Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT:

6 Nutley Terrace,

London NW3 5BX

REPORT PREPARED FOR:

Mr Omar Shafi

6 Nutley Terrace,

London, NW3 5BX

REPORT PREPARED BY

Adam Hollis

MSc ARB MICFor FArbor A MRICS C Env

Ref: SHF/NTL /AIA/01

Date: 20th October 2011

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 an inspection they will of course appear in the report.
Inherent in tree inspection 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:	Mr Omar Shafi	**Case Ref:**	SHF/NTL/ AIA/01
Local Authority:	LB Camden	**Date:**	20/10/11
Site Address: Mr Omar Shafi, 6 Nutley Terrace, London, NW3 5BX			
Proposal: replacement of single dwelling with two new dwellings with basements.			

Report Checklist	**Y/N**		**Y/N**
Arboricultural constraints on site	Y	Trees (previously) removed	(Y)
Tree Survey	Y	Topographical Survey	Y
BS5837 Report	Y	Conservation Area	Y
Tree Preservation Orders	Y		
Tree Protection Plan:	N/a	(include In future method statement)	
Tree Constraints Plan:	Y		
Arboricultural Impact Assessment:	Y		

Site Layout					
Site Visit	Y	Date: 28/7/11		Access Full/Partial/None	F
Trees on Site			Y	Off site Trees	Y
Trees affected by development			Y	O/s trees affected by development	Y
Tree replacement proposed on plans:			Y	On or off-site trees indirectly affected by development	Y

Trees with the potential to be affected

Front garden: T1 & 2 limes incur mostly positive impacts – conversion of existing drive to bedding, but need precautionary measures. Similarly conversion of 2m2 of bed to drive under supervision. Net decrease of building footprint within RPA's.

Rear garden: basement & lower garden construction within conventional RPA of T3 poplar (22% of RPA). However, no impact occurs, when allowance made for pollarding under BS5837:1991. Building construction within outer 2m of T7 sycamore canopy requires remedial tree surgery. T7 is low quality, self-sown boundary tree.

Comments

Impacts rate (very) low and are supportable. New trees planted to front and rear.

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	N
6	The Proposal will result in significant root damage to retained trees	N
7	Further investigation of tree condition recommended	N

RPA= Root Protection Area
TPP= Tree Protection Plan
AMS= Arboricultural Method Statement
AIA = Arboricultural Implication Assessment
BS5837: 2005 'Trees in relation to construction – recommendations'

1. SUMMARY

1.1 This report comprises an arboricultural impact assessment of the revised proposals for 6 Nutley Terrace, London, NW3 5BX, reviewing any conflicts between the proposals and material tree constraints identified in our survey.

1.2 There are 7 trees surveyed on or around the site, of which 4 are 'B' category *(Moderate Quality) and 3 'C' category *(Low Quality). There is also an outstanding conservation area requirement to plant two new trees in the garden, in replacement for two hazard trees removed in 2011. Moderate quality trees and above are considered material constraints on development. However, the low quality trees will comprise a constraint in aggregate, in terms of the conservation area. Final agreement of planting location for the 2 replacement trees may also be a constraint on the site.

1.3 The principal primary impacts in the current proposals are positive rather than negative: substantial portions of the existing drive will be converted to soft landscaping within the RPA's of T1 (2.5m^2) and T2 (3m^2) limes. There will also be a net decrease of building footprint (3.5m^2) within their RPA's. The only negative impact here would be the conversion of 2m^2 of bedding to drive at the edge of T2's RPA. The impacts are rated very low, provided they are executed cautiously. T3 poplar (a residual totem pole) incurs marginal basement & lower garden construction impacts (22% by area) to its conventional RPA. However, no impact would occur, when allowance were made for the tree's lack of a crown. No lasting injury is anticipated.

1.4 Minor secondary impacts would arise from the juxtaposition with the outer 2m of T7 sycamore's canopy. The crown will require both initial, remedial tree surgery (lateral reduction) and cyclical pruning to maintain practical clearance. However, T7 is a low quality, self-sown, (shared) boundary tree, already growing too close to the existing house. The requirement for cyclical pruning as the tree matures is outstanding, regardless of development, which merely brings forward the requirement.

1.5 Replacement tree planting (for prior hazard tree removals) is recommended at the front (NE entrance) and rear of the site (southern boundary). There will be no net loss of amenity from their removal and replacement.

