

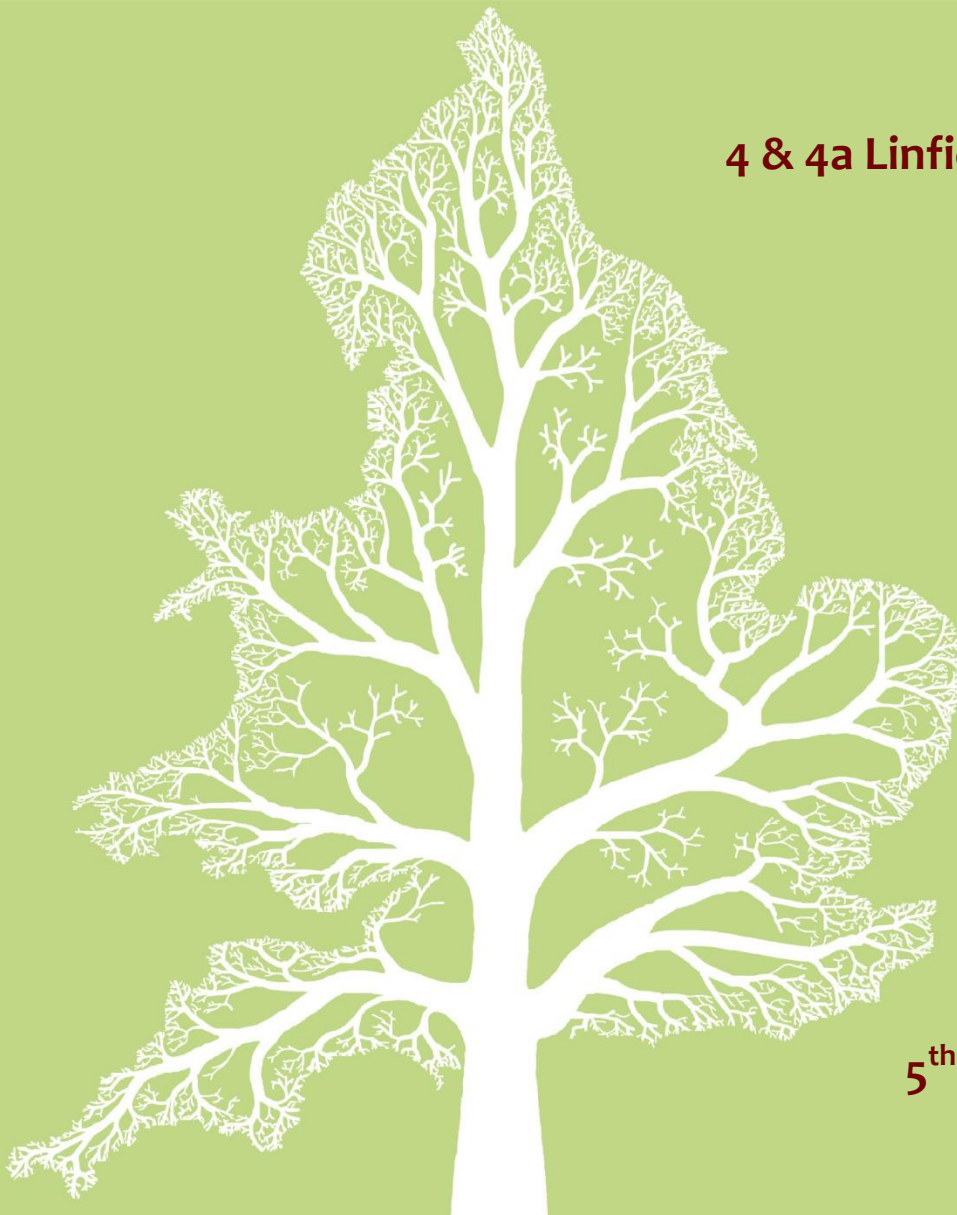
# BS 5837 Arboricultural Report

(pre-planning)



at

**4 & 4a Linfield Gardens  
London  
NW3 6PU**



**Dated  
5<sup>th</sup> March 2018**



**CROWN**  
Consultants

Tree consultants throughout England and Wales



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Arboricultural Report to BS 5837: 2012 for: Square Feet Architects

Crown Ref: 09862

Site: 4 & 4a Linfield Gardens, London

Author: Ivan Button

Date: 5<sup>th</sup> March 2018

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# 1. Introduction

## 1.1. Instruction

1.1.1. We are instructed by Daniel Leon of Square Feet Architects to:

- Undertake an Arboricultural Survey at 4 & 4a Linfield Gardens and assess all trees potentially within influencing distance of proposed development within the site.
- Plot the trees on a Tree Constraints Plan and record the data in a Tree Data Schedule.
- Provide an overview of the site and any management recommendations.
- Determine if any of the trees are growing within a conservation area or are protected by a tree preservation order.
- Provide guidance for architects or developers to enable them to understand and design within the existing tree constraints.

## 1.2. Scope and Purpose of the Report

1.2.1. This report is designed to assist parties interested in developing the site to understand the constraints that are presented by any trees within the curtilage of the site or adjacent to it.

1.2.2. It primarily contains information to assist designers and developers whilst being fully compliant with local authority planning requirements. This report does not take into account specific design proposals which were not available at the time of writing. Where significant trees could be impacted upon by development proposals, we advise that this report is integrated into a suitably detailed arboricultural impact assessment in order to meet validation requirements for a planning application.

1.2.3. This report is produced according to the guidance and recommendations within BS 5837: 2012 - *Trees in Relation to Design, Demolition and Construction*.

## 1.3. Survey Details and Findings

1.3.1. A visual ground level inspection of all trees was undertaken on the 2<sup>nd</sup> October 2017 by Ivan Button. No climbed inspections or specialist decay detection were undertaken. Details of how the survey was undertaken can be found in Appendix 1.

1.3.2. The findings of the survey are presented in The Tree Data Schedule which is provided as a separate document as well as being appended to the end of this document within Appendix 6. The vegetation is further discussed in Section 3.

1.3.3. The Schedule includes scaled tree images based on measurements recorded for stem diameter, crown spread, crown height and overall height. Their purpose is to indicate, at a glance, the relative dimensions of each tree.

1.3.4. A definition of the Retention Categories can be found in Appendix 1. All other terms used within the Tree Data Schedule are defined and explained in Appendix 2. A more detailed description of the survey method is detailed in Appendix 3.

1.3.5. The tree locations shown on the accompanying plans which are reproduced in Appendix 6 are based on a measured plan of the site supplied to Crown Consultants. This plan had the tree positions already plotted. Where applicable, additional trees have been plotted by us according to measurements taken on site.



## 2. Site Overview

### 2.1. Coordinates

- 2.1.1. The site coordinates are 51°33'8.44"N 0°10'55.89"W and the altitude is approximately 82m above sea level<sup>1</sup>.

### 2.2. Brief Description

- 2.2.1. The survey area encompasses the front and rear gardens of two adjacent residential properties along with trees beyond their boundaries which could potentially be affected by any development within.
- 2.2.2. The front gardens are terraced and slope steeply up to meet both houses. The front gardens contain no significant vegetation from a planning perspective. Just a few saplings and shrubs.
- 2.2.3. The rear gardens also only contain relatively small Retention Category C trees.
- 2.2.4. The only significant trees identified in the survey are the Retention Category B ash, sycamore and beech growing in a neighbouring garden, the Retention Category A oak and lime (T7 and T8) which grow two gardens away, and the row of old horse chestnut and London plane trees which have been very heavily topped and are growing beyond the southern boundary on adjacent land.
- 2.2.5. The Tree Constraints Plan and Tree Data Schedule (see Appendix 6) should be referred to for descriptions and locations of all trees.

### 2.3. Survey Extent

- 2.3.1. Our survey covered the area indicated in Figure 1.

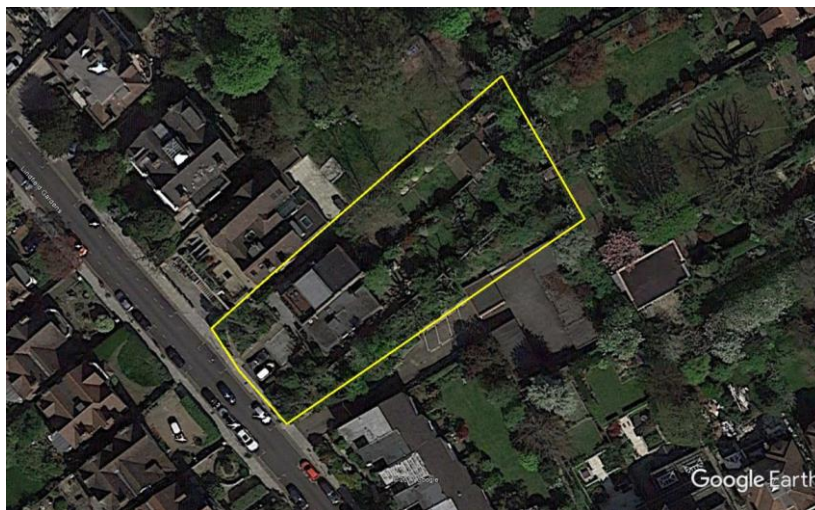


Figure 1 Extent of the survey (image is not current).

