TYBALDS ESTATE
CAMDEN
LONDON
WC1N 3PF

ARBORICULTURAL IMPACT ASSESSMENT

A Report to: The London Borough of Camden

Report No: RT-MME-154667-02 Rev A

Date: April 2021
Revised: June 2021

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REPORT VERIFICATION

This study has been undertaken in accordance with British Standard 5837:2012 "*Trees in Relation to Design, Demolition and Construction - Recommendations*".

Report Version	Date	Completed by:	Checked by:	Approved by:
Final	23/04/2021	Dave Farmer FdSc MArborA (Senior Arboricultural Consultant)	Duncan Smith BSc (Hons) M.Arbor.A (Arboricultural Manager)	Tom Docker CEcol MCIEEM (Managing Director)
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DISCLAIMER

The contents of this report are the responsibility of Middlemarch Environmental Ltd. It should be noted that, whilst every effort is made to meet the client's brief, no site investigation can ensure complete assessment or prediction of the natural environment.

Middlemarch Environmental Ltd accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

VALIDITY OF DATA

The findings of this study are based upon the survey data produced as part of the Preliminary Arboricultural Assessment which is valid for a period of 12 months from the date of survey. If a planning application has not been submitted by this date, an updated site visit should be carried out by a suitably qualified and experienced arboriculturist to assess any changes to the trees and hedgerows on site to inform a review of the conclusions and recommendations made.

It should be noted that trees are dynamic living organisms that are subject to natural changes as they age or are influenced by changes in their environment. As such, following any significant meteorological event or changes in the growing environment of the trees they should be re-assessed by a suitably qualified and experienced arboriculturist.

This Arboricultural Impact Assessment has been produced following a review of a proposed development layout for the site based on data provided by the client. Should the development proposals change, this report will need to be updated to assess the impact of the amended development.

CONTENTS

1. INTRODUCTION

1.1 PROJECT BACKGROUND

Middlemarch Environmental Ltd were commissioned by The London Borough of Camden to undertake an Arboricultural Impact Assessment of trees and hedgerows as part of a detailed planning application for a residential development at Tybalds Estate, Camden, London, WC1N 3PF. A survey of the trees and hedgerows on site and within influencing distance of the boundaries was undertaken on the 8th of April 2021 as part of a Preliminary Arboricultural Assessment which was produced to aid design and avoid unnecessary tree removal.

This Arboricultural Impact Assessment has been carried out in accordance with British Standard 5837:2012 *'Trees in Relation to Design, Demolition and Construction - Recommendations'* (hereafter referred to as BS5837). BS5837 sets out a structured assessment methodology to assist in determining which trees would be considered suitable or unsuitable for retention in the context of the proposed development.

The purpose of this report is to:

- Identify the potential impact of the proposed development upon the existing trees and hedgerows identified during the Preliminary Arboricultural Assessment in accordance with BS5837:2012 *"Trees in Relation to Design, Demolition and Construction - Recommendations"*.
- Provide a Tree Retention Plan that identifies the trees and hedgerows to be retained and incorporated into the proposed development including Root Protection Areas (RPA) for the retained trees. The Tree Retention Plan also identifies trees and hedgerows that are to be removed to facilitate the development proposals.
- Identify mitigation proposals to offset any tree loss as part of the development proposals.
- Identify all areas where specific working methods will be required to ensure protection to trees as part of an Arboricultural Method Statement.

1.2 SITE DESCRIPTION

The site under consideration, hereinafter referred to as the study area, comprises the land and buildings which together form the Tybalds Estate; a post-war housing estate located in the Bloomsbury area of central London. The site, which extends to approximately 1.58 ha in size, is located in central London at Ordnance Survey Grid Reference TQ 305 818.

The study area is located within the administrative district of the London Borough of Camden, within the Holborn and Covent Garden Ward, and it is bounded by properties on Great Ormond Street to the north, Orde Hall Street to the east, buildings off Theobalds Road to the south and Boswell Street and Old Gloucester Street to the west. Tree cover across the site was generally found to be of relatively good quality and is located amongst areas of amenity grassland and shrub beds, between the various buildings within the site boundary.

The location of the trees surveyed can be found on the Tree Survey Plan (C154667-01-01 Rev B), attached to this report.

1.3 DEVELOPMENT PROPOSALS

The proposed development of the site includes the construction of new residential buildings and renovation works to the existing buildings, with associated access, landscaping, and facilities.

The proposed development has been designed so that safe and healthy existing trees are retained wherever possible and that those trees to be retained are not significantly impacted upon by the development.

1.4 DOCUMENTATION PROVIDED

This assessment is based upon the information provided by the client in addition to information collected by Middlemarch Environmental Ltd during the Preliminary Arboricultural Assessment. The documents and drawings considered are detailed within Table 1.1.

Table 1.1: Documentation Provided			
Author	**Document**	**Drawing Number**	**Date**
Matthew Lloyd Architects LLP	SITE LOCATION PLAN	X-001	Jun-21
Matthew Lloyd Architects LLP	EXISTING SITE PLAN	X-010	Apr-21
Matthew Lloyd Architects LLP	PROPOSED MASTERPLAN - LANDSCAPE	X-102	Apr-21
Matthew Lloyd Architects LLP	PROPOSED MASTERPLAN – colour	X-116	Jun-21
MK Surveys	Topographical and Utility Survey – Sheet 1	17033-1	May-12
MK Surveys	Topographical and Utility Survey – Sheet 2	17033-2	May-12

2. METHODOLOGY

2.1 DESK STUDY

Consultation with the Local Planning Authority was undertaken to identify if any of the trees present within or near the site are protected by Tree Preservation Orders (TPOs) or if the site is situated within a Conservation Area.

An online search using the Multi Agency Geographic Information for the Countryside (*MAGIC)* website for statutory conservation sites was also undertaken (where appropriate) to determine the presence of Ancient Woodland within 15.0 metres of the site boundary.

2.2 SURVEY SCOPE

To determine the status of the trees and hedgerows within the site, a full arboricultural survey has been undertaken, assessing the species and status of all trees and hedgerows present. This survey has been carried out in accordance with British Standard 5837:2012 '*Trees in Relation to Design, Demolition and Construction – Recommendations'*.

