The Beehive Redevelopment

Arboricultural Impact Assessment

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This document has been prepared and checked in accordance with Waterman Group's IMS (BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS EN ISO 45001:2018)

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[redacted] [redacted] [redacted]

Comments

Second – Revised Landscape Masterplan

Third – Revised Landscape Masterplan

Disclaimer

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Executive Summary

The Beehive Centre site (hereafter referred to as the 'Site') located approximately 1 mile east of Cambridge city centre is being considered for redevelopment.

The development proposals (hereafter referred to as the 'Development') are for the for the demolition and redevelopment of the Beehive Centre, including in Outline Application form for the demolition and redevelopment for a new local centre (E (a-f), F1(b-f), F2(b,d)), open space and employment (office and laboratory) floorspace (E(g)(i)(ii) to the ground floor and employment floorspace (office and laboratory) (E(g)(i)(ii) to the upper floors; along with supporting infrastructure, including pedestrian and cycle routes, vehicular access, car and cycle parking, servicing areas, landscaping and utilities.'.

The Site is 7.58ha in area and comprises a mid-sized retail park with mixed uses and associated ground level car park. A tree survey of the Site was undertaken in February 2022 and the results of that tree survey exercise have been used to guide the design process. That tree survey and the recommendations made in this report follow the principles of BS5837:2012 Trees in Relation to Design, Demolition and Construction – Recommendations[1] (BS5837) and relevant Cambridge City Council planning policy.

A total of 119No individual trees, groups of trees and hedgerows were recorded as part of the tree survey. Of these arboricultural features, 3No. were awarded a high A grade, 20No. a moderate B grade and 96No. were awarded a low C grade. No trees were awarded a very low U grade.

At the time of writing this report, the South Cambridgeshire District Council interactive map shows that 10No. of the trees present on the site (T69, T70, T71, T73, T74, T75, T77, T78, T79 and T80) were afforded protection through the provisions of an individual Tree Preservation Order (TPO). None of the site is located within a Conservation area, however the site borders the Mill Road Conservation area on its southwest boundary from where some of the trees within this site are visible. Accordingly, these specimens might be considered to contribute to the character of this conservation area.

The purpose of this Arboricultural Impact Assessment (AIA) is to evaluate the direct and indirect effects of the proposed design on the tree stock present both on and adjacent to the Site. In line with Annex B of BS5837, it also contains sufficient information to be submitted in support of any planning application pertinent to the Site and the design layout shown on Drawing 2.

A total of 60No. trees and a section of 1 group will be removed to facilitate the Development. Of these, 10No. were awarded a moderate B grade and 51No. were awarded a low C grade.

Due to the living nature of trees and other site considerations, this report and any recommendations made within it are valid for a period of 18 months following the Site survey.

[1] BS5837:2012 Trees in relation to design, demolition and construction – Recommendations, 2012, British Standards Institution

1. Introduction

1.1. Waterman Infrastructure & Environment Limited (Waterman) was instructed by the Railway Pension Nominees Limited (hereafter referred to as the 'Applicant') to undertake an Arboricultural survey and Impact Assessment (AIA) of trees on land at the Beehive Shopping Centre ('the Site'). The Site is currently being considered for redevelopment.

1.2. The current development proposals ('the Development') broadly comprise the demolition and redevelopment for a new local centre (E (a-f), F1(b-f), F2(b,d)), open space and employment (office and laboratory) floorspace (E(g)(i)(ii) to the ground floor and employment floorspace (office and laboratory) (E(g)(i)(ii) to the upper floors; along with supporting infrastructure, including pedestrian and cycle routes, vehicular access, car and cycle parking, servicing areas, landscaping and utilities.

1.3. The purpose of this AIA is to evaluate the direct and indirect effects of the proposed design on the tree stock present both on and adjacent to the Site. It includes recommendations for an appropriate level of mitigation and/or compensation where necessary.

1.4. It documents the findings of a baseline survey of the arboricultural features on and immediately adjacent to the Site. The above and below ground constraints posed by the canopy shape and subterranean rooting area of the surveyed trees are described.

1.5. This report should be read in conjunction with the other documents, plans and technical studies submitted to support the proposed development of the Site.

1.6. Trees are a material consideration in the planning process and as such, the information within this report has been aligned where possible with the general policies and development objectives of the relevant planning policies outlined within **Appendix A** and the principles set out in BS5837.

2. Site Description

2.1. The Site, known as the Beehive Centre, is approximately 7.58 hectares (ha) in size and comprises a mid-sized retail park with mixed uses and associated ground level car park.

2.2. The Site is located east of Cambridge city centre, along the west side of the railway line. The Site is accessed via Coldhams Lane which forms the northern site boundary and connects to Newmarket Road, which is a main vehicular route into the city, whilst to the east the road leads to Coldham's Common. The Site is approximately 10 minutes' cycle and 25 minutes' walk from the city centre.

Photograph 1 Looking south towards T84, T85 and T83.

3. Tree Survey Methodology

3.1. A tree survey of the Site was carried out on 14th and 15th February 2022. The tree survey methodology followed the recommendations set out in BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'[2] (BS5837).

3.2. The tree survey was based upon existing topographical information relating to the Site, produced by Greenhatch Group and provided by the Applicant (drawing ref. 35829A_T Rev 2 dated 20/02/2021). For the purposes of this report, it is assumed that the detail of the topographical survey is accurate and correct.

3.3. The survey involved collecting the following information on all trees (both on and off-site) with a stem diameter over 75mm in diameter which have the potential to influence the development proposals.

Tree Numbers

3.4. Individual trees surveyed were given the prefix 'T'. Trees have been grouped where they form cohesive aerodynamic (i.e. companion shelter), visual (i.e. screening) or cultural (i.e. parkland) arboreal features of similar quality, as identified by the prefix 'G'. Hedges and Woodland groups were given the prefixes 'H' and 'W' respectively.

Species

3.5. Species are listed by both their common name and Latin name in the schedule in **Appendix C** and by their common name in the body of the report.

Height

3.6. Tree heights are approximate and estimated in metres.

Stem Diameter

3.7. The stem diameter of single stemmed trees is measured at 1.5m above ground level and given in millimetres. The diameter measurement of multi-stemmed trees is shown as a measurement of each major stem present. Where stems fork or swell, the measurement is taken at the narrowest point below the fork or swelling. Where access to the trunk of a tree is not available, an estimation of the stem diameter is made and identified by '*' on the accompanying tree survey table.

Crown Spread

3.8. Radial crown spread is measured in metres to the nearest 0.5m (rounded up). These are recorded for each of the four cardinal points where access allows. Where access is not available the crown spread is a visual estimate derived from site-based observations and identified by '*' on the accompanying tree survey table. As such, the canopy shape for surveyed trees depicted on the accompanying plans accurately represents the canopy spread as measured on Site.

[2] BS5837:2012 Trees in relation to design, demolition and construction – Recommendations, 2012, British Standards Institution

Height of Crown Clearance and Canopy

3.9. The height of crown clearance is the height above ground in metres of the first significant branch and the direction of growth. The height of canopy is the average height above ground in metres of the main canopy. These are measured to the nearest half metre (rounded up) for dimensions up to 10m and the nearest whole metre for dimensions over 10m.

Age Class

3.10. The age of each tree is defined as follows:

Young (Y):	Within the first 1/4 of useful life expectancy.
Semi-mature (SM):	Within the second 1/4 of useful life expectancy.
Early Mature (EM):	Within the third 1/4 of useful life expectancy.
Mature (M):	Within the fourth 1/4 of useful life expectancy.
Over Mature (OM):	Tree has exceeded normal life expectancy.
Veteran (V)	Tree displaying veteran characteristics [3].

Physiological and Structural Condition

3.11. The physiological or structural condition of each tree, tree group, hedgerow and woodland is described, highlighting specific features. The survey involved ground level examination of the external features of the trees. The structural condition for each tree is described as being Good, Fair or Poor and the physiological condition is described as Good, Fair, Poor, Moribund or Dead.

3.12. Where appropriate, notes on the structural integrity are provided on form, taper, forking habit, storm damage, decay, fungi, pests, etc. Where identified, signs of substantial defects or debility have been recorded. Where access to a tree was not possible, an estimation of physiological and structural condition has been made.

Estimated Remaining Contribution (ERC) in Years

3.13. The Estimated Remaining Contribution (ERC) for each tree is based on species and the existing physiological and structural condition of the tree. The ERC may affect proposed development layout because the longer the tree is likely to live, the greater the contribution it will make and the greater the need for retention.

Category Grading

3.14. Each individual tree was given a Category Grading in accordance with BS5837 to reflect their overall quality and value. Further details of the tree categorisation method can be found in **Appendix B** and Section 7 of this report.

Preliminary Management Recommendations

3.15. Any recommendations made for management of the trees (for example, tree surgery) prior to development are not a 'specification' for tree work. These recommendations are proposed on the basis that they are undertaken by a qualified arboricultural contractor, such as those listed in the

[3] http://www.ancienttreeforum.co.uk/ancient-trees/what-are-ancient-veteran-trees/

Arboricultural Association's Approved Contractors Directory (www.trees.org.uk). Any work undertaken by the contractor should be in accordance with best practice, such as the European Tree Pruning Guide[4], or required by BS3998: 2010 'Tree work – recommendations'[5].