1.6 Thus, with suitable mitigation and supervision the scheme is viable.

* British Standards Institute. 2005. Trees in Relation to Construction BS 5837: 2005 HMSO, London

2. INTRODUCTION

2.1 Terms of reference

2.1.1 LANDMARK TREES were asked by Mr Omar Shafi to undertake an arboricultural planning survey of the site, 6 Nutley Terrace, London, NW3 5BX. The report is to accompany a planning application.

2.1.2 The proposals are for the construction of PROPOSALS and 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 20 years experience of the landscape industry - including the Forestry Commission and Agricultural Development and Advisory Service. I am a UK Registered Expert Witness, trained in single joint expert witness duties. I am also Chairman of the UK & I Regional Plant Appraisal Committee, inaugurated to promote international standards of valuation in arboriculture.

2.2 Drawings supplied

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

Topographical survey – 6 Nutley Terrace

Proposed ground floor – NUT 000 C4

2.3 Scope of survey

2.3.1 As Landmark Trees' arboricultural consultant, I surveyed the trees on site on 28th July 2011, recording relevant qualitative data in order to assess both their suitability for retention and their constraints upon the site, in accordance with British Standard 5837:2005 Trees in relation to construction – Recommendations [BS5837:2005].

2.3.2 Our survey of the trees, the soils and any other factors, is of a preliminary nature. The trees were inspected 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). I have not taken any samples for analysis and the trees were not climbed, but inspected from ground level.

2.3.3 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 4.

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: 2005) overlain onto it. These constraints are then overlain in turn onto the client's proposals to create an Arboricultural Impact Assessment Plan in Appendix 5. General observations and discussion follow, below.

3.0 OBSERVATIONS

3.1 Site description

3.1.1	The site is a residential house in Camden with south-facing garden to the rear. The adjoining network of rear gardens provides a good degree of tranquility and greenery. There is a notable presence of mature tree cover in the locality.
3.1.2	The site is relatively level around the house, but the garden slopes significantly to the rear with some existing terracing.
3.1.3	In terms of the Soil Survey of England and Wales, the soil lies within the unsurveyed area of Greater London where the soils are generally, highly shrinkable clay; e.g. slowly permeable seasonally waterlogged fine loam over clay. Such soils are prone to compaction during development. Damage to soil structure can have a serious impact on tree health. Design of foundations near problematic tree species will also need to take into consideration subsidence risk. A structural engineer may be able to advise further on the local geology and its implications for development.

3.2 Subject trees

3.2.1	There are 7 trees surveyed on or around the site, of which 4 are 'B' category *(Moderate Quality) and 3 'C' category *(Low Quality). There is also an outstanding conservation area requirement to plant two new trees in the garden in replacement for two hazard trees removed in 2011.
3.2.2	In terms of age demographics there is a preponderance of mature forest trees on the site with few younger, garden ornamental replacement trees in the population.

3.3 Planning Status

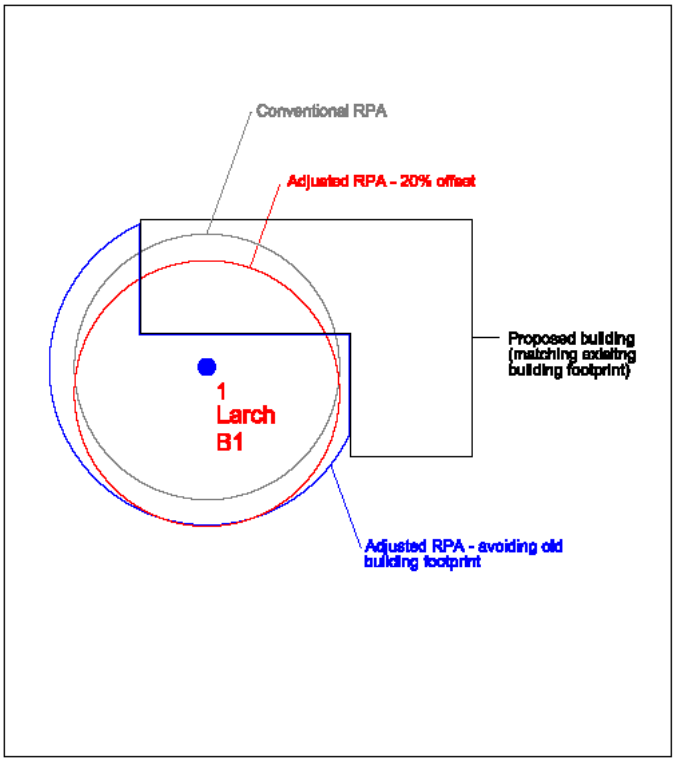
3.3.1	We are not aware of the existence of any Tree Preservation Orders or Conservation Areas, which may affect trees on the site. It is a criminal offence to disturb or damage such trees without permission from the local authority.

