

Tree Survey and Arboricultural Impact Assessment

**Clapham College Site, 45 Clapham
Common South Side, London SW4 9BL**

Thornton Park Southside Ltd

March 2022 (Rev B: February 2023)



Tree Survey & Arboricultural Impact Assessment

Clapham College
45 Clapham Common, Southside
London, SW4

UTC-0650-03-AIA
11 March 2022
Revision A 22 August 2022
Revision B 10 February 2023



DATA & SUMMARY TABLE

Local Planning Authority	London Borough of Lambeth	Tree Officer	Ian Leonard
Development Proposal	The proposal is for the redevelopment of the whole site into residential accommodation.		
Report Author & Contact Details	Graham Underhill, Chartered Arboriculturist and Registered Consultant with the Institute of Chartered Foresters. Details of qualifications and experience can be found at http://www.underhilltc.co.uk/about-us . Contact: graham@underhilltc.co.uk 01245 209928		
Previous Input	Previously issued a Tree Constraints Plan to inform feasibility and design options.		
Site Visit(s)	January 2022; weather clear with no visibility or data collection issues.		
Limitations to Survey	<ul style="list-style-type: none"> • Where access to trees was limited by site conditions or materials, or where ivy growth or other vegetation prevented full assessment, this is highlighted in the tree schedule. • Observations were from ground level only and of a preliminary nature, and no detailed investigations were carried out. • Observations of trees outside the site boundaries are confined to what was visible from within the site, unless noted in the comments. • No safety inspection of trees has been carried out, although any obvious defects and any need for further investigations, has been noted. • Comments relating to engineering solutions are for their suitability from an arboricultural perspective. Specification and suitability for use is the responsibility of the engineer and/or architect. • Comments relating to ecology are those of an informed layperson. A qualified ecologist should be consulted where necessary. 		
Summary	<p>This report considers the impact of the proposed development on existing trees, evaluates the significance of impacts, and makes recommendations for methods to control the impacts. It also informs the client, design team and contractors of their options and responsibilities when designing and constructing structures close to trees. It contains the information required by the local planning authority to demonstrate that trees have been properly considered throughout the process.</p> <p>A baseline survey has identified key arboricultural features, highlighting constraints and benefits. It follows the principles of British Standard <i>BS 5837:2012, Trees in relation to design, demolition and construction - Recommendations</i>.</p> <p>There are 26 subject trees. Using the BS 5837 categorisation method, 3 of these trees are of A (high) value, 9 trees of B (moderate) value, 14 trees of C (low) value, and no trees of U (unsuitable for retention) value.</p> <p>Three trees are to be removed as part of the proposal. All three are small or very small.</p> <p>Works are proposed within the root protection area of some trees to be retained and specialist methods of design and construction are proposed as mitigation.</p> <p>New hard surfacing will be designed and constructed using a permeable, no-dig or minimal dig system; therefore, this will have a minimal impact on the trees.</p> <p>Tree protection measures have been specified which are achievable and sufficient to protect trees during the proposed works.</p> <p>In my opinion the proposed development is achievable in both arboricultural terms and in relation to planning policy as it applies to trees.</p> <p>Revision B – Updated tree removal table.</p>		

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1 INTRODUCTION

INSTRUCTION & TERMS OF REFERENCE

- 1.1 In January 2022, Underhill Tree Consultancy was instructed by Liz Lake Associates to provide tree information to accompany a planning application for a proposed development. This was to include a site visit, collection and preparation of tree details, preparation of constraints details, an assessment of the impact of the proposal on trees, tree protection requirements and a preliminary arboricultural method statement.
- 1.2 Documents supplied include:
- Topographical survey LS2508_T_230721
 - Landscape General Arrangement-THP-LLA-ZZ-GF-DR-L-0101

PURPOSE & SCOPE OF THIS REPORT

- 1.3 This report's purpose is to allow the local planning authority (LPA) to assess the tree information as part of the planning submission to develop Thornton Park College Phase 2, London SW4 (the 'site'). Following the initial survey, constraints information was supplied to the architect and design team to inform layout.
- 1.4 It follows the principles of British Standard *BS 5837:2012, Trees in relation to design, demolition and construction - Recommendations* (BS 5837)¹. This document gives guidance and recommendations on categorising the quality of trees, the protection of retained trees, and any operations with the potential to affect trees. It aims to guide decision making towards sustainable design and tree cover on all new developments.
- 1.5 The site survey establishes a baseline assessment of trees to enable an evaluation of negative, positive, or neutral impacts from the proposal, and the significance of any impact. This report assesses the impact the proposed development has on trees, as well as any adverse impacts caused by trees. Methods to avoid or mitigate impacts are assessed, along with identifying remediation and enhancement opportunities. Additionally, it informs the client and design team of tree constraints, opportunities and responsibilities when designing and constructing structures close to trees. It demonstrates to the LPA that trees have been properly considered throughout the process, and it includes the information required for the LPA to make a decision, i.e., a **Tree Survey** compliant with BS 5837, an **Arboricultural Impact Assessment**, and **Tree Protection** details. It also includes an Arboricultural Method Statement Heads of Terms and a Tree Protection Plan in draft form describing in principle how trees will be protected and managed during the development. This follows the recommendations in BS 5837 and the LPA may place a planning condition requiring a detailed Arboricultural Method Statement to be produced following planning consent. This is because at the planning submission stage there is usually insufficient detail known of the design and construction method of structures and hard surfaces to be built where they may affect trees. If no works

¹ British Standards Institution (2012) BS 5837: Trees in relation to design, demolition and construction – Recommendations, BSI <https://shop.bsigroup.com/>

are proposed within root protection areas, the information contained within this report may suffice.

2 PLANNING POLICY & LEGAL CONSIDERATIONS

2.1 National and local planning policies have been considered in relation to the arboricultural impacts from the development proposals as trees are a material consideration in the planning process and these policies will guide the decision-making process of the local planning authority.

NATIONAL PLANNING POLICY

2.2 The government's National Planning Policy Framework (NPPF)² was published in July 2021 and replaced previous versions. At the centre of the NPPF is a presumption in favour of sustainable development including recognising the wider benefits of ecosystem services and to move from a net loss of biodiversity to achieving net gains for nature.

2.3 With direct reference to trees, the 2021 revision states that:

131. 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-lined⁵⁰, 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.

180.c) 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.

2.4 The trees subject to this report are not considered to be part of ancient woodland or aged or veteran trees, and therefore this aspect of NPPF is not considered applicable.

LOCAL PLANNING POLICY

2.5 Under the UK planning system, local planning authorities have a statutory duty to consider the protection and planting of trees when granting planning permission. Trees are a material consideration under the UK planning system, whether statutorily protected or not. The space required for any proposed new trees to become established is an important consideration.

2.6 Any application will be subject to the Planning Policies of the London Borough of Lambeth. Policies and Supplementary Planning Guidance in the Lambeth Local Plan 2030-2035, adopted September 2021, may apply.

² National Planning Policy Framework (NPPF), published by DCLG, <http://www.gov.uk/government/publications/national-planning-policy-framework--2>

2.7 Relevant local policies which have been considered include:

- Policy Q10: Trees

2.8 The London Plan has been considered, including:

- Policy G7: Trees and Woodlands. This states that any trees removed as a result of development should be adequately replaced based on the existing value of the benefits of the trees removed. The use of an appropriate valuation system, such as CAVAT or i-tree, should be used for this purpose.

TREE PRESERVATION ORDERS & CONSERVATION AREAS

2.9 A formal search has been carried out on this site via the LPA website.

2.10 TPO/238 appears to cover many of the larger trees to the rear of the college buildings. In particular, the cedar T11, sycamores T12 and T13, and London plane T14, appear to be included within the TPO.

2.11 A Tree Preservation Order on any subject tree means written consent for any works will be required from the LPA unless works are necessary to implement a full planning consent.

2.12 The site is partially within Clapham Conservation Area.

2.13 If a subject tree is within a CA, six weeks' notice must be given to the LPA for any works unless necessary to implement a full planning consent. During this time, the LPA can protect the tree with a TPO, confirm acceptance of the Notice, or do nothing, after which time the proposed tree work can go ahead.

2.14 BS 5837 does not make a distinction between trees subject to statutory protection, such as a TPO, and those trees without. This is principally because all trees are a material consideration and works to implement full planning consent overrides any TPO protection. Therefore, we do not seek to offer any comparison between, or imply any difference in the quality or importance of trees covered by a TPO and other trees.

2.15 The tree protection status is correct at the time of report production but can be subject to change. It is therefore the responsibility of any persons undertaking tree works operations to the trees which are the subject of this report and in accordance with our recommendations, to undertake their own statutory tree protection checks with the local planning authority, to include TPO, Conservation Area and planning conditions prior to works commencing. Tree work necessary to implement full planning consent overrides the need to apply separately although pre-commencement planning conditions may need to be discharged first. Wilful damage or destruction of TPO/Conservation Area trees can result in prosecutions for companies or individuals and fines can be up to £20,000 (County Court fines are unlimited).

ECOLOGICAL CONSIDERATIONS

2.16 It is important that any tree removals or works to trees does not harm or disturb protected species.

- 2.17 Although outside the specific scope of this report, tree removal and tree work have the potential to cause harm to wildlife, and this should be considered at the planning stage. Additionally, some wildlife which uses trees is legally protected: the Wildlife and Countryside Act 1981, as amended, The Conservation of Habitats and Species Regulations 2010 and the Countryside and Rights of Way Act 2000, provide statutory protection to species of flora and fauna including birds, bats and other species that are associated with trees. These could impose significant constraints on the use and timing of access to the site. It is the responsibility of the main contractor and tree surgery contractor to ensure that no protected species are harmed whilst carrying out site clearance or tree surgery works. Unless competent to do so, the advice of an ecologist must be sought. It is generally considered that birds nest between March and August but it must be understood that birds and active nests are protected irrespective of the time of year and some species can nest in any month. Therefore, due diligence must be observed towards nesting birds whenever tree works are carried out.

3 SITE APPRAISAL & TREE INFORMATION

THE SITE

- 3.1 The site is a complex of college buildings and amenity areas.
- 3.2 The topography of the site is predominantly level although there are localised changes in levels around some trees and this can have implications for trees if levels are to be changed as part of the development. Any reduction in soil levels will remove important roots, along with the topsoil they need for survival; however, raising soil levels can be just as harmful as even a modest increase disturbs the ability of water, and particularly air, to move into and out of the root zone, therefore, roots can suffocate from a lack of oxygen or a build-up of carbon dioxide.

SOIL CONDITIONS

- 3.3 Soil conditions have a significant effect on tree growth, including rooting depths and available soil volume that can be used by roots, and therefore the likely tolerance of trees to soil disturbance. In addition, soil type will influence the species that will grow successfully.
- 3.4 The British Geological Survey online Geology Map indicates the soils on site are London Clay Formation – Clay, Silt and Sand, with superficial deposits of Sand and Gravel.
- 3.5 Typically, trees have relatively shallow but wide spreading roots with around 80-90% in the top 60-100cm of the soil profile. Tree root depth is limited by their water requirements which primarily come from above (rain), and the need for air to diffuse in and out of the soil. Some soils, particularly clays, limit this movement. Tree roots are opportunistic and will grow deeper if conditions allow. Trees growing in previously developed urban situations sometimes utilise disturbed ground, rubble, old drains or foundations etc., therefore having roots at far greater depth than in more natural, undisturbed settings.