3.16. Where management recommendations are made, they are accompanied by a recommended timeframe in which they should be undertaken.

[4] European Tree Pruning Guide, 2001, Arboricultural Association
[5] BS3998:2010 'Tree work - recommendations', 2010, BSI

4. Root Protection Area

4.1. The Root Protection Area (RPA) of a tree is defined in BS5837 as a "*layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability and where the protection of the roots and soil structure is treated as a priority".* For single stemmed trees it is equivalent to a circle with a radius 12 times the stem diameter when measured at 1.5m above ground level. BS5837 outlines the calculation of RPA as follows:

$$\text{RPA}(\text{m}^2) = \left(\frac{\text{stem diameter (mm) @ 1.5 m} \times 12}{1\ 000}\right)^2 \times$$ [redacted]

4.2. Trees with more than one stem originating below 1.5m above ground level are given an aggregate stem diameter using either of the following two calculations as outlined in BS5837. This diameter is then used in the above calculation to estimate RPA:

a) For trees with two to five stems:

$$\sqrt{(\text{stem diameter 1})^2 + (\text{stem diameter 2})^2 \ldots + (\text{stem diameter 5})^2}$$

b) For trees with more than five stems:

$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

4.3. The RPA of existing tree stock is an important material consideration when considering site constraints and planning development activities.

4.4. Unless there is an overriding justification for them, construction activities, materials storage or changes in level should be avoided within the RPA of a retained tree. This is because these operations have the potential to damage or kill the tree, the safe retention of which may be a condition of planning permission. If operations are proposed within the RPA of a retained tree, it may be necessary to prove to the relevant Local Planning Authority that:

All other alternative solutions have been explored and proven unviable;

That the tree can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with its RPA;

That mitigation measures can be put in place to improve the soil environment that is used by the tree (if necessary).

5. Limitations

5.1. This report is intended to assist with the planning and management of construction, refurbishment and/or demolition operations under current best practice guidance. It focuses on measures which will need to be implemented to ensure the protection of retained trees. It is the responsibility of the design team and site manager to ensure that any recommendations made also comply with all relevant health, safety and construction guidance and legislation.

5.2. This report is concerned with the arboricultural features of the Site only. Ground condition/history information has not been consulted as part of this assessment (such as history of ground disturbance, root damage, changes in soil levels, previous utility installations or changes in site conditions) unless otherwise stated.

5.3. All trees were visually inspected from ground level with no climbing, boring or core sampling undertaken. All measurements are metric and approximate. The comments made are based on observable factors present at the time of inspection.

5.4. Trees that were not directly accessible at the time of survey have been highlighted in the comments section within **Appendix C**.

5.5. The tree survey was based upon existing topographical information relating to the Site, produced by Greenhatch Group and provided by the Applicant (drawing ref. 35829A_T Rev 2 dated 20/02/2021). For the purposes of this report, it is assumed that the detail of the topographical survey is accurate and correct.

5.6. The design and construction of foundations on Site should be informed by appropriate soil sampling and laboratory testing in accordance with Chapter 4.2 of 'Building Near Trees' of the National House Building Council's Standards 2019. This report does not specifically relate to risks associated with subsidence, heave or other forms of disturbance associated with tree root growth or tree removal.

5.7. This report is not intended to confirm the safety (or otherwise) of surveyed trees or tree groups. References to defects or potential safety issues are not exhaustive and are intended as a guide only to inform the provision of further resources / more detailed investigations. The persons(s) responsible for the management of trees surveyed as part of this report are recommended to commission a separate Tree Condition Survey by a suitably qualified and experienced person in order to manage the health and safety aspects of trees under their control and discharge their reasonable 'Duty of Care' owed under the Occupiers' Liability Act 1984[6].

5.8. Owing to the changing nature of trees as living, dynamic features and other Site circumstances, the baseline survey results are representative of the arboricultural features on the date of survey only and are subject to change. The impact assessment is based on development proposals as provided to Waterman IE and contained in **Drawing 3**. Any alteration to the application Site or development proposals could change the current circumstances and may invalidate this report and any recommendations made.

Unless otherwise stated, trees should be inspected regularly to satisfy the 'Duty of Care' owed under the Occupiers' Liability Act 1984[7], or directly after heavy storms (i.e. force 6-7 and above on the Beaufort scale). It is recommended that advice from an ecologist is sought prior to carrying out

[6] Occupiers' Liability Act 1957 and 1984. HMSO
[7] Occupiers' Liability Acts 1957 and 1984. HMSO

any works to trees, in order to ensure these are carried out in accordance with (in particular) the protection afforded to wild birds and bats under The Wildlife and Countryside Act[8] and The Conservation of Habitats and Species Regulations[9].

[8] The Wildlife and Countryside Act 1981 (as amended), OPSI
[9] The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, OPSI

6. Tree Preservation Orders and Conservation Areas

6.1. Under Part VII of the *Town and Country Planning Act 1990* and as amended in the *Town and Country Planning (Tree Preservation) (England) Regulations 2012*, local planning authorities are given the powers to protect trees, groups of trees and woodlands through the provisions of a Tree Preservation Order (TPO). TPOs prohibit:

cutting down;

topping;

lopping;

uprooting;

wilful damage; and

wilful destruction

without the local planning authority's written consent.

6.2. All trees with a stem diameter above 75mm in diameter when measured at 1.5m above ground level are also afforded protection if they are located within a Conservation Area.

6.3. At the time of writing this report, the South Cambridgeshire District Council interactive map shows that 10No. of the trees present on the site (T69, T70, T71, T73, T74, T75, T77, T78, T79 and T80) were afforded protection through the provisions of an individual Tree Preservation Order (TPO). None of the site is located within a Conservation area, however the site borders the Mill Road Conservation area on its southwest boundary from where some of the trees within this site are visible. Accordingly, these specimens might be considered to contribute to the character of this conservation area.

6.4. Further details on TPOs and Conservation Areas can be found in **Appendix A.**

7. Existing Tree Stock

7.1. The majority of the trees are growing in rows within the car parking area and mainly consist of young or semi-mature specimens that have been managed through crown reductions and crown lifting previously. The main species in these areas are London plane, silver maple, cherry and Norway maple.

7.2. In addition to the car park trees, there are trees growing within areas of soft ground as well as boundary planting.

Photograph 2 London plane trees (T77-T79) growing adjacent to the shopping centre access road

7.3. Further details relating to the existing tree stock on or adjacent to the Site can be found in **Appendix B** and on **Drawing 1**.

Quality Category Grading

7.4. Each arboricultural feature was given a Category Grading in accordance with the principles of BS5837. The Category Gradings are defined according to the following criteria, which are further divided into sub-categories based on arboriculture, landscape and/or historic/cultural value, as defined within BS5837 and contained at **Appendix B**. Table 1 summarises the arboricultural features by category.

- **Category Grading A:** Trees of high quality and value (with an estimated remaining life expectancy of at least 40 years) (coloured green on **Drawing 1**).
- **Category Grading B:** Trees of moderate quality and value (with an estimated remaining life expectancy of at least 20 years) (coloured blue on **Drawing 1**).
- **Category Grading C:** Trees of low quality and value (with an estimated remaining life expectancy of at least 10 years or young trees with a stem diameter less than 150mm) (coloured grey on **Drawing 1**).

Category Grading U: Trees which are 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 (coloured red on **Drawings 1**).

Table 1 Summary of tree features by category

	Tree Numbers & BS5837 Categories				
	Cat A	**Cat B**	**Cat C**	**Cat U**	**Total**
Trees	T69, T70, T71	T15, T16, T17, T18, T19, T39, T40, T41, T43, T44, T45, T77, T78, T79, T80, T81, T82, T83, T96, T98	T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T20, T21, T22, T23, T24, T25, T26, T27, T28, T29, T30, T31, T32, T33, T34, T35, T36, T37, T38, T42, T46, T47, T48, T49, T50, T51, T52, T53, T54, T55, T56, T57, T58, T59, T60, T61, T62, T63, T64, T65, T66, T67, T68, T72, T73, T74, T75, T76, T84, T85, T86, T87, T88, T89, T90, T91, T92, T93, T94, T95, T97, T99, T100, T101, T102, T103, T104, T105, T106, T107, T108, T109, T110, T111, T112, T113	N/A	**113**
Groups	N/A	N/A	G1, G2, G3, G4, G5, G6	N/A	**6**
Total	**3**	**20**	**96**	**0**	**119**

8. Arboricultural Impact Assessment

8.1. The Development proposals as shown on the Tree Protection and Removal Plan (TPRP) which is contained as **Drawing 2** comprise the demolition and redevelopment of the Beehive Centre, including in Outline Application form for the demolition and redevelopment for a new local centre (E (a-f), F1(b-f), F2(b,d)), open space and employment (office and laboratory) floorspace (E(g)(i)(ii) to the ground floor and employment floorspace (office and laboratory) (E(g)(i)(ii) to the upper floors; along with supporting infrastructure, including pedestrian and cycle routes, vehicular access, car and cycle parking, servicing areas, landscaping and utilities.

