TYBALDS ESTATE
CAMDEN
LONDON
WC1N 3PF

PRELIMINARY ARBORICULTURAL ASSESSMENT

A Report to: The London Borough of Camden

Report No: RT-MME-154667-01 Rev A

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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*".

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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 valid for a period of 12 months from the date of survey. If works have not commenced 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, groups and hedgerows on site and 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.

The document is designed to identify the existing trees and hedgerows on the site to aid design and avoid unnecessary tree removal. An Arboricultural Impact Assessment which identifies the relationship between the existing, retained trees and future proposed development will be required to accompany the planning application.

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1. INTRODUCTION

1.1 PROJECT BRIEF

Middlemarch Environmental Ltd were commissioned by The London Borough of Camden to undertake a Preliminary Arboricultural 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 which was produced to aid design and avoid unnecessary tree removal.

The tree survey and assessment of existing trees has been carried out in accordance 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:

- Record the current condition of the trees found during the survey and categorise them using criteria outlined in BS5837:2012 "*Trees in Relation to Design, Demolition and Construction - Recommendations*".
- Provide a Tree Survey Plan that identifies the opportunities and constraints to development presented by the trees to include Root Protection Areas (RPA) for the retained trees as described in BS5837:2012.
- Provide guidance detailing arboricultural opportunities and constraints to development and factors to be considered during the design of the proposed development.

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 Middlemarch Environmental Ltd Drawing Number C154667-01-01, attached to this report.

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 and the specific location of species within a hedgerow 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 or woody species within hedgerows 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 and hedgerows across the site as well as the above and below ground constraints which should be considered during the design process.

The positions of trees and their current crown spread, root protection area and shade pattern (where appropriate) have been shown on the Tree Survey Plan. 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 and hedgerows have been positioned using GPS and aerial photography to provide approximate locations in relation to existing surrounding features. Further confirmation of tree and hedgerow locations through a topographical survey of the site is recommended to ensure future design accuracy.

2.8 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.

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 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 an area of ancient woodland has not been recorded within 15.0 metres of the survey area.

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 and Groups in BS5837:2012 Categories

BS5837:2012 Category	Tree/ Group/ Hedgerow Reference
A	T16, T29, T30, T31, T32
B	T5, T11, T12, T15, T17, T18, T21, T27, T33, T35, T39, T40, T44, T47, T50
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

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 DESIGN GUIDANCE

5.1 OPPORTUNITIES AND CONSTRAINTS

The presence of existing trees provides the opportunity to enhance the site and offer a mature, feature landscape to the final development. The removal of trees and hedgerows across the site should be minimised and new tree planting should be provided to adequately mitigate any essential tree loss. Any retained trees must therefore be protected, and sufficient offsets provided during the development to ensure they positively contribute to the new site use.

The information provided within this section of the report aims to inform designers, architects, builders, landscape architects and engineers of the opportunities and constraints posed by the trees to ensure that those trees selected for retention can be successfully integrated within the proposed development. The objective is to achieve a harmonious and sustainable relationship between trees and structures for the future.

5.2 ABOVE GROUND CONSTRAINTS

Existing Canopy Spreads

The existing canopy spreads and indicative shade patterns of the assessed trees are shown on the Tree Survey Plan (C154667-01-01). Whilst larger, more mature trees offer significant value in term of their contribution to the future site use and are unlikely to grow much larger, the future crown spreads of younger trees will need to be fully considered when designing any built development nearby.

Where built development is proposed in close proximity to existing trees consideration should be given to the amount of working space required to allow construction access (typically 2.5m for scaffolding).

Where development is proposed in close proximity to the existing canopy spread of a tree the likelihood of leaf or fruit fall or an accumulation of tree sap or aphid honeydew causing nuisance must be considered.

An indicative shade pattern for each tree has been shown on the Tree Survey Plan. The shade from trees can be considered both a constraint and 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)”*.

