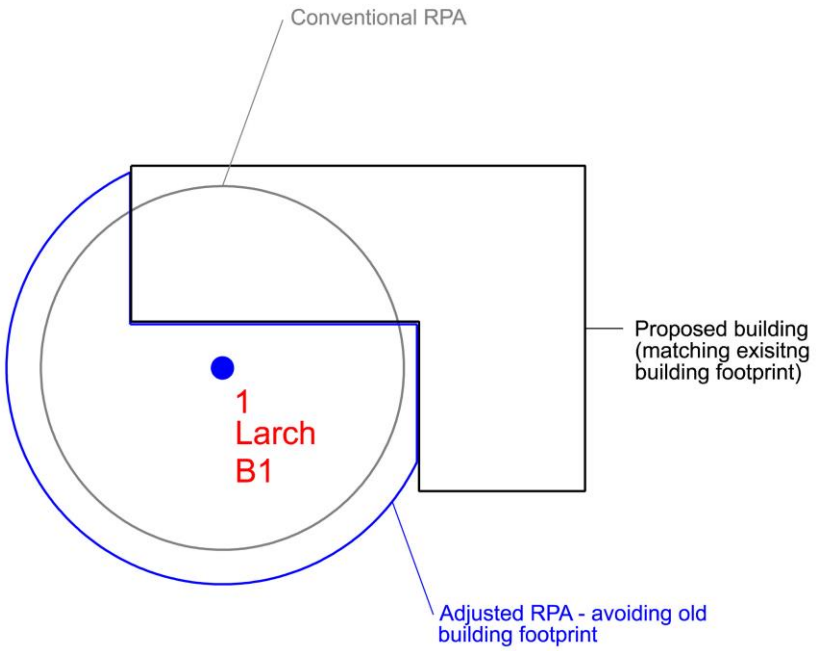


Figure 2 – Generic BS 5837 RPA Adjustments

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.

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 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.

4.1.11 The main constraints to development on this site comprise the category B trees T1 and T10; however they will not significantly constrain development, provided it will not be necessary to build right up to the boundaries.

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.

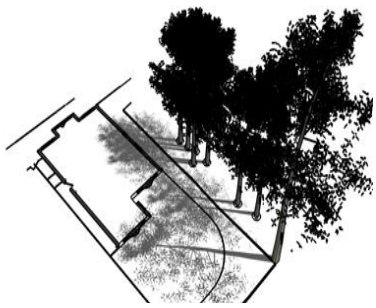


Figure 3 –
Generic Shading Constraints

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.

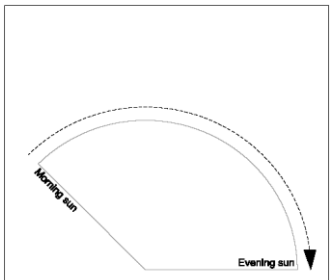


Figure 4 – Shading Arc

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 trees on the southern/western boundary 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

Hide irrelevant | Show All Trees

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

Ref: HVL/11PAR/AIA

B.S. Cat.	Tree No.	Species	Impact	Tree / RPA Affected	Age	Growth Vitality	Species Tolerance	Impact on Tree Rating	Impact on Site Rating	Mitigation
C	5	Honey Locust	LGF/GF Construction within canopy (3m ground clearance)	m^2 N/A %	Young	Normal	Moderate	Very Low	N/A	Remedial tree surgery (see Rec. Works)
C	6	Beech, Common	Felled to Facilitate Development	m^2 N/A %	Young	Normal	N/A	N/A	Low	New planting / landscaping
C	7	Cypress, Lawson variety	Felled to Facilitate Development	m^2 N/A %	Young	Normal	N/A	N/A	Low	New planting / landscaping
C	8	Cypress, Lawson variety	Fell to Facilitate Development	m^2 N/A %	Young	Normal	N/A	N/A	Low	New planting / landscaping
C	9	Cherry, Ornamental	Fell to Facilitate Development	m^2 N/A %	Semi-mature	Normal	N/A	N/A	Low	New planting / landscaping
C	13	Laburnum	New landscaping/stairs in RPA/under canopy	0.65 m^2 7.18 %	Semi-mature	Normal	Moderate	Low	N/A	Manual excavation with pre-emptive root pruning

6.0 DISCUSSION

6.1 Rating of Primary Impacts

6.1.1 This scheme is a considerable improvement in arboricultural terms, as there are no longer any primary impacts to the theoretical RPA of category B tree, T10.