- 3.6 Damage to soil structure and roots is by far the most common, significant and unseen way trees are damaged during development and the main purpose of tree protection and working methods close to trees is to avoid this.
- 3.7 Precautions to prevent soil compaction to rooting zones of retained trees will be particularly important on this site due to the presence of clay.

THE SUBJECT TREES

- 3.8 Full details of all trees surveyed can be found in the tables in Appendix B. Their locations can be found on the plans at Appendix A.

TREE QUALITY

- 3.9 Trees have been assessed using the tree categorisation method in BS 5837. This identifies the quality and value (non-fiscal) of existing trees to allow an informed decision to be made concerning which trees should be removed or retained as part of the development proposal.
- 3.10 The survey recorded 26 individual trees. A breakdown of the quality and value of each tree is given in Table 1 below. Full category definitions, comments and full survey details are given in the Tree Schedule at Appendix B.
- 3.11 The fiscal value of the trees was assessed using the CAVAT (Capital Asset Valuation of Trees).

Category A trees

- 3.12 Category A trees are considered to be of high quality and particularly important and desirable to retain and therefore could be considered a major constraint during the design process.

Category B trees

- 3.13 Category B trees are considered to be of moderate quality. They are considered important to retain.

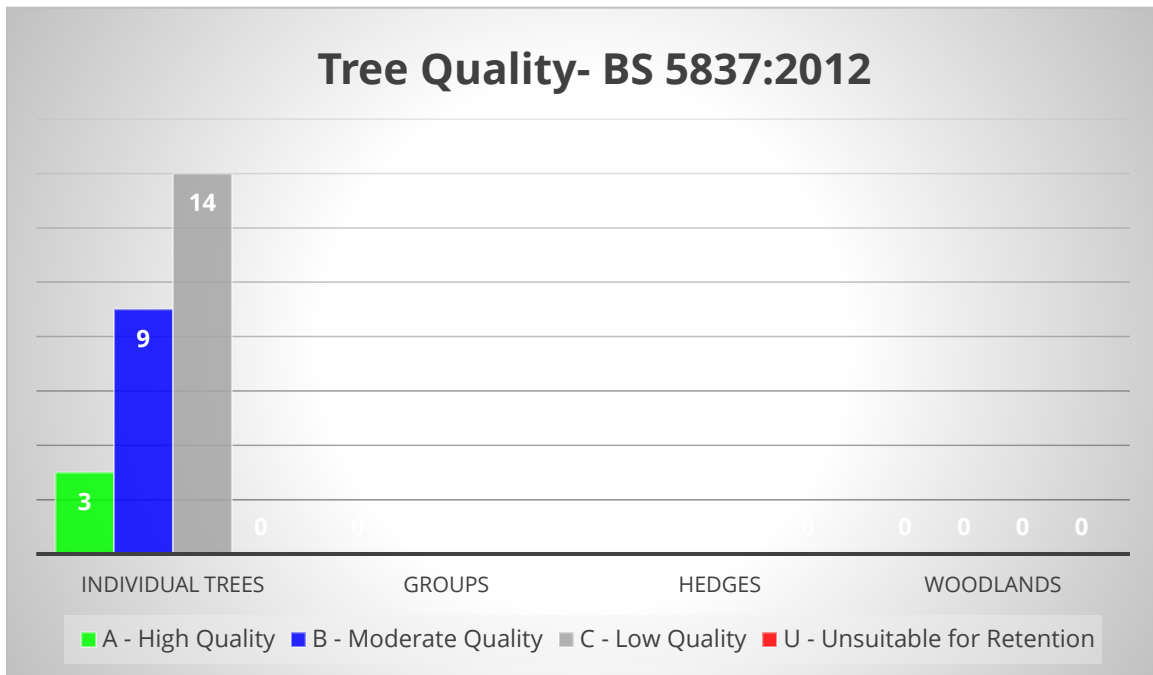
Category C trees

- 3.14 Category C trees are considered to be of low quality and of limited benefits which may be readily replaced in the existing context. Therefore, it is generally accepted they are excluded from consideration regarding development although they may be suitable to retain where they pose no constraint on development.

Category U trees

- 3.15 Category U trees are in such a condition that they cannot realistically be retained in the current context for longer than 10 years. Although Category U trees should not be a constraint to development, sometimes they have conservation value and may be desirable to retain where appropriate.

Table 1: Tree quality



KEY ARBORICULTURAL FEATURES

- 3.16 There are a significant number of trees, including large trees, to the front of the site along Clapham Common South Side, both on and offsite.
- 3.17 To the rear of the main building where the focus of the development will occur, there are four large trees and a number of smaller trees. The large trees include a significant London plane and a blue cedar.
- 3.18 The presence of large, mature or veteran trees is usually seen as desirable but particular care is needed where such trees become enclosed within the new development. Adequate space must be allowed for their long-term retention and maintenance.
- 3.19 The blue cedar T11 has a large wound on the lower trunk from a previously removed large limb. The wound extends into the heartwood of the tree and decay is present. The extent of the decay is unknown and it would be prudent to assess and monitor this tree as the wound is in a structurally important part of the tree.



Picture 1 - Cedar T11



Picture 2 - large wound on cedar T11



Picture 3 - Sycamore T12



Picture 4 - London plane T14

- 3.20 The London plane T14, is the largest and most important tree on site. It is growing on a grassy mound which must be taken account of during design as no significant changes in level should occur.

- 3.21 The tree has some exudation and staining at the base of the trunk. This is likely to indicate death or dysfunction of tissue beneath. There was no obvious cause and from a visual assessment, it is not possible to assess the extent or significance of this. Currently, the small size of the area affected, and the overall apparent health of the tree, means it is unlikely to be significant at this stage. I would recommend that regular monitoring of the area of exudation is undertaken by an experienced arboriculturist to ascertain any spread or changes, which may then indicate the need for further investigation using technical invasive, or non-invasive equipment.



Picture 5 - Base of London plane T14, showing exudation

4 ARBORICULTURAL IMPACT ASSESSMENT

- 4.1 This section evaluates the direct and indirect impacts of the proposals on trees on and adjacent to the site. Methods to avoid or mitigate impacts are assessed, along with identifying remediation and enhancement opportunities. It sets out protection measures and principles for work close to trees, including in Root Protection Areas (RPAs³). The buildability of the project is considered, including access, site facilities, plant movement, parking etc. The Tree Protection Plan indicates graphically the location and extent of many of the areas described below.

TREE REMOVAL

- 4.2 Three small trees are to be removed because of the development.

³ A Root Protection Area (RPA) is a layout design tool indicating the minimum area surrounding the tree that contains sufficient rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority.

- 4.3 A CAVAT calculation (see Appendix D) has been made on the three trees to be removed. The total value is £1,114.00. All tree removals will be mitigated by tree planting as part of the landscaping scheme for the site.
- 4.4 Table 2 is not a specification for works but an indication of likely works required as part of the development. A detailed specification should form part of a detailed Arboricultural Method Statement produced in response to a planning condition issued as part of planning permission.

Table 2 – Tree removals summary

BS 5837 Category	A High quality	B Moderate quality	C Low quality	U Unsuitable for retention
Individual trees	0	T1	T15, 16, 17	0
Groups	0	0	0	0
Hedges	0	0	0	0
Woodlands	0	0	0	0
Removed/Total	0/3	0/9	3/14	0/0

- 4.5 Laburnum T15 (arrowed in photo below) is to be removed. This is a small tree beneath the large London plane T14. It is somewhat suppressed by the plane tree and adds little to the visual amenity.



Picture 6 - Laburnum T15

- 4.6 Two fastigate hornbeams, T16 and T17, (arrowed in photo below) are to be removed. These are very small, recently planted trees. Both are small enough that they could be lifted and replanted if desired. At present, these trees are too small to add any measurable amenity or ecological value to the location.



Picture 7 - Hornbeams T16 & T17

ROOT PROTECTION AREA INCURSIONS

- 4.7 Part of a building and hard surfacing will be within the RPAs of T11, T12, T13 and T14. The design and construction of the building means specialist foundations to minimise impact on tree roots are not feasible. The extent of the ingress into RPAs is considered acceptable, given the tree species and overall size of RPAs. The area of new hard surfacing is more of a consideration as it covers a larger percentage of the RPAs. The encroachment is sufficient that specialist design and construction will be necessary. The principles can be found in Appendix C; however, the design should be produced by an engineer and be covered in detail in the Arboricultural Method Statement.
- 4.8 Conventional hard surfacing using a sub-base requiring excavation, is damaging to tree roots and is not acceptable within RPAs. Above-ground, or no-dig principles, using permeable materials, will be followed. This usually results in higher finished levels and this must be considered during design. Further details in Appendix C and on the Tree Protection Plan.
- 4.9 During construction, all excavation within RPAs will be supervised by the project arboriculturist.
- 4.10 The exact location of services is often difficult to establish until construction is in progress. New lighting is proposed as part of the development. The principle should be no new services to be installed within RPAs. When existing services within RPAs require upgrading or where it can be demonstrated that it is unavoidable to install new services in RPAs, conventional excavation techniques are unacceptable and great care must be taken to minimise any disturbance. Trenchless installation should be the preferred option but if that is not feasible,

any excavation must be carried out by hand or using a compressed air lance under arboricultural supervision or by following the methodology in Appendix B.

- 4.11 It is unknown whether there may be a requirement to excavate soil as part of investigation or remediation works not directly connected to the development, such as archaeological investigations, contaminated soil or Japanese knotweed control etc. This has the potential to be very damaging to trees which must be considered in any proposals and the project arboriculturist should be consulted on any excavation within RPAs.
- 4.12 It is important that space is allocated during the design stage for temporary welfare buildings, site storage, car parking etc., as this must be outside RPAs. Exceptions can sometimes be made for carefully sited and supported temporary buildings where agreed with the LPA. Where agreed during the design phase, these spaces will be shown on the Tree Protection Plan.

TREE WORKS OTHER THAN REMOVAL

- 4.13 It is likely that some reduction of the crowns of **T11, T12, T13** and **T14** may be necessary to allow for construction and to give a suitable juxtaposition between the trees and the new building. The exact specification will depend on a detailed assessment of site usage etc. and should be dealt with in the Arboricultural Method Statement produced following planning consent, where necessary.
- 4.14 Tree surgery works to be undertaken in accordance with *BS 3998:2010 Recommendations for tree works*⁴, or industry best practice. The Arboricultural Association run an Approved Contractor scheme and provide details of assessed contractors <https://www.trees.org.uk/Find-a-professional>.
- 4.15 Where appropriate, the arisings from tree felling and pruning should be retained on site as ecological features. The advice of the project ecologist should be sought.