5.3 BELOW GROUND CONSTRAINTS

Root Protection Areas (RPAs)

Root Protection Areas for each tree and group of trees have been determined in accordance with BS5837:2012 - recommendations and is detailed within Appendix A Tree Schedule.

Initial Root Protection Areas (RPAs) for the trees have been plotted onto the Tree Survey Plan as circles, with the tree located centrally on the main stem, extending to encompass the area of ground, and thus the root-able soil volume, required for protection.

There are areas on site where, due to the presence of existing structures and hard surfaces, tree root development may have been restricted as a result of reduced nutrient or moisture availability and a lack of provision for gaseous exchange. In such areas it may be appropriate to modify the shape of the RPAs, whilst not reducing their area, to consider the likely root morphology and distribution of the affected trees.

Determining the extent of a tree’s root system is not a simple process and whilst roots can generally be considered absent beneath substantial buildings, they may be present beneath lighter structures and areas of hard surfacing. Where possible all development, including new hard landscaping, should be situated outside of the designated Root Protection Areas of retained trees.
If accurate root mapping is required, further assessment using ground penetrating radar can be provided as an additional service to better inform design processes.

5.4 TREE CATEGORISATION

Trees assessed as retention category A, B or C are a material consideration in the planning process and provide future value to the new site use, however, the prioritisation for tree retention should be based upon the guidance contained within BS5837:2012.

Retention Category U
Trees found unsuitable to retain (retention category U) have limited, transient retention value due to their current condition and, in most circumstances, such specimens will not be considered for retention within new development unless they offer wildlife habitat potential and are situated in areas with limited pedestrian access. Trees found to be unsuitable for retention 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. As such prior to undertaking works to trees, a check to see if they are being used for bat roosting should be undertaken by a suitably qualified and experienced ecologist.

Retention Category A
Trees found to be high quality during the Preliminary Arboricultural Assessment should be given the highest priority when making decisions of which trees should be retained and incorporated during the evolution of proposed development layouts. These trees offer the opportunity to significantly contribute to the future of the site in arboricultural and landscape terms and their loss should be avoided.

Retention Category B
Moderate quality trees should be retained and incorporated into development proposals as they offer the potential to provide medium to long term arboricultural and landscape benefits to the site. These trees are typically found to have remediable defects that may improve over time. The removal of Retention Category B trees should generally be avoided.

Retention Category C
When considering which Retention Category C trees to retain in the new development, priority should be given to those trees that have been included within this category solely due to their young age and limited proportions (stem diameters of less than 150 mm at 1.5 m above ground level). These specimens are normally relatively young trees with future potential which can be translocated to areas away from potential development to avoid their loss. The remaining trees in this category would provide only temporary or transient landscape benefits until new tree planting becomes established and therefore, should not constrain the development of a site.

5.5 CONSTRUCTION WITHIN ROOT PROTECTION AREAS

Construction near to trees has the potential to cause soil compaction, root damage and a reduction in nutrient and moisture availability to roots and should therefore be avoided. To minimise harm occurring as a result of such works, specialist construction methods will be required to ensure any potential impact is fully considered.

Should new construction be proposed within the RPA of an existing tree it will be necessary to take steps to minimise the potential impact to the tree to allow construction. The use of traditional strip footings can result in extensive root loss and should be avoided. The insertion of specially engineered structures within RPAs may be justified if this enables the retention of a good quality tree that would otherwise be lost (usually Categories A or B). Designs for foundations that would minimize adverse impact on trees should include particular attention to existing levels, proposed finished levels and cross-sectional details. In order to arrive at a suitable solution, site-specific and specialist advice regarding foundation design should be sought from the Project Arboriculturist and Structural Engineer. In shrinkable soils, foundation design should consider the risk of indirect damage through subsidence and heave.