- 2.3.2. Photographs of the site are included in Section [0](#).

<sup>1</sup> To access satellite imagery and street views of the site these co-ordinates may be entered into: <http://maps.google.co.uk/>





### 3. Vegetation Overview (independent of proposals)

This section summarises all the recommendations within the Tree Data Schedule regardless of whether trees are to be retained, felled or pruned to facilitate the proposed development. It does not specify works that may be required to facilitate the development proposals. The protection status of the trees is also reported in this section.

#### 3.1. Preliminary Management Recommendations

- 3.1.1. All trees growing within the site were small, relatively young specimens and all were deemed to be in an acceptable condition so no remedial works have been recommended.
- 3.1.2. The horse chestnuts and London planes growing beyond the site boundary to the south have all been very heavily topped and their canopies are limited to epicormic regrowth. None were in good condition at the time of the survey, their starch reserves appearing quite low after years of cyclical pruning and recent pest attacks. They are not particularly attractive specimens but do afford some amenity to the locality due to their size and prominent location. They will need to be managed by regular pollarding.
- 3.1.3. Beyond the rear boundary is a recently topped tree whose flush of epicormic growth was high above ground level and had largely died off and crumpled at the time of the survey. A dense smothering of ivy also prevented a positive species identification, though the high epicormic growth appeared poplar-like from ground level. This specimen was observed to be in poor condition at the time of the survey. Most of its canopy having died off very prematurely this season and significant decay apparent to the stem despite the smothering of ivy preventing views of the stem. If this tree were to survive the recent heavy topping works and recover, it will require extensive management due to its size and inherent problems associated with managing topped trees.
- 3.1.4. Given the high costs associated with managing large old, declining trees that have been lopped and topped, and contrasting this with the low amenity value of this tree, and its poor condition, we would recommend that this specimen is removed and replaced with a new vigorous specimen more suited to an urban environment. We have categorised this tree as Retention Category U accordingly.

#### 3.2. Future Inspections

- 3.2.1. The table below suggests a schedule of future inspections based on the condition and location of each tree:

Inspection Frequency (years)	Tree Number
0.5	None
1	T10, if retained.
1.5	None
3	All other trees

- 3.2.2. The trees should be inspected sooner if there is a noticeable decline in their condition, or following extreme weather events.



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### 3.3. Tree Protection Status – Site Specific

- 3.3.1. On 4<sup>th</sup> October 2017, we were informed, by Chantel of London Borough of Camden that:
- The site is within Reddington & Froggnal Conservation Area.
  - There are tree preservation orders affecting trees within the site at Number 4a.

### 3.4. Tree Protection – General Notes

- 3.4.1. Before undertaking works to trees protected by a tree preservation order, consent needs to be obtained from the local authority which will provide application forms and advice to potential applicants. The removal of dead wood is exempt.
- 3.4.2. Where the works are proposed for reasons of safety or ill health, a report from a suitably qualified arborist will usually be required. Trees that are dead or imminently dangerous are technically exempt from protection, as are dead branches. If the tree work is not urgently necessary however, at least five working days notice of intention should be given to the local authority. In any case it would be prudent to take photographs before undertaking works without prior consent being granted. Unauthorised works to protected trees may result in a criminal prosecution and a large fine (unlimited).
- 3.4.3. Where trees are located in a conservation area, works are not permitted without first giving the local authority 6 weeks' notice of intention. During this time the local authority may elect to create a tree preservation order or to inform the applicant that they have no objection to the proposed works. If the local authority does not respond within 6 weeks, then the intended work may be undertaken. Note: the local authority cannot refuse consent for works to trees within a conservation area; they may only create a tree preservation order if they wish to have further control over what works are undertaken.
- 3.4.4. Where planning permission is granted and tree works have been approved as part of the planning consent, no further application is required in respect of protected trees and no further notice is required in respect of trees within a conservation area.



### 3.5. Species Present – Additional Information

3.5.1. The table below contains general information about the tree *species* (rather than the actual tree *specimens*) included in the survey. Its purpose is to assist readers who are unfamiliar with the characteristics of the various species.

Species	Typical Height at Maturity (m)	Typical Canopy Spread at Maturity (m)	General Notes
Ash	25	18	Large deciduous tree with a straight bole and a high open domed crown. Native to Britain and commonly found in woodlands and adjacent roadsides. Not suitable for small gardens. Easily identified by its oppositely arranged pinnate leaves and black buds. Branches are relatively brittle resulting in a fairly high incidence of small branch failure in windy conditions. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Fraxinus+excelsior">http://www.pfaf.org/user/Plant.aspx?LatinName=Fraxinus+excelsior</a> for more info.
Cabbage Palm	14	4	Native to New Zealand. Abundant in milder coastal areas of the UK. May die back in severe winters in the North. One of the few monocot trees (i.e. with parallel leaf veins like grasses and lilies). Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Cordyline+australis">http://www.pfaf.org/user/Plant.aspx?LatinName=Cordyline+australis</a> for more info.
Copper Beech	27	20	Purple variety of the common beech. A majestic tree with grey bark and purple leaves. The best forms are grafted though this species does occasionally appear in the wild. Visit <a href="http://en.wikipedia.org/wiki/Fagus_sylvatica">http://en.wikipedia.org/wiki/Fagus_sylvatica</a> for more info.
Evergreen Oak	25	20	Also called Holm Oak or Holly Oak because of its evergreen vaguely holly-like leaves. Originating in the Mediterranean region. Mulched leaves are said to repel slugs and grubs. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Quercus+ilex+ballota">http://www.pfaf.org/user/Plant.aspx?LatinName=Quercus+ilex+ballota</a> for more info.
Holly	16	12	Evergreen tree native across Western Europe. Many cultivars available, often with variegated leaves. Females produce bright red berries. Good wildlife value. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Ilex+aquifolium">http://www.pfaf.org/user/Plant.aspx?LatinName=Ilex+aquifolium</a> for more info.
Horse Chestnut	25	18	Deciduous tree native to Albania and N Greece. Naturalised throughout the UK. Iconic landscape tree. Susceptible to attack by Bleeding Canker, as well as Leaf Miner and Leaf Blotch. Should be inspected regularly if located close to high public use areas. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Aesculus+hippocastanum">http://www.pfaf.org/user/Plant.aspx?LatinName=Aesculus+hippocastanum</a> for more info.
Lime	25	12	Very common street tree. Several species exist; the one most often found in woods is 'common lime' which produces a mass of suckers at the stem base, making it very cheap to propagate. Limes have non-symmetrical heart shaped leaves which are much loved by aphids (hence the sticky honeydew on cars parked beneath). Limes are tolerant of heavy pruning and are often managed as pollards. Old limes tend to support a lot of small dead branches. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Tilia+x+europaea">http://www.pfaf.org/user/Plant.aspx?LatinName=Tilia+x+europaea</a> for more info.
London Plane	30	20	Deciduous tree arisen in cultivation probably as a cross between the Oriental Plane and the American Buttonwood. Has attractive bark which peels off in small plates leaving a multiple-coloured flecked pattern. Very common as a street tree, especially throughout London where it dominates the streetscape. Often managed as a pollard in order to constrain its large size to more manageable proportions, especially where there are clay soils and adjacent buildings. Somewhat susceptible to the decay fungus <i>Inonotus hispidus</i> . Visit <a href="http://en.wikipedia.org/wiki/Platanus">http://en.wikipedia.org/wiki/Platanus</a> for more info.
Oak	22	18	Deciduous, long lived tree native and common throughout Europe with very durable timber. Excellent habitat tree - provides food and shelter for thousands of native species. Can be very attractive as a mature open grown specimen though not particularly ornamental, having no autumn colour or showy flowers. Responds well to pruning. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Quercus+robur">http://www.pfaf.org/user/Plant.aspx?LatinName=Quercus+robur</a> for more info.
Plum	6	8	Small fruit tree. Many varieties available. Usually white flowering. Fruits may be green, yellow, red or dark purple. Often quite an untidy looking tree.
Poplar	30	18	Rapidly growing deciduous genus of predominantly large trees. Mostly introduced to Britain, excepting the native Black Poplar. Tolerant of heavy pruning. Timber makes poor firewood. Not suitable for small gardens.
Sycamore	25	16	Deciduous tree native to S. Europe, widely naturalised in the UK. Often regarded as a weed species due to its invasive nature and ability to tolerate most conditions. Responds well to pruning. Not a good tree to park beneath in summer due to the sticky sap secreted by aphids. Visit <a href="http://www.pfaf.org/user/Plant.aspx?LatinName=Acer+pseudoplatanus">http://www.pfaf.org/user/Plant.aspx?LatinName=Acer+pseudoplatanus</a> for more info

3.5.2. The figures quoted regarding typical height and canopy spread should be treated as approximate. Actual heights and spreads vary according to several environmental factors such as soil conditions, climate and presence of competing vegetation. The figures quoted are not the maximum dimensions that the species may attain.