4.0 DEVELOPMENT CONSTRAINTS

4.1 Primary constraints

4.1.1 BS5837: 2005 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 generally 12-x stem diameter at 1.5m above ground level, except where basal diameters are used in the case of multi-stemmed trees, and the radius is set at 10x the diameter.

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, and where appropriate shifted 20% in the direction of undisturbed ground, as shown in the diagram below. Alternatively, one need only remember that RPA's are area-based and not linear – notional rather than fixed entities. **No relocations of RPA's have been made in this instance (please see overleaf).**



4.1.3 In BS5837, para. 5.2 states that RPA's should reflect the morphology and disposition of the roots, when **KNOWN TO BE INFLUENCED** by past or existing site conditions (e.g. the presence of roads, structures and underground services). 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 or **KNOWN**, 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 (ISA) by Kopinga J, 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 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 relocations are made here to the RPA's, regardless of roads etc.

4.1.8 The only modification considered here, is of T3 poplar's RPA: a tree of this stem size would normally command a massive crown. In this case, the entire crown has been removed (in a subsidence claim), leaving a totem pole. The object of the pruning exercise was to reduce water demand with the root system expected to adapt. There is no specific mechanism to correlate the RPA of a pollard tree with its reduced water demand. However, the previous BS draft, BS5837:1991 which provided recommendations in practice for 14 years, contained just such a mechanism: trees with minimal crown spreads were awarded RPA equivalents of 50% tree height. LT cannot recommend the implementation of a succeeded draft, but recommend its provision at least, be born in mind, when considering impacts to the BS5837:2005 RPA; i.e. to maintain a sense of proportion that is otherwise lacking in the current draft.

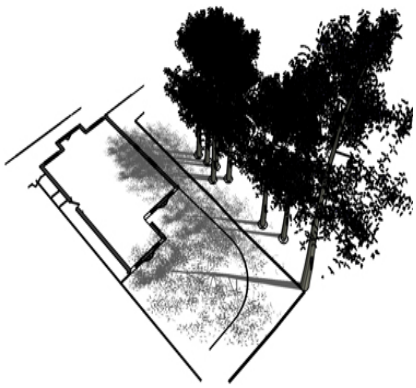
4.1.9 The quality of trees will also be a consideration: R Category trees are discounted from the planning process in view of their limited service life. Again, Category-C trees would not normally constrain development individually, unless they provide some external screening function. As discrete, internal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

4.1.10 "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 development work and subsequent demands for their removal. The end result is usually fewer and less suitable trees than would be the case if proper planning, selection and conservation had been applied from the outset." (BS5837: 2005)

4.1.11 Moderate quality trees and above are considered material constraints on development. However, the low quality trees will comprise a constraint in aggregate, in terms of the conservation area. Final agreement of planting location for the 2 replacements may also be a constraint on the site.

4.2 Secondary Constraints

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



4.2.3 The shading constraints are crudely determined from BS5837:2005 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. This arc represents the effects that a tree will have on layout through shade, based on shadow patterns of 1x tree height for a period May to Sept inclusive 10.00-18.00 hrs daily.

4.2.4 The principal secondary constraint would be shading on to the site from trees along the south and west boundaries. Shading will always be a factor on this evergreen site, but no more than exists now

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

5.0 Table 1: Arboricultural Impact Assessment for Retained Trees

Hide irrelevant | Show All Trees

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

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	Lime, Common	New building: 1m2 (all of which is existing), Drive conversion to bed: 2.5m2	3.5 m^2 4.18 %	Early Mature	Normal	Moderate	Very Low	N/A	Not required for building. 1m2 removed from RPA Manual working / Arboricultural supervision
B	2	Lime, Common	New building: 5m2 (4m2 of which is existing), Drive conversion: 32m2 Bed conversion to drive: 2m2	39 m^2 33.14 %	Mature	Normal	Moderate	Very Low	N/A	Not required for building. 2.5m2 removed from RPA Manual working / Arboricultural supervision
C	3	Poplar, Hybrid	Basement & Lower Garden Construction within RPA NB no impact to more realistic BS5837:1991 RPA	170 m^2 22.93 %	Mature	Moderate	Good	Very Low	N/A	Pre-emptive root pruning of retaining wall footprint
C	7	Sycamore	Building Construction within outer 2m of Canopy	m^2 N/A %	Early Mature	Normal	Good	Low	N/A	Remedial tree surgery (see Rec. Works)