All trees and hedgerows have been assigned a unique reference number. Individual trees above 75 mm in diameter (at 1.5 m above ground level) have had their position plotted to the Tree Survey Plan. Trees, and hedgerows were visually assessed and a schedule prepared listing:

- Tree number,
- Species,
- Tree height,
- Stem diameter at 1.5 m above ground level (or in accordance with Annex C of BS5837:2012),
- Crown spread (cardinal points where necessary),
- Minimum crown clearance,
- Age class,
- Condition and;
- Preliminary management recommendations (where required).

Measurements for tree height, minimum crown clearance and crown spread were taken to an accuracy of 0.5 m. Stem diameter measurements were recorded to the nearest 10 mm. Any specific observations or management recommendations were also noted. All observations and measurements are included in Appendix A Tree Schedule.

Trees and hedgerows were assessed and assigned one of the following categories:

- **Category U:** Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.
- **Category A:** Trees of high quality with an estimated remaining life expectancy of at least 40 years.
- **Category B:** Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.
- **Category C:** Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm.

Categories A, B and C have further sub-categories with regards to the reasons for tree retention:

1: Mainly arboricultural qualities.
2: Mainly landscape qualities.
3: Mainly cultural values, including conservation.

N.B. Certain category U trees may possess existing or potential conservation value which make them desirable to preserve in the context of wildlife habitat (e.g. areas with limited public access).

2.3 ROOT PROTECTION AREA (RPA)

In order to avoid damage to the roots or rooting environment of retained trees, the RPA has been calculated for each of the Category A, B and C trees in accordance with section 4.6 of BS5837. This is a minimum area around a tree which is deemed to contain sufficient roots and rooting volume to maintain the tree's viability. Where groups of trees have been assessed, the Root Protection Area has been shown based on the maximum sized tree stem in each group and so may exceed the Root Protection Area required for some of the individual specimens within the group. Further detailed inspection of the individual trees forming a group may be required where development impacts upon individual trees forming the combined group.

Protection of the roots and soil structure within the RPA should be treated as a priority. These figures have been calculated utilising the formulas within Section 4.6 and Annex D of British Standard 5837:2012.

2.4 TREE SCHEDULE

Appendix A details the individual trees and groups found during the assessment and includes the relevant information for each at the time of inspection. General observations of any structural and physiological condition and the presence of any decay or physical defects have also been included. Preliminary management recommendations have also been recorded where appropriate.

2.5 ASSESSMENT LIMITATIONS

This survey has been undertaken in accordance with BS5837 recommendations only. Trees under 75mm in diameter have not been identified in accordance with the guidance. It may therefore be necessary during detailed design to undertake further assessment and accurate positioning of juvenile trees and tree groups to assist structural calculations for foundation design of structures in accordance with current building regulations and NHBC Chapter 4.2 *Building near Trees*.

The exact position of individual trees or species included as part of a tree group should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken.

2.6 CONDITIONS OF TREE SURVEY

The survey was completed by a suitably qualified and experienced Arboriculturist from ground level only and from within the boundary of the site. Aerial tree inspections or the internal condition of the stem/s or branches was not undertaken at this stage. Evaluation of tree condition given within this assessment applies to the date of survey and cannot be assumed to remain unchanged. It may be necessary to review these within 12 months, in accordance with sound arboricultural practice.

2.7 TREE SURVEY PLAN

The Tree Survey Plan seeks to act as a design tool that shows potential opportunities for inclusion of the existing trees across the site as well as the above and below ground constraints which should be considered during the design process.

2.8 TREE RETENTION PLAN

The Tree Retention Plan identifies which trees are to be retained and incorporated as part of the site development and which are to be removed. The positions of trees and their current crown spread that are to be removed have been shown on the Tree Retention Plan with a dashed outline.

All survey data is based on a topographical survey where possible, supplied by the client. Where topographical information has not identified tree positions or Ordnance Survey mapping has been utilised, trees have been positioned using GPS and aerial photography to provide approximate locations in relation to existing surrounding features. Further confirmation of tree locations through a topographical survey of the site is recommended to ensure future design accuracy.

3. STATUTORY PROTECTION

3.1 TREE PRESERVATION ORDER AND CONSERVATION AREA DESIGNATIONS

No direct consultation with the Local Planning Authority, The London Borough of Camden, has taken place, however, it is understood having used the online search facility on the website for the Local Planning Authority, that several of the trees included within this survey are within the Bloomsbury Conservation Area. Therefore, statutory constraints would apply to the development in respect of trees. There are no Tree Preservation Orders that would apply to trees present on, or in close proximity to the site. Prior to any tree works being undertaken, confirmation of the online information should be sought from the Local Authority.

The table below details which trees are included in the Conservation Area.

Middlemarch Tree No	Conservation Area
T17, T18, T21, T22, T25, T26, T27, T29, T30, T31, T32, T50, T57, OSG1	Bloomsbury Conservation Area

Reference to the Multi Agency Geographic Information for the Countryside (MAGIC) website indicates that Ancient Woodland has not been recorded within 15.0 metres of the survey area.

3.2 PROTECTED SPECIES

Bats
Mature trees often contain cavities, hollows, peeling bark or woodpecker holes which provide potential roosting locations for bats. Bats and the places they use for shelter or protection (i.e. roosts) receive European protection under The Conservation of Habitats and Species Regulations 2017 (Habitats Regulations 2017). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. Consequently, causing damage to a bat roost constitutes an offence.

Generally, should the presence of a bat roost be suspected whilst completing works on any trees on site then an appropriately licensed bat worker should be consulted for advice.

Birds
Trees and hedgerows offer potential habitat for nesting birds which are protected under the Wildlife and Countryside Act WCA 1981 (as amended). Some species (listed in Schedule 1 of the WCA) are protected by special penalties. This legislation makes it an offence to intentionally or recklessly damage or destroy an active bird nest or part thereof.

As the trees on, and adjacent, to the site provide potential habitat for nesting birds all tree work should ideally be completed outside the nesting bird season (Generally March to September).