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## 4. Implications for Development

### 4.1. Site Specific Issues

We understand that some development works are proposed towards the rear of the survey area.

Any proposed building foundations in this area would need to take into account the root systems of trees T6 and T9 in particular. Some incursion into their Root Protection Areas might be acceptable but not much more than 10%. How the building will be installed will need to be considered and what the wider impact will be. Specialist (shallow) foundations may be required such as a shallow raft supported by piles.

At the time of the survey, T10 appeared to be in very poor condition and with a short life expectancy so it is not considered that this tree should be a significant constraint to development (hence the Retention Category U categorisation). Nevertheless we would advise not to excavate within 2m of the boundary close to this tree if that can be avoided. This would purely be to prevent destabilising this tree if it were to be retained (and to give us some room to argue that we will not be killing it off).

The root systems of T1 and T14 are considered unlikely to extend into the site so these trees shall be unaffected by any proposed development.

The pittosporum. T11 is a small tree / shrub and is not considered to be a material planning consideration. This could be removed if desired to maximise the development potential of the site.

This remainder of this section of the report offers general advice on dealing with tree related constraints. It is intended to assist designers to work with the Tree Constraints Plan. Examples of mitigation strategies are included which may reduce potential impacts on trees. Persons familiar with BS 5837 Arboricultural Reports (e.g. tree officers) may wish to skip this section and go straight to the following section.

### 4.2. Retention Categories

4.2.1. The Tree Constraints Plan indicates the BS 5837 Retention Categories for each tree. These should be taken into account during the design stage of any development proposals according to the following criteria:

4.2.2. Wherever possible, Category A trees should be retained. These are usually large trees with a relatively high amenity value. They are generally in good condition, well suited to their surroundings and with a significant life expectancy.

4.2.3. The retention of Category B trees is also desirable, though these trees are of a lesser quality, or have a reduced life expectancy or are smaller than category A trees.

4.2.4. The retention of Category C trees should be seen as optional. These are usually small trees or trees of no particular merit and are not considered to be a material planning consideration.

4.2.5. Category U trees have been recommended for removal due to their poor condition, and should be removed regardless of development proposals.





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### 4.3. Root Protection Areas

- 4.3.1. The Tree Constraints Plan indicates the Root Protection Areas of each tree. This does not represent the maximum extent of rooting activity; rather, it defines the area within which the majority of roots are expected to be confined. Wherever possible, this should be left undisturbed for all trees to be retained. In which case the trees shall be unharmed. Significant disturbances such as changes in ground level, soil compaction, excavation of trenches, or interference with oxygen and rainwater exchange may have a significant impact on the health of the tree. (Soil compaction may be caused by vehicles, plant machinery, excessive pedestrian usage, storing of materials/spoil or by the installation of a new vehicular surface.)
- 4.3.2. Some disturbance of the Root Protection Area may be acceptable but must be kept to a minimum. Construction methods should be adopted that are sympathetic to root requirements:
- 4.3.3. Concrete strip foundations should be avoided except at the very extremity of the Root Protection Area. Instead, pile/pier and beam foundations or raft foundations should be utilised. These will minimise root severance.
- 4.3.4. Hard surfaces should be installed with the minimum of excavation. The majority of roots lie within the upper soil horizons and are relatively fine. Roots do not need to be as thick as branches, since they do not have to combat gravity and high winds etc. A root as thin as a finger is able to transport a lot of nutrients. Thus, excavation as shallow as 30cm can have a significant impact on the health of a tree even though large roots might not be severed. Cellular confinement systems help to reduce the amount of excavation required to give a driveway adequate strength.
- 4.3.5. Hard surfaces should ideally be porous to allow rainwater and oxygen to pass into the soil. Gravel is the ideal medium and can be retained in a cellular system to prevent rutting. Block paving and flagstones without mortar joints are a good alternative. Tarmac is not very porous; the use of a no-fines tarmac is preferable.
- 4.3.6. Trenches for underground services are commonly overlooked but can cause major damage to trees. Further arboricultural advice should be sought if underground services are to pass within Root Protection Areas. Trenchless techniques can sometimes be utilised but are not usually practical for installing drains.
- 4.3.7. If ground levels are to be raised, this should always be done with a loose granular material such as gravel or coarse sand. Ground levels must never be raised against the trunks of trees as this may cause them to rot.
- 4.3.8. It is sometimes possible to mitigate against root disturbance, by above ground pruning or by improving rooting conditions for existing roots. The introduction of mycorrhizal fungi and earth worms significantly improves rooting conditions, as does the removal of competing vegetation such as grass.
- 4.3.9. Soil compaction occurs when vehicles repeatedly pass over rooting areas without some kind of structure to disperse their weight. Healthy soils will contain approximately 25% airspace. When soils become compacted these air spaces disappear and roots are unable to respire. It is possible to de-compact soils but this is an expensive operation. It is preferable to avoid compaction, by spreading the load of traffic passing over Root Protection Areas with the use of metal road plates or suitable boards.



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## 4.4. Tree Canopies

- 4.4.1. Where trees are to be retained, adequate space should be allowed between buildings and tree canopies. A minimum distance of 3m is recommended. For high quality trees (Category A or B) which have not yet reached maturity a further allowance should be made to allow the canopies to mature without the need for extensive pruning.
- 4.4.2. For residential dwellings, the shade cast by trees should be also taken into account. Particularly where buildings are located north or north-east of sizeable trees. Some species e.g. birch, have light airy canopies so shade is less of an issue. Commonly occurring trees which cast quite dense shade include beech, oak, ash, chestnut, sycamore, lime and most evergreen species. Shade constraints are less of an issue for garages and other non-residential buildings.
- 4.4.3. More sources of information regarding the above points can be found within Appendix 5. Crown Consultants will gladly offer any further advice, and you are invited to contact the author of this report on 01422 316660.





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## 5. Photographs

Refer to the Tree Constraints Plan for photo locations

Photo 1.



Photo 2.



Photo 3.



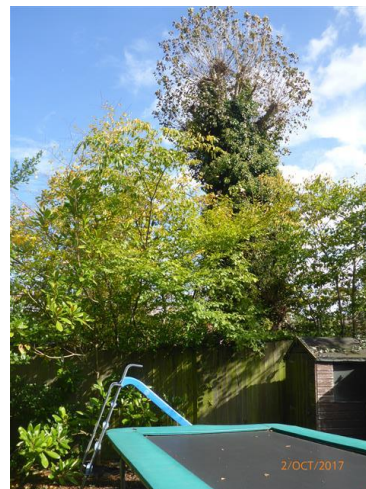
Photo 4.



Photo 5.



Photo 6.







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Photo 7.



Photo 8.



Photo 9.



Photo 10.



Photo 11.



Photo 12.







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Photo 13.



Photo 14.







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Site: 4 & 4a Linfield Gardens, London

Author: Ivan Button

Date: 5<sup>th</sup> March 2018

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## 6. Signature

This report represents a true and factual account of the trees at

4 & 4a Linfield Gardens  
London  
NW3 6PU

**Signed**

  
.....

Ivan Button N.C.H. (Arb), FDS Sc (Arb), BSc (Hons), P.G.C.E., M. Arbor. A.

**on behalf of**

**Crown Consultants Ltd**

**Dated**

5<sup>th</sup> March 2018





## Appendix 1: BS 5837: 2012 – Guidance Notes

This Standard prescribes the principles to be applied to achieve a satisfactory juxtaposition of trees and structures. It sets out to assist those concerned with trees in relation to design, demolition and construction to form balanced judgements.

It acknowledges the positive contribution trees may offer to a site, as well as the negative aspects of retaining inappropriate trees. It addresses the negative impacts that construction activity may have upon trees and offers mitigation strategies to minimise these impacts.

The Standard suggests a three stage approach to ensure best practice is followed when developing close to trees:

### A1.1 Stage 1: Survey Details and Notes

- 6.1.1. A ground level visual survey was undertaken. No climbed inspections or specialist decay detection were undertaken. Only trees with a stem diameter over 75mm, which lie within the site boundary or relatively close to it, were included.
- 6.1.2. Where applicable, trees with significant defects have been highlighted and appropriate remedial works have been recommended. However, this report should not be seen as a substitute for a full *Safety Survey* or *Management Plan* which are specifically designed to minimise risk and liability associated with responsibility for trees.
- 6.1.3. Wherever practicable dimensions were obtained using diameter tapes, logger's tapes, distometers and clinometers. Where obstacles prevent accurate measurement, dimensions are estimated. Trees on privately owned third party are surveyed from the best available vantage point and observations relating to the condition of these trees should be treated accordingly. All height measurements should be regarded as approximate.

Data is recorded for each tree and is presented in a Tree Data Schedule. Each tree is allocated a **Retention Category** according to its size, amenity value, condition and safe useful life expectancy. The categories are allocated independently of development proposals. Our interpretation of the Retention Categories is explained below:

#### A1.1.1 Retention Categories

**A Category:** Trees of high quality and amenity value. Usually, mature trees with a significant life expectancy which would enhance any development. Retention of these trees is strongly encouraged.