8.2. The proposed layout shown on **Drawing 2** was taken from the Landscape Masterplan (Drawing ref. 7775) which is contained as **Drawing 3**.

8.3. The relationship between the proposed Development and the existing tree stock has been assessed taking into account existing site-specific factors such as topography, waterbodies and existing built form.

8.4. **Table 2** identifies the impact of the proposed layout on those trees under the following headings**:**

i. **Trees to be removed**: Trees will need to be removed if they are directly under proposed structures; if they are so close to proposed works that the impact of the works on the roots or crowns of the tree will render the retention of the tree unviable; if they create an unacceptable constraint on occupants of the site post construction (shading, nuisance etc.); for reasons of sound arboricultural management;

ii. **Trees to be retained but requiring additional protection**: Trees fall into this category where the assessment has identified that they can be retained, but additional protection measures may be required to ensure their continued health and structural integrity. This is usually where works are proposed within their RPA or below their crowns; and

iii. **Trees unaffected by the development proposals**: These are trees which are unaffected by the works and can therefore safely be retained. These trees are still likely to require protection through the placement of Tree Protection Barriers.

8.5. **Table 3** summarises the cause of potential harm along with any mitigation measures for those trees which require additional protection. Where specific construction measures are prescribed, these are detailed in Section11 of this report.

Table 2 Arboricultural Impact Assessment

	Tree Numbers				
	Cat A	Cat B	Cat C	Cat U	Total
Trees unaffected by the development proposals	T71	T80, T81, T82, T96, T98	T73, T74, T75, T76, T85, T86, T87, T88, T89, T90, T91, T92, T93, T94, T95, T97, T107, T108, T109, T110, T111, T112, T113, G1, G2, G3, G4, G6	N/A	34
Trees to be retained but requiring additional protection	T69, T70	T39. T40, T41, T79,	T12, T13, T14, T29, T31, T38, T42, T46, T50, T68, T83, T84, T99, T100, T101, T102, T103, T104,	N/A	24
Trees to be removed		T15, T16, T17, T18, T19, T43, T44, T45, T77, T78	T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T20, T21, T22, T23, T24, T25, T26, T27, T28, T30, T32, T33, T34, T35, T36, T37, T47, T48, T49, T51, T52, T53, T54, T55, T56, T57, T58, T59, T60, T61, T62, T63, T64, T65, T66, T67,T72, T105, T106, G5 (in part)	N/A	61
				Total	**119**

Table 3: Summary of Potential Damage to Retained Trees and Mitigation Measures (further details provided in section 11).

Tree Number	Species	Cause of Damage	Mitigation
T12, T13, T14	Silver maple x 3	Replacement of hard surfaces within RPA	Existing hard surface to be removed using hand tools, and where possible, sub-base retained. New surface to be laid on top of existing subbase. If sub-base needs to be replaced this will be done using hand tools only.

Tree Number	Species	Cause of Damage	Mitigation
T29, T31	Norway maple x2	Replacement of hard surfaces within RPA	Existing hard surface to be removed using hand tools, and where possible, sub-base retained. New surface to be laid on top of existing subbase. If sub-base needs to be replaced this will be done using hand tools only.
T38, T42	Silver maple x 2	Replacement of hard surfaces within RPA	Existing hard surface to be removed using hand tools, and where possible, sub-base retained. New surface to be laid on top of existing subbase. If sub-base needs to be replaced this will be done using hand tools only.
T39, T40, T41	Silver maple x 3	Replacement of hard surfaces within RPA Incursion of proposed building into RPA of trees T39 and T41. Conflict between proposed building and branches	Existing hard surface to be removed using hand tools, and where possible, sub-base retained. New surface to be laid on top of existing subbase. If sub-base needs to be replaced this will be done using hand tools only. Incursion of building into RPA is minor and is not considered to be detrimental to the health of the tree as it is an area currently laid to hard surfacing. Trees to be pollarded back to old pruning points.
T46, T50	Raywood ash	Replacement of hard surfaces within RPA Minor conflict between proposed building and branches	Existing hard surface to be removed using hand tools, and where possible, sub-base retained. New surface to be laid on top of existing subbase. If sub-base needs to be replaced this will be done using hand tools only. Minor pruning of tree canopy away from the building.
T68	Norway Maple	Removal of hard surfaces within RPA	Hard surfaces to be removed using hand tools and taking care to avoid damaging the soil below.
T69	London Plane	Removal of substation within RPA. Removal of existing hard surface from within RPA	Substation to be demolished from within its own footprint, or from areas outside of the protective fencing as shown on Drawing 2. Foundations to be removed taking care to avoid disturbing the soil below. Hard surfaces to be removed using hand tools and taking care to avoid damaging the soil below.

Tree Number	Species	Cause of Damage	Mitigation
T70	London Plane	Replacement of hard surface within RPA	Existing hard surface to be removed using hand tools, and where possible, sub-base retained. New surface to be laid on top of existing subbase. If sub-base needs to be replaced this will be done using hand tools only.
T79	London plane	Existing hard surface to be removed from within RPA New hard surface within RPA	Existing hard surface to be removed using hand tools, and where possible, sub-base retained. New surface to be laid on top of existing subbase. If sub-base needs to be replaced this will be done using hand tools only. New hard surface within RPA on currently unprotected ground to be installed above existing ground levels and avoiding compaction of soil below.
T83	London plane	Existing hard surface to be removed from within RPA Conflict between proposed landscape excavation works.	Hard surfaces to be removed using hand tools and taking care to avoid damaging the soil below. Hand tools used for the excavation within the RPA, root severance and presence assessed during excavation; retain any root >25mm in diameter, if not possible consult Scheme arboriculturist.
T84, T85	Silver birch x2	Replacement of hard surface within RPA	Existing hard surface to be removed using hand tools, and where possible, sub-base retained. New surface to be laid on top of existing subbase. If sub-base needs to be replaced this will be done using hand tools only.
T87, T88, T90, T91	Cherries	Widening of footpath into RPAs	Minor widening of footpath into RPAs requiring minimal excavations with impact on trees considered to be low. No special construction methodologies to be followed.
T92	Wild cherry	Existing hard surface to be removed from within RPA	Hard surfaces to be removed using hand tools and taking care to avoid damaging the soil below.
T99 to T103	Ash and goat willow	Existing hard surface to be removed from within RPA	Hard surfaces to be removed using hand tools and taking care to avoid damaging the soil below.

9. Proposed Tree Planting

9.1. The majority of the arboricultural features proposed for removal have been categorised as low C grade trees due to poor past management or the reduced vigour as a result of growing in a

9.2. To mitigate for the loss of these trees detailed planting landscape proposals have been developed and these are contained as **Drawing 3**. These proposals include the planting of approximately 212No. new Standard trees across the Site.

9.3. As the majority of the trees being removed are low C trees, the new tree planting provides the opportunity to ensure the long-term value of the tree stock on the Site through improvements in tree quality, species diversity and planting environment.

10. Proposed Tree Works

10.1. **Table 1** provides details of all trees and tree groups which will be removed to facilitate the Development.

10.2. **Table 2** provides details of any trees which will require pruning to facilitate the development

10.3. These tree works will not be undertaken until a full planning approval has been granted for the proposed Development and they will be undertaken by a suitably qualified, experienced and insured tree works contactor with the works compliant with best practice, such as the European Tree Pruning Guide[10], or required by BS3998: 2010 'Tree Work – Recommendations'[11].

10.4. Tree work will be timed to avoid the bird nesting season and other potential ecological constraints with legally protected species, subject to consultation with an ecologist. If required, tree surgery work on trees with deadwood, cavities, split/lifted bark and dense ivy should be carried out under an Ecological Watching Brief. Care will be taken not to damage any surrounding vegetation to be retained.

[10] European Tree Pruning Guide, 2001, Arboricultural Association
[11] BS3998:2010 'Treework - Recommendations', 2010, BSI

11. Tree Protection Measures

Site Monitoring

11.1. A retained Arboricultural Consultant will be appointed prior to the commencement of any works on Site. Their purpose will be to ensure compliance with all agreed tree protection measures. As a minimum, a pre-commencement site meeting should be held with a representative of the appointed contractor(s), the retained Arboricultural Consultant and a representative of Cambridge City Council. The purpose of this meeting will be to agree the location and design of any tree protection barriers, as well as to agree the need for / frequency of any on-going arboricultural clerk-of-works visits.

Arboricultural Method Statement

11.2. An Arboricultural Method Statement (AMS) will be produced prior to commencement of any development on site. The AMS will provide further details of any tree protection measures which are required to ensure that the retained trees are adequately protected throughout the demolition and construction phases of the Development.