If this is not possible then the vegetation should be subject to a nesting bird inspection by a suitably experienced ecologist prior to commencement of works. If any active nests are identified then the vegetation, and a defined buffer zone, will need to remain in place until the young have naturally fledged.

4. RESULTS SUMMARY

4.1 PRELIMINARY ARBORICULTURAL ASSESSMENT

67 individual trees and 1 group of trees were surveyed as part of the Preliminary Arboricultural Assessment. Trees assessed during the survey are listed as individual trees and groups of trees in the Tree Schedule (Appendix A) in accordance with BS5837:2012 recommendations. Table 4.1, below, provides a summary of the survey results in terms of categorisation.

Table 4.1: Summary of Trees, Groups and Hedgerows in BS5837:2012 Categories

BS5837:2012 Category	Tree/ Group/ Hedgerow Reference	Frequency		
		T	G	H
A	T16, T29, T30, T31, T32	5		
B	T5, T11, T12, T15, T17, T18, T21, T27, T33, T35, T39, T40, T44, T47, T50	15		
C	T1, T2, T3, T4, T6, T7, T8, T9, T10, T22, T25, T26, T36, T37, T38, T41, T42, T43, T45, T46, T48, T49, T51, T52, T53, T54, T55, T56, T57, T58, T59, T60, T61, T62, T63, T64, T65, T66, T67, T68, T69, T70, T71, T72, T73, T74, T75, OSG1	47	1	

Key:

T: Trees
G: Groups
H: Hedgerows

The most significant trees recorded during the survey were a line of individual London plane trees (*Platanus x hispanica*), which were located adjacent to the eastern boundary of the site near to Boswell Street, and a single sugar maple (*Acer saccharum*) tree, which was located in the north-eastern corner of the assessment area.

In addition to the London plane and sugar maple trees, which were generally considered to have a moderate to high retention value, a number of Swedish whitebeam (*Sorbus intermedia*), rowan (*Sorbus aucuparia*), narrow leaved ash (*Fraxinus oxycarpa* 'Raywood'), common lime (*Tilia x europaea*), cherry (*Prunus* sp.), Chanticleer pear (*Pyrus calleryana* 'Chanticleer'), apple (*Malus* sp.), false acacia (*Robinia pseudoacacia*), sycamore (*Acer pseudoplatanus*), box elder (*Acer negundo*), small-leaved lime (*Tilia cordata*), Norway maple 'Crimson King' (*Acer platanoides* 'Crimson King'), and Crimean lime (*Tilia* × *euchlora*) trees were also present within the site. These specimens were less significant in the local landscape and many exhibited decay, poor pruning, and crown dieback, which has limited their likely future potential, and as such these specimens were typically considered to be of a low retention value.

5. ARBORICULTURAL IMPACT ASSESSMENT

5.1 INTRODUCTION

This section of the report details the potential impacts that the proposed development may have upon the site's tree stock. The assessment has been based upon the documents detailed in Table 1.1 with reference to the results of the Preliminary Arboricultural Assessment. The location of the trees can be found on the Tree Survey Plan and a schedule of the trees (Appendix A) attached to this report.

5.2 IMPACTS FROM DEVELOPMENT LAYOUT

5.2.1 Tree Retention and Removal

The proposed development has been designed so that all existing trees are retained. Provided that adequate protective measures are installed the retention of all trees within the study area is deemed appropriate.

5.2.2 Tree Pruning

Pruning of mature trees should only be undertaken where essential, to prevent open wounds that allow the ingress of decay and provide an opportunity for fungal spores to infect the tree. Pruning works should ideally be undertaken during the winter months when the tree is dormant or during the summer months when the tree is fully active. Autumn pruning (when fungal spores are abundant in the surrounding atmosphere) should be avoided if possible. Juvenile trees should be formatively pruned in their early years to reduce the presence of potential defects into maturity that would reduce their lifespan.

Pruning works that are required to facilitate the proposed development are detailed in Table 5.1 below.

Table 5.1: Tree Pruning

Tree/ Group Reference	Species	Retention Category	Pruning Requirements
T18	Sycamore	B1	Crown raise southern canopy to 6m over proposed development

All tree pruning works should be detailed as part of an Arboricultural Method Statement and completed in accordance with the current best practice guidance set out within BS3998:2010 *"Tree Work – Recommendations"* by suitably competent, qualified, and insured arboricultural contractors. It is recommended that the extent of pruning required is then identified to contractors in a pre-commencement site meeting as part of the enabling works.

5.3 DIRECT IMPACTS FROM CONSTRUCTION

5.3.1 Works Within RPAs and Beneath Canopies

Some aspects of the proposed development will require works within the RPAs or beneath the canopy spreads of retained trees as detailed within Table 5.2.

Table 5.2: Works in RPAs and Canopy Spreads

Tree/ Group/ Hedgerow Reference	Species	Retention Category	Proposed Works
T18	Sycamore	B1	Construction of Eastern Mews
OSG1	Ash Walnut	C1	Construction of Western Mews

There is significant encroachment of the new development into the RPA of the retained tree T18, however the majority of this area will be developed into managed gardens. Where buildings are to be constructed within the RPA, the potential for root damage can largely be mitigated through the use of a specialist foundation design. Provided that a suitable foundation design is deemed feasible, and no excavations occur during the landscaping phase of the development the tree is likely to remain unaffected.

The new development encroaches into the edge of the RPA of the retained tree group OSG1. In this instance, the encroachment is relatively minor and root growth is likely to have been significantly impeded in the direction of the development due to a retaining wall and existing hard surfaces between the trees and the proposed new buildings. As such the retained trees are unlikely to be impacted by the development.

Where any existing hard surfaces are to be replaced or enhanced within the RPA of retained trees, provided that the current sub-base layer remains intact, the trees are unlikely to be affected by the works. Care must be taken when working beneath the tree canopy to ensure that no damage is caused to the lower branches or foliage.

All works within the Root Protection Areas or beneath the canopy spreads of retained trees should be detailed as part of an Arboricultural Method Statement to ensure the method of construction is suitably considered.