**B Category:** Trees of moderate quality and amenity value. Usually these are maturing trees or younger trees with exceptional form. Retention of these trees is desirable though the removal of occasional specimens may be acceptable.

**C Category:** Trees of low quality or small specimens with a relatively low amenity value. These trees are not considered to be a material planning constraint and their removal will generally be seen as acceptable in order to facilitate development.

**U Category:** Trees of such low quality that their removal is recommended regardless of development proposals.

- A1.1.2 Occasionally trees are borderline and do not fall neatly into one of the categories A, B or C. In such cases we apply a superscript (+/-) such that:

C<sup>+</sup> Indicates borderline C/B, though Category C is deemed to be most appropriate.




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**B** Indicates borderline C/B, though Category B is deemed to be most appropriate.

A1.1.3 The British Standard suggests that each of the A, B and C categories may be further subdivided (A1, A2, A3, B1, B2, B3 etc) such that subcategory 1 denotes mainly arboricultural values, subcategory 2 denotes mainly landscape values and subcategory 3 denotes mainly cultural values (including conservation). Multiple subcategories may be used.

Our experience suggests that these subdivisions lack clarity and can be confusing. Within this report subcategories are **not** denoted. Where appropriate, the use of phrases such as 'Part of a formal group', or 'Has a high ecological value', or 'Offers good screening to the site' are incorporated into the observation section of the Tree Data Schedule. We believe this conveys all relevant landscape and cultural information without any confusion.

A1.1.4 **Tree Constraints Plan (TCP).** This indicates the position, crown spread, Retention Category and Root Protection Area of each tree. It is used to inform where development may proceed without causing damage to trees.

A1.1.5 **Root Protection Area (RPA).** This is the area around each tree likely to contain the majority of roots. It should ideally remain undisturbed to avoid a detrimental impact on tree health. For single stemmed trees It is calculated according to the formula "radius of RPA" = "12 x stem diameter". Where a tree has more than one stem, the equivalent-single-stem diameter is usually recorded. This is calculated by adding the squares of the stems and then finding the square root of this total. The radius of the Root Protection Area is then calculated by multiplying the equivalent-stem-diameter by 12.

A1.1.5 **Shade Constraints.** The previous Standard (BS 5837 2005) suggested that shade constraints should be indicated on the TCP. These are denoted as a circle-segment drawn northwest to due east with a radius equal to the height of the tree. These do not represent the actual shade pattern which varies through the seasons. Rather, they indicate the area most shaded by the tree throughout the course of the year. Ideally habitable room windows should be located outside of these shade constraints. Where we consider it appropriate, we will include shade constraints information on our Impact Assessment Plan or Proposed Layout Plan.

## A1.2 Stage 2: Arboricultural Impact Assessment

After the initial survey and the production of the Tree Constraints Plan, arborists and designers are encouraged to work together to establish a design proposal with minimal impact on the high quality trees. An assessment should be made of all possible impacts including the impact that the trees may have upon the proposal. The arborist may recommend mitigation strategies to minimise these impacts and help achieve a more harmonious juxtaposition between buildings and trees.

## A1.3 Stage 3: Arboricultural Method Statement

This type of report specifies the measures necessary to protect trees against damage from construction activity. The Method Statement should be written in a manner that it may be conditioned and enforced by the local authority upon granting of planning permission. The site manager should be familiar with all aspects of the Method Statement and should ensure that all persons working on the site are aware of those aspects which appertain to their work. This includes service installation engineers and operators of plant machinery.



## Appendix 2: Explanation of Tree Data & Glossary

This section explains the terms used in the **Tree Data Schedule** (see Section 3 and Appendix 6).

### A4.1 General Observations

A4.1.1	<b>Numbering System:</b>	Each item of vegetation has its own unique number prefixed by a letter such that T1=Tree 1, G2=Group 2, H3=Hedge 3 and W4=Woodland 4, S5=Shrub 5.
A4.1.2	<b>Age Categories:</b>	
	<b>Young</b>	Usually less than 10 years old.
	<b>Semi-Mature</b>	Significant future growth to be expected, both in height and crown spread (typically below 30% of life expectancy).
	<b>Early-Mature</b>	Full height almost attained. Significant growth may be expected in terms of crown spread (typically 30-60% of life expectancy).
	<b>Mature</b>	Full height attained. Crown spread will increase but growth increments will be slight (typically 60% or more of life expectancy).
	<b>Veteran</b>	A level of maturity whereby significant management may be required in order to keep the tree in a safe condition.
	<b>Over Mature</b>	As for veteran except management is not considered worthwhile.
A4.1.3	<b>Species:</b>	Common names and Latin names are given.
A4.1.4	<b>Height:</b>	Measured from ground level to the top of the crown.
A4.1.5	<b>Stem Diameter:</b>	Taken at 1.5m above ground level where possible. On multi-stemmed trees this measurement may be taken at ground level, though usually an indication of the number of stems and average diameter is given, e.g. 3 x 30cm.
A4.1.6	<b>Crown Height:</b>	Measured from ground level to the height at which the main crown begins. Where the crown is unbalanced it is measured on the side deemed to be most relevant. This is usually the side facing the area of anticipated development.
A4.1.7	<b>Tree Diagram:</b>	This scaled drawing is computer generated based on measurements taken for stem diameter, crown height and spread, and overall height. It is designed to help the reader rapidly assess the data. It is not an accurate representation of the form of the tree.
A4.1.8	<b>Crown Spread:</b>	Measured N, E, S & W, taken from the centre of the stem and usually rounded up to the nearest metre.
A4.1.9	<b>Observations:</b>	If a tree's position is considered to be relevant it will be commented upon (e.g. overhanging a children's play area). Tree form and pruning history are also recorded along with an account of any significant defects. Defects and descriptive terms are dealt with in more detail at the end of this section.
A4.1.10	<b>Recommendations:</b>	Usually based on any defects observed and intended to ensure that the tree is in an acceptable condition.
A4.1.11	<b>Priority Scale:</b>	Depending upon the threat posed by the tree, and the likelihood of failure, recommendations should be carried out according to the following priority scale:
	<b>Urgent</b>	To be carried out as soon as possible.
	<b>Very High</b>	To be carried out within 1 month.
	<b>High</b>	To be carried out within 3 months.
	<b>Moderate</b>	To be carried out within 1 year.
	<b>Low</b>	To be carried out within 3 years.
A4.1.12	<b>Inspection Frequency:</b>	An interval of 6 months, 1 year, 1.5 years or 3 years is allocated before the next inspection is due. Wherever practical, consideration should be given to seasonal changes so that deciduous trees are not always surveyed in winter when they have no leaves, or in summer when leaves may obscure branches within the upper crown.
A4.1.13	<b>Vigour:</b>	An indication of growth rate and the tree's ability to cope with stresses:
	<b>High</b>	Having above average vigour.
	<b>Moderate</b>	Having average vigour.
	<b>Low</b>	Having below average vigour.
	<b>Very Low</b>	Tree is struggling to survive and may be dying.
A4.1.14	<b>Physiological Condition:</b>	
	<b>Good</b>	Healthy and with no symptoms of significant disease.
	<b>Fair</b>	Disease present or vigour is impaired.
	<b>Poor</b>	Significant disease present or vigour is extremely low.
	<b>Very Poor</b>	Tree is dying.
A4.1.15	<b>Structural Condition:</b>	
	<b>Good</b>	Having no significant structural defects.
	<b>Fair</b>	Some defects observed though no high priority works are required.
	<b>Poor</b>	Significant defects found. Tree requires monitoring or remedial works.
	<b>Very Poor</b>	Major defects which will usually require significant remedial works or tree removal.
A4.1.16	<b>Amenity Value:</b>	
	<b>Very High</b>	Exceptional specimen, observable by a large number of people.
	<b>High</b>	Attractive specimen, observable by a significant number of people.
	<b>Moderate</b>	One of the above factors is not applicable.
	<b>Low</b>	Unattractive specimen or largely hidden from view.
A4.1.17	<b>Life Expectancy:</b>	The estimated number of years before the tree may require removal. Classified as (<10), (10 – 20), (20 – 40), or (40+).
A4.1.18	<b>Retention Category:</b>	These are explained in detail in Appendix 1.

### A4.2 Evaluation of Defects

Cavities, wounds, deadwood etc are all evaluated as follows:

<b>Major</b>	Such that structural integrity is, or will become, compromised and the tree is, or will inevitably become, hazardous.
<b>Significant</b>	A defect that may over time become a major defect, though not necessarily so. This will depend on the vigour of the tree and its ability to deal with decay etc.
<b>Minor</b>	A defect that is not likely to compromise the tree's structural integrity.