5.6 BUILDING FOUNDATIONS

Any structures built on the site should comply with the current building regulations and *NHBC Chapter 4.2 building near trees (2020)*. Foundation depths for buildings near or adjacent to trees should consider the potential size of the trees at maturity and their subsequent water demand. The soil types throughout the site should be fully investigated and appropriate measures taken. If trees are removed across the site the potential for soil heave should be assessed and foundations designed accordingly (see *NHBC Chapter 4.2, 2020*).

This survey has been undertaken in accordance with BS5837 recommendations only and therefore, further assessment in accordance with current building regulations will be required to inform foundation design.

5.7 SUBTERRANEAN UTILITIES AND SERVICE EASEMENTS

All new below-ground service runs, utilities and similar infrastructure should consider trees and hedgerows and RPAs should be avoided to ensure potential impacts are minimised and future conflicts are avoided. Service easements should also be considered when designing new infrastructure to ensure retained trees are not adversely impacted upon.

5.8 FUTURE TREE GROWTH

All trees have the potential for future growth. Where trees are to be retained, their ultimate crown spread and height should be fully considered as future branch growth may result in conflict with the proposed development, damage to branches and the need for a long-term tree pruning regime. In addition, it is important to consider the likelihood of damage to trees or structures that may be caused by continuous whipping of branches in windy conditions. In such circumstances, branches may require continuous pruning which causes open wounds and may spoil the form or shape of the crown.

As trees grow, they absorb carbon dioxide from the atmosphere and store it in the form of roots, branches and leaves. Loss of the woody parts of trees and hedgerows should therefore be avoided if possible.

6. STANDARD RECOMMENDATIONS

The following standard recommendations are made:

- The retention of the Category A and B trees across the site should be considered as a priority as these specimens are likely to make a future contribution as part of the development of the site.
- The retention of the Category C trees should be considered, where possible, though it must be noted that these specimens have a low retention value and are likely to only offer a temporary contribution to the future site use.
- The retention of Category U trees should not be considered within new development unless they offer wildlife habitat potential and are situated in areas with limited pedestrian access and pose limited potential risk.
- All new development shall be located outside of the RPA or canopy spread of any retained tree.
- Where any new development is proposed within the RPA or canopy spread of a retained tree it must be constructed in such a way that damage of the tree root system or crown can be avoided.
- Should new development require works within the RPA of any retained tree an Arboricultural Method Statement should be prepared to set out what steps are to be taken to protect the trees during the course of development.
- Any proposed new planting should consist of a mix of ornamental, native and wildlife attracting species with a robust management plan to assist with the development proposal and to offer mitigation for any tree loss.
- This Arboricultural Survey is valid for a period of 12 months. If works are not commenced within this time, then it is advised that the trees are re-inspected to ensure no significant defects have developed since the original survey.
- If works take place during the bird breeding season, usually from March to September inclusive, trees and hedgerows should be checked for nesting birds. Should any tree removal be required works should be completed outside the breeding season or in the presence of a suitably qualified ecologist.

7. REFERENCES AND BIBLIOGRAPHY

British Standards Institution. (2012). *British Standard 5837:2012, Trees in relation to design, demolition, and construction – Recommendations.* British Standards Institution, London.

British Standards Institution. (2010). *British Standard 3998:2010, Trees work– Recommendations.* British Standards Institution, London.