5.3.2 Underground and Overhead Utilities

Wherever possible, common service trenches should be specified to minimise land take associated with underground service provision and facilitation access for future maintenance.

5.4 IMPACTS FROM CONSTRUCTION RELATED OPERATIONS

5.4.1 Site Access

It is understood that construction access to the site will be provided through the existing access points and it may therefore be necessary to undertake access facilitation pruning works to low-hanging branches to minimise the potential for vehicular impact.

It will be necessary to ensure retained trees adjacent to the access routes are protected from vehicular impact through the installation of tree protection barriers, prior to the commencement of the development.

5.4.2 Site Compound, Contractors Car Parking, Delivery and Storage of Materials

Material deliveries to the site will utilise the existing access points. Retained trees will be protected from harm by the prior installation of tree protection barriers and the completion of access facilitation pruning works (if required).

The site compound, contractor's parking, and areas for materials storage within the site should be confirmed as part of an Arboricultural Method Statement following approval of the current planning application.

5.5 POST-DEVELOPMENT IMPACTS

5.5.1 Shading

The shade from trees can be considered both a constraint and an opportunity and therefore its effect upon the new development should be fully considered to ensure a harmonious and sustainable relationship can be achieved. When considering the position and orientation of new buildings in relation to existing trees, primary living areas should receive the largest proportion of natural sunlight. BRE guidelines recommends *"at least half of the garden or open space should receive at least two hours sunlight on March 21 (Spring Equinox)"*.

It is considered unlikely that shading will cause significant conflict with the proposed development of the site as the majority of retained trees are located at a distance that will make significant shading, beyond that already cast by the existing buildings, improbable. The trees that are located more closely to proposed residential dwellings are located adjacent to northern boundaries and will therefore not cast their shade over the dwellings.

5.5.2 Future Pressure for Removal

The layout of the proposed development is such that future pressure for tree removal is generally unlikely to occur.

5.5.3 Seasonal Nuisance

It is unlikely that a significant degree of seasonal nuisance will occur due to the lack of retained tree cover across the site.

The sweeping up of leaves and cleaning of gutters, which may become blocked by falling leaves, is considered to be routine seasonal maintenance and as such, no notable conflict with the proposed development is considered likely to occur. Nonetheless, it may prove appropriate in certain areas to use gutter guards, or otherwise enclosed gutters, to minimise the potential for leaf fall to cause blockage and an ongoing nuisance.

6. SUMMARY OF IMPACTS

The proposed development of the site is unlikely to significantly impact the visual amenity of the local area as all trees are to be retained and the proposed works will not impact significantly upon their long-term health. Whilst some works are to be undertaken within the RPAs of retained trees, the nature of those works are such that they can be completed without impacting significantly upon the trees subject to the adoption of appropriate working practices as detailed in a future Arboricultural Method Statement following approval of the current planning application.

7. MITIGATION AND PROTECTION

7.1 INTRODUCTION

This section of the report details the initial protection and avoidance measures suggested to prevent harm to the retained trees.

7.2 NEW TREE PLANTING

The development of the site provides an excellent opportunity for new planting throughout the site as part of a soft landscaping scheme. The planting of a diverse range of species, that are in keeping with the surrounding landscape character and tolerant of climate change, can increase the value of the tree cover within the site and provide long term amenity benefits to the site and surrounding areas.

Tree planting should be avoided where they may obstruct overhead power lines or cables. Any underground apparatus should be ducted or otherwise protected at the time of construction to enable trees to be planted without resulting in future conflicts.

7.3 GENERAL TREE PROTECTION

7.3.1 Construction Exclusion Zone

To minimise the potential for harm to the root systems and canopies of retained trees during development construction exclusion zones will be required throughout the site. These are areas surrounding the trees' RPAs and canopies in which construction works, or related activities, will be avoided.

It is recommended that the exclusion zones are afforded protection at all times through the use of tree protection barriers and/or ground protection (specified in accordance with BS5837:2012). No works that cause compaction of the soil or severance of tree roots, except where undertaken in accordance with the guidance provided within this document or detailed within a subsequent AMS, will be undertaken within any exclusion zone.

7.3.2 Tree Protection Barriers

The protective barriers should be erected following any tree removal or tree surgery works and prior to the commencement of any construction site works e.g. before any construction materials or machinery are brought on site or the stripping of soil commences.

The protective barriers are to be constructed in accordance with the specification detailed in BS5837:2012. Any variation to the specification of the protective barrier should be agreed with the Local Planning Authority Arboricultural Officer or included as part of an Arboricultural Method Statement following approval of the current planning application.

7.3.3 Ground Protection

There are no areas on site where ground protection measures will require installation on this site.

8. ARBORICULTURAL METHOD STATEMENT

An Arboricultural Method Statement will be required for the site as various aspects of the proposed development will need to be fully considered due to the presence of retained trees.

The purpose of an Arboricultural Method Statement is to ensure that all site operations can occur with minimal risk of adverse impact upon trees that are to be retained. The document will identify all areas where specific working methods will be required to ensure protection to trees. The document will also specify the location and extent of tree protection barriers and ground protection.

In relation to this development the Arboricultural Method Statement should address the following:

- Tree pruning works.
- Site setup and logistics.
- Works within Root Protection Areas.
- Suitable site access, material storage contractor's car parking and site compound locations.
- Final protective barrier and ground protection locations and specifications.
- Extent of any access facilitation pruning works to be undertaken.
- Pre-commencement site meeting.

9. REFERENCES AND BIBLIOGRAPHY

British Standards Institution. (2010). *British Standard 3998:2010, Tree Work - Recommendations.* British Standards Institution, London.

British Standards Institution. (2012). *British Standard 5837:2012, Trees in Relation to Design, Demolition and Construction – Recommendations.* British Standards Institution, London.

Middlemarch Environmental Ltd. (2021). *Report Number RT-MME-154667-01 Rev B*. Preliminary Arboricultural Assessment.