## General Glossary

<b>Adaptive growth</b>	In tree biomechanics, the process whereby wood formation is influenced both in quantity and quality by the action of gravitational forces and mechanical stresses on the cambial zone.
<b>Aerobic</b>	Conditions in which oxygen is freely available, or to biomechanical processes that depend on the presence of oxygen.
<b>Anaerobic</b>	A condition marked by the absence of oxygen; Generally such areas are unsuitable for normal life and growth of plant tissues. These sites tend to be populated by bacteria capable of surviving low oxygen conditions often associated with Slime Flux.
<b>Arboriculture</b>	The culture and management of trees as groups and individuals primarily for amenity and other non-forestry purposes.
<b>Arborist</b>	A person possessing the technical competence through experience and related training to provide management of trees or other woody plants in a landscape setting. Generally involved with the development or management of trees for visual amenity or land management rather than the growth of trees for product or profit.
<b>Barrier zone</b>	A layer within an annual increment of wood which contains abnormal xylem cells, laid down by the cambium in response to wounding or other trauma.
<b>Body language</b>	In trees, the outward display of growth responses and or deformation in response to mechanical stress.
<b>Bole</b>	Or Trunk, the main stem of a tree below its first major branch.
<b>Bracket</b>	A type of fruiting body produced by various fungal species, plate like to hoof like in shape and often a one sided attachment to the wood or bark.
<b>Branch bark ridge</b>	A ridged area located at the union of a branch to a trunk or stem.
<b>Branch Collar</b>	Trunk tissue that forms around the base of a branch between the main stem and the branch, or between a main branch and a lateral branch. As a branch decreases in vigour or begins to die, the collar usually becomes more pronounced and completely encircles the branch.
<b>Brown Rot</b>	Form of decay where cellulose is degraded, while lignin is only modified.
<b>Buttress Root</b>	Roots that emerge from the base of the tree stem, normally large and well developed that rapidly reduce in diameter to create the Root Plate this offers structural support for the tree. Buttress roots divide rapidly forming the connection between the stem and the transport roots.
<b>Cabling Bracing</b>	Installing cables within the crown of a tree to prevent collapse.
<b>Callus</b>	Undifferentiated cells often formed at the edges of recent injuries. This tissue quickly becomes differentiated, forming cells of the type characteristic of that position on the tree (e.g. forming wood, bark, roots, etc.) see wound response tissue.
<b>Cambium</b>	A thin layer of actively growing and dividing cells, located between the xylem (sapwood) and bark of a plant; the part responsible for radial growth of a tree stem or branch.
<b>Canopy</b>	The topmost layer of twigs and foliage in a woodland, tree or group of trees.
<b>Canker</b>	A localised area of dead bark and cambium on a stem or branch, caused by fungal or bacterial organisms, characterised by woundwood development on the periphery. This may be annual or perennial.
<b>Cavity</b>	An open and exposed area of wood, where the bark is missing and internal wood has been decayed and dissolved.
<b>Chlorotic</b>	Also Chlorosis. A condition of the plant marked by yellowing of normally green foliage, often indicating nutrient deficiency or plant dysfunction.
<b>Clinometer</b>	Devices that measures vertical angles, and provides direct height measurements of objects by triangulation.
<b>Co-dominant stems/trunk</b>	Are forked branches or trunks of nearly the same size in diameter and lacking a normal branch union.
<b>Compacted soils</b>	Soils in which the air-space (oxygen space) has been reduced or eliminated, reducing water infiltration and percolation, reducing root presence and inhibiting new root development.
<b>Compartmentalisation</b>	The physiological process that creates the chemical and mechanical boundaries that act to limit the spread of disease and decay organisms.
<b>Compression</b>	Localized buckling of fibres and other longitudinal elements produced by compression of wood along the grain; compression failures sometimes develop in standing trees.
<b>Failure</b>	The ability of a material or structure to resist failure when subjected to compressive loading; measurable in trees using special drilling devices
<b>Compression Strength</b>	Abnormal wood formed on the lower side of branches and curved stems, with physical properties different from normal wood.
<b>Compression Wood</b>	In Great Britain, designated areas of architectural or historical interest, in which there are special procedures for planning applications. Additionally tree works cannot generally be undertaken without prior notification (Currently 6 weeks) to the relevant local planning authority. See also Tree Preservation Orders.
<b>Conservation Area</b>	A sample of wood extracted from a trunk or branch, using an increment borer tool. The resulting core can be analysed for characteristics of growth, wood strength, structure, decay, and for species identification.
<b>Core Sample</b>	The union of two or more branches; the auxiliary zone between branches.
<b>Crotch</b>	The upper canopy of a tree, including upper trunk, scaffold branches, secondary branches, stems and leaves.
<b>Crown</b>	Crown Lift The removal of the lowest branches, usually to a given height. It allows more residual light and greater clearance underneath for vehicles etc.
<b>Crown lifting / raising</b>	The reduction of a tree's height or spread while preserving its natural shape.
<b>Crown reduction</b>	The removal of some of the density of a tree's crown, usually 5-25% allowing more light through its canopy and reducing wind resistance.
<b>Crown thinning</b>	Deadwood is often present within the crown or on the stems of trees. It may be an indication of ill health, however, it may also indicate natural growth processes. If a target is present beneath the tree, deadwood may fall and cause injury or damage and should be removed, otherwise deadwood can remain intact for conservation purposes (insects, fungi, birds etc.).
<b>Deadwood (noun)</b>	The removal of dead branches from a tree's canopy, usually of a specified size (in diameter).
<b>Deadwood (verb)</b>	Progressive deterioration of organic tissues, usually caused by fungal or bacterial organisms, resulting in loss of cell structure, strength, and function. In wood, the loss of structural strength.
<b>Decay</b>	The assessment of decay within a tree has been traditionally difficult, but recent advances have made it possible to achieve accurate representations of the internal section of a tree in both 2D and 3D, removing doubt over the condition of the tree and allowing accurate management decisions.
<b>Decay Detection</b>	In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment.
<b>Defect</b>	The losing of plants foliage.
<b>Defoliation</b>	





<b>Dieback</b>	Progressive death of buds, twigs and branch tissues, on individual limbs resulting in Deadwood, or throughout the canopy, extreme cases can result in Stag Heading.
<b>Dripline</b>	A projected line on the ground that corresponds to the spread of branches in the canopy; the farthest spread of branches.
<b>Epicormic shoots</b>	Fast growing, weakly attached shoots/branches that often grow as a response to stress factors upon a tree or branch removal.
<b>Failure</b>	In connection with tree hazards, a partial or total fracture within the wood tissue or loss of cohesion between roots and soil. (In total failure affected parts will snap or tear away completely, Partial failure there is a crack or deformation, which results in an altered distribution of mechanical stress.
<b>Feeder Roots</b>	Fine fibrous Water and nutrient absorbing roots located in the outer root system.
<b>Flush-Cut</b>	In trees and shrubs, a pruning cut close to the parent stem, which removes the branch bark ridge.
<b>Foliage</b>	The live leaves or needles of the tree; the plant part primarily responsible for photosynthesis.
<b>Formative pruning</b>	The trimming of a tree to remove weaknesses and irregularities which may lead to problems. The formative pruning operation is aimed at reducing the potential for future weaknesses or problems within the tree's crown.
<b>Gall</b>	An abnormal, disorganized growth of plant tissues, caused by parasitic or infectious organisms such as insects, fungi, bacteria, or viruses.
<b>Girdling</b>	In woody plants, any form of damage that destroys the bark and / or the Cambium all the way around the stem, branch or root, normally resulting in death of the damaged section.
<b>Girdling Root</b>	In woody plants, a root that grows across the buttress, or across other roots, eventually causing constriction of the radial growth.
<b>Growth Increment</b>	The incremental growth added as new annual ring develops each season over existing wood. This is seen as (growth) rings in cross-sections of wood.
<b>Hazard beam</b>	An upwardly curved branch in which strong internal stresses may occur without the compensatory formation of extra wood (longitudinal splitting may occur in some cases).
<b>Heartwood</b>	Inner non functioning tissues that provide structural support to trunk.
<b>Heave</b>	The primary shrinkable clay soils, expansion due to rewetting of a volume of soil previously subjected to the removal or water by plant / trees following felling or root severance. Also in relation to root growth, the lifting of pavements and other structures by radial expansion. Also in relation to tree stability, the lifting of one side of a wind rocked root plate.
<b>Herbicide</b>	A chemical compound that causes the death of a plant.
<b>Included Bark</b>	Bark that becomes embedded in a crotch between branch and trunk or between co-dominant stems, usually found in narrow or tight crotches, and causes a weak structure.
<b>Increment Borer</b>	A tool that cuts and extracts a narrow cylinder of wood from a tree for analysis of the wood tissue and growth increments.
<b>Leader</b>	The primary terminal shoot or trunk of a tree.
<b>Limb</b>	A large lateral branch growing from the main trunk or from another larger branch.
<b>Lion Tailing</b>	Often the result of poor pruning practices; the main leader or branches are largely devoid of side branches, growth is restricted to the end of branches and is likely to suffer damage through end loading.
<b>Lopping</b>	In trees, a general term that related to the removal of branches from a tree.
<b>Monitoring</b>	Due to the relative life span of trees in relation to our own, long-term monitoring provides a valuable insight to the health of trees, identifying decline and or stabilisation and or improvement.
<b>Mulch</b>	A material laid over the root system of a tree to help conserve moisture within the soil. Additionally it may help control the development of weeds close to the tree.
<b>Mycelium</b>	A mass of growing filaments (hyphae) formed by fungi.
<b>Mycorrhizae</b>	The symbiotic relationship between roots and certain beneficial fungi. Mycorrhizae are the combined root / fungal growth.
<b>Occluding tissue</b>	The general term of wood, cambium and bark that develop around the site of a wound on a woody plant
<b>Pathogen</b>	A microorganism that causes diseases within another organism.
<b>Phloem</b>	The principle conductive tissue that the products of Photosynthesis are transported around the plant
<b>Photosynthesis</b>	The process where light energy is used to create energy (Carbohydrate) for use within the plant.
<b>Pollard</b>	A term for a pollarded tree.
<b>Pollard head</b>	The swollen section of branch / stem that forms behind the pollarding cut.
<b>Pollarding</b>	The complete or partial removal of the crown of a young tree so as to encourage the development of numerous branches either for amenity or historically as fodder, repeated management is required cyclically to maintain the feature
<b>Prune or Pruning</b>	Selective removal of woody plant parts of any size, using saws, Loppers, Secateurs, or other pruning tools.
<b>Reaction Wood</b>	Wood with distinctive anatomical characteristics, formed in parts of leaning or crooked stems and in branches to provide additional strength / support. In hardwoods, tension wood usually forms. In conifers, compression wood is usually found.
<b>Reaction Zone</b>	A zone normally darker than surrounding wood that denoted the boundary often a defensive one between functional sapwood and dysfunctional or decaying wood.
<b>Re-grading</b>	The raising or lowering of a soil profile from its original grade.
<b>Remedial pruning</b>	The removal of old stubs, deadwood, epicormic growth, rubbing or crossing branches and other unwanted items from the tree's crown.
<b>Resistograph</b>	Invasive decay detection technique whereby the resistance offered by the timber to a spinning probe is measured and plotted.
<b>Rib</b>	In tree body language, a long narrow, axial protuberance which often over lays a crack.
<b>Ring Barking</b>	Artificial Girdling of the stem, to result in the death of a tree. May be used in habitat creation where the retention of dead standing trees is required.
<b>Rod Bracing / Bolting</b>	Traditionally, this has relied upon the Installation of steel rods or bolts through the stems or limbs, to reduce twisting or splitting of the wood. The installation of such features does require legal interpretation.
<b>Root Barriers</b>	Both Buildings and services can benefit from the installation of root barriers to protect a soil volume from the ingress of roots.
<b>Root Collar</b>	The basal area of the tree; transition zone from trunk to root. Also sometimes called trunk flare.
<b>Root Plate</b>	The primary support area for the tree; an area of the root system close to the base that structurally anchors the tree to the soil.
<b>Root Rot</b>	Either a general term for decay within the wood of the lower stem / buttress roots, or a disease in which the fine roots are killed.
<b>Root System</b>	The portion of the tree containing the root organs, including buttress roots, transport roots, and fine absorbing roots; all underground parts of the tree.
<b>Root Zone</b>	The area and volume of soil around the tree in which roots are expected. May extend to three or more times the branch spread