6.0 DISCUSSION

6.1 Rating of Primary Impacts

6.1.1 The principal primary impacts in the current proposals are positive rather than negative: substantial portions of the existing drive will be converted to bedding within the RPA's of T1 (2.5m^2) and T2 (3m^2) limes. There will also be a net decrease of building footprint (3.5m^2) within their RPA's. The only negative impact here would be the conversion of 2m^2 of bedding to drive at the edge of T2's RPA. The impacts are rated very low, provided they are executed cautiously.

6.1.2 T3 poplar (a residual totem pole) incurs basement & lower garden construction impacts (22% by area) to its conventional RPA, which would normally rate low-medium impact. However, no impact would occur, if allowance were made for the tree's lack of a crown (under BS5837:1991 or common sense interpretation). No lasting injury is anticipated.

6.1.3 The principal of RPA encroachment is established within BS5837:2005 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 misinterpreted as *Root Prohibition Areas* – a category error on the part of those making this assumption. In logic, a category error occurs when someone acts as though an object had properties, which it does not or cannot have.

6.1.4 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 BS5837:2005 and other published references to healthy trees tolerating up to 30-50% root severance (Coder, Helliwell and Watson in CEH 2006).

6.1.5	The trees in question are generally healthy or vigorous specimens of species with good resistances to development impacts, and quite capable of tolerating these low impacts
6.1.6	"**In practice 50% of roots can sometimes be removed with little problem**, provided there are vigorous roots elsewhere. Inevitably, this degree of root loss will temporarily slow canopy growth and even lead to some dieback" (Thomas 2000). LT do not recommend annexing such high proportions of the root system; rather that within the context of the published science, planning should not be unduly concerned by impacts that are well below the subcritical threshold – *tree survival is not at stake.*

6.2 Rating of Secondary impacts

6.2.1	Minor secondary impacts will arise from the conflict with the outer 2m of T7 sycamore's canopy. The crown will require both initial remedial tree surgery (lateral reduction) and cyclical pruning to maintain practical clearance. However, T7 is a low quality, self-sown, (shared) boundary tree, already growing too close to the existing house. The requirement for cyclical pruning as the tree matures is outstanding, regardless of development, which merely brings forward the requirement.

6.3 Mitigation of Impacts

6.3.1 All plant and vehicles engaged in demolition works should either operate outside the RPA, or should run on a temporary surface designed to protect the underlying soil structure. The demolition of the building should proceed inwards in a "pull down" fashion. Hard surfacing can be lifted with caution by a skilled machine operator again working away from the tree. The 2m2 planting bed section must be demolished by hand.

6.3.2 It may be possible to improve upon the existing driveway surfacing further, by replacing existing pavement and sub-base with a no-dig section, using a permeable paving surface and cellular confinement system. with no fines aggregate for the sub-base. The finished section is likely to be c. 150mm above grade, depending on final specification, which will need to be factored into the overall finished site levels and highway crossovers. The cellular confinement system with a temporary hard surface (e.g. road stone) can be used for site access during construction and the surface material replaced on completion of construction.

6.3.3 The T7 immediate canopy encroachment can be avoided with a crown reduction of lower limbs. Nuisance deposition can be mitigated with regular crown cleaning and filtration traps on the guttering.

6.3.4 The landscape impact of historic tree losses from the site (not specific to the development) will be mitigated by new landscape proposals, ideally involving new planting of ornamental varieties of native species, and where appropriate with columnar or compact form. A selection of columnar tree species cultivars for constricted sites is provided in Appendix 3.

6.3.5 These proposals include new tree planting at the very front of the site to ensure there is no net loss of amenity from past felling.