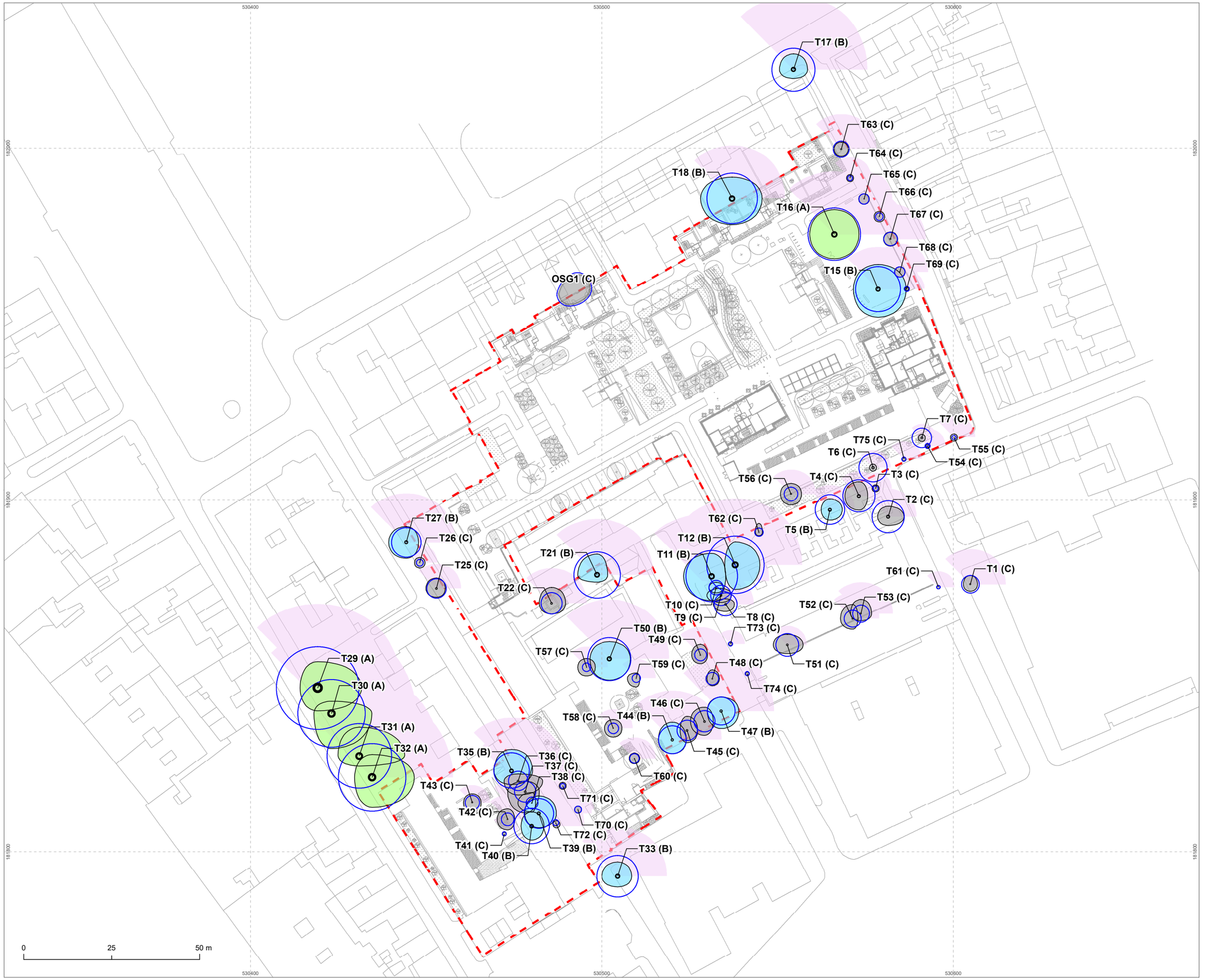
Littlefair P. (2011). *Site layout planning for daylight and sunlight: a guide to good practice* (BR 209). British Research Establishment, Watford.

10. DRAWINGS

Drawing Number C154667-01-01-Rev B – Tree Survey Plan

Drawing Number C154667-02-01 Rev A – Tree Retention Plan

Appendix A: Tree Schedule



C154667-02-01-RevA

Legend

- Tree location and stem diamter
- Category A
- Category B
- Category C
- Current canopy - tree to be retained
- Root Protection Area
- Indicative tree shadow
- Site boundary
- Proposed site layout

T - Tree
G - Tree group

Note: tree locations are approximate, based on combined field observations and aerial imagery

The original of this drawing was produced in colour - a monochrome copy should not be relied upon

NOTES
All dimensions to be verified on site. Do not scale this drawing, use figured dimensions only. All discrepancies to be clarified with Project Arboriculturalist. Drawing to be read in conjunction with Preliminary Arboricultural Assessment and Tree Schedule. Drawing has been produced in colour and is based on digital informaton in .dwg format, aerial images and/or GPS location where appropriate. A monochrome copy should not be relied upon. The exact position of individual trees or species included as part of a tree group, woodland or hedgerow should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken. Further survey work would be required for calculating foundation depths.
Trees are living organisms that change over time, the condition of all trees illustrated herein, are to be checked by the Project Arboriculturalist should works commence 12 months after the date of this survey.
SOME TREES MAY BE SUBJECT TO STATUTORY CONSTRAINTS. IT IS THEREFORE ADVISED THAT NO WORKS SHOULD BE UNDERTAKEN TO ANY TREES ILLUSTRATED HEREIN WITHOUT FIRST OBTAINING THE RELEVANT AUTHORISATION TO DO SO UNLESS AGREED AS PER THE APPROVED PLANS THROUGH PLANNING CONSENT.