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## Arboricultural Report to BS 5837: 2012 for: Square Feet Architects

Crown Ref: 09862

Site: 4 & 4a Linfield Gardens, London

Author: Ivan Button

Date: 5<sup>th</sup> March 2018

	of the tree, or several times the height of the tree.
Sail Area	That area or the tree subjected to wind load.
Sapwood	Xylem wood tissue, usually light in colour, representing the outer growth rings of the wood. Usually living, reactive wood tissue, in a healthy tree. See heartwood
Scaffold limbs / scaffold Branches	The branches that from the main network framework of the crown of a tree.
Senescent	A decline in growth and vigour due to age or stress factors.
Shrub	A woody plant that branches at or close to the ground level and so does not have a single stem.
Slime Flux	Relating to a toxic condition from the spreading of bacteria or their products from a source of infection; characterized by malodorous gases, or salt deposits upon the bark. If these products enter the sap stream, localised vessel necrosis can result, usually associated with anaerobic conditions.
Soft Rot	A kind of wood decay, where a fungi degrades cellulose within the cell wall, without causing overall degradation.
Soil Compaction	The compression of soil, causing a reduction of pore space and an increase in the density of the soil. Air is squeezed out and nutrients become locked. Tree roots cannot grow in compacted soil.
Sonic Decay Detection	Non invasive method whereby sound waves are passed through the tree and the speed is measured. Slow speeds indicate decay and a tomography picture representing the inner stem is produced.
Stag Heading	In a tree, a state of dieback where dead branches protrude beyond the current living crown.
Stress	In plant physiology, conditions where one or more physiological functions are not working within normal parameters.
Stump Grinding	The removal of a tree stump using a specialist grinding machine.
Subsidence	In relation to vegetation, the removal of water by plant growth resulting in localised shrinkage in the soil volume.
Sucker	Same as sprout.
Suppressed	Trees which are dominated by surrounding vegetation and whose crown development is restricted from above.
Systemic	Affecting the whole plant or organism. A systemic compound is carried throughout the entire plant to all parts through the vascular system.
Target	Any person or object within reach of a falling tree or part of a tree that may be injured or damaged.
Target Pruning	The pruning of a branch where the wound affects only branch material, often results in a target shaped wound.
Tension Wood	Reaction wood typically formed on the upper side of limbs or curved stems; characterized by lack of cell wall lignifications (higher ratios of cellulose to lignin).
Tight Union / Tight Crotch	Also, narrow crotch. A crotch with a narrow angle between branches, often having included bark.
Tomography	The comparison of sound or stress waves through the tree allows the creation of a 2D or 3D representation of the internal structure of a stem or branch section and highlights areas of damage. Virtually non-injurious.
Topography	The configuration of surface features, including the vertical and horizontal relationships of the ground and other features.
Topping	Cutting large limbs back severely, without regard to form or habit of the tree. Cuts are usually made between lateral branch nodes. This practice is extremely injurious to trees, and promotes decay and structural weakness within the crown.
Tree	A woody plant that typically has a single stem, at maturity has a height of at least 4 metres and a stem diameter at breast height of at least 75mm.
Tree Preservation Order	In Great Britain, an order made by the local planning authority, where consent must be gained before undertaking all but exempt works to a tree.
Trunk Flare	The basal area of the trunk that flares or widens, and merges with the main roots. See root collar
Veteran Tree	Veteran trees are often found in large parks or estates and commonly affected by extensive decay or have been subject to extensive works. These trees are retained for historical importance and often pose greater risk than normal, which is generally justified. They need careful management and often propping or bracing to support them, some require fencing to limit access.
Vigour	Active, healthy growth of plants: ability to respond to stress factors.
Visual Tree Assessment (VTA)	An assessment of the mechanical condition of trees based upon their 'body language'. Trees are dynamic and respond to faults / decay / environmental factors in various ways, these responses can be indicative of structural integrity.
Wetwood	An infection caused by bacteria living inside the plant tissues. The bacteria ferment the plant fluids, resulting in death of nearby cells, and often causing exudations of fluid from the bark, often referred to as a Slime Flux.
White Rot	A kind of wood decay where a fungi attacks the lignin within the wood matrix
Wind loading	Forces placed upon tree canopy, branches, trunk and roots of a tree under windy conditions.
Wind Throw	The failure of a tree due to wind loading.
Witches Broom	A deformed or unusual growth of twigs from adventitious buds, caused by insects, disease, or dieback of twigs and buds.
Wood	Secondary Xylem; the main structural support and water conducting tissue of trees and shrubs.
Wound Response Tissue	Also Occluding Tissue, Wound Wood or Callus. Differentiated wood tissue that grows around the margins of a wound or injury.
Wound Wood	Wood with atypical features, formed in the vicinity of a wound and a term to describe the occluding tissues around a wound
Xylem	Plant tissues with special function of translocation of water and dissolved nutrients.



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## Appendix 3: Survey Methodology

- A2.1 Ground level visual surveys are carried out using the *Visual Tree Assessment* technique described by Mattheck and Broeler (1994) and endorsed by the Arboricultural Association (LANTRA Professional Tree Inspection course, 2007).
- A2.2 Structural condition is assessed by inspecting the stem and scaffold branches from all angles looking for weak branch junctions or symptoms of decay. Particular attention is paid to the stem-base. Cavities are explored using a metal probe in order to assess the extent of any decay. If this is not possible further inspection is recommended in the form of a climbed inspection or using specialist decay detection equipment.
- A2.3 The physiological condition is assessed by inspecting the stem, branches and foliage for symptoms of disease. The overall vigour of the tree is also taken into account.
- A2.4 Where significant defects are observed, recommendations are made according to a scale of priority in order to reduce the likelihood of structural failure. The position of the tree and its potential targets are taken into account.
- A2.5 Measurements are obtained using a diameter tape, clinometer, distometer and loggers tape. Where this is not practical measurements are estimated.
- A2.6 Some trees are surveyed as groups, though this is usually avoided close to areas likely to be developed.
- A2.7 Finally, a *Retention Category* is allocated as described in Appendix 1.1.1.