CHANGES TO GROUND LEVELS

- 4.16 During design, consideration should be given to changes in ground levels. This should be dealt with in the detailed AMS, however, it is important at the planning stage to recognise any significant changes. Even where this occurs outside the RPA of a retained tree it still has the ability to impact on the tree, particularly in respect to changes in water availability, and methods of dealing with the change in levels such as retaining walls, slopes etc. should be assessed by the project arboriculturist. See Appendix C for further details.

TREE PLANTING, ESTABLISHMENT AND AFTERCARE

- 4.17 In the context of the loss of trees, a new landscaping scheme is proposed. Planting locations should be determined at the planning stage and protected during the development to preserve soil structure. The suggested selection of species, size, method of planting and location are outside the scope of this report, however, the general principles should be for

⁴ British Standards Institute (2010) BS 3998: Tree work – Recommendations, BSI <https://shop.bsigroup.com/>

bigger tree species to be chosen which have the potential to reach their ultimate height and spread without the need for excessive management. This must be balanced with available site-specific space, both above and below ground. Tree planting and establishment should follow the principles laid out in *BS 8545 Trees: from nursery to independence in the landscape - Recommendations*⁵.

- 4.18 Landscape operations have the potential to damage trees if not carried out appropriately; in addition, the removal of protective barriers to carry out landscape operations may allow other contractors in previously protected areas. Appropriate measures should form part of the Arboricultural Method Statement.

PROTECTION OF RETAINED TREES

- 4.19 Tree protection measures, usually in the form of barriers and/or ground protection, must be in place before any works, including site clearance or demolition, begin, and stay in place for as long as a risk of damage remains. The location and specification of protection is shown on the draft Tree Protection Plan together with the RPR (root protection radius) which is the minimum distance protection barriers or ground protection are to be positioned from the trunks of retained trees. See Appendix C. Further details on tree protection should form part of a detailed Arboricultural Method Statement produced after planning approval.
- 4.20 Trees growing along Clapham Common South Side may potentially be impacted by site access or new accesses. Protection using barriers or trunk protection may be required and this will be specified in the Arboricultural Method Statement produced following planning consent.

MONITORING AND SUPERVISION OF WORKS CLOSE TO TREES

- 4.21 Most damage to trees on development sites occurs inadvertently and to ensure continued protection during development a system of site monitoring is good practice.
- 4.22 It is recommended that a Project Arboriculturist is appointed to oversee tree protection for the duration of the construction contract. This may be conditioned by the LPA. Part of the project arboriculturist's role is to monitor compliance with arboricultural conditions and advise on any tree problems that arise or modifications that become necessary. This will usually involve regular site visits, following which a report will be sent to the local authority tree officer and the client/developer as an audit trail of compliance (ref. subsection 6.3 of BS 5837). See Appendix C.
- 4.23 On this site, the following monitoring and supervision are likely to be needed:
- A visit following installation of tree protection prior to any works commencing on site to confirm that it is fit for purpose.
 - Any agreed works in Root Protection Areas.
 - Any time there are potential conflicts with tree protection.
 - A visit at the completion of construction works to confirm tree protection can be removed to enable final landscaping.

⁵ British Standards Institute (2014) BS 8545: Trees: from nursery to independence in the landscape – Recommendations, BSI <http://shop.bsigroup.com/>

- 4.24 A site supervision and monitoring schedule is often conditioned as part of planning consent and would form part of the detailed Arboricultural Method Statement.

5 ARBORICULTURAL METHOD STATEMENT – HEADS OF TERMS

An Arboricultural Method Statement (AMS) describes how operations which may affect trees will be carried out to minimise any adverse effect on them. Details of site management, detailed construction methods, materials etc., can only be finalised once detailed design begins post planning permission. The table below contains an Arboricultural Method Statement heads of terms as recommended in Table B1 of BS 5837. This recommends that a detailed Arboricultural Method Statement is produced in response to a planning condition following planning consent. **Appendix C** contains general protection information, such as tree barriers and ground protection which are common to most developments. Additionally, principles for working close to trees are given. On straightforward sites and where no works are proposed within RPAs, this may be sufficient. Where there are complex interactions between the development and trees, or work is proposed within RPAs, a detailed Arboricultural Method Statement is likely to be conditioned as part of planning consent.

The table below identifies areas likely to need covering in a detailed AMS following planning permission. Not all operations are relevant to all projects, and for some sites, this report will contain sufficient information.

Table 3 – AMS heads of terms

OPERATION	DETAILED INFORMATION
Pre-commencement meeting – all relevant parties to agree tree protection measures and contact details	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.
Auditable system of arboricultural site monitoring and supervision – to ensure compliance with tree protection measures and planning conditions	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.
Tree felling and pruning	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.
Other pre-commencement works with ability to affect trees – soil/archaeological investigations, contaminated soil removal, Japanese knotweed control, or any other works within RPAs	Full information to be in detailed Arboricultural Method Statement, produced post planning permission, if relevant.
Installation of tree protection barriers and any ground protection – precise location and specification	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.

OPERATION	DETAILED INFORMATION
Site clearance and demolition - including the removal of hard surfaces in Root Protection Areas.	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.
Site set-up – site access, welfare facilities, parking, storage of materials etc.	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.
Pollution control near trees – location of concrete washings or other contaminants which may affect trees	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.
Operation of cranes and piling rigs where there is potential to impact trees	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.
Soil level changes - details of changes in soil levels, grading, mounding and removal of spoil and details of retaining structures	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.
Any excavations within RPAs – services/utilities, foundations, hard surfacing etc. – all will require specialist methods if within RPAs	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.
New structures - specialist foundation design if within RPAs	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.
New hard surfacing - specialist, no-dig systems and permeable substrates and surface materials will be required if within RPAs, which may result in higher finished levels	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.
Services - if within RPAs, guidelines within <i>NJUG Volume 4: Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees</i> , will be followed	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.

OPERATION	DETAILED INFORMATION
Landscaping works – has the potential to damage trees if not carried out appropriately; in addition, the removal of protective barriers to carry out landscape operations may allow other contractors in previously protected areas	Full information to be in detailed Arboricultural Method Statement, produced post planning permission, if relevant.
Root zone amelioration – may be required where compaction or other rooting zone issues have been identified	Full information to be in detailed Arboricultural Method Statement, produced post planning permission, if relevant.
Removing tree protection	Full information to be in detailed Arboricultural Method Statement, produced post planning permission.

6 CONCLUSIONS

- 6.1 To implement the design proposal, it will be necessary to remove 3 small individual trees. Their loss will have a negligible impact on visual or environmental factors.
- 6.2 Various works will be within the root protection area of trees to be retained. To ensure these do not adversely impact on trees, design and construction methods must be carefully planned. As recommended in Table B.1 of BS 5837, this report includes a Heads of Terms Arboricultural Method Statement. A detailed Arboricultural Method Statement should be produced in response to a planning condition, and this should cover all works within root protection areas.
- 6.3 New hard surfacing within the root protection areas will have a permeable subbase and surface and be of a minimal, or no-dig construction, utilising the depth of the existing hard surface and its subbase where applicable.

7 RECOMMENDATIONS

- 7.1 Post planning consent, a detailed Arboricultural Method Statement should be produced with the design team to ensure all works proposed within root protection areas can be achieved with minimum impact on retained trees. This should cover, in particular, new hard surfacing, lightweight structures, landscaping, and the timing of works in respect to tree protection.
- 7.2 The LPA has a duty to ensure the use of planning conditions, where appropriate, for the retention and protection of trees, when they grant planning permission. This can include the need for a detailed method statement and the requirement for arboricultural monitoring and supervision.
- 7.3 It is important that the project arboriculturist monitors and supervises key stages, particularly any works within RPAs of retained trees. Supervision/monitoring reports should be issued after each inspection as a record of compliance and audit trail for the local authority.
- 7.4 Tree protection measures defined in this report should be implemented.
- 7.5 Foundation design should take into account trees to be retained, trees to be removed and new trees to be planted.
- 7.6 The routes of proposed services should be assessed by the project arboriculturist and a detailed Arboricultural Method Statement produced in conjunction with the services engineer and contractor if services are to be routed within root protection areas.
- 7.7 The project arboriculturist should review proposals for any archaeological investigations, contaminated soil remediation or Japanese knotweed control, that may be required, to assess any impact on retained trees and if there is a conflict, advise on mutually acceptable solutions.

APPENDIX A – PLANS

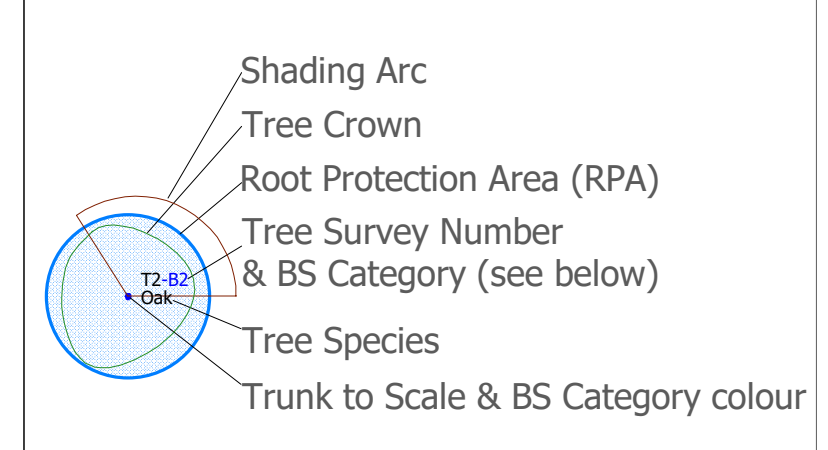
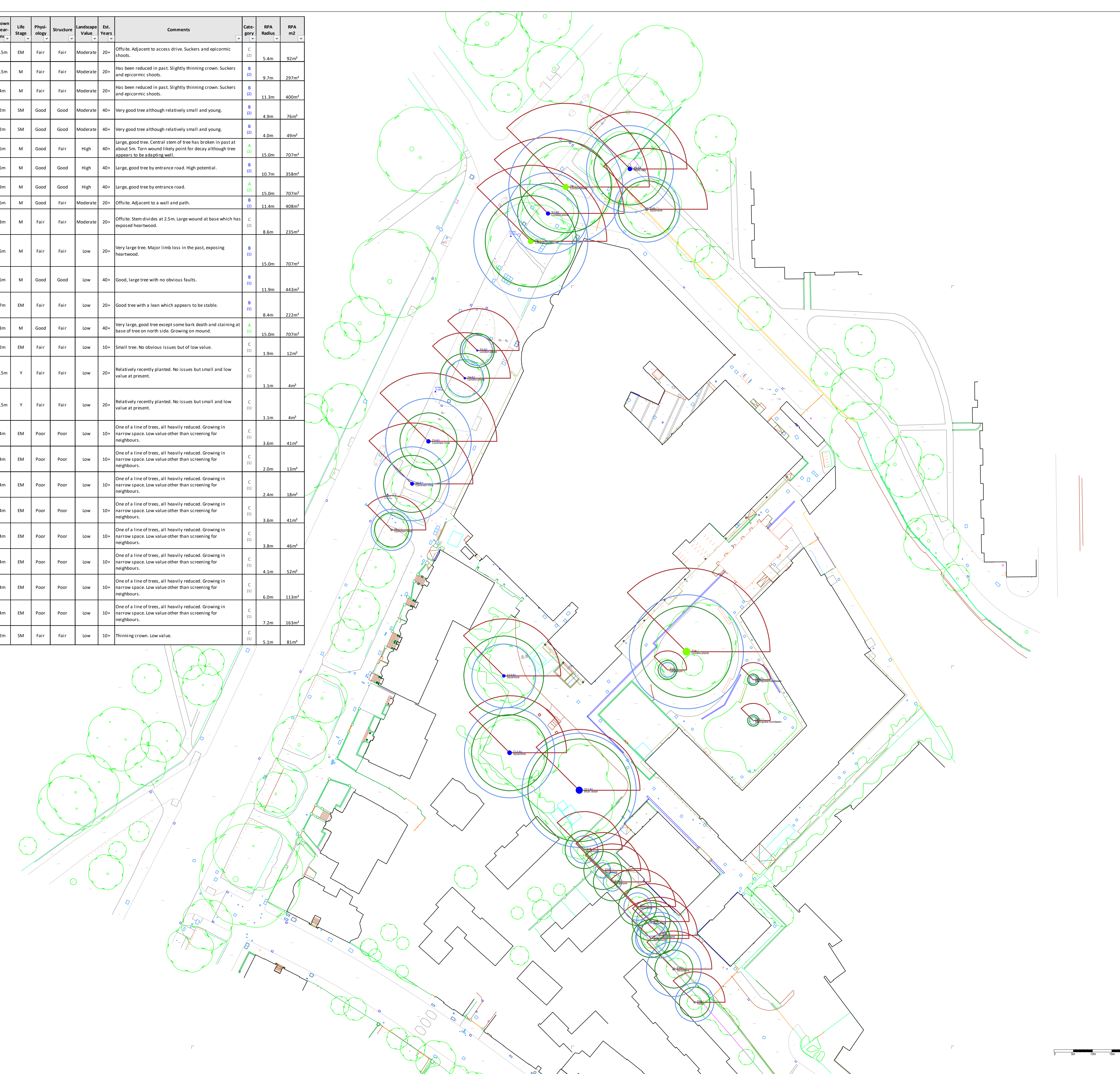
TREE CONSTRAINTS PLAN (UTC 0650-P02-TCP)