11.3. The AMS will provide further details in relation to the points made below.

Construction Exclusion Zone

11.4. Trees are to be retained in proximity to construction work, and therefore tree protection will be required to mitigate for potential above and below ground impacts and ensure these trees are retained successfully. The factors which most commonly result in below ground damage affecting oxygen diffusion (and therefore must be avoided) include:

Compaction of the ground;

Any change in soil levels (even if temporary), including ground excavation and soil stripping;

Covering the root zone with impervious surfaces;

Changes in the water table level or ground saturation; and

Damage by the direct toxicity of phytotoxic materials, dust and runoff.

11.5. A **Construction Exclusion Zone (CEZ**) will be established around the retained trees where no unauthorised access or construction operations (including Site compounds / facilities / storage of materials) are permitted to protect the ground from compaction or excavation and canopies from physical damage. This will be secured by means of temporary protective fencing with weatherproof signage.

11.6. Following the principles set out in section 6.2.2 of BS5837, these barriers should be "*fit for the purpose of excluding construction activity and appropriate to the degree and proximity of the work taking place around the retained trees*". In this instance, is proposed that the CEZ will be secured using 2 m tall welded mesh panels on rubber or concrete feet. The fence panels will be joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence. The panels will be supported on the inner side by stabilizer struts, which will be attached to a base plate secured with ground pins. Where space is limited, tree protection boxes may be used as an alternative. An example of both types of protection are contained in **Appendix D.**

11.7. All weather notices should be secured to the barrier, examples of which are contained in **Appendix E**.

11.8. The indicative locations of the temporary protective fencing are shown on **Drawing 2,** although these may be updated in any future AMS and through the pre-commencement site meeting.

Removal / Replacement of Existing Hard Surfaces.

11.9. It will be necessary to remove or replace some of the existing hard surfaces where they are within the RPAs of trees. To ensure this is done in such a way that the trees are not damaged the following precautions will be followed.

Within the RPAs, the existing wearing courses will be removed using hand tools or pedestrian operated breakers only;

If the sub-base needs to be removed within the RPAs, this will again be removed using hand tools and pedestrian operated plant only. There is the potential for roots to be present in the sub-base and care will be taken to retain any root above 25mm in diameter. Care will also be taken to avoid disturbing the soil below the sub-base.

The existing surfaces and sub-bases will be removed in a rolling operation working backwards through the RPAs with all operatives and equipment working from the existing surfaces;

Where the surfaces are to the replaced, they will ideally utilise the existing sub-base. Where new sub-bases are required, they will not extend deeper than the depth of the existing sub-base;

The new surfaces will be constructed with a porous finish to allow for moisture and air movement into the area occupied by the tree roots;

The new surfaces will be installed in a forward rolling direction to ensure that all plant and operatives work from the new surfaces.

Demolition of Structures

11.10. Existing structures will be demolished within and adjacent to retained trees and replaced with areas of hard surfacing and soft landscaping. Precautions will need to be followed to ensure that this is done in such a way that the roots and canopies are not damaged.

11.11. The structures will be demolished using a 'Top Down – Pull Back' methodology, whereby they are pulled away from the existing tree into their own footprint.

11.12. Where possible, plant will operate from outside the canopies of the tree. Where this is not possible all works will be undertaken under the supervision of a Banksman to ensure that the canopies of the trees are protected.

11.13. Where foundations and floor slabs need to be removed from within the RPA of the trees, these will be broken up using vehicle or pedestrian mounted breakers. The spoil can then be removed using mechanical plant, but under the supervision of the retained arboricultural consultant to ensure that the surrounding soil within the RPAs is not disturbed. At the discretion of the retained arboricultural consultant, and where necessary, smaller plant or hand tools will be used to ensure that the roots are protected.

Soft Landscaping Within RPAs

11.14. New soft landscaping is proposed within the RPA of some retained trees once the existing hard surface and structures have been removed. This will be achieved by importing topsoil to provide suitable growing medium for the new planting. As this will be in areas currently under hard surfaces

and structures, it is considered that this will be a considerable improvement on the existing growing conditions for the trees.

11.15. Should the retained 'soil' require breaking up prior to the installation of the new topsoil, this will be undertaken using hand tools or pedestrian operated plant taking care to avoid damaging roots over 25mm in diameter.

11.16. New soil levels will not result in the levels immediately around the base of the trees being raised

Utility Connections

11.17. At the time of writing this report, the locations of proposed any service runs are not known. If for any reason services are required to be located within the RPAs of the retained trees, the following precautions will be followed:

Mechanical trenching will not be permitted within the RPA.

To limit the extent of any excavations, and where possible, any services will be located within shared ducts.

The preference will be to install the services using trenchless technology, but where this isn't viable, the trenches will be dug using hand tools and under the supervision of the retained arboricultural consultant. Roots over 25mm in diameter will be retained. Where this is not possible, they will only be severed if approved by the retained arboricultural consultant.

Any trenches within RPAs will be backfilled using the native material or another inert granular material.

DRAWINGS

Drawing 1: Arboricultural Constraints Plan (Drawing ref. 17469-100-WIE-ZZ-XX-DR-V-77-001 and 002)

This drawing should not be scaled. Dimensions to be verified on site.
Any discrepancies should be referred to the Engineer prior to work being put in hand.

GENERAL NOTES

- CATEGORY GRADE A — Trees of high quality
- CATEGORY GRADE B — Trees of moderate quality
- CATEGORY GRADE C — Trees of low quality
- CATEGORY GRADE U — Trees unsuitable for retention
- ROOT PROTECTION AREAS (RPA)

NOTES:

ROOT PROTECTION AREA
Root Protection Areas are calculated in accordance with BS5837: 2012. The precise morphology and disposition of roots may not be fully reflected by these areas, particularly where there are hard standings, however they provide a good indication of potential root constraint.

Status		Date	Description	By	Chk
P01	S0	17.02.22	PRELIMINARY ISSUE	MC	RH

Amendments

Project
PROJECT OTTER, BEEHIVE CENTRE, CAMBRIDGE

Title
ARBORICULTURAL CONSTRAINTS PLAN (SHEET 1 OF 2)

Client
Railpen

Pickfords Wharf Clink Street London SE1 9DG
t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Status
PRELIMINARY

Designed By	Director	Waterman Ref
RH	RH	WIE17469-100
Drawn By: MC	Date: FEBRUARY 2022	Scales @ A1: 1:500

Project - Originator - Volume - Level - Type - Role - Number	Revision
17469-100-WIE-ZZ-XX-DR-V-77-001	P01

File Path

A1-Wat-BS-S

1:500 0 10m 20m 30m 40m 50m

1:1 0 10 20 30 40 50 60 70 80 90 100

GENERAL NOTES

CATEGORY GRADE A
Trees of high quality

CATEGORY GRADE B
Trees of moderate quality

CATEGORY GRADE C
Trees of low quality

CATEGORY GRADE U
Trees unsuitable for retention

ROOT PROTECTION AREAS (RPA)

NOTES:

ROOT PROTECTION AREA
Root Protection Areas are calculated in accordance with BS5837: 2012. The precise morphology and disposition of roots may not be fully reflected by these areas, particularly where there are hard standings, however they provide a good indication of potential root constraint.

Status	Date	Description	By	Chk
P01 S0	17.02.22	PRELIMINARY ISSUE	MC	RH

Amendments

Project
PROJECT OTTER, BEEHIVE CENTRE, CAMBRIDGE

Title
ARBORICULTURAL CONSTRAINTS PLAN (SHEET 2 OF 2)

Client
Railpen

Pickfords Wharf Clink Street London SE1 9DG
t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Status
PRELIMINARY

Designed By	Director	Waterman Ref
RH	RH	WIE17469-100
Drawn By	Date	Scales @ A1
MC	FEBRUARY 2022	1:500

Project - Originator - Volume - Level - Type - Role - Number	Revision
17469-100-WIE-ZZ-XX-DR-V-77-002	P01

File Path N:\Projects\WIE17469\100\7_CAD\77\

A1-Wat-BS-S

Drawing 2: Tree Protection and Removal Plan (Drawing ref. 17469-100-WIE-ZZ-XX-DR-V-77-003 and 004)

TPO

TPO

TPO

Pickfords Wharf, Clink Street, London SE1 9DG t 020 7928 7888 f 03333 444 501

GENERAL NOTES

LEGEND

- TREES TO BE RETAINED
- TREES TO BE REMOVED
- TREE PROTECTION FENCING
- ROOT PROTECTION AREA (RPA)
- PRECAUTIONARY CONSTRUCTION

NOTES:

ROOT PROTECTION AREA
Root Protection Areas are calculated in accordance with BS5837: 2012. The precise morphology and disposition of roots may not be fully reflected by these areas, particularly where there are hard standings, however they provide a good indication of potential root constraint.