## Appendix 4: Author's Qualifications

### **Qualifications & Experience of Ivan Button N.C.H. (Arb), FDS (Arb), BSc (Hons), P.G.C.E., M. Arbor. A.**

Between 1983 and 1995 Ivan worked primarily within the construction industry and received training in a broad range of practical building skills and general construction principles. During this time he obtained a BSc (Hons) at Leeds University followed by a P.G.C.E at The University of Wales.

In 1995, Ivan obtained a NCH (Arboriculture) at the University of Lincoln and became a member of the Arboricultural Association. He then worked for an Arboricultural Consultancy for one year before establishing a tree surgery and landscaping business in 1998. In 2005 Ivan commenced full time employment with a leading Arboricultural Association approved consultancy and soon adopted a senior role responsible for five consultants.

He obtained a FDS in arboriculture at the University of Lancashire, which he passed with distinction and is now a Director and Principal Consultant of Crown Consultants Ltd. He is accredited as a LANTRA *Professional Tree Inspector*. A qualification produced in association with the Arboricultural Association and generally recognised as appropriate for all levels of tree inspection.

He is a member of the Consulting Arborist Society and is listed within their areas of professional expertise for QTRA and as an expert witness.

Ivan is a professional member of the Arboricultural Association and the International Society of Arboriculture and is a licensed Quantified Tree Risk Assessment user.

Ivan has undertaken professional expert witness training and has been registered as a Sweet and Maxwell Checked Expert Witness since 2008.

Throughout 2009 acted as the principal Tree Officer for Barnsley Metropolitan Borough Council.

Ivan has produced several hundred Arboricultural Reports for the purposes of Development, Safety, Management, Mortgage, Subsidence, Mitigation and Litigation.

### **Qualifications & Experience of Emma Hoyle FDS (Arboriculture), ED (Forestry & Arboriculture), M. Arbor. A.**

Emma is a qualified Arboricultural Consultant educated to Level 5 in Arboriculture at Askham Bryan College and is a professional member of the Arboricultural Association. She has worked for Crown Consultants since 2015 and has since written numerous reports relating to all aspects of arboriculture including; planning and development, vegetation related subsidence, tree preservation orders and tree risk assessment. Emma regularly attends seminars and events in order to keep abreast with current knowledge and best practise in Arboriculture.

Prior to becoming an arboricultural consultant, Emma worked for two reputable tree surgery firms from 2008 and became an NPTC Qualified tree surgeon after completing a Level 3 Extended Diploma in Forestry and Arboriculture at Askham Bryan College. Emma also has experience in other areas of arboriculture such as forest clearance, tree planting, tree maintenance and landscaping.

### **Qualifications & Experience of Joe Taylor - MArborA, FdSc (Arboriculture)**

Joe began his career in Arboriculture as a tree surgeon/climber. During his time as a tree surgeon, Joe has achieved City & Guilds NPTC qualifications in Chainsaw Maintenance and Cross Cutting, Tree Climbing and Rescue, Safe Use of Manually Fed Wood-chipper and Supporting Colleagues Undertaking Tree Related Operations.

Joe obtained a Foundation Degree in Arboriculture at Askham Bryan College in 2015 which he passed with merit. Joe is a professional member of the Arboricultural Association, the International Society of Arboriculture and the Royal Forestry Society and regularly attends industry related seminars in order to keep abreast of industry best practice.

Studying at Askham Bryan College reinforced Joe's passion for trees and drove his enthusiasm to learn more. Learning how trees interact with their surrounding environment and their importance within our urban and rural landscapes highlighted an interest in pursuing a career in consultancy.



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Arboricultural Report to BS 5837: 2012 for: Square Feet Architects

Crown Ref: 09862

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Date: 5<sup>th</sup> March 2018

Since working for Crown Consultants Joe has undertaken numerous surveys and produced numerous reports for the purpose of planning (BS 5837), tree condition surveys, subsidence risk assessments, root surveys and decay detection investigations.

## Appendix 5: Further Information

### Building Near Trees – General

National Joint Utilities Group publication # 10 (1995), *Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees*. Downloadable at [www.njug.demon.co.uk/pdf/NJUG%20Publication10.pdf](http://www.njug.demon.co.uk/pdf/NJUG%20Publication10.pdf)

NHBC Standards Chapter 4.2., *Trees and Buildings*.

Horticulture LINK project 212. (University of Cambridge, 2004), *Controlling Water Use of Trees to Alleviate Subsidence Risk*.

### Tree Planting and aftercare

See [www.trees.org.uk/leaflets.php#](http://www.trees.org.uk/leaflets.php#) for downloadable leaflets on selecting a garden tree, planting, aftercare and veteran tree management.

### British Standards

BS 5837: 2012. Trees in Relation to Design, Demolition and Construction – Recommendations.

Bs 3998: 2010. Recommendations for Tree Work.

BS 3936: 1992. Nursery Stock. Part 1: Specification for Trees and Shrubs.

BS 3936: 1992. Nursery Stock. Part 10: Specification for Groundcover Plants.

BS 4043: 1989. Transplanting Root-balled Trees.

BS 8004: 1986. Foundations.

BS 8103: 1995. Structural design of Low-Rise Buildings.

BS 8206: 1992. Lighting for Buildings.

BS 8545:2014. Trees: From nursery to independence in the landscape – Recommendations

BS 3882: 2007. Topsoil.

BS 4428: 1989. General Landscaping Operations (excluding hard surfaces).

### Permission to do Works to Protected Trees / Tree Law

Forestry Commission (Edinburgh, 2003), *Tree Felling – Getting Permission*. Country Services Division - Forestry Commission. Downloadable at [www.forestry.gov.uk/website/pdf.nsf/pdf/wgsfell.pdf/\\$FILE/wgsfell.pdf](http://www.forestry.gov.uk/website/pdf.nsf/pdf/wgsfell.pdf/$FILE/wgsfell.pdf)

Transport and the Regions (Department of the Environment, 2000), *Tree Preservation Orders, A Guide to the Law and Good Practice*. Downloadable at [www.communities.gov.uk/publications/planningandbuilding/tposguide](http://www.communities.gov.uk/publications/planningandbuilding/tposguide)

C. Mynors, *The Law of Trees, Forests and Hedgerows* (Sweet and Maxwell, London, 2002)

Communities and Local Government website with numerous downloadable documents, from: <http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/>

### Lighting Levels

P.J. Littlefair, B.R.E. 209: *Site layout planning for daylight and sunlight A guide to good practice*. B.R.E. Bookshop, London.

British Standards Institution. Code of practice for day lighting. *British Standard BS 8206: Part 2* (1992).

Chartered Institution of Building Services Engineers. *Applications manual: Window Design* (London, 1987).

NBA Tectonics. A study of passive solar housing estate layout. *ETSU Report S-1126*. Harwell, Energy Technology Support Unit (1988).

I.P. Duncan; D. Hawkes, Passive solar design in non-domestic buildings. *ETSU Report S-1110*. Harwell, Energy Technology.

P. J. Littlefair, Measuring Daylight, *BRE Information Paper 23/93 f3.50*. (Advises on measuring daylight under the real sky or an artificial sky, allowing for the changing nature of sky light).

### High Hedges

Communities and Local Government website with numerous downloadable documents, from: <http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/>

### Tree Specific Websites

[www.crowntrees.co.uk](http://www.crowntrees.co.uk)

Crown Consultants site containing useful information

[www.trees.org.uk](http://www.trees.org.uk)

Arboricultural Association

[www.rfs.co.uk](http://www.rfs.co.uk)

Royal Forestry Society of England, Wales and N. Ireland

[www.treehelp.info](http://www.treehelp.info)

The Tree Advice Trust

[www.woodland-trust.org.uk](http://www.woodland-trust.org.uk)

The Woodland Trust

[www.treecouncil.org.uk](http://www.treecouncil.org.uk)

The Tree Council





PDF readers select *page-width* for detail & *page-view* for scrolling

Arboricultural Report to BS 5837: 2012 for: Square Feet Architects

Crown Ref: 09862

Site: 4 & 4a Linfield Gardens, London

Author: Ivan Button


Date: 5<sup>th</sup> March 2018





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## Appendix 6: Tree Data Schedule and Site Plan(s)

The Tree Data Schedule and any drawings accompanying this report follow this page.  
They are also provided as separate documents for ease of printing and screen viewing.