TREE PROTECTION PLAN - DEMOLITION (UTC 0650-P04-TDP)

TREE PROTECTION PLAN - CONSTRUCTION (UTC 0650-P05-TPP-Rev A)

This drawing should be reproduced in colour

No.	Species	Height	Trunk Dia.	Radial Crown Spred.	Crown Clearanc.	Life Stage	Physiology	Structure	Landscape Value	Est. Years	Comments	Category	RPA Radius	RPA m ²
T1	Common lime (Tilia x europaea)	9m	450mm	4.5m	2.5m	EM	Fair	Fair	Moderate	20+	Offsite. Adjacent to access drive. Suckers and epicormic shoots.	C (2)	5.4m	92m ²
T2	Common lime (Tilia x europaea)	16m	810mm	7.5m	3.5m	M	Fair	Fair	Moderate	20+	Has been reduced in past. Slightly thinning crown. Suckers and epicormic shoots.	B (2)	9.7m	297m ²
T3	Common lime (Tilia x europaea)	18m	940mm	7.5m	4m	M	Fair	Fair	Moderate	20+	Has been reduced in past. Slightly thinning crown. Suckers and epicormic shoots.	B (2)	11.3m	400m ²
T4	London plane (Platanus acerifolia)	12m	410mm	6.5m	2m	SM	Good	Good	Moderate	40+	Very good tree although relatively small and young.	B (2)	4.9m	76m ²
T5	London plane (Platanus acerifolia)	11m	330mm	4.5m	2m	SM	Good	Good	Moderate	40+	Very good tree although relatively small and young.	B (2)	4.0m	49m ²
T6	London plane (Platanus acerifolia)	20m	1300mm	12m	6m	M	Good	Fair	High	40+	Large, good tree. Central stem of tree has broken in past at about 5m. Torn wound likely point for decay although tree appears to be adjusting well.	A (2)	15.0m	707m ²
T7	London plane (Platanus acerifolia)	20m	890mm	8m	6m	M	Good	Good	High	40+	Large, good tree by entrance road. High potential.	B (2)	10.7m	358m ²
T8	London plane (Platanus acerifolia)	22m	1400mm	12m	9m	M	Good	Good	High	40+	Large, good tree by entrance road.	A (2)	15.0m	707m ²
T9	Horn oak (Quercus ilex)	15m	950mm	9.5m	6m	M	Good	Fair	Moderate	20+	Offsite. Adjacent to a wall and path.	B (2)	11.4m	408m ²
T10	Sycamore (Acer pseudoplatanus)	16m	720mm	7.5m	8m	M	Fair	Fair	Moderate	20+	Offsite. Stem divides at 2.5m. Large wound at base which has exposed heartwood.	C (2)	8.6m	235m ²
T11	Blue cedar (Cedrus libani subsp. atlantica 'Glauca')	16m	1650mm	13.5m	6m	M	Fair	Fair	Low	20+	Very large tree. Major limb loss in the past, exposing heartwood.	B (1)	15.0m	707m ²
T12	Sycamore (Acer pseudoplatanus)	15m	990mm	10m	6m	M	Good	Good	Low	40+	Good, large tree with no obvious faults.	B (1)	11.9m	443m ²
T13	Sycamore (Acer pseudoplatanus)	15m	700mm	10.5m	7m	EM	Fair	Fair	Low	20+	Good tree with a lean which appears to be stable.	B (1)	8.4m	222m ²
T14	London plane (Platanus acerifolia)	22m	1800mm	12m	3m	M	Good	Fair	Low	40+	Very large, good tree except some bark death and staining at base of tree on north side. Growing on mound.	A (1)	15.0m	707m ²
T15	Laburnum (Laburnum angustifolius)	5m	160mm	2.5m	2m	EM	Fair	Fair	Low	10+	Small tree. No obvious issues but of low value.	C (1)	1.9m	12m ²
T16	Fastigate hornbeam (Carpinus betulus 'Fastigiata')	4.5m	90mm	1.5m	1.5m	Y	Fair	Fair	Low	20+	Relatively recently planted. No issues but small and low value at present.	C (1)	1.1m	4m ²
T17	Fastigate hornbeam (Carpinus betulus 'Fastigiata')	4.5m	90mm	1.5m	1.5m	Y	Fair	Fair	Low	20+	Relatively recently planted. No issues but small and low value at present.	C (1)	1.1m	4m ²
T18	Sycamore (Acer pseudoplatanus)	10m	300mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	3.6m	41m ²
T19	Sycamore (Acer pseudoplatanus)	10m	170mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	2.0m	13m ²
T20	Sycamore (Acer pseudoplatanus)	10m	200mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	2.4m	18m ²
T21	Sycamore (Acer pseudoplatanus)	10m	300mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	3.6m	41m ²
T22	Sycamore (Acer pseudoplatanus)	10m	320mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	3.8m	46m ²
T23	Sycamore (Acer pseudoplatanus)	10m	340mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	4.1m	52m ²
T24	Sycamore (Acer pseudoplatanus)	10m	500mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	6.0m	113m ²
T25	Sycamore (Acer pseudoplatanus)	10m	600mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	7.2m	163m ²
T26	Holly (Ilex aquifolium)	8m	2 stems @ 300mm	4m	2m	SM	Fair	Fair	Low	10+	Thinning crown. Low value.	C (1)	5.1m	81m ²



BS 5837 Category
(see report for full details)

Category A - Green Category Letter
Tree of high quality and value

Category B - Blue Category Letter
Tree of moderate quality and value

Category C - Grey Category Letter
Tree of low quality and value

Category U - Red Category Letter
Tree of poor quality and value

Rev	Description	Date	Drawn

Underhill
Tree Consultancy

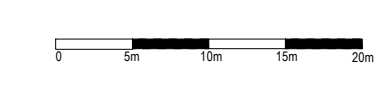
Elizabeth House, 28 Baddow Road, Chelmsford, CM2 0DG
01245 209928 - mail@underhilltc.co.uk - www.underhilltc.co.uk

Project
Clapham College, 45 Clapham Common
Southside

Title
Tree Constraints Plan

Drawing Number	Scale	Date
UTC-0650-P02-TCP	1:500 @ A1	11.01.2022

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ARBORICULTURAL METHOD STATEMENT (HEADS OF TERMS)
British Standards 5837:2012
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 Only tree works specified on this plan or in the associated report shall be carried and should be before any plant and machinery arrives on site. Any variation or uncertainty must be clarified with the project arboricultural consultant or local authority before continuing.
 All tree works to be in accordance with BS 3998:2010 Recommendations for tree works, or industry best practice.
 Tree works have the potential to cause harm to wildlife and some wildlife which use trees is legally protected. It is the responsibility of the main contractor and tree surgery contractor to ensure no protected species are harmed whilst carrying out site clearance or tree surgery works.

Monitoring & Supervision
 The project arboricultural consultant's role includes monitoring compliance with tree protection. Once tree protection is in place, the project arboricultural consultant will be notified and a site visit will take place to approve the protection is fit for purpose. All works within Root Protection Areas (RPAs) and any other works with the capacity to impact retained trees, shall be monitored or supervised by the arboricultural consultant. Site visits shall be limited to cover key activities, and/or at timing agreed by planning condition or at the pre-commencement site meeting.

Protective Barriers & Ground Protection
 Tree protection must be in place before any works, including site clearance or demolition, begin, and stay in place as long as a risk of damage remains.
 The position of protection is shown on this plan. The minimum distance of protective barriers measured from the tree trunk is shown on the plan and in the Tree Survey Sheets. The tree crown MUST NOT be used to indicate the position of protective barriers except where the crown extends beyond the RPA.
 Signs shall be fixed to every third panel stating it is a Tree Protection Area - see example on this plan.

Services
 Underground services will avoid RPAs, but where this is unavoidable and agreed with the local authority, the installation or alteration of services will follow the guidance within BS 5837 or NUGO Volume 4: Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees. All manholes must avoid RPAs entirely.

Excavation & Root Pruning
 The default position is that no excavation is carried out within RPAs. Only where agreed in advance with the local authority and supervised by the project arboricultural consultant, can this occur. The use of hand tools will be required. Exposed roots <25mm diameter will be cut cleanly with sharp tools. Roots larger than 25mm diameter are to be retained unless agreed with the project arboricultural consultant. Great care must be taken to not damage the bark of the roots and any exposed roots must be wrapped in wet hessian to prevent drying. Services should be routed around the retained roots.

No-Dig Surfacing
 Where no-dig construction is specified on this drawing the design and construction will retain existing ground levels. No-dig involves building up levels on top of existing ground or removing an existing surface and sub-base and building up from there. No scraping or reducing of existing soft surfaces, other than the removal of turf or surface vegetation, will be undertaken.
 Suitable no-dig systems are available from:
www.geogrid.co.uk
www.geogrid.co.uk
www.ecoconcrete.co.uk

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- No fires will be permitted within 10m of the crown of any tree.
- No materials or liquids which will contaminate soil (e.g. cement, diesel, vehicle washings, chemical toilets etc.) must not be permitted within, or close to RPAs of retained trees. Consideration must be given to sloping ground to ensure contamination will not occur in the event of a spillage.