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH WATERMAN TREE SURVEY REPORT

P02	S0	14.08.24	UPDATED LAYOUT, T72 UPDATED	DC	RH
P01	S0	03.07.23	PRELIMINARY ISSUE	MC	RH
Status		Date	Description	By	Chk

Amendments

Project

PROJECT OTTER, BEEHIVE CENTRE, CAMBRIDGE

Title

TREE PROTECTION REMOVAL
(SHEET 1 OF 2)

Client

Railpen

Pickfords Wharf Clink Street London SE1 9DG
t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Status

PRELIMINARY

Designed By: RH	Director: RH	Waterman Ref: WIE17469-100
Drawn By: MC	Date: AUGUST 2024	Scales @ A1: 1:500

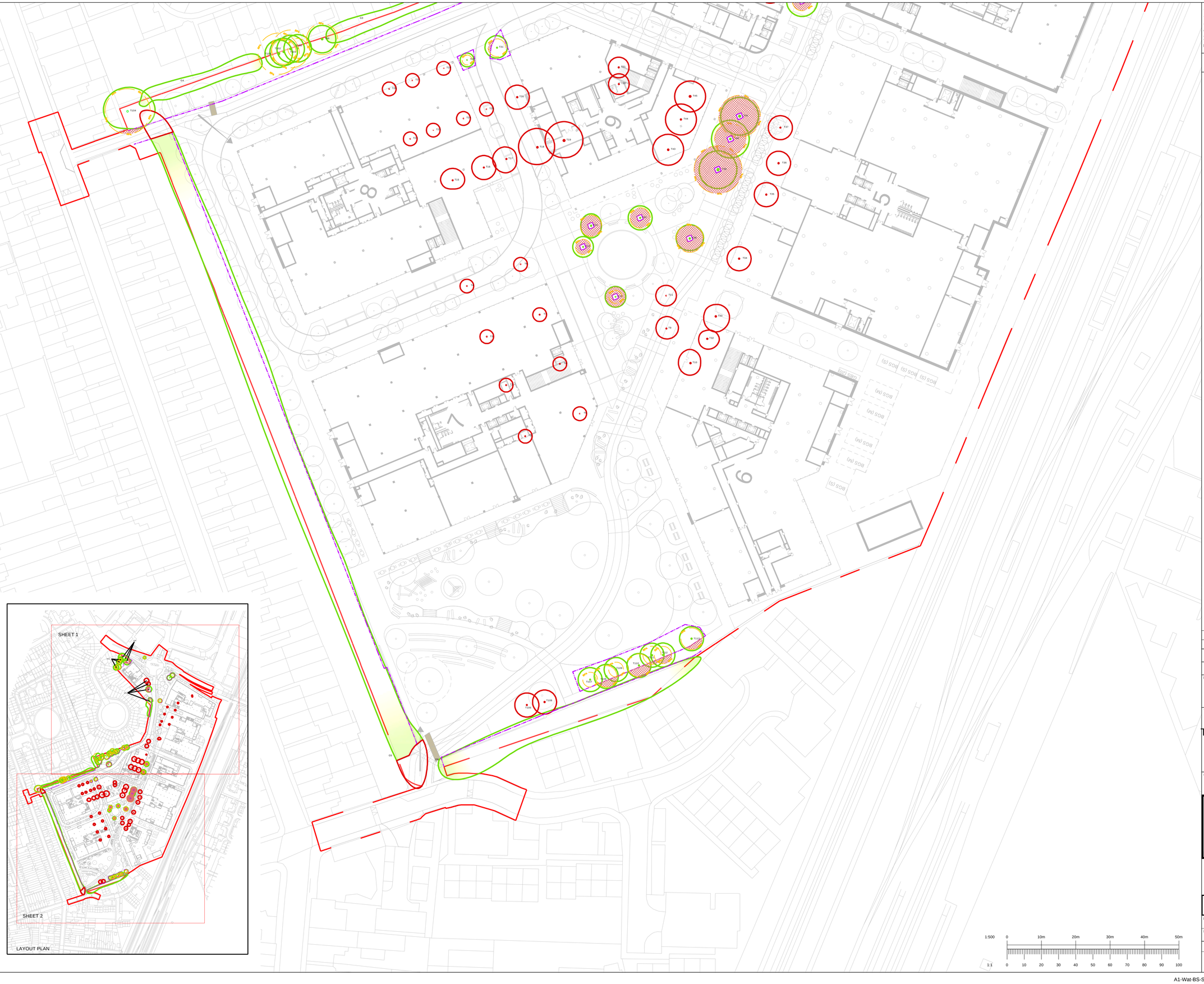
Project - Originator - Volume - Level - Type - Role - Number

17469-100-WIE-ZZ-XX-DR-V-77-003

Revision: P02

1:500 0 10m 20m 30m 40m 50m
1:1 0 10 20 30 40 50 60 70 80 90 100

File Path: I:\17469\...\A1-Wat-BS-S, WIE17469-100_SA_77_Masterplan, WIE17469-100_SA_77_Tree_Protection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Drawing 3: Landscape Masterplan (Drawing ref. PO-LDAD-ZZ-GF-DR-L-000101)

Z:\7775_PROJECT_OTTER\CAD\DRAWINGS\SHEETS\STAGE 2 RESUBMISSION\CAD\PO-LDAD-ZZ-GF-DR-L-000101.DWG

LEGEND

LOCATION PLAN SCALE 1:10,000

SITE BOUNDARY

REV.	DESCRIPTION	APP.	DATE
P01.	ISSUED FOR DESIGN FREEZE	CI	05/07/2024

LDĀDESIGN

PROJECT TITLE

PROJECT OTTER

DRAWING TITLE

LANDSCAPE ILLUSTRATIVE COLOUR PLAN

ISSUED BY	London	T: 020 7467 1470	
DATE	Jul' 24	DRAWN	HF
SCALE@A2	1:1,250	CHECKED	LS
STATUS	Planning	APPROVED	CI

DWG. NO **PO-LDAD-ZZ-GF-DR-L-000101**

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources Ordnance Survey

APPENDICES

A. Relevant Planning Policy and Legislation

National Planning Policy

The National Planning Policy Framework (NPPF 2023)[1] sets out the government's planning policies for England and how these are expected to be applied. Under the NPPF, Local Planning Authorities (LPAs, including borough, district or unitary councils or nation park authorities), have a statutory duty to consider the protection and planting of trees when granting planning permission for a proposed development. The potential effect of a development on trees, whether statutorily protected or not (see below), is a material consideration within a planning application. The following paragraphs are of relevance to trees;

Paragraph136: Trees make an important contribution to the character and quality of urban environments and can also help mitigate and adapt to climate change. Planning policies and decisions should ensure that new streets are tree-lined, that opportunities are taken to incorporate trees elsewhere in developments (such as parks and community orchards), that appropriate measures are in place to secure the long-term maintenance of newly-planted trees, and that existing trees are retained wherever possible. Applicants and local planning authorities should work with highways officers and tree officers to ensure that the right trees are planted in the right places, and solutions are found that are compatible with highways standards and the needs of different users.

Paragraph 186: When determining planning applications, local planning authorities should apply the following principles;

(a) If significant harm resulting from a development cannot be avoided (through locating on an alternative Site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.

(b) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons, and a suitable compensation strategy exists.

Local Planning Policy

Cambridge City Council's Local Plan October 2018, sets out the way that they will meet the development needs of Cambridge to 2031. Over that time the city has plans to grow significantly; supporting the nationally important economic contribution the city makes and the factors that are inseparable from that success, seen in the exceptional quality of life and place that Cambridge benefits from. This local plan will manage change in a positive and sympathetic way. It delivers a vision for growth that will secure the priorities for Cambridge. The policies of the plan set out how we will meet the important development needs that must be accommodated, but also how we intend to protect this special city's outstanding heritage and environmental assets. The plan will deliver new homes and jobs in a sustainable way, providing affordable housing and an accessible, compact city form where people can have sustainable choices about how they access work, study, leisure and other services.

[1] https://www.gov.uk/guidance/national-planning-policy-framework

Policy 71 states:

Development will not be permitted which involves felling, significant surgery (either now or in the foreseeable future) and potential root damage to trees of amenity or other value, unless there are demonstrable public benefits accruing from the proposal which clearly outweigh the current and future amenity value of the trees.

Development proposals should:

a. preserve, protect and enhance existing trees and hedges that have amenity value as perceived from the public realm;

b. Section Seven: Protecting and enhancing the character of Cambridge Cambridge Local Plan 2018 206 b. provide appropriate replacement planting, where felling is proved necessary; and

c. provide sufficient space for trees and other vegetation to mature. Particular consideration should be given to veteran or ancient trees, as defined by Natural England, in order to preserve their historic, ecological and amenity value.

Tree Preservation Orders (TPOs)

TPOs are administered by Local Planning Authorities (LPA) and are made to protect trees which bring significant amenity benefit to the local area. All types of tree, tree species and sizes can be protected and a TPO can protect a single tree, tree groups, all trees within a defined area (Area TPO) or a woodland (Woodland TPO).

A TPO is a written order which makes it a criminal offence without the Authority's permission (liable to an unlimited fine) to;

Cut down, top, lop, uproot, wilfully damage or wilfully destroy a tree protected by that order; or

Cause or permit such actions.