6.1.2 Other primary impacts comprise the felling of mainly young category C trees, T6, T7, T8 and T9. The loss of these trees is rated as a low impact, with no significant effect on the visual character of the local conservation area. The replanting scheme will offer considerable enhancement and replaces the three young/one semi-mature trees with species specifically selected for the proposed site, healthy and fit-for-purpose. There will also be some very minor canopy encroachment during construction only to T5 (3m ground clearance). It is recommended that the canopy is either tied back or minor pruning works used to facilitate the construction of the LFG/GF extensions beneath the canopy.

6.2 Rating of Secondary impacts

6.2.1 The secondary impacts comprise some shading/organic deposition of the lightwells, particularly from the trees on the southern boundary. These minor impacts can be mitigated with building design adaptions, such as choice of room layout, in addition to simple cleaning maintenance. Thus, the secondary impacts of development are minimal.

6.3 Mitigation of Impacts

6.3.1 The landscape impact of tree losses will be offset by the landscape proposals involving new planting of ornamental varieties of native species, where appropriate using columnar or compact form. A selection of columnar tree species cultivars for constricted sites is provided in Appendix 4.

6.3.2 The line of the foundations within the RPA of T2 should be manually excavated with pre-emptive root pruning to 750mm under arboricultural supervision; any roots encountered within the trenches / pits will be cleanly pruned back to an appropriate junction with a sharp pruning saw or secateurs back to a junction. Roots larger than 25mm diameter may only be cut in consultation with an arboriculturalist.

6.3.3	Any replacement hard landscaping within RPA's 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.
6.3.4	Nuisance deposition can be further mitigated with routine maintenance, light pruning / deadwooding.
6.3.5	The shading impacts can be mitigated by building design, with the choice of room layout. Some minor crown reduction may be necessary, but not such as to impose a burden of frequent, repetitive management.

7.0 CONCLUSION

7.1 The revised scheme has considerably reduced the primary impacts, with the removal of 4 mainly young category C trees and a low canopy encroachment to T5 from the construction of the extension only. The trees that are recommended for felling are of little individual significance, such that their loss will not affect the visual character of the area. The full potential of the impacts can be mitigated through the proposed manual excavation and landscaping scheme, with associated replacement planting.

7.2 The minor secondary impacts of shading and organic deposition can be mitigated by building design and layout, in addition to simple cleaning maintenance.

7.3 Therefore, 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 The felled trees should be replaced with native ornamental nursery stock under current best practice; i.e. conforming to and planted in accordance with the following:

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

8.2 General Recommendations

8.2.1 Any trees which are in close proximity to the proposed development should be protected with a Tree Protection Barrier (TPB). Protective barrier fencing should be installed immediately following the completion of the tree works, remaining in situ for the entire duration of the development unless otherwise agreed in writing by the council. It should be appropriate for the intensity and proximity of the development, usually comprising steel, mesh panels 2.4m in height ('Heras') and should be mounted on a scaffolding frame (shown in Fig 2 of BS5837:2012). The position of the TPB can be shown on plan as part of the discharge of conditions, once the lay out is agreed with the planning authority. The TPB should be erected prior to commencement of works, remain in its original form on-site for the duration of works and removed only upon full completion of works.

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

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

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

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

8.2.6 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.

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

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

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

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

9.0 REFERENCES

- 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: 11 Prince Albert Road, London NW1 7SR

Date: 17 12 2013

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd
Tel: 020 7851 4544
Surveyor(s): Adam Hollis

Ref: HVL/11PAR/AIA

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Clear Stem Height	Stem Diameter	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
1	Honey Locust	15	4	2.5	5.0	620.0	Mature	7.4	Normal	Good	B	1	>40	Canker on N base
2	Rowan	10	1533	2.0	3.0	250.0	Early Mature	3.0	Moderate	Poor	C	2	10-20	Asymmetry (major) Suppressed by nearby tree Ivy clad
3	Willow, Weeping	10	5385	1.0	3.0	470.0	Early Mature	5.6	Moderate	Poor	C/u	2	10-20	Break-out wound Asymmetry (major) Storm damage
4	Honey Locust	5	2	2.0	3.0	50.0	Young	0.6	Moderate	Fair	C	2	20-40	A tree with insignificant defects
5	Honey Locust	8	3	3.0	2.0	100.0	Young	1.2	Normal	Fair	C	2	20-40	A tree with insignificant defects
6	Beech, Common	8	3342	0.5	2.0	120.0	Young	1.4	Normal	Fair	C	2	20-40	Leaning (slightly) Co-dominant stems
7	Cypress, Lawson variety	8	1.5	0.0	0.0	100.0	Young	1.2	Normal	Good	C	2	20-40	