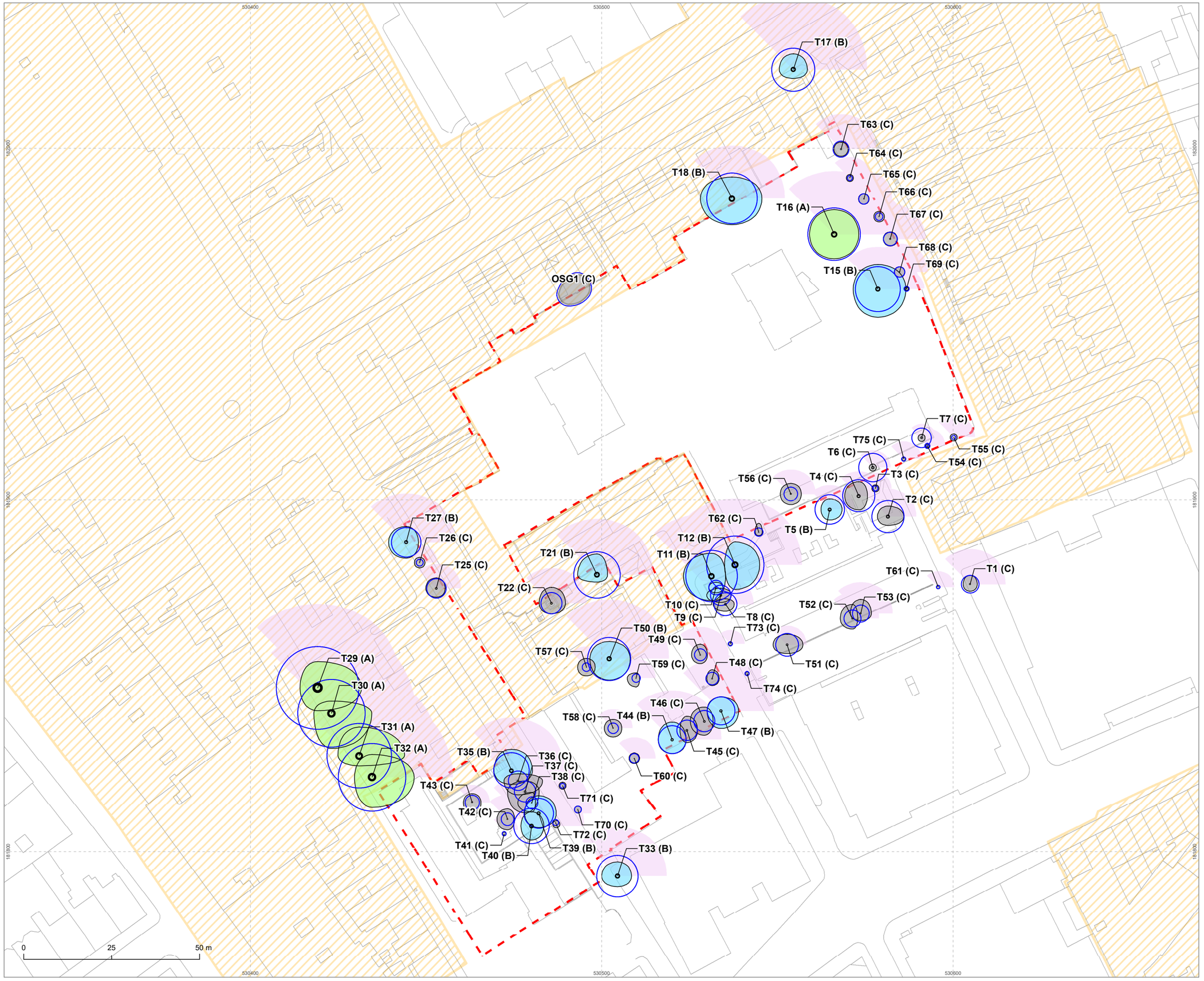
Littlefair P. (2011). *Site layout planning for daylight and sunlight: a guide to good practice* (BR 209). British Research Establishment, Watford.

National House Building Council. (2020). *NHBC Standards 2020: Chapter 4.2 - Building Near Trees*. NHBC, Milton Keynes.

8. DRAWINGS & APPENDICES

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

Appendix A: Tree Schedule



C154667-01-01-RevB

Legend

- Tree location and stem diamter
- Category A
- Category B
- Category C
- Current canopy extent
- Root Protection Area
- Indicative tree shadow
- Bloomsbury Conservation Area (approximate boundary)
- Site boundary

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 Survey Plan

Client
The London Borough of Camden

Drawing Number	Revision
C154667-01-01-RevB	Rev B
Scale @ A3	Date
1:1000	June 2021
Approved By	Drawn By
DF	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.