In the Secretary of State's view, cutting roots is also a prohibited activity which requires the authority's consent. Applications to carry out works to trees covered by TPOs need to be submitted to the LPA for approval, via forms which can be found on the Planning Portal, however LPA consent is not required for carrying out work on trees subject to a TPO so far as such work is necessary to implement a full planning permission. Where full planning permission has been granted showing the loss of (or work to) TPO trees is required to implement the permitted scheme, the Order is overwritten.

Conservation Areas (CA)

Normal TPO procedures apply if a tree within a CA is protected by a TPO. If a tree within a CA is not protected by a TPO and is above 75mm in trunk diameter when measured at 1.5m height, written notice must be given to the LPA for any proposed work, describing what work is proposed, at least six weeks before the proposed work date. This is called a 'section 211 notice' which gives the LPA an opportunity to consider whether the tree should be subject to a TPO.

Felling Licences

To fell trees, a felling licence from the Forestry Commission is required. It is an offence to fell trees, including in advance of a planning application, without a licence if an exemption does not apply. Exemptions include;

locations (gardens, orchards, churchyards or designated open spaces);

type of tree work (lopping, topping, pruning and pollarding);

volume and diameter of trees to be felled (less than 5 cubic meters in one calendar quarter, trees of a girth at 1.3m height of less than 80mm, 100mm if thinning and 150mm if coppicing);

other permissions (such as having planning permission granted); and

statutory/legal requirements (there is a real or immediate threat of danger or abatement of nuisance, to prevent the spread of a pest/disease, to comply with an Act of Parliament or undertake your duties as a statutory service provider (gas, water, electric).

B. Cascade Chart for Tree Quality Assessment (extract from BS5837)

TREES FOR REMOVAL				
Category and Definition	**Criteria**			**Identification on Drawing / Within Tree Schedule**
Category U Those 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	Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category trees (i.e. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning); Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline; and Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality. NOTE: Category U trees can have existing or potential conservation value which it might be desirable to preserve.			DARK RED
TREES TO BE CONSIDERED FOR RETENTION				
Category and Definition	**Criteria - Subcategories**			**Identification on Drawing / Within Tree Schedule**
	1 Mainly Arboricultural Values	2 Mainly Landscape Values	3 Mainly Cultural Values, including Conservation	
Category A **Trees of high quality** with an estimated remaining life expectancy minimum of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	LIGHT GREEN
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	MID BLUE
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	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	GREY