Procedure for Incidents
 If any breach of the approved tree protection measures occurs:

- The site manager must be informed immediately.
- The Local Authority Tree Officer (or other Planning Officer) and the Project Arboriculturalist must be informed at the earliest opportunity.
- Immediate action must be taken to halt the breach and prevent any further breaches.
- All preventative action and details of agreed remedial works must be recorded and reported to the LPA.

Issues relevant to this site and requiring more detailed consideration once consent is approved, include:

- Who will be responsible for protecting the trees on site? Usually the site manager – to be agreed at the pre-commencement meeting.
- Auditable system of arboricultural site monitoring, including a schedule of specific site events requiring input or supervision and how problems will be reported and solved.
- Tree works pre-development and any facilitation granting to allow for site access.
- Site clearance, demolition including the removal of hard surfaces.
- Installation of tree protection barriers and any ground protection.
- Details of soil and archaeological investigations, contaminated soil removal, Japanese knotweed control and other works requiring excavation, if near trees.
- Site heading, temporary services, site facilities, parking, storage of materials and plant and welfare.
- Crane access, location and movements.
- Details of changes in soil levels, grading, mounding and removal of spoil and details of retaining structures where permanent changes of soil level are proposed.
- Measures to control dust, concrete washings and wheel washings near trees.
- Any excavations within RPAs.
- Specialist foundations, including details of piling operations.
- Installation of new hard surfacing.
- Precise services locations, including methods of installation near trees where unavoidable.
- Landscaping works, including removal of tree protection.
- Post construction amelioration where required.


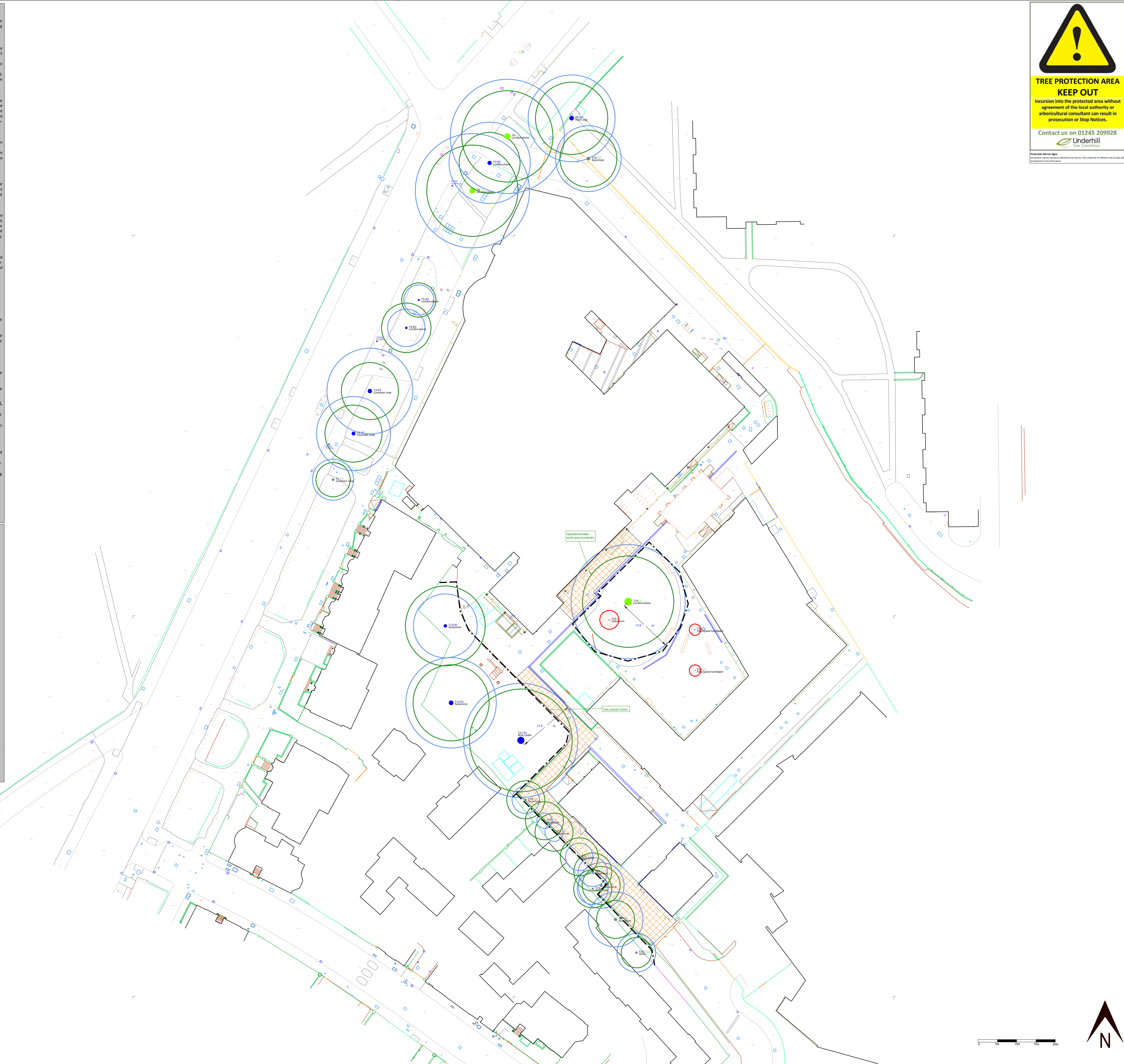
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Various approaches can be used, including retaining existing hard surfaces where possible. It might comprise one of the following:

- for pedestrian movements or the erection of scaffolding within the RPA the installation of ground protection in the form of a single thickness of scaffold boards either on top of a driven scaffold frame, or as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip laid onto a geotextile);
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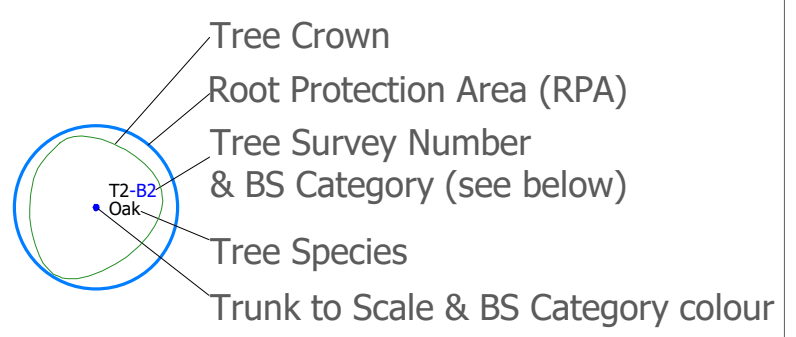
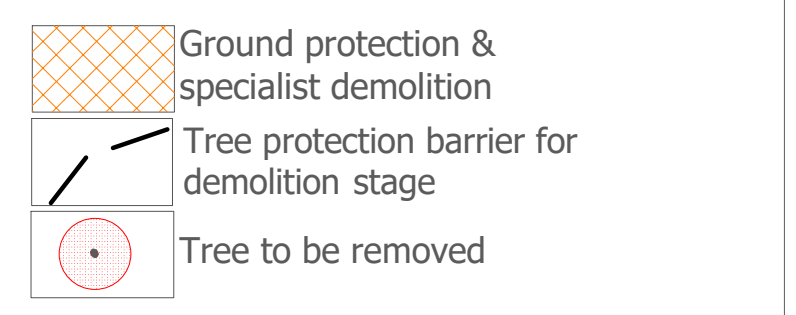
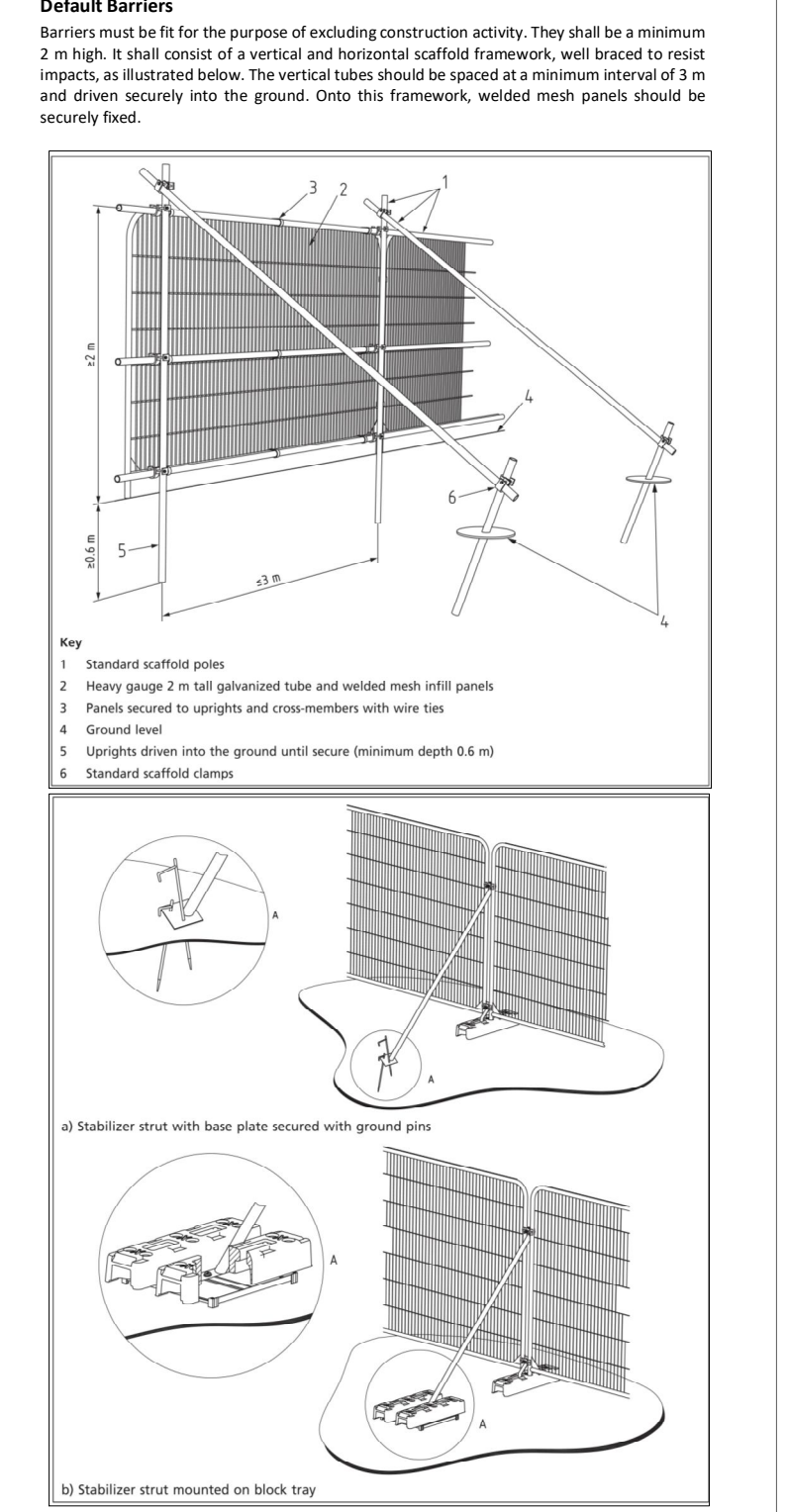
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This drawing should be reproduced in colour

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 Barriers must be fit for the purpose of excluding construction activity. They shall be a minimum 2 m high. It shall consist of a vertical and horizontal scaffold framework, well braced to resist impacts, as illustrated below. The vertical tubes should be spaced at a minimum interval of 3 m and driven securely into the ground. Onto this framework, welded mesh panels should be securely fixed.