N

Project	Tybalds Estate, Camden, London
Drawing	Tree Retention Plan
Client	The London Borough of Camden
Drawing Number: C154667-02-01-RevA	Revision: Rev A
Scale @ A3: 1:1000	Date: June 2021
Approved By: DF	Drawn By: VO/CD

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Appendix A - Tree Schedule

<table>
<tr><th>Measurements</th><th>Age Class</th><th>Overall Condition</th><th>Root Protection Area (RPA)</th></tr>
<tr><td>Height - estimated from ground level (m).</td><td>YNG: Young trees up to ten years of age.</td><td>G - Good: Trees with only a few minor defects and in good overall health needing little, if any attention.</td><td rowspan="4">• The RPA column gives the required area (m²).
• The RPA Radius column gives the radius (m) of an equivalent circle.
• The RPA is calculated using the formulae described in paragraph 4.6.1 of British Standard 5837: 2012 and is indicative of the required rooting area in order for a tree to be retained.</td></tr>
<tr><td>Stem Dia. - Diameter measured (mm) in accordance with Annex C of the BS5837.</td><td>SM: Semi-mature, trees less than 1/3 life expectancy.</td><td>F - Fair: Trees with minor, but rectifiable, defects or in the early stages of stress from which it may recover.</td></tr>
<tr><td>Crown - crown spread estimated radially from the main stem (m).</td><td>EM: Early mature, trees 1/3 – 2/3 life expectancy.</td><td>P - Poor: Trees with major structural and/or physiological defects such that it is unlikely the tree will recover in the long term.</td></tr>
<tr><td rowspan="2">Abbreviations
Est - Estimated stem diameter
Avg - Average stem diameter
Max - Maximum stem diameter</td><td>M: Mature trees, over 2/3 life expectancy.</td><td>D - Dead: Trees no longer alive. This could also apply to trees that are dying and unlikely to recover.</td></tr>
<tr><td>OM: Over mature, declining or moribund trees of low vigour.</td><td colspan="2" rowspan="2">In the assessment, of the BS category, particular consideration has been given to the following
• The health, vigour and condition of each tree
• The presence of any structural defects in each tree and its future life expectancy
• The size and form of each tree and its suitability within the context of a proposed development
• The location of each tree relative to existing site features e.g. its screening value or landscape features
• Age class
• Life expectancy</td></tr>
<tr><td></td><td>V: Veteran, tree possessing certain attributes relating to veteran trees.</td></tr>
</table>

Structural Condition
The following has been considered when inspecting structural condition: • The presence of fungal fruiting bodies around the base of the tree or on the stem, as they could possibly indicate the presence of possible internal decay. • Soil cracks and any heaving of the soil around the base. • Any abrupt bends in branches and limbs resulting from past pruning. • Tight or weak 'V' shaped forks and co-dominant stems. • Hazard beam formations and other such biomechanical related defects (as described by Claus Mattheck, Body Language of Trees HMSO Research for Amenity Trees No. 4 1994). • Cavities as a result of limb losses or past pruning. • Broken branches or storm damage. • Canker formations. • Loose or flaking bark. • Damage to roots. • Basal, stem or branch / limb cavities. • Crown die-back or abnormal foliage size and colour. • Any changes to the timing of normal leaf flush and leaf fall patterns.

Quality Assessment of Retention Category
Category U - Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.
Category A - Trees of high quality with an estimated remaining life expectancy of at least 40 years.
Category B - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.
Category C - Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.
Sub-categories: (i) - Mainly arboricultural value (ii) - Mainly landscape value (iii) - Mainly cultural or conservation value

Appendix A - Summary

	Individual Trees	Totals	Tree Groups	Totals
Category U		0		0
Category A	T16, T29, T30, T31, T31	5		0
Category B	T5, T11, T12, T15, T17, T18, T21, T27, T33, T35, T39, T40, T44, T47, T50	15		0
Category C	T1, T2, T3, T4, T6, T7, T8, T9, T10, T22, T25, T26, T36, T37, T38, T41, T42, T43, T45, T46, T48, T49, T51, T52, T53, T54, T55, T56, T57, T58, T59, T60, T61, T62, T63, T64, T65, T66, T67, T68, T69, T70, T71, T72, T73, T74, T75	47	OSG1	1
	Total	67	**Total**	1

	Hedgerows	Totals	Woodlands	Totals
Category U		0		0
Category A		0		0
Category B		0		0
Category C		0		0
	Total	0	**Total**	0

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
T1	Chanticleer pear	10.0	2.0	1	210	2.5	2.0	2.0	2.0	SM	G	G	20.0	2.5	C1	Previous pruning wounds observed. Branch stubs. Included union. Minor deadwood. Several minor bark wounds on main stem.
T2	Swedish whitebeam	8.0	2.0	1	380	3.0	4.5	2.5	3.0	EM	F	G	65.3	4.6	C1	Area of decay at 1 m at old bark wound with adaptative growth, occluding slowly. Previous pruning wounds observed. Included unions.
T3	Rowan	4.5	2.0	1	**60**	1.0	1.0	1.0	1.0	Y	G	G	1.6	0.7	C1	Recently planted.
T4	Swedish whitebeam	7.0	1.5	1	380	4.0	2.5	4.0	4.0	EM	G	F	65.3	4.6	C1	Minor crown die-back throughout crown. Previous pruning wounds observed. Branch socket cavities.
T5	Swedish whitebeam	7.0	3.5	1	350	3.0	3.5	3.0	2.5	EM	G	G	55.4	4.2	B1	Minor deadwood. Included union. Crossing branches to south. Minor damage to exposed roots.
T6	Apple	5.0	3.0	1	335	1.0	1.0	1.0	1.0	EM	G	F	50.8	4.0	C1	Recently pollarded at 4 m. No regrowth present.
T7	Apple	4.0	2.0	1	230	1.0	1.0	1.0	1.0	EM	G	F	23.9	2.8	C1	Recently pollarded at 3 m. No regrowth present.
T8	Swedish whitebeam	8.0	5.0	1	270	1.5	2.5	2.0	3.5	EM	G	G	33.0	3.2	C1	Part of linear group. Open branch socket cavity wound at 3 m.
T9	Swedish whitebeam	7.5	2.5	1	240	2.0	3.0	2.0	4.0	EM	G	G	26.1	2.9	C1	Part of linear group. Minor crown die-back.
T10	Swedish whitebeam	7.5	4.0	1	170	1.5	2.0	1.5	2.0	Y	G	F	13.1	2.0	C1	Part of linear group. Minor crown die-back.
T11	London plane	19.0	3.0	1	610	6.5	4.0	7.0	8.0	M	G	F	168.4	7.3	B1	Soil compaction. Recently pollarded. Branch stubs. Previous pruning wounds observed. Superficial bark damage to northern buttress root.
T12	London plane	19.0	5.0	1	680	6.5	7.0	7.0	3.0	M	G	F	209.2	8.2	B1	Soil compaction. Exposed roots. Recently pollarded. Previous pruning wounds observed.
T13	London plane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Tree has been removed.
T14	London plane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Tree has been removed.
T15	Sugar maple	12.0	3.0	1	530	7.0	8.0	8.0	7.0	M	F	F	127.1	6.4	B1	Small cavity at 1 m, nearly occluded. Minor deadwood. Suspected decay in swollen stem from ground level to 1m.
T16	Sugar maple	18.0	3.0	1	620	7.0	7.0	7.0	7.0	M	G	G	173.9	7.4	A1	Soil compaction. Minor deadwood.
T17	False acacia	21.0	2.0	1	510	4.5	4.0	2.5	4.0	M	G	F	117.7	6.1	B1	Epicormic growth on trunk and crown. Branches touching building to south. Recently pollarded. Exposed roots.