C. Schedule of Existing Trees

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
T1-8	Crab apple	#T1 6m #T2 6.5m #T3 5m #T4 5m #T5 4.5m #T6 6m #T7 7m #T8 5m	#T1 210mm #T2 200mm #T3 170mm #T4 150mm #T5 105mm #T6 200mm #T7 205mm #T8 120mm	N2m E2m S2m W2m	2m	1.5m	Y	Fair	Fair	Low	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	C (12)	2.5m 2.4m 2.0m 1.8m 1.3m 2.4m 2.5m 1.4m	20.0m² 18.1m² 13.1m² 10.2m² 5.0m² 18.1m² 19.0m² 6.5m²
T9	Silver maple	8.5m	240mm	N3.5m E3.5m S3m W3m	1.5m	2m W	Y	Good	Fair	Low	40+	Growing in area of soft ground within shopping centre car park; previously crown lifted; previous heavy crown reduction.	C (12)	2.9m	26.1m²
T10	Silver maple	9m	330mm	N4m E3m S3.5m W3.5m	2m	2m SE	SM	Good	Fair	Low	40+	Growing within soft ground area within shopping centre car parking area; previously crown lifted; previous heavy crown reduction.	C (12)	4.0m	49.3m²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
T11-13	Silver maple	#T11 4.5m #T12 6m #T13 5.5m	#T11 125mm #T12 160mm #T13 185mm	3m	1.5m	1.5m E	Y	Good	Fair	Low	40+	Growing within shopping centre car park; young trees; previously crown lifted; previous crown reduction.	C (12)	1.5m 1.9m 2.2m	7.1m² 11.6m² 15.5m²
T14	Silver maple	8m	260mm	N3.5m E3m S3.5m W3m	1.5m	2m E	Y	Good	Fair	Low	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	C (12)	3.1m	30.6m²
T15	London plane	10m	230mm	N3.5m E3.5m S2.5m W3.5m	2.5m	2.5m S	SM	Good	Fair	Moderate	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	B (12)	2.8m	23.9m²
T16	London plane	9.5m	230mm	N3.5m E3.5m S3.5m W3.5m	2m	2m SE	SM	Good	Fair	Moderate	40+	Growing within shopping centre car park; previously crown lifted; previous crown reduction.	B (12)	2.8m	23.9m²
T17	London plane	10m	240mm	N3.5m E3m S4m W4m	2m	2m NE	SM	Good	Fair	Moderate	40+	Growing within shopping centre car park; previous heavy crown reduction; previously crown lifted.	B (12)	2.9m	26.1m²
T18	London plane	13.5m	375mm	N5.5m E5m S5m W5.5m	2m	2m NW	SM	Good	Fair	Moderate	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	B (12)	4.5m	63.6m²
T19	London plane	12m	470mm	N5.5m E5.5m S5m W5.5m	1.5m	2m SE	EM	Good	Fair	Moderate	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	B (12)	5.6m	99.9m²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
T20-21	London plane	#T20 9m #T21 9m	#T20 220mm @1m #T21 220mm	3m	2m	2m	Y	Good	Fair	Low	40+	Growing within shopping centre car park; previously crown lifted; previous crown reduction.	C (12)	2.6m 2.6m	21.9m² 21.9m²
T22-29	#22 Norway maple	#T22 4.5m #T23 3.5m #T24 5m #T25 4.5m #T26 5m #T27 3m #T28 4m #T29 5m	#T22 100mm #T23 75mm #T24 100mm #T25 110mm #T26 95mm #T27 70mm #T28 75mm #T29 120mm	2m	2m	2m	Y	Fair	Fair	Low	40+	Growing within shopping centre car park; young small trees.	C (12)	1.2m 0.9m 1.2m 1.3m 1.1m 0.9m 0.9m 1.4m	4.5m² 2.5m² 4.5m² 5.5m² 4.1m² 2.5m² 2.5m² 6.5m²
T30	Norway maple	9.5m	290mm	N3.5m E3.5m S3.5m W3.5m	2m	2m SW	SM	Good	Fair	Low	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	C (12)	3.5m	38.0m²
T31	Norway maple	6.5m	215mm	N3.5m E3m S3m W3.5m	2m	2m N	SM	Good	Fair	Low	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	C (12)	2.6m	20.9m²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
T32	Silver maple	8m	260mm	N2.5m E3.5m S3m W2.5m	2m	2m SW	Y	Good	Fair	Low	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	C (12)	3.1m	30.6m²
T33	Silver maple	10m	335mm	N3.5m E4m S4.5m W3.5m	2m	2m SW	SM	Good	Fair	Low	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	C (12)	4.0m	50.8m²
T34-37	Silver maple	#T34 7m #T35 8m #T36 8m #T37 8m	#T34 290mm #T35 280mm #T36 300mm #T37 250mm	N3.5m E3.5m S3.5m W3.5m	2m	2m	Y	Good	Fair	Low	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	C (12)	3.5m 3.4m 3.6m 3.0m	38.0m² 35.5m² 40.7m² 28.3m²
T38	Silver maple	9m	335mm	N4m E4m S3.5m W4m	2m	2.5m E	SM	Good	Fair	Low	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	C (12)	4.0m	50.8m²
T39-41	Silver maple	9m	#T39 580mm #T40 380mm #T41 505mm	5.5m	2m	2m	M	Good	Fair	Moderate	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	B (12)	7.0m 4.6m 6.1m	152.2m² 65.3m² 115.4m²
T42	Silver maple	7.5m	245mm	N3.5m E3.5m S3.5m W3.5m	2m	2m SE	SM	Good	Fair	Low	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	C (12)	2.9m	27.2m²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
T43-45	Silver maple	#T43 10m #T44 8.5m #T45 10.5m	#T43 370mm #T44 275mm	4.5m	2m	2.5m	SM	Good	Fair	Moderate	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	B (12)	5.5m	96.1m²
T46-53	Raywood ash	#T46 6.5m #T47 9m #T48 9m #T49 7m #T50 9m #T51 7m #T52 8m #T53 7.5m	#T46 235mm #T47 300mm #T48 260mm #T49 240mm #T50 270mm #T51 215mm #T52 270mm #T53 290mm	4.5m	2m	1.5m	SM	Good	Fair	Low	40+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction.	C (12)	2.8m 3.6m 3.1m 2.9m 3.2m 2.6m 3.2m 3.5m	25.0m² 40.7m² 30.6m² 26.1m² 33.0m² 20.9m² 33.0m² 38.0m²
T54	Flowering cherry	4m	110mm	1m	2m	2m S	Y	Good	Good	Low	40+	Growing within shopping centre car park; small young tree.	C (1)	1.3m	5.5m²
T55-56	Box elder	#T55 7m #T56 7m	#T55 240mm est #T56 250mm est	3.5m	2m	2.5m	Y	Good	Fair	Low	40+	Growing in shrub bed;# previously crown lifted; previous heavy crown reduction.	C (12)	2.9m 3.0m	26.1m² 28.3m²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
T57	Wild cherry	6m	360mm	N3m E3m S1.5m W3m	2.5m	2.5m NE	M	Poor	Fair	Low	10+	Growing within shopping centre car park; previously crown lifted; previous heavy crown reduction; crown dead on SE side.	C (1)	4.3m	58.6m²
T58-65	Flowering cherry	#T58 4m #T59 4m #T60 3m #T61 6m #T62 5.5m #T63 5.5m #T64 3m #T65 3m	#T58 105mm #T59 110mm #T60 55mm #T61 180mm #T62 165mm #T63 160mm #T64 100mm #T65 80mm	1.5m	2m	1.5m	Y	Fair	Fair	Low	40+	Growing within shopping centre car park; small young trees; growing within shopping centre car park.	C (12)	1.3m 1.3m 0.9m 2.2m 2.0m 1.9m 1.2m 1.0m	5.0m² 5.5m² 2.5m² 14.7m² 12.3m² 11.6m² 4.5m² 2.9m²
T66-67	Fasigiate oak	#T66 11m #T67 10m	#T66 180mm #T67 150mm	1m	2.5m	2m	Y	Good	Good	Low	40+	Growing within shopping centre car park; young trees.	C (1)	2.2m 1.8m	14.7m² 10.2m²
T68	Norway maple	8.5m	305mm	N3.5m E4m S3.5m W3m	2m	2m SW	SM	Good	Fair	Moderate	40+	Growing within shopping centre car park close to entrance; previously crown lifted; previous heavy crown reduction.	C (1)	3.7m	42.1m²
T69	London plane	16m	450mm	N3m E7m	2m	2m W	EM	Good	Good	Moderate	40+	Growing adjacent to Coldhams Lane; readily visible in views from from road and surrounding area; significant tree in the area.	A (12)	5.4m	91.6m²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
				S8m W7m											
T70	London plane	16m	400mm	N4.5m E6.5m S3.5m W7m	2m	3.5m NE	EM	Good	Good	Moderate	40+	Growing adjacent to Coldhams Lane; readily visible in views from from road and surrounding area; significant tree in the area.	A (12)	4.8m	72.4m²
T71	London plane	17m	470mm	N7m E5.5m S6m W8m	2m	3m NW	EM	Good	Good	High	40+	Growing adjacent to Coldhams Lane; readily visible in views from from road and surrounding area; significant tree in the area.	A (12)	5.6m	99.9m²
T72	Whitebeam	6m	210mm	2.5m	2.5m	2m SE	Y	Good	Fair	Low	40+	Off site tree; growing in soft ground adjacent to Coldhams Lane; previously crown lifted.	C (12)	2.5m	20.0m²
T73-75	Fastigiate hornbeam	10m	#T73 220mm #T74 240mm #T75 235mm	5m	1m	2m	SM	Good	Fair	Low	40+	Growing in soft ground to the rear of retail unit; views from Coldhams Lane largely obscured by other trees; provides screening of the site in views from residential properties to NW.	C (12)	2.6m 2.9m 2.8m	21.9m² 26.1m² 25.0m²
T76	Common walnut	12m	215mm 370mm	N5.5m E6m S4m W2.5m	1.5m	3m S	SM	Good	Fair	Low	40+	Growing in soft ground to the rear of retail unit; previously crown lifted; twin stemmed from base with included bark union.	C (12)	5.1m	82.8m²
T77	London plane	12m	370mm	N5m E5m S4m W4m	2m	5m S	SM	Good	Fair	Moderate	40+	Growing in shrub bed next to site entrance; previously crown lifted; previous heavy crown reduction; readily visible in views from from road and surrounding area.	B (12)	4.4m	61.9m²
T78	London plane	10.5m	270mm	N4m E4m S3m W3m	3m	4m E	SM	Good	Fair	Moderate	40+	Growing in soft ground next to site entrance; previously crown lifted; previous heavy crown reduction; readily visible in views from from road and surrounding area.	B (12)	3.2m	33.0m²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
T79	London plane	12m	445mm	N6m E5.5m S5m W5.5m	2m	3m E	EM	Good	Fair	Moderate	40+	Growing in shrub bed next to site entrance; previously crown lifted; previous heavy crown reduction; readily visible in views from from road and surrounding area.	B (12)	5.3m	89.6m²
T80	London plane	13m	330mm	N6.5m E6m S0m W0m	2m	3.5m N	SM	Good	Fair	Moderate	40+	Growing in shrub bed next to site entrance; previously crown lifted; previous crown reduction; readily visible in views from from road and surrounding area; canopy off set due to adjacent off site trees.	B (12)	4.0m	49.3m²
T81-82	London plane	11m	#T81 340mm #T82 270mm	4.5m	1.5m	2m	SM	Good	Fair	Moderate	40+	Growing in shrub bed next to site entrance; previous crown reduction; readily visible in views from from road and surrounding area.	B (12)	4.1m 3.2m	52.3m² 33.0m²
T83	London plane	11.5m	350mm	N5.5m E5.5m S4m W4m	2m	2.5m W	SM	Good	Fair	Moderate	40+	Growing in soft ground adjacent to shopping centre access road; previous crown reduction.	B (12)	4.2m	55.4m²
T84-85	Silver birch	#T84 9m #T85 10m	#T84 220mm #T85 355mm	4.5m	2m	2m	SM	Fair	Fair	Moderate	40+	Growing in soft ground adjacent to shopping centre access road;# multi stemmed from 2m; minor deadwood in crown.	C (12)	2.6m 4.3m	21.9m² 57.0m²
T86	Hawthorn	5m	100mm	1.5m	2m	3m	Y	Fair	Fair	Low	40+	Small young tree.	C (12)	1.2m	4.5m²
T87-88	Wild cherry	8.5m	#T87 215mm #T88 270mm	4.5m	2m	2m	SM	Fair	Fair	Low	40+	Growing in soft ground adjacent to shopping centre access road; previously crown lifted.	C (12)	2.6m 3.2m	20.9m² 33.0m²
T89	Goat willow	10m	380mm @1m	N4.5m E4.5m S5.5m W4.5m	2m	1.5m S	SM	Fair	Poor	Low	20+	Growing in soft ground adjacent to shopping centre access road; next to boundary wall; wound with decay on trunk at0.5m on W side.	C (12)	4.6m	65.3m²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
T90-91	Bird cherry	#T90 7.5m #T91 7.5m	#T90 240mm #T91 285mm	5m	2m	2m	SM	Fair	Fair	Low	40+	Growing in soft ground adjacent to shopping centre access road; previously crown lifted.	C (12)	2.9m 3.4m	26.1m² 36.7m²
T92	Wild cherry	9.5m	240mm 230mm	N3.5m E4.5m S4.5m W4m	2m	3m SW	SM	Good	Poor	Low	40+	Growing in soft ground adjacent to shopping centre access road; previously crown lifted; exposed surface roots.	C (12)	4.0m	50.0m²
T93	Rowan	7m	105mm	2.5m	2m	3m	Y	Fair	Fair	Low	40+	Growing in soft ground adjacent to shopping centre access road; small young tree; strimmer damage at base.	C (12)	1.3m	5.0m²
T94	Wild cherry	12.5m	310mm	N4.5m E4.5m S5m W2m	2m	3m S	SM	Fair	Fair	Moderate	40+	Growing in soft ground adjacent to shopping centre access road; previously crown lifted; exposed surface roots with mower damage on upper surface.	C (12)	3.7m	43.5m²
T95	Wild cherry	8m	125mm	2.5m	2m	2.5m SW	Y	Fair	Fair	Low	20+	Growing in soft ground adjacent to shopping centre access road; strimmer damage at base; small young tree.	C (12)	1.5m	7.1m²
T96	Grey poplar	18m	630mm ivy	N7m E7.5m S6m W3m	3m	2.5m N	M	Fair	Fair	Moderate	40+	Single slightly leaning trunk towards E; ivy on trunk; growing in soft ground adjacent to shopping centre access road.	B (2)	7.6m	179.6m²
T97	Ash	9.5m	195mm	3m	4m	3m N	Y	Fair	Fair	Low	40+	Growing in soft ground adjacent to shopping centre access road; small young tree.	C (12)	2.3m	17.2m²
T98	Grey poplar	14m	410mm	N4m E5m S7m W7m	2.5m	1.5m SE	EM	Fair	Fair	Moderate	40+	Growing in soft ground adjacent to shopping centre access road; 45 degree lean towards E of trunk to1.5m; decay from old pruning wound on E limb at 2m.	B (2)	4.9m	76.0m²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
T99	Ash	13m	250mm ivy est 200mm ivy est 200mm ivy est	4m	3m	4m	SM	Fair	Fair	Low	40+	Three stemmed from 0.5m; ivy on stems.	C (12)	4.5m	64.5m²
T100-103	Goat willow	12m	#T100 240mm #T101 460mm #T102 300mm #T103 500mm @1m	4m	3.5m	2m	EM	Fair	Fair	Low	40+	Growing in narrow strip of soft ground adjacent to boundary fence; recently crown lifted over footpath; row of scrubby trees; #103 dead branch over footpath; group provides screening to the site for residential properties to N.	C (12)	2.9m 5.5m 3.6m 6.0m	26.1m² 95.7m² 40.7m² 113.1m²
T104	London plane	12m	550mm ivy est	N7m E8m S5m W7m	3m	3m SE	SM	Fair	Fair	Low	40+	Growing in NW corner of site; multi stemmed from 3m; dense ivy on trunk extending into canopy.	C (12)	6.6m	136.8m²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
T105-113	Silver birch	14m	#T105 240mm #T106 260mm #T107 180mm #T108 260mm #T109 180mm #T110 280mm #T111 220mm #T112 210mm #T113 260mm	3.5m	2m	2m	SM	Good	Fair	Low	40+	Group of trees growing in site maintenace / delivery area to rear of retail units; visible in views from adjacent footpath.	C (12)	2.9m 3.1m 2.2m 3.1m 2.2m 3.4m 2.6m 2.5m 3.1m	26.1m² 30.6m² 14.7m² 30.6m² 14.7m² 35.5m² 21.9m² 20.0m² 30.6m²
G1	Goat willow, Sycamore, Elder, Silver birch and Wild cherry	14m	Avg 200mm est	6m	2m	1.5m	SM	Fair	Fair	Low	40+	Off site group of trees; growing in rear gardens of residential properties.	C (12)	2.4m	18.1m²
G2	Himalayan tree-cotoneaster	5m	Avg 100mm	4m	0m	1m	Y	Fair	Fair	Low	40+	Growing in soft ground adjacent to shopping centre access road; provides screening to site for residential properties to W.	C (1)	1.2m	4.5m²
G3	Various	8m	Avg 100mm	4m	2m	1m	Y	Fair	Fair	Low	40+	Species include goat willow, buddleia, cherry; shrubby group growing adjacent to footpath; provides screening to the site from N.	C (12)	1.2m	4.5m²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clear-ance	Height to 1st Branch	Life Stage	Physi-ology	Structure	Landscape Value	Est. Years	Comments	Cate-gory	RPA Radius	RPA m2
G4	Various	7m	Avg 100mm	3.5m	2m	1m	Y	Fair	Fair	Low	40+	Species include ash, hawthorn, rose, buddleia; scrubby boundary group growing adjacent to N boundary fence.	C (12)	1.2m	4.5m²
G5	Various	12m	Avg 200mm	4m	2m	2m	SM	Fair	Fair	Low	40+	Boundary planting; species includes blackthorn silver birch, maple, sycamore, ; mix of SM specimens with low level hedging between ; provides screening to the site for residential properties to W.	C (12)	2.4m	18.1m²
G6	Sycamore and Ash	10m	Avg 150mm	4m	2m	2m	Y	Fair	Fair	Low	40+	Scrubby group of young trees; growing on raised ground behind retaining wall.	C (12)	1.8m	10.2m²