Landmark Trees

Site: 11 Prince Albert Road, London NW1 7SR

Date: 17 12 2013

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd
Tel: 020 7851 4544
Surveyor(s): Adam Hollis

Ref: HVL/11PAR/AIA

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Clear Stem Height	Stem Diameter	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
8	Cypress, Lawson variety	8	1.5	0.0	0.0	100.0	Young	1.2	Normal	Good	C	2	20-40	
9	Cherry, Ornamental	8	3524	2.0	2.0	150.0	Semi-mature	1.8	Normal	Fair	C	2	20-40	Entry wounds on trunk
10	Lime, Common	15	6685	6.0	7.0	510.0	Mature	6.1	Normal	Fair	B	2	20-40	Basal cavity Entry wounds on trunk Ivy clad; minor deadwood
11	Laurel, Cherry	7	3	0.0	0.0	173.2	Early Mature	2.1	Normal	Good	C	2	>40	A tree with insignificant defects
12	Yew, Common	7	2	0.0	2.0	100.0	Young	1.2	Normal	Good	C	2	>40	A tree with insignificant defects
13	Laburnum	5	3	2.0	1.5	141.4	Semi-mature	1.7	Normal	Good	C	2	>40	2 stems left out of 4

APPENDIX 2

RECOMMENDED TREE WORKS

Notes for Guidance:

Husbandry 1 - Urgent (ASAP), 2 - Standard (within 6 months), 3 - 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.

Landmark Trees

Site: 11 Prince Albert Road, London NW1 7SR

Date: 17 12 2013

Surveyor(s): Adam Hollis

Ref: HVL/11PAR/AIA

Recommended Tree Works

Show All Trees
Hide irrelevant

Tree No.	English Name	Height	Stem Diameter	Crown Spread	Recommended Works	Comments/ Reasons
2	Rowan	10	250.0	1533	Fell	Asymmetry (major) Suppressed by nearby tree Ivy clad Recommended Husbandry 3
3	Willow, Weeping	10	470.0	5385	Fell	Break-out wound Asymmetry (major) Storm damage Recommended Husbandry 2

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.

Landmark Trees

Site: 11 Prince Albert Road, London NW1 7SR

Surveyor(s): Adam Hollis

Date: 02 07 2015

Ref: HVL/11PAR/AIA

Recommended Tree Works To Facilitate Development

Show All Trees
Hide irrelevant

Tree No.	English Name	Height	Stem Diameter	Crown Spread	Recommended Works	Comments/ Reasons
5	Honey Locust	8	100.0	3	CB Cut back/tie back minor branches to facilitate	A tree with insignificant defects To Facilitate Development
6	Beech, Common	8	120.0	3342	Fell	Leaning (slightly) Co-dominant stems To Facilitate Development
7	Cypress, Lawson variety	8	100.0	1.5	Fell	To Facilitate Development
8	Cypress, Lawson variety	8	100.0	1.5	Fell	To Facilitate Development
9	Cherry, Ornamental	8	150.0	3524	Fell	Entry wounds on trunk To Facilitate Development

APPENDIX 4: TREE SELECTION FOR CONSTRICTED LOCATIONS

Table A4.1: Rosaceous Tree Species for Constricted Planting Locations

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

Table A4.2: Specimen Tree Species for Constricted Planting Locations

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

APPENDIX 5

TREE CONSTRAINTS PLAN

19
17
15
13
11
9
13
12
11
10

T10
Common Lime
B2

T11
Cherry Laurel
C2

T12
Yew
C2

T13
Laburnum
C2

T9
Ornamental Cherry
C2

T7
Lawson Cypress
C2

T8
Lawson Cypress
C2

T6
Beech
C2

T5
Honey Locust
C2

T4
Honey Locust
C2

T3
Weeping Willow
C/U1

T2
Rowan
C2

T1
Honey Locust
B1

N
W
E

5m
10m

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).

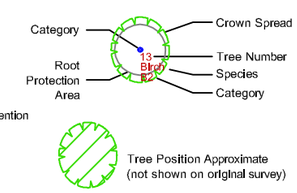
Landmark Trees

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: 11 Prince Albert Road	1:200@ A3
Drawing Title: Tree Constraints Plan	Dec 2013

Key:

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



Tree Position Approximate
(not shown on original survey)

APPENDIX 6

ARBORICULTURAL IMPACT ASSESSMENT PLAN

NOTE:

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

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

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: 11 Prince Albert Road	1:200@ A3
Drawing Title: Arboricultural Impact Assessment	June 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 — Tree Number, Species, Category (T3 Birch B2)

Tree To Be Removed

Tree Position Approximate (not shown on original survey)