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
T18	Sycamore	15.0	3.0	1	600	6.0	8.5	7.5	9.0	M	G	G	162.9	7.2	B1	Unable to inspect stem from base up to 3.0m due to no access. Poor pruning.
T19	Apple	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Tree has been removed.
T20	Sycamore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Tree has been removed.
T21	Box elder	16.0	2.5	1	550	6.0	3.0	2.0	5.5	M	G	G	136.9	6.6	B1	Trunk leans significantly to the west. Multiple old pruning wounds. Pollarded in past. Branch socket cavities.
T22	Norway maple 'Crimson King'	10.0	4.0	1	250	4.5	4.0	3.0	3.5	SM	F	F	28.3	3.0	C1	Growing in elevated planter. Minor crown die-back. Old pruning wounds. Branch stubs. Minor deadwood.
T23	Chinese tree privet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Tree has been removed.
T24	Narrow-leaved ash	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Tree has been removed.
T25	Cherry	7.0	2.0	1	230	3.0	2.5	2.5	3.0	SM	G	G	23.9	2.8	C1	Pruning wounds observed.
T26	Narrow-leaved ash	5.0	2.0	1	80	1.5	1.5	1.5	1.5	Y	G	G	2.9	1.0	C1	Recently planted.
T27	Narrow-leaved ash	14.0	7.0	1	350	4.5	3.5	4.5	5.0	EM	G	G	55.4	4.2	B1	Bark wound on west side at 1.5 m (150 x 50 mm), occluding well. Multiple old pruning wounds occluding well. Poor form.
T28	Narrow-leaved ash	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Tree has been removed.
T29	London plane	24.0	3.0	1	980	7.5	12.5	6.5	5.0	M	F	G	434.5	11.8	A1,2	Part of linear group. Old pruning wounds. Minor deadwood. Branch socket cavities.
T30	London plane	24.0	3.0	1	800	3.5	11.5	10.0	5.0	M	F	G	289.6	9.6	A1,2	Part of linear group. Old pruning wounds. Minor deadwood. Branch socket cavities. Lifting tarmac at base.
T31	London plane	23.0	4.0	1	765	8.0	13.0	3.0	6.0	M	F	G	264.8	9.2	A1,2	Part of linear group. Old pruning wounds. Branch stubs. Epicormic growth in crown. Branch socket cavities.
T32	London plane	23.0	5.0	1	800	6.5	12.0	8.5	5.0	M	G	G	289.6	9.6	A1,2	Part of linear group. Old pruning wounds. Branch stubs. Epicormic growth in crown. Branch socket cavities. Lifting tarmac at base.

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
T33	London plane	14.0	4.0	1	490	4.0	4.0	3.0	4.5	EM	G	G	108.6	5.9	B1	Recently pollarded. Exposed roots.
T34	Swedish whitebeam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Tree has been removed.
T35	Common lime	15.0	4.0	1	420	6.0	6.0	4.0	5.0	EM	G	G	79.8	5.0	B1	Part of linear group. Minor cavity at old pruning wound at 4.5 m. Minor deadwood. Epicormic growth on stem.
T36	Small-leaved lime	14.0	4.0	1	230	2.0	7.0	4.0	4.0	EM	F	F	23.9	2.8	C1	Part of linear group. Minor crown die-back. Minor deadwood. Branch stubs. Epicormic growth on stem.
T37	Small-leaved lime	14.0	3.0	1	250	3.0	4.0	6.0	5.0	EM	G	F	28.3	3.0	C1	Part of linear group. Old pruning wounds. Minor deadwood.
T38	Common lime	9.0	2.5	1	140	3.0	1.0	2.5	4.0	SM	G	F	8.9	1.7	C1	Part of linear group. Suppressed form. Old pruning wounds. Epicormic growth on stem. Unable to fully inspect due to access restrictions.
T39	Common lime	15.0	4.0	1	350	5.0	5.0	4.0	4.0	EM	G	G	55.4	4.2	B1	Part of linear group. Minor deadwood. Epicormic growth on stem. Unable to fully inspect due to access restrictions.
T40	Common lime	15.0	2.0	1	420	4.0	3.5	4.0	3.0	EM	G	F	79.8	5.0	B1	Part of linear group. Recently pollarded. Old pruning wounds. Minor deadwood. Unable to fully inspect due to access restrictions.
T41	Cherry	4.0	1.0	1	50	0.5	0.5	0.5	0.5	Y	G	G	1.1	0.6	C1	Recently planted. Unable to fully inspect due to access restrictions.
T42	Cherry	7.0	2.5	1	150	3.0	2.0	3.0	3.0	Y	F	F	10.2	1.8	C1	Old pruning wounds. Sparse crown. Unable to fully inspect due to access restrictions.
T43	Cherry	5.0	3.0	1	170	2.5	2.5	3.5	2.5	EM	P	F	13.1	2.0	C1	Old pruning wounds. Unable to fully inspect due to access restrictions.
T44	Crimean lime	14.0	2.0	1	330	5.0	4.0	4.0	4.0	EM	G	G	49.3	4.0	B1	Part of linear group. Old pruning wounds. Minor deadwood. Roots lifting paving stones.
T45	Swedish whitebeam	5.5	2.5	1	240	4.0	3.0	3.5	2.0	EM	G	G	26.1	2.9	C1	Part of linear group. Old pruning wounds. Branch socket cavities. Many small bark wounds on stem from base to 2m.
T46	Swedish whitebeam	5.0	2.5	1	250	4.0	2.5	4.0	4.0	EM	G	G	28.3	3.0	C1	Part of linear group. Old pruning wounds. Many small bark wounds on stem from base to 2m.