Notes

Any management recommendations in this report subject to presence of nesting birds or protected species (e.g. Bats) checks.

Any tree surgery recommendations contained within this report to be undertaken in accordance with BS3998(2010) 'Tree work – Recommendations' (BS3998)

Fieldwork survey information provided within this table is subject to seasonal/access constraints.

N/A - measurement not accessible/applicable.

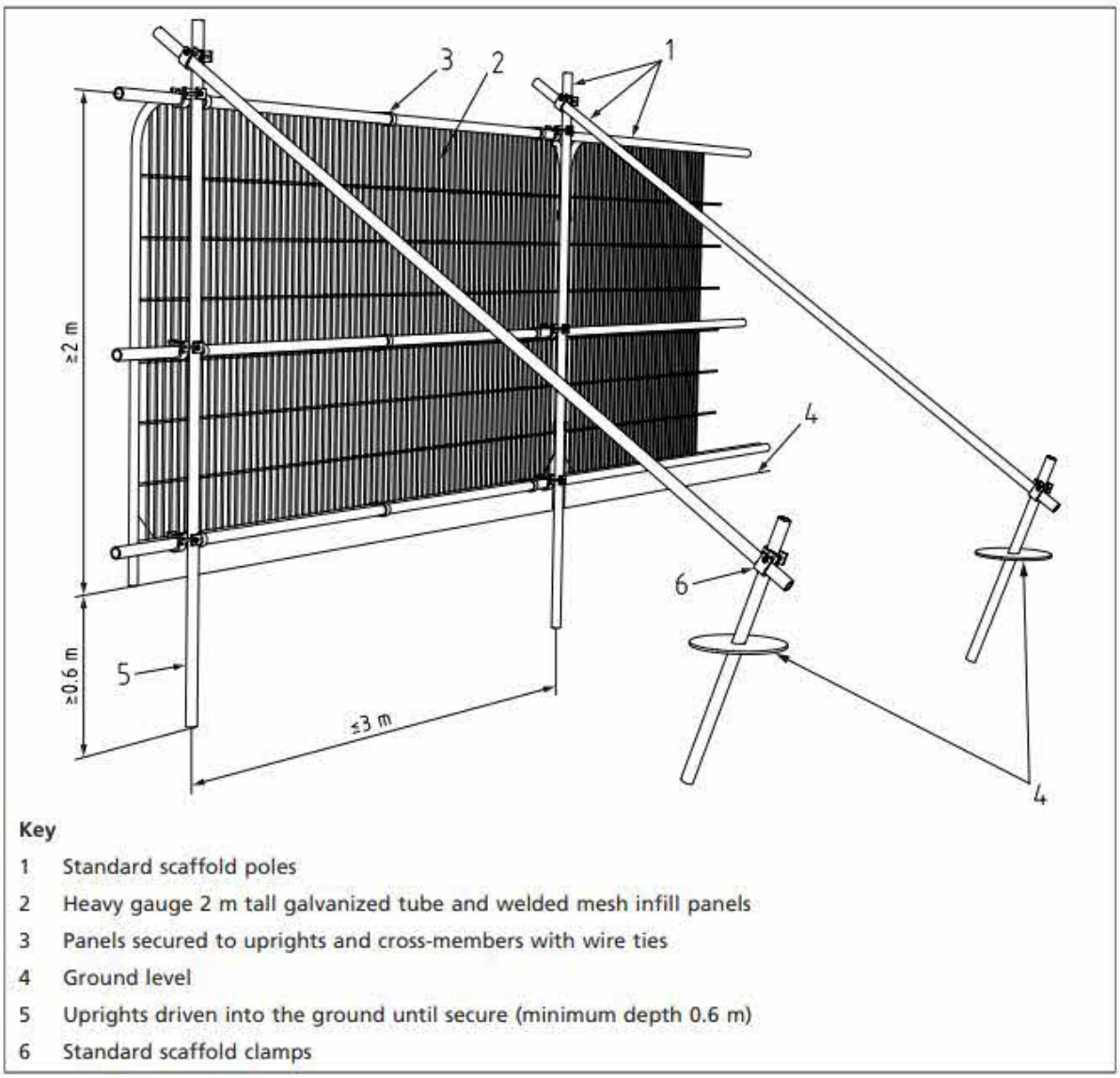
'*' - estimated position of tree (not indicated on topographical survey);

'^' – average value based upon average of remaining measurements or visual estimate.

Unless otherwise stated, all group dimensions are an estimated average.

This schedule should be read in conjunction with **Drawing 1.**

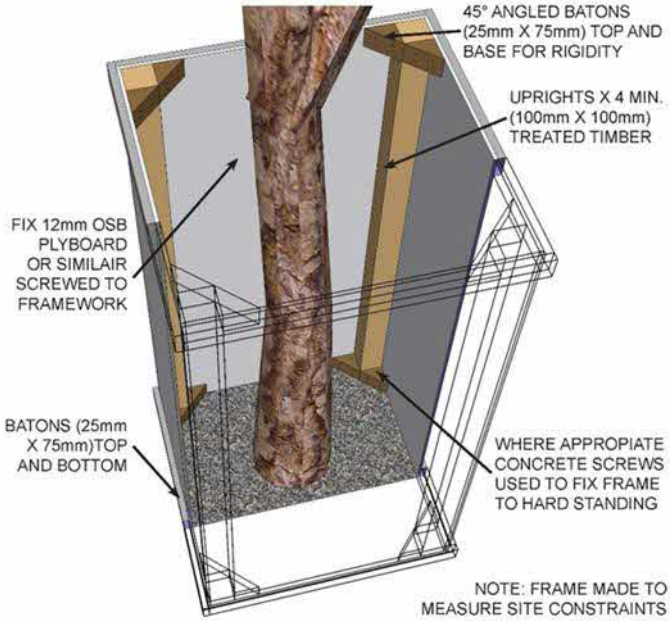
D. Example Specification for Tree Protection Barrier.



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

TREE PROTECTION BOX FRAME SPECIFICATION



E. Tree Protection Signage (Example)

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