BS 5837 Category
 (see report for full details)

Category A - Green Category Letter
 Tree of high quality and value

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 Tree of moderate quality and value

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Category U - Red Category Letter
 Tree of poor quality and value

Rev	Description	Date	Drawn

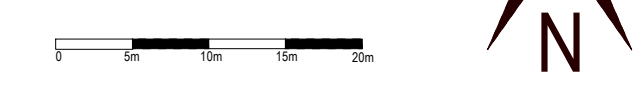
Underhill Tree Consultancy
 Elizabeth House, 28 Baddow Road, Chelmsford, CM2 0DG
 01245 209928 - mail@underhilltc.co.uk - www.underhilltc.co.uk

Project
 Clapham College, 45 Clapham Common Southside

Title
 Tree Protection Plan - Demolition

Drawing Number	Scale	Date
UTC-0650-P04-TTP-D	1:500 @ A1	05.03.2022

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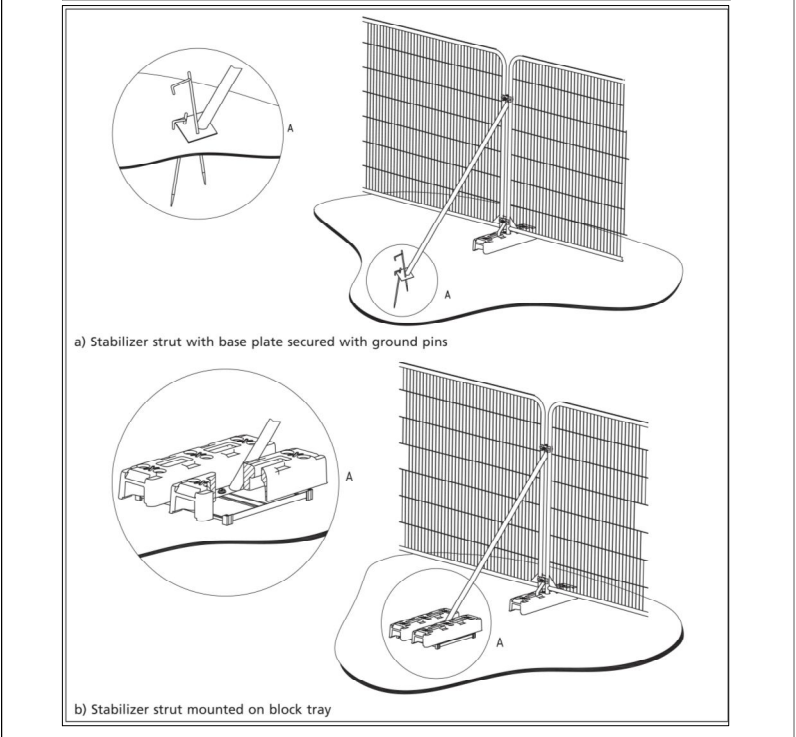
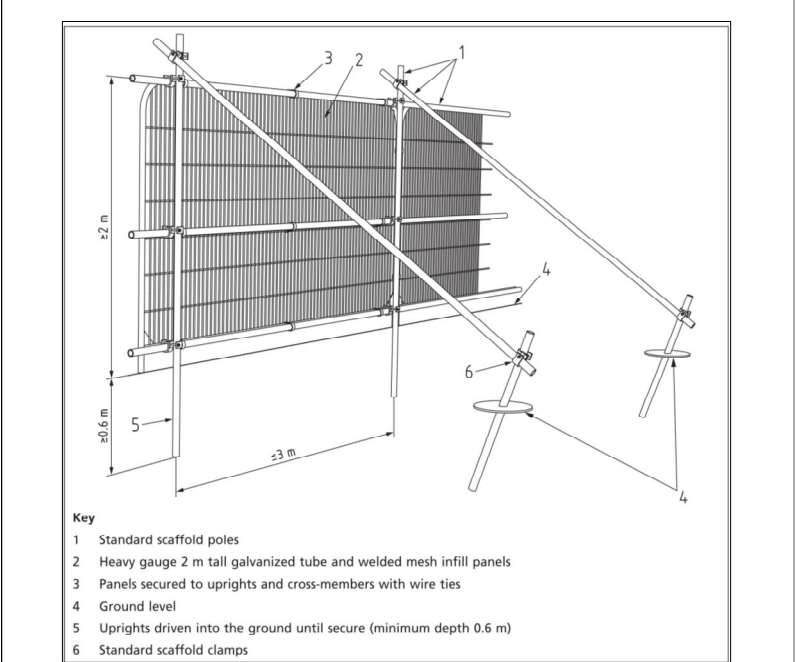
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Ground protection & specialist construction (hatched pattern)

Tree protection barrier for construction stage (dashed line)

Tree Crown

Root Protection Area (RPA)

Tree Survey Number & BS Category (see below)

Tree Species

Trunk to Scale & BS Category colour

BS 5837 Category
 (see report for full details)

- Category A** - Green Category Letter
Tree of high quality and value
- Category B** - Blue Category Letter
Tree of moderate quality and value
- Category C** - Grey Category Letter
Tree of low quality and value
- Category U** - Red Category Letter
Tree of poor quality and value

A	Revised layout added	22.08.22	IGU
Rev	Description	Date	Drawn

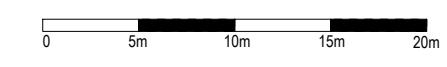
Underhill Tree Consultancy
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 01245 209928 - mail@underhilltc.co.uk - www.underhilltc.co.uk

Project
 Clapham College, 45 Clapham Common
 Southside

Title
 Tree Protection Plan - Construction

Drawing Number	Scale	Date
UTC-0650-P05-TPP-C	1:400 @ A1	05.03.2022

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APPENDIX B - TREE SURVEY SCHEDULE – EXPLANATORY NOTES & SURVEY SHEETS

<p><u>METHODOLOGY</u> A ground level only survey was undertaken. No specialist decay detection equipment was used with basic sounding and probing tools used where necessary. No soil samples or investigations were carried out. Access to trees outside the site boundaries may not have been possible, thus observations are confined to what was visible from within the site and any surrounding public areas. Where heavy ivy, or other vegetation is present, trees are assessed from what can be seen. The survey and this report are prepared for planning purposes only and is not a safety assessment of trees. Any obvious faults, hazards or health issues will be commented on and are part of the assessment for suitability for retention; however, it must be understood that this report is not a tree risk assessment and should not be construed as such. This report must not be relied on to ensure the tree owner's Duty of Care has been fulfilled.</p> <p><u>TREE NO.</u> T: Tree; G: Group; W: Woodland; H: Hedge; S: Shrub mass</p> <p><u>SPECIES</u> English name with botanical name given for first entry.</p> <p><u>HEIGHT</u> Estimated or measured with the use of a Disto laser measurer, given in metres.</p> <p><u>TRUNK DIAMETER</u> Measured at approximately 1.5m above ground level and given in millimetres.</p> <p><u>RADIAL CROWN SPREAD</u> Measured by Disto laser measurer at the main cardinal points and given in metres. For trees with reasonably symmetrical crowns, a single averaged figure is given.</p> <p><u>CROWN CLEARANCE</u> Estimated height of main crown above ground level. Given in metres.</p>	<p><u>HEIGHT TO 1ST BRANCH (WHERE RELEVANT)</u> Any low branches that would not be feasible for removal during normal management and should be considered a design constraint, are noted. Given as the height of the first main branch above ground level and aspect. Given in metres.</p> <p><u>LIFE STAGE</u> NP: Newly planted. Y: Young - an establishing tree that could be easily transplanted. High ability to cope with change. SM: Semi-mature - an established tree still to reach its ultimate height and spread and with considerable growth potential. High ability to cope with change. EM: Early mature - a tree reaching its ultimate height and whose growth is slowing, however, it will still increase considerably in stem diameter and crown spread. Moderate ability to cope with change. M: Mature - a tree with limited potential for further significant increase in size although likely to have a considerable safe useful life expectancy. Limited ability to cope with change. LM: Late mature - a senescent tree, in decline, although may still have a useful life expectancy. Very little ability to cope with change. V: Veteran – has features associated with advanced age for its species but not necessarily very old chronologically. Very low ability to cope with change. A: Ancient - a tree older than typical for the species and of great ecological, cultural, or aesthetic value. Very low ability to cope with change.</p> <p><u>PHYSIOLOGY</u> Health, condition and function of the tree, in comparison to a normal specimen of its species and age.</p> <p><u>STRUCTURE</u> Structural condition of the tree, based on both the structure of its roots, trunk, major stems and branches, and on the presence of any structural defects or decay. Given as Good, Fair, Poor or Hazardous.</p>	<p><u>LANDSCAPE VALUE (WHERE USED)</u> An evaluation of the visibility of the tree from public viewpoints. Given as Unspecified, Low, Moderate or High.</p> <p><u>ESTIMATED YEARS</u> Estimated remaining useful contribution in years. This is not necessarily the ultimate life expectancy of the tree as trees can often exist in a collapsed, decayed form for many years, however, this may not be appropriate in the site context.</p> <p><u>COMMENTS</u> Where appropriate, comments could expand on tree condition and health, features within the rooting zone, safety concerns etc. Recommendations for any tree works are only intended to address significant issues identified during the inspection and is not for works to facilitate the development. Shown in red text.</p> <p><u>BS 5837 CATEGORY</u> U: Unsuitable for retention. Existing condition is such that they cannot be realistically retained as living trees in the context of the current land use for longer than 10 years. Note, category U trees can have existing or potential conservation value which it might be desirable to preserve. A: High quality and value (non-fiscal) with at least 40 years remaining life expectancy. B: Moderate quality and value with at least 20 years remaining life expectancy. C: Low quality and value with at least 10 years remaining life expectancy, or young trees with a stem diameter below 150 mm. A, B and C category trees are additionally graded into 1) Mainly arboricultural values; 2) Mainly landscape values; 3) Mainly cultural values including conservation.</p> <p><u>RPA RADIUS</u> Root protection radius in metres measured from base of tree.</p> <p><u>RPA M²</u> The total area of the RPA in square metres.</p>
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All trees with a trunk diameter of 75mm or above were surveyed, as recommended in BS 5837. Obvious hedges and shrub masses were identified where appropriate. Information collected is in accordance with recommendations in subsection 4.4.2.5 of BS 5837 and includes species, height, diameter, branch spread, crown clearance, age class, physiological condition, structural condition, and remaining contribution. Each tree was then allocated one of four categories (U, A, B or C) to reflect its suitability as a material constraint on development.