Reference G = Group H = Hedge	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N W      E S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour	Amenity Value
								Priority	Inspect Freq (yrs)	Physiological Condition	Life Expectancy (yrs)
										Structural Condition	Retention Category
G1	Semi-Mature <b>Cabbage Palm</b>  Cordyline australis.	av 2.5	av 2	av 18	av 1      1 1 each		Position: Situated within the front garden. Form: Four specimens, all single stemmed and vertical with compact crowns. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		High  Good  Good	Low  20-40  C
		n/a	3								
T2	Semi-Mature <b>Holly</b>  Ilex aquifolium.	3	1.5	13	1.5 1.5		Position: Situated within the front garden. Form: Single stemmed and vertical with a compact crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		High  Good  Good	Low  20-40  C
		n/a	3								
T3	Early-Mature <b>Horse Chestnut</b>  Aesculus hippocastanum.	10	6	50	2      2 2		Position: Situated on third party land. Form: Multi-stemmed at 3m with a compact crown. History: Previously topped at 8m. Defects: <b>No significant defects observed.</b>	No action required.		Moderate  Fair  Fair	Low  20-40  C
		n/a	3								
T4	Semi-Mature <b>Ash</b>  Fraxinus excelsior.	14	2.5	43	4      4 5		Position: Situated within the rear garden of 4a. Form: Twin-stemmed at 3m with a well-formed crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		High  Good  Good	Moderate  40+  B
		n/a	3								
T5	Semi-Mature <b>Sycamore</b>  Acer pseudoplatanus.	12	4.5	39	5      4.5 4		Position: Situated within the rear garden of 4a. Form: Single stemmed and vertical with a balanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		High  Good  Good	Moderate  40+  B
		n/a	3								
T6	Early-Mature <b>Copper Beech</b>  Fagus sylvatica 'purpurea'.	11	2.5	56	5      2 4		Position: Situated within the rear garden of 4a. Form: Multi-stemmed at 2m with a balanced crown. History: No evidence of significant pruning. Defects: <b>Scattered dead twigs.</b>	No action required.		Low  Fair  Good	Moderate  40+  B
		n/a	3								
T7	Mature <b>Oak</b>  Quercus robur.	17	4	75	8      8 8		Position: Situated on third party land. Form: Multi-stemmed at 4m with a balanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate  Good  Good	High  40+  A
		n/a	3								

Reference G = Group H = Hedge	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N W      E S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour		Amenity Value
								Priority	Inspect Freq (yrs)	Physiological Condition	Life Expectancy (yrs)	
										Structural Condition	Retention Category	
T8	Mature  Lime  Tilia sp.	16	3	65	4      4 5      4		Position: Situated on third party land. Form: Single stemmed and vertical with a balanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated.	No action required.		Moderate  Fair  Good	High  40+  A -	
	n/a		3									
T9	Semi-Mature  Sycamore  Acer pseudoplatanus.	10	5	39	3      0.5 4      4		Position: Situated within the rear garden of 4a. Form: Twin-stemmed at 1.5m with a compact crown. History: Large pruning wound at 2.5m. Defects: <b>No significant defects observed.</b>	No action required.		Moderate  Fair  Fair	Low  20-40  C	
	n/a		3									
T10	Over-topped tree.  Unidentifiable, possibly poplar.  Canopy dying at time of survey.	10	7	70	2      2 2      2		Position: Situated on third party land. Form: Young epicormic regrowth on recently topped tree. History: Huge tree topped at 8m within the recent past. Defects: <b>Entire canopy limited to epicormic regrowth at 8m above ground level. All leaves died in early - mid September and unrecognisable at distance. Species ID not even certain. Possibly poplar.</b>	Remove or undertake extensive inspection, canopy clearance and management.		Low  Poor  Fair	Low  <10  U	
	Moderate		n/a									
T11	Semi-Mature  Pittosporum  Pittosporum sp.	3.5	1	13	1.5      1.5 1.5      1.5		Form: Multi-stemmed at 2m with a compact crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b>	No action required.		High  Good  Good	Low  20-40  C	
	n/a		3									
T12	Semi-Mature  Ash  Fraxinus excelsior.	6.5	3.5	35	3      2.5 3      3		Position: Situated on third party land. Form: Multi-stemmed at 2m with an unbalanced crown. History: No evidence of significant pruning. Defects: <b>No significant defects observed.</b> Other: Limited inspection, dimensions estimated. Ivy smothered.	No action required.		Low  Fair  Fair	Low  10-20  C	
	n/a		3									
T13	Semi-Mature  Evergreen Oak  Quercus ilex.	3.5	2	22	1      1 1.5      1.5		Position: Situated within the rear garden of 4a. Form: Twin-stemmed at ground level with a compact crown. History: Regularly trimmed. Defects: <b>No significant defects observed.</b>	No action required.		High  Good  Good	Low  20-40  C	
	n/a		3									
T14	Mature  London Plane  Platanus x hispanica.	12	4	75	5.5      5 3      3		Position: Situated on third party land. Form: Single stemmed and vertical with a compact crown. History: Heavily reduced. Other: Limited inspection, dimensions estimated.	No action required.		Moderate  Fair  Fair	Moderate  20-40  B	
	n/a		1.5									

Reference G = Group H = Hedge	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) W N E S	Scaled Tree Diagram (m) <div><div>909</div></div>	Notes	Recommendations (Independent of any development proposals)		Vigour	Amenity Value
								Priority	Inspect Freq (yrs)	Physiological Condition	Life Expectancy (yrs)
										Structural Condition	Retention Category
T15	Mature <b>London Plane</b>  Platanus x hispanica.	10	3	70	<div><div>244</div></div>	Position: Situated on third party land. Form: Single stemmed and vertical with a compact crown. History: Heavily reduced. Other: Limited inspection, dimensions estimated.	No action required.		Moderate  Fair  Fair	Moderate  20-40  B	
							n/a	1.5			
T16	Mature <b>Horse Chestnut</b>  Aesculus hippocastanum.	11	4	80	<div><div>5154</div></div>	Position: Situated on third party land. Form: Single stemmed and vertical with a compact crown. History: Heavily reduced. Other: Limited inspection, dimensions estimated.	No action required.		Moderate  Fair  Fair	Moderate  20-40  B	
							n/a	1.5			
T17	Mature <b>Plum</b>  Prunus sp.	6	3	29	<div><div>2143.5</div></div>	Position: Situated within the rear garden of 4a. Form: Multi-stemmed at 3.5m with a compact crown. History: Reduced. Defects: No significant defects observed.	No action required.		High  Good  Fair	Low  20-40  C	
							n/a	3			



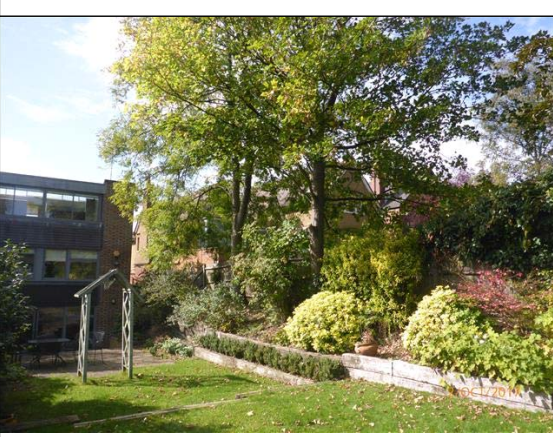


Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

See the accompanying report  
for more photographs

Drawing No: CCL 09860 / TCP Rev: 1  
Title: Tree Constraints Plan  
(Existing Layout)  
Site: 4 Linfield Gardens  
London, NW3 6PU  
Scale: 1:200 Paper Size: A1

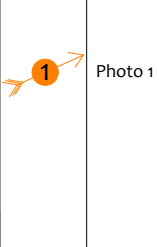


Tree Retention Categories  
Stems & canopies shown  
Category A tree  
Category B tree  
Category C tree  
Category U tree

Trees of high quality with an estimated life expectancy of 40+ years. Usually large trees with significant presence or smaller trees with excellent form. Retention of these trees is highly desirable.  
Trees of moderate quality with a life expectancy of 20+ years. Usually maturing trees, or younger trees with good form. Retention of these trees is desirable though less than Category A trees.  
Unremarkable trees of low quality and merit. Individual specimens are not considered to be a material planning consideration.  
Trees unsuitable for retention due to their very poor condition.

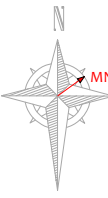
# Tree Constraints Plan

BS 5837 Root Protection Area (radius = 1xstem diameter)  
Root Protection Area needing amendment due to site conditions, e.g. presence of existing road or building.  
Root Protection Area having been amended to account for site conditions  
T1 = Tree No 1 G2 = Group No 2 H3 = Hedge No 3



MN = Measured North:  
Canopy spreads are sometimes measured to an approximate N defined by site features. Often more accurate, especially where rows of trees are not aligned N-S or E-W.

Tree Ref.	Species	Height (m)	Root Protection Area		
			Radius (m)	m <sup>2</sup>	Square (m)
G1	Cabbage Palm	2.5	2.2	15	3.8
T2	Holly	3	1.6	8	2.8
T3	Horse Chestnut	10	6.0	113	10.6
T4	Ash	14	5.2	84	9.1
T5	Sycamore	12	4.7	69	8.3
T6	Copper Beech	11	6.7	142	11.9
T7	Oak	17	9.0	254	16.0
T8	Lime	16	7.8	191	13.8
T9	Sycamore	10	4.7	69	8.3
T10	Poplar	10	8.4	222	14.9
T11	Pittosporum	3.5	1.6	8	2.8
T12	Ash	6.5	4.2	55	7.4
T13	Evergreen Oak	3.5	2.6	22	4.7
T14	London Plane	12	9.0	254	16.0
T15	London Plane	10	8.4	222	14.9
T16	Horse Chestnut	11	9.6	290	17.0
T17	Plum	6	3.5	38	6.2



## Tree Constraints Plan

(Existing Layout)



RPA amended to account for past heavy reduction of T10 and its small canopy size.