7.0 CONCLUSION

7.1	The potential impacts of development are all relatively low in terms of overall RPA percentage. Indeed, the major impacts are all positive / beneficial (replacement of hard landscape with soft).
7.2	The full potential of the impacts can be largely mitigated through design and precautionary measures. These measures can be elaborated in Method Statements in the discharge of planning conditions.
7.3	The species affected are generally tolerant of root disturbance / crown reduction and the retained trees are generally in good health and capable of sustaining these reduced impacts.
7.4	Landscape proposals, including new tree planting at the very front of the site, ensure there is no net loss of amenity from past felling.
7.5	Therefore, the proposals will not have any significant impact on either the retained trees or wider landscape.

8.0 RECOMMENDATIONS

8.1 Specific Recommendations

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

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

8.1.3 Replace (previously) felled trees with 1 new tree at the front of the site and 1 on the rear boundary; species TBC, but e.g. native field maple (Acer campestre Louisa Red Shine) pit-planted at as 14-16 cm girth nursery stock under current best practice; i.e. conforming to and planted in accordance with the following:

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

8.2 General Recommendations

8.2.1 Any trees which are in close proximity to buildings proposed for demolishing should be protected with a Tree Protection Barrier (TPB). This TPB should comprise steel, mesh panels 2.4m in height ('Heras') and should be mounted on a scaffolding frame (shown in Fig 2 of BS5837:2005). The position of the TPB can be shown on plan as part of the discharge of conditions, once the lay out is agreed with the planning authority. The TPB should be erected prior to commencement of works, remain in its original form on-site for the duration of works and removed only upon full completion of works.

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

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

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

8.2.5 Where sections of hard surfacing are proposed in close proximity to trees, it is recommended that "No-Dig" surfacing be employed in accordance with BS5837:2005 and 'The Principles of Arboricultural Practice: Note 1, Driveways Close to Trees, AAIS 1996 [APN1]'.

8.2.6 Where scaffolding installation is required within the RPA the provisions of Figure 3 of BS5837:2005 with regard to ground protection must be employed.

8.2.7 If the RPA of a tree is encroached by underground service routes then BS5837:2005 and NJUG VOLUME 4 provisions should be employed. If it is deemed necessary, further arboricultural advice must be sought.

8.2.8 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.

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

1) Plan of underground services.
2) Schedule of tree protection measures, including the management of harmful substances.
3) Method statements for constructional variations regarding tree proximity (e.g. foundations, surfacing and scaffolding).
4) Site logistics plan to include storage, plant parking/stationing and materials handling.
5) Tree works: felling, required pruning and new planting. All works must be carried out by a competent arborist in accordance with BS3998.

6) Site supervision: the Site Agent must be nominated to be responsible for all arboricultural matters on site. This person must:

* be present on site for the majority of the time
* be aware of the arboricultural responsibilities
* have the authority to stop work that is causing, or may cause harm to any tree
* ensure all site operatives are aware of their responsibilities to the trees on site and the consequences of a failure to observe these responsibilities.
* make immediate contact with the local authority and/or a retained arboriculturalist in the event of any tree related problems occurring.

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

8.2.11 The sequence of works should be as follows:

* initial tree works: felling, stump grinding and pruning for working clearances
* installation of TPB for demolition & construction
* installation of underground services
* installation of ground protection
* main construction
* removal of TPB
* soft landscaping

9.0 REFERENCES

- British Standards Institute. 2005. Trees in Relation to Construction BS 5837: 2005 HMSO, London.
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- Centre for Ecology & Hydrology. 2006. Tree Roots in the Built Environment, HMSO, London.
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- Mattheck C. & Breloer H. 1994. Research for Amenity Trees No.2: The Body Language of Trees, HMSO, London.
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APPENDIX 1

TREE SCHEDULE - Notes for Guidance

Dm -	is the diameter of the trunk in millimetres at 1.5m above ground level.
Spread -	is in metres at the points of the compass relevant to the woodland boundary
Class/Colour -	refers to the retention classifications in Section 5.2 BS5837: 2005 and colouring on the site map - Highly High Quality (A) (Green), Moderate Quality (B) (Blue), Low Quality (C) (Grey), Poor Quality (R) (Red)

Landmark Trees Ltd
Tel: 020 7851 4544

Tree Survey Schedule

Site: 62 Nutley Terrace, London
Date: 28/7/11

Surveyor: Adam Hollis
Ref:

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Cat	Sub Cat	Useful Life	Observations
1	Lime, Common	14	3223	4	Early Mature	430	12	5.2	Normal	Fair	Medium	B	2	20-40	Pollarded Near entrance to property with wall 50cm to north and perimeter fence 10cm west
2	Lime, Common	12	3223	4	Mature	510	12	6.1	Normal	Fair	Medium	B	2	20-40	Pollarded Boundary wall 10cm north.
3	Poplar, Hybrid	16	3434	8	Mature	1280	12	15.4	Moderate	Fair	Medium	C	2	10-20	Pollarded Large totem pole next to eastern boundary wall.
4	Plane, London	17	3453	4	Early Mature	420	12	5.0	Normal	Fair	Medium	B	2	>40	Next to eastern boundary wall.
5	Apple, Cultivated	4	3313	1	Early Mature	210	12	2.5	Moderate	Fair	Low	C	2	20-40	
6	Oak, Turkey	18	4435	5	Early Mature	460	12	5.5	Normal	Fair	Medium	B	2	>40	Leans to west.
7	Sycamore	16	6556	4	Early Mature	430	10	4.3	Normal	Fair	Low	C	2	>40	Remote survey only (O/s tree) Co-dominant stems

Notes:

1. Height describes the approximate height of the tree measured in meters from ground level.
2. The Crown Spread refers to the crown radius in meters from the stem centre and is expressed as an average of NSEW aspect if symmetrical.
3. Ground Clearance is the height in meters of crown clearance above adjacent ground level.
4. Stem Diameter is the diameter of the stem measured in millimeters at 1.5m from ground level for single stemmed trees or at ground level for multi-stemmed trees. Stem Diameter may be estimated where access is restricted.
5. Protection Multiplier is 12 for single stemmed and 10 for multi-stemmed trees 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 5837:2005 Table 1) and refers to tree/group quality and value; 'A' - High, 'B' - Moderate, 'C' - Low, 'R' - Remove.
11. Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
12. Useful Life is the tree's estimated remaining contribution in years.

APPENDIX 2

RECOMMENDED TREE WORKS

Landmark Trees Ltd
Tel: 0207 851 4544

Recommended Tree Works

Hide irrelevant | Show All Trees

Site: 62 Nutley Terrace, London

Surveyor: Adam Hollis

Date: 6/10/11

Ref:

Tree No.	English Name	Height	Stem Diameter	Crown Spread	Recommended Works	Comments/ Reasons
3	Poplar, Hybrid	16	1280	3434	Monitor	Pollarded Large totem pole next to eastern boundary wall. Advisable for good arboricultural practice
7	Sycamore	16	430	6556	CB3m Clear canopy of build	Remote survey only (O/s tree) Co-dominant stems Recommended to permit development

Notes:

CB - Cut Back to boundary/clear from structure.
CL# - Crown Lift to given height in meters.
CT#% - Crown Thinning by identified %.
CCL - Crown Clean (remove deadwood/crossing and hazardous branches and stubs).
CR#% - Crown Reduce by given %.
DDD - Decay Detection Device recommended.
Fell - Fell to ground level.
Fell2 - Fell and treat stump to prevent re-growth.
Pol - Pollard or re-pollard.
YM - Carry out normal maintenance of a young/newly planted tree.
RE - Remove Epicormic Growth (specific notes may be made).