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clearance	Life Stage	Physiology	Structure	Landscape Value	Est. Years	Comments	Category	RPA Radius	RPA m2
T1	Common lime (<i>Tilia x europaea</i>)	9m	450mm	4.5m	2.5m	EM	Fair	Fair	Moderate	20+	Offsite. Adjacent to access drive. Suckers and epicormic shoots.	C (2)	5.4m	92m ²
T2	Common lime (<i>Tilia x europaea</i>)	16m	810mm	7.5m	3.5m	M	Fair	Fair	Moderate	20+	Has been reduced in past. Slightly thinning crown. Suckers and epicormic shoots.	B (2)	9.7m	297m ²
T3	Common lime (<i>Tilia x europaea</i>)	18m	940mm	7.5m	4m	M	Fair	Fair	Moderate	20+	Has been reduced in past. Slightly thinning crown. Suckers and epicormic shoots.	B (2)	11.3m	400m ²
T4	London plane (<i>Platanus acerifolia</i>)	12m	410mm	6.5m	2m	SM	Good	Good	Moderate	40+	Very good tree although relatively small and young.	B (2)	4.9m	76m ²
T5	London plane (<i>Platanus acerifolia</i>)	11m	330mm	4.5m	2m	SM	Good	Good	Moderate	40+	Very good tree although relatively small and young.	B (2)	4.0m	49m ²
T6	London plane (<i>Platanus acerifolia</i>)	20m	1300mm	12m	6m	M	Good	Fair	High	40+	Large, good tree. Central stem of tree has broken in past at about 5m. Torn wound likely point for decay although tree appears to be adapting well.	A (2)	15.0m	707m ²
T7	London plane (<i>Platanus acerifolia</i>)	20m	890mm	8m	6m	M	Good	Good	High	40+	Large, good tree by entrance road. High potential.	B (2)	10.7m	358m ²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clearance	Life Stage	Physiology	Structure	Landscape Value	Est. Years	Comments	Category	RPA Radius	RPA m2
T8	London plane (<i>Platanus acerifolia</i>)	22m	1400mm	12m	9m	M	Good	Good	High	40+	Large, good tree by entrance road.	A (2)	15.0m	707m ²
T9	Holm oak (<i>Quercus ilex</i>)	15m	950mm	9.5m	6m	M	Good	Fair	Moderate	20+	Offsite. Adjacent to a wall and path.	B (2)	11.4m	408m ²
T10	Sycamore (<i>Acer pseudoplatanus</i>)	16m	720mm	7.5m	8m	M	Fair	Fair	Moderate	20+	Offsite. Stem divides at 2.5m. Large wound at base which has exposed heartwood.	C (2)	8.6m	235m ²
T11	Blue cedar (<i>Cedrus libani</i> subsp. <i>atlantica</i> 'Glauca')	16m	1650mm	13.5m	6m	M	Fair	Fair	Low	20+	Very large tree. Major limb loss in the past, exposing heartwood.	B (1)	15.0m	707m ²
T12	Sycamore (<i>Acer pseudoplatanus</i>)	15m	990mm	10m	6m	M	Good	Good	Low	40+	Good, large tree with no obvious faults.	B (1)	11.9m	443m ²
T13	Sycamore (<i>Acer pseudoplatanus</i>)	15m	700mm	10.5m	7m	EM	Fair	Fair	Low	20+	Good tree with a lean which appears to be stable.	B (1)	8.4m	222m ²
T14	London plane (<i>Platanus acerifolia</i>)	22m	1800mm	12m	3m	M	Good	Fair	Low	40+	Very large, good tree except some bark death and staining at base of tree on north side. Growing on mound.	A (1)	15.0m	707m ²
T15	Laburnum (<i>Laburnum anagyroides</i>)	5m	160mm	2.5m	2m	EM	Fair	Fair	Low	10+	Small tree. No obvious issues but of low value.	C (1)	1.9m	12m ²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clearance	Life Stage	Physiology	Structure	Landscape Value	Est. Years	Comments	Category	RPA Radius	RPA m2
T16	Fastigate hornbeam (<i>Carpinus betulus</i> 'Fastigiata')	4.5m	90mm	1.5m	1.5m	Y	Fair	Fair	Low	20+	Relatively recently planted. No issues but small and low value at present.	C (1)	1.1m	4m ²
T17	Fastigate hornbeam (<i>Carpinus betulus</i> 'Fastigiata')	4.5m	90mm	1.5m	1.5m	Y	Fair	Fair	Low	20+	Relatively recently planted. No issues but small and low value at present.	C (1)	1.1m	4m ²
T18	Sycamore (<i>Acer pseudoplatanus</i>)	10m	300mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	3.6m	41m ²
T19	Sycamore (<i>Acer pseudoplatanus</i>)	10m	170mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	2.0m	13m ²
T20	Sycamore (<i>Acer pseudoplatanus</i>)	10m	200mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	2.4m	18m ²
T21	Sycamore (<i>Acer pseudoplatanus</i>)	10m	300mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	3.6m	41m ²

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clearance	Life Stage	Physiology	Structure	Landscape Value	Est. Years	Comments	Category	RPA Radius	RPA m2
T22	Sycamore (<i>Acer pseudoplatanus</i>)	10m	320mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	3.8m	46m ²
T23	Sycamore (<i>Acer pseudoplatanus</i>)	10m	340mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	4.1m	52m ²
T24	Sycamore (<i>Acer pseudoplatanus</i>)	10m	500mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	6.0m	113m ²
T25	Sycamore (<i>Acer pseudoplatanus</i>)	10m	600mm	5m	4m	EM	Poor	Poor	Low	10+	One of a line of trees, all heavily reduced. Growing in narrow space. Low value other than screening for neighbours.	C (1)	7.2m	163m ²
T26	Holly (<i>Ilex aquifolium</i>)	8m	2 stems @ 300mm	4m	2m	SM	Fair	Fair	Low	10+	Thinning crown. Low value.	C (1)	5.1m	81m ²

APPENDIX C – TREE PROTECTION & PRINCIPLES FOR WORKING CLOSE TO TREES

On some sites, where the interaction between trees and development are straightforward, the following information may be sufficient. On sites with more complex interactions, the information is to aid design and decision making. The detailed Arboricultural Method Statement, produced following planning permission, will be site specific.

PROTECTION OF RETAINED TREES

- 1 Protection measures, usually a combination of barriers and ground protection must be in place before any works, including site clearance or demolition, begin, and stay in place for as long as a risk of damage remains. The protection of trees must take account of the buildability of the proposal, including services, and ensure that all activities such as storage of materials, parking and the use of plant and vehicles can be accommodated outside of RPAs. Particular care and planning are necessary for the operation of excavators, lifting machinery and cranes to ensure all vehicle movements and lifting operations will not impact on retained trees. No protection barriers or ground protection can be moved from its agreed location, however temporarily, without consulting the project arboriculturist.
- 2 The location of tree protection barriers and ground protection can be found on the Tree Protection Plan. Unless agreed at the pre-commencement site meeting, the location of tree protection must follow the positions shown on the Tree Protection Plan. The crown spread of the tree IS NOT the default position for barriers.
- 3 The position of the barriers should be confirmed by the Project Arboriculturist following the first site monitoring visit.
- 4 The specification of barriers should be in accordance with Section 6 of BS 5837, see examples below. The precise form of the barriers can vary, provided it is fit for the purpose of preventing pedestrian or vehicular access.

DESIGN OF WELDED MESH, HERAS TYPE TREE PROTECTION BARRIER

- 5 Barriers should be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place. The default specification should be in accordance with 6.2.2.2 of BS 5837, as set out below.
- 6 Specifications: Barriers shall be a minimum 2 m high. It shall consist of a vertical and horizontal scaffold framework, well braced to resist impacts, as illustrated below. The vertical tubes should be spaced at a minimum interval of 3 m and driven securely into the ground. Onto this framework, welded mesh panels should be securely fixed. See Figures 2 and 3 below.
- 7 Where site circumstances and associated risk of damaging incursions into the RPA do not necessitate the default level of protection, an alternative specification may be used if agreed with the local authority. An example would be 'Heras' type welded mesh panels on rubber or concrete feet. The panels should 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 should be supported on the inner side by stabiliser struts. See Figure 3 overleaf. All-weather notices, at

least A3 size, should be attached to the barrier with words such as 'TREE PROTECTION ZONE - NO ACCESS (see example below).

Figure 2 Default specification for protective barrier

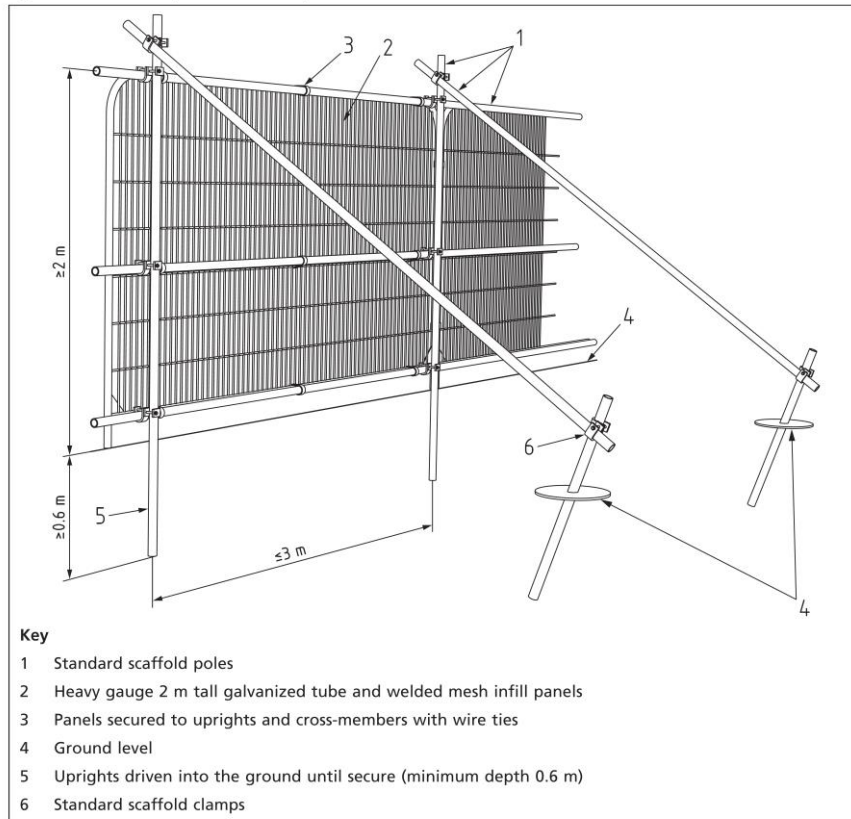
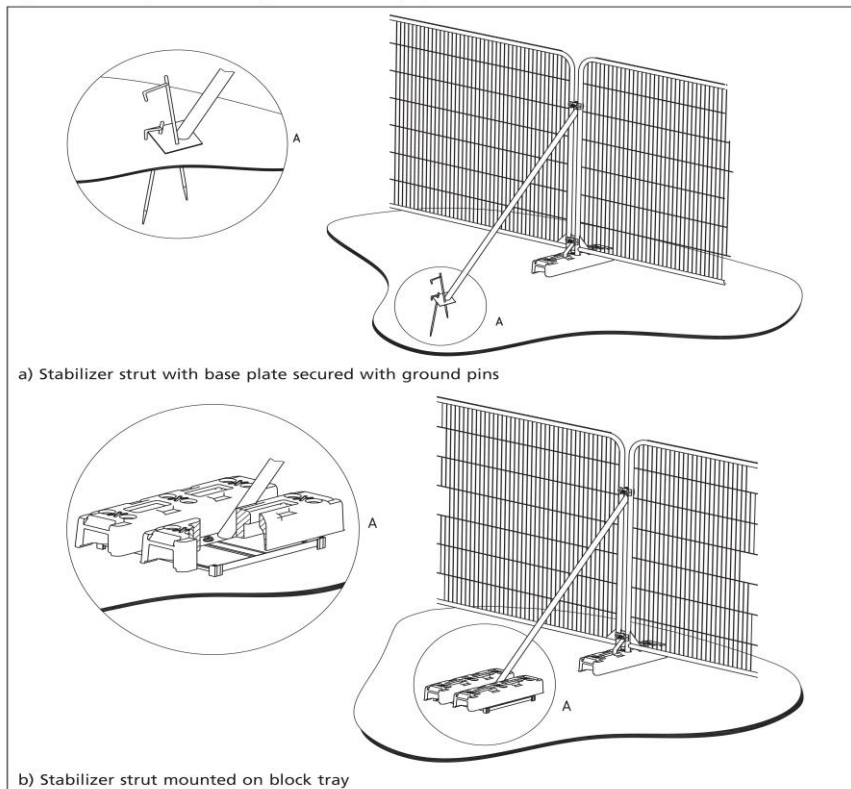