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
T47	Crimean lime	15.0	2.0	1	330	4.0	5.0	5.0	4.0	EM	G	G	49.3	4.0	B1	Part of linear group. Old pruning wounds. Minor deadwood.
T48	Rowan	8.0	2.0	1	150	2.5	2.0	2.0	1.5	SM	G	G	10.2	1.8	C1	Old pruning wounds. Included unions. Branch stubs.
T49	Rowan	8.0	2.0	1	140	3.0	2.0	2.5	2.5	SM	G	G	8.9	1.7	C1	Old pruning wounds. Included unions. Branch stubs.
T50	London plane	17.0	3.5	1	510	5.0	6.0	6.0	5.5	M	G	G	117.7	6.1	B1	Previously pollarded. Old pruning wounds. Branch stubs. Minor deadwood. Growing in elevated brick planter.
T51	Goat willow	5.5	1.0	1	270	3.0	4.5	2.5	4.0	SM	F	F	33.0	3.2	C1	Old pruning wounds. Branch stubs. Trunk leans significantly to north.
T52	Southern evergreen magnolia	7.5	4.0	1	200	4.0	1.5	3.0	3.5	SM	G	F	18.1	2.4	C1	Old pruning wounds. Minor deadwood.
T53	Silver birch	9.0	3.5	1	200	4.0	3.0	2.0	3.0	EM	F	G	18.1	2.4	C1	Old pruning wounds. Branch stubs.
T54	Pear	5.0	2.0	1	60	0.5	0.5	0.5	0.5	Y	F	F	1.6	0.7	C1	Recently planted. Bark wound from ground level to 1.4m on main stem.
T55	Silver birch	6.0	2.0	1	50	1.0	1.0	1.0	1.0	Y	G	G	1.1	0.6	C1	Recently planted.
T56	Cherry	7.0	2.5	1	160	3.0	3.0	3.0	3.0	SM	G	G	11.6	1.9	C1	No obvious defects.
T57	Rowan	6.0	2.0	1	100	2.5	2.5	2.5	2.5	Y	G	G	4.5	1.2	C1	Branch stubs. Minor deadwood.
T58	Olive	5.5	1.5	3	100, 80, 80	2.5	2.5	2.5	2.5	SM	G	G	7.2	1.5	C1	Old pruning wounds.
T59	Olive	5.5	1.5	1	100	1.5	1.0	2.5	2.5	SM	G	G	4.5	1.2	C1	Old pruning wounds. Epicormic growth on stem.
T60	Hornbeam	6.0	2.0	1	110	1.5	1.5	1.5	1.5	Y	G	G	5.5	1.3	C1	No obvious defects.
T61	Hornbeam	4.5	1.5	1	40	0.5	0.5	0.5	0.5	Y	G	G	0.7	0.5	C1	Recently planted tree.
T62	Bay	5.0	1.5	3	100, 50, 40	2.5	1.0	1.0	1.0	Y	F	G	4.4	1.2	C1	Included unions. Old pruning wounds. Branch stubs. Surrounded by Mahonia & Privet shrubs.
T63	Tibetan cherry	10.0	3.0	1	190	2.0	2.0	2.0	2.0	SM	G	G	16.3	2.3	C1	Soil compaction. Included unions.
T64	Pride of India	6.0	2.0	1	60	1.0	1.0	1.0	1.0	Y	G	G	1.6	0.7	C1	Recently planted tree.
T65	Sweetgum	8.0	2.0	1	120	1.5	1.5	1.5	1.5	SM	G	G	6.5	1.4	C1	Minor deadwood.
T66	Amelanchier	6.0	2.5	1	90	1.5	1.5	1.5	1.5	Y	G	G	3.7	1.1	C1	No obvious defects.
T67	Tibetan cherry	10.0	3.0	1	160	2.0	2.0	2.0	2.0	SM	G	G	11.6	1.9	C1	Soil compaction. Included unions.

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
T68	Sweetgum	8.0	2.0	1	120	1.5	1.5	1.5	1.5	SM	G	G	6.5	1.4	C1	Minor deadwood.
T69	Hornbeam	5.0	1.0	1	60	0.5	0.5	0.5	0.5	Y	G	G	1.6	0.7	C1	Recently planted tree.
T70	Hornbeam	4.5	2.0	1	80	1.0	1.0	1.0	1.0	Y	G	G	2.9	1.0	C1	Recently planted tree.
T71	Hornbeam	4.5	2.0	1	60	1.0	1.0	1.0	1.0	Y	G	G	1.6	0.7	C1	Recently planted tree.
T72	Hornbeam	4.5	2.0	1	70	1.0	1.0	1.0	1.0	Y	G	G	2.2	0.8	C1	Recently planted tree.
T73	Field maple	4.0	2.0	1	50	0.5	0.5	0.5	0.5	Y	G	G	1.1	0.6	C1	Recently planted tree.
T74	Field maple	4.0	2.0	1	50	0.5	0.5	0.5	0.5	Y	G	G	1.1	0.6	C1	Recently planted tree.
T75	Sea buckthorn	5.0	1.5	1	50	0.5	0.5	0.5	0.5	Y	G	G	1.1	0.6	C1	Recently planted tree.
OSG1	Walnut, Ash	13.0	4.0	1	300	4.0	4.0	6.0	4.0	SM	F	F	40.7	3.6	C1	Located in elevated garden beyond retaining wall. No access for inspection, all measurements are indicative only.
H1	Lawson cypress	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Hedge has been removed.
H2	Lawson cypress	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Hedge has been removed.