APPENDIX 3: TREE SELECTION FOR CONSTRICTED SITES

Table 4: Rosaceous Tree Species for Constricted Planting Sites

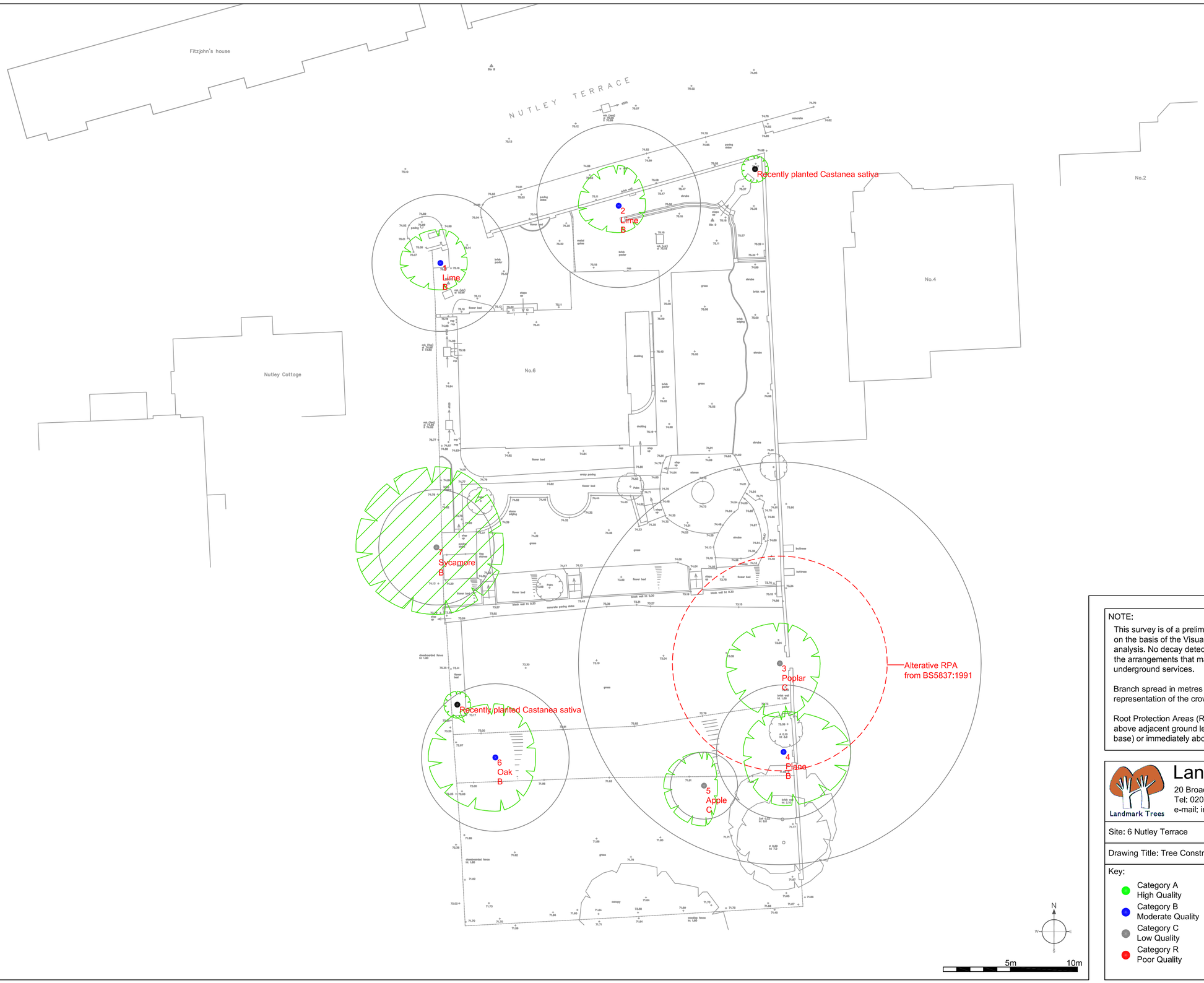
Common Name	Species	Selected Form
Hawthorn	Crataegus monogyna	Stricta
Cockspur	Crataegus prunifolia	Splendens
Cherry	Prunus x hillieri	Spire
Bird cherry	Prunus padus	Albertii
Rowan / Mountain ash	Sorbus aucuparia	Cardinal Royal
Rowan / Mountain ash	Sorbus aucuparia	Rossica Major
Rowan / Mountain ash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

Table 5: Specimen Tree Species for Constricted Planting Sites

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

APPENDIX 4

TREE CONSTRAINTS PLAN



NOTE:

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

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

Root Protection Areas (RPA) are derived from stem diameter measured at 1.5 m above adjacent ground level (taken on sloping ground on the upslope side of the tree base) or immediately above the root flare for multi-stemmed trees.

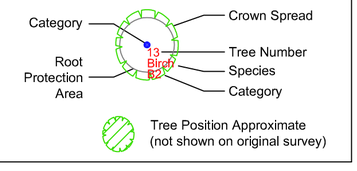
Landmark Trees

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

Site: 6 Nutley Terrace	1-200@A2
Drawing Title: Tree Constraints Plan	Rev A, May 2012

Key:

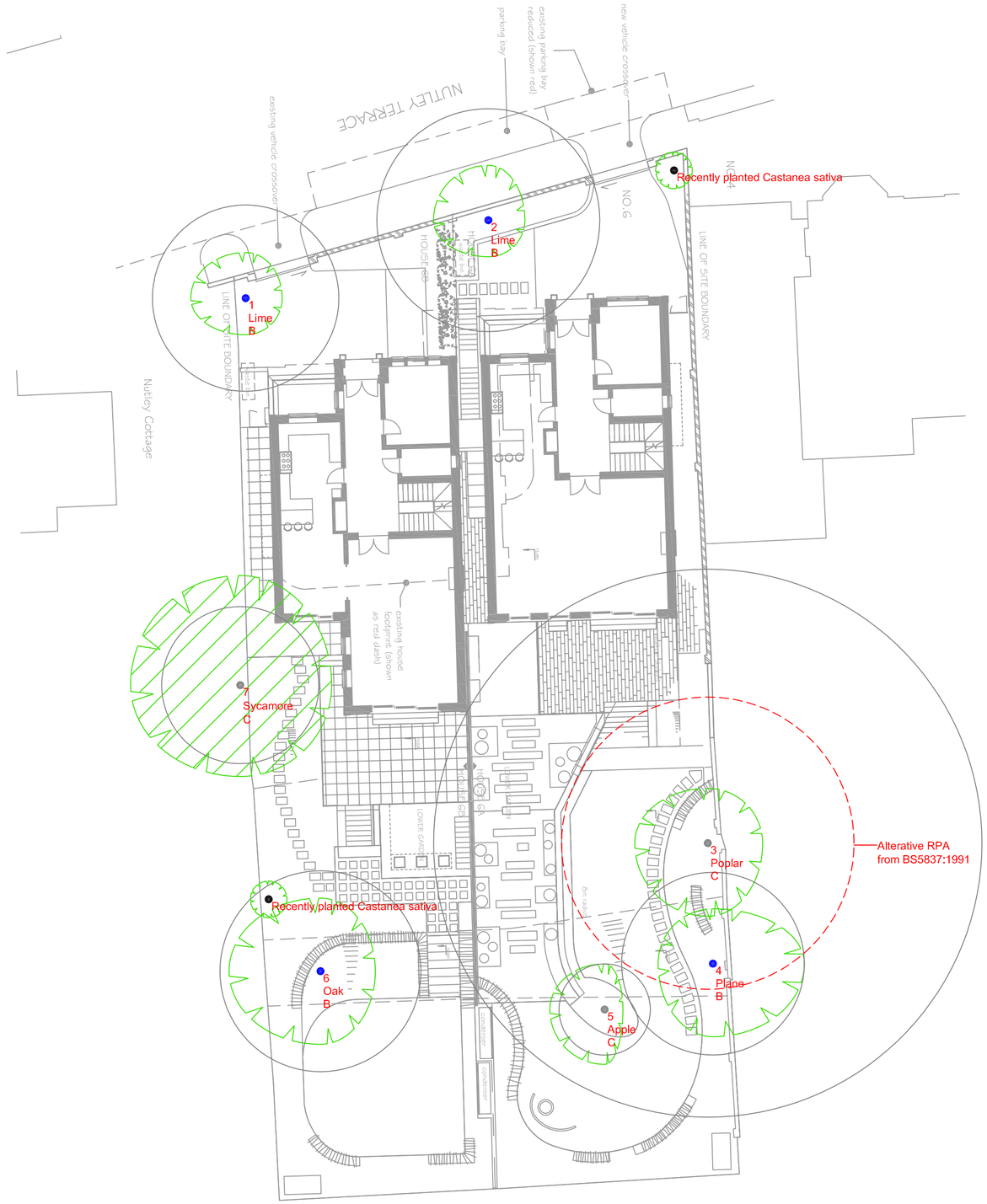
- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category R Poor Quality



Tree Position Approximate (not shown on original survey)

APPENDIX 5

ARBORICULTURAL IMPACT ASSESSMENT PLAN



NOTE:

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

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

Root Protection Areas (RPA) are derived from stem diameter measured at 1.5 m above adjacent ground level (taken on sloping ground on the upslope side of the tree base) or immediately above the root flare for multi-stemmed trees.

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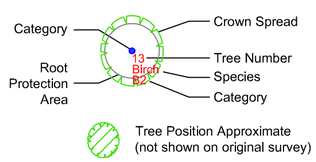
e-mail: info@landmarktrees.co.uk Web: www.landmarktrees.co.uk

Site: 6 Nutley Terrace	1-200@A2
Drawing Title: Arboricultural Impact Assessment	Rev B, May 2012

Key:

- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category R Poor Quality



Tree Position Approximate (not shown on original survey)