Figure 3 Examples of above-ground stabilizing systems



Figures reproduced with the permission of the British Standards Institute

Suggested tree protection barrier warning sign format



GROUND PROTECTION

- 8 Ground protection, if specified by the Project Arboriculturist, can be used to protect the RPAs of trees where access is still required. The purpose of the ground protection is to prevent compaction of the soil structure beneath. Ground protection must be fit for the purpose of supporting the expected loading without distorting or compacting the underlying soil.

- 9 Various approaches can be used, including retaining existing hard surfaces where possible. It might comprise one of the following:
- for pedestrian movements or the erection of scaffolding within the RPA the installation of ground protection in the form of a single thickness of scaffold boards either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip laid onto a geotextile);
 - for pedestrian-operated plant up to a gross weight of 2t, proprietary, inter-linked ground protection boards or panels placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane; or
 - for wheeled or tracked construction traffic exceeding 2t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.
- 10 Ground protection will be installed at the locations shown on the Tree Protection Plan before any works begin on site and will remain in place until there is no risk of harm from development. Its location will not be changed or removed without consulting the project arboriculturist.
- 11 The following is a list of suppliers of temporary ground protection including polymer, metal or wooden panels. Other companies supply similar products and the following are given only as an example:
- www.ground-guards.co.uk □ www.centriforce.com
 - www.evetrakway.co.uk □ www.marwoodgroup.co.uk
 - www.trakmatseurope.com □ www.groundtrax.com



Examples of proprietary ground protection panels

EXCAVATION IN RPAs

- 1 Excavation can directly damage tree roots and disturb the soil environment. However, some trees can tolerate limited excavation if carried out carefully and the disturbance is kept to a minimum. The amount of disturbance that an individual tree can tolerate depends on factors such as tree species, health, age, and the growing conditions. These are all matters that will be assessed by the Project Arboriculturist.
- 2 Unless otherwise agreed by the Project Arboriculturist, all excavation will be carried out using hand tools. The preferred method will be compressed air displacement, such as an Air Spade®. If soil conditions or other factors mean the compressed air method is not available, hand digging will be acceptable.
- 3 Excavation by hand using hand-tools only or by an excavator equipped with a smooth-bucket must be under strict arboricultural supervision.
- 4 Care must be taken to not damage any roots found. The stripping of bark from around a root will result in it dying from that point on. The bark on roots is often soft and easily damaged by hand tools. Roots must not be used to lever spades and other tools for example, as this will damage bark.
- 5 It may be acceptable to cut roots found with a diameter less than 25mm if agreed after assessment by the Project Arboriculturist.
- 6 Individual roots, or clumps of roots with a diameter of 25mm or more must be retained, unless cutting is agreed after assessment by the Project Arboriculturist. Retained roots will be carefully exposed and temporarily wrapped in damp hessian to reduce desiccation from sun and wind, and to protect from extremes of temperature.
- 7 If large diameter roots have been retained, the foundation must be designed to accommodate the roots. Depending on the roots' location it may be possible to bridge a root using a concrete lintel or similar supported by concrete pads either side before continuing with a conventional footing for example.
- 8 Where roots have been retained it is important that any foundation allows for incremental growth of the root. There should also be sufficient space around the root to backfill with topsoil.

NEW STRUCTURES IN RPAs

- 1 Conventional construction with traditional foundations results in extensive loss of tree roots and must be avoided in RPAs.
- 2 The covering of the soil surface by the new structure can impede water and gaseous exchange.

FOUNDATIONS

- 3 Conventional foundations require deep excavations which will sever any roots encountered. The principle of acceptable foundations within RPAs is that important tree roots are not just retained but can continue to function normally which includes further growth.

- 4 Pile and beam foundations are often assumed to be more suitable than strip foundations, however, conventional pile and beam requires the top of the beam to be at soil level and therefore requires excavation for the beam and any compressible layer or void beneath. The overall depth is usually 600mm upwards. Most roots are usually found at this depth and therefore this system will not be acceptable where root loss would adversely affect a retained tree.
- 5 The use of pile and beam or pile and raft can be acceptable provided the beams or raft are designed to be at or above ground-level. This will result in higher finished levels which must be allowed for during design because of the effect on access thresholds and structure heights etc.
- 6 The use of cantilevered structures supported on foundations outside RPAs may be an option.
- 7 The beam or raft must be designed so an absolute maximum of 100mm excavation takes place. This is to allow for the removal of minor undulations and allow for close contact between the soil and the beam.
- 8 Steel beams are available with a lower profile than concrete beams thereby resulting in a lower finished floor level.
- 9 Where there is a need for a compressible layer beneath the beam, an acceptable method is to open up a trench using a compressed air lance, which retains roots, and inserting the compressible material between retained roots. An assessment of the exposed roots can be made to determine if roots can be pruned to allow for sufficient compressible material to be inserted.
- 10 Depending on the percentage of the RPA covered by the building, and site circumstances, it may be necessary to leave a void for gaseous exchange, and to direct rainwater underneath.
- 11 Where poured concrete is to be used for foundations, the sides of the excavation will be lined with an impermeable membrane such as plastic sheeting to prevent the caustic and toxic effects of wet cement in the concrete from damaging tree roots.

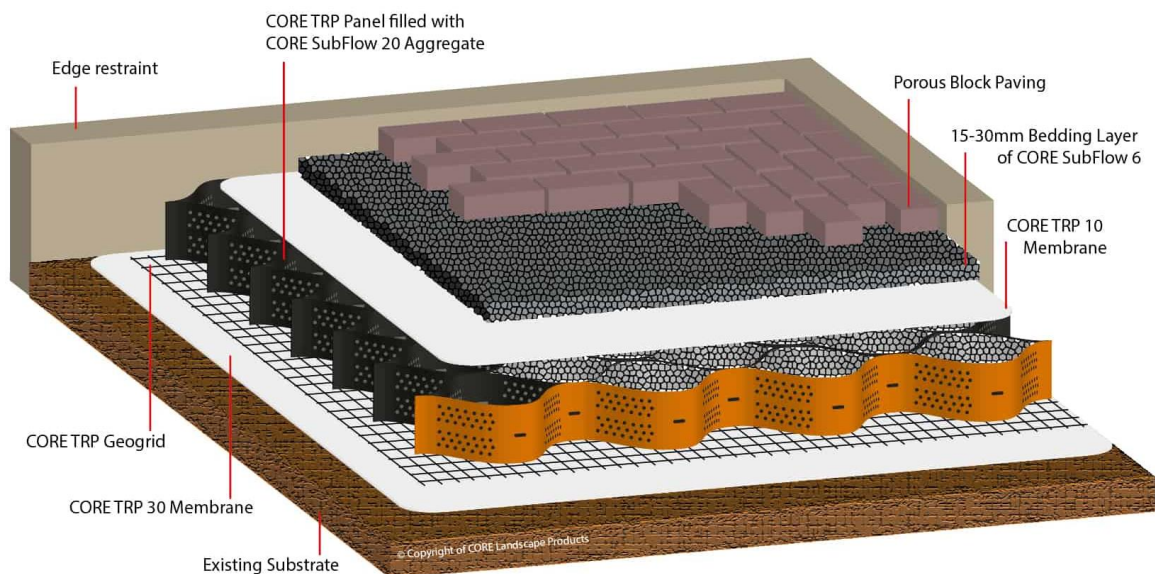
HARD SURFACES IN RPAs

- 1 Conventional surfacing installation based on excavating and compacting a supporting subbase is unacceptable in RPAs because it can damage roots and the rooting environment by severing roots, compacting soil structure and impeding water and gaseous exchange through the soil.

SURFACING OPTIONS

- 2 The principles to follow when considering design include protecting roots and the rooting environment during installation, a load spreading system to prevent compaction, and providing adequate permeability for water and gaseous exchange. The main approaches, often referred to as no-dig, are:
 - Three-dimensional cellular confinement systems (CCS) filled with washed aggregate laid directly onto the soil surface;

- Concrete slabs cast directly onto the soil surface; and
 - Surfacing supported above the soil surface on top of piles, pads, or posts.
- 3 The specific design chosen will take account of the bearing capacity of the soil and intended loading and is an engineering issue.
- 4 No-dig systems result in higher finished levels than conventional construction by as much as 300mm. It is important to ensure that a raised finished level can be incorporated into the development. Existing road levels and existing and proposed building thresholds often cause conflict. Speed-humps or similar can sometimes be used to disguise changes in level between roads.
- 5 The following is a list of manufacturers and suppliers of CCSs and edging materials. Other products and suppliers are available:
- Cellweb™ - Geosynthetics www.geosyn.co.uk/product/cellweb-tree-root-protection
 - InfraGreen Solutions – Infracore TRP <http://infragreen-solutions.com/tree-root-protection>
 - ProtectaWeb™ - Wrekin www.wrekinproducts.com/articles/protectaweb-meets-tree-root-protection-requirements
 - CORE Landscape Products - [www. https://www.corelp.co.uk/core-tree-root-protection/](http://www.corelp.co.uk/core-tree-root-protection/)
 - Treetex™ - Geosynthetics www.geosyn.co.uk/wp-content/uploads/2015/08/cellweb-fact-sheet-4-60.pdf



Examples of cellular confinement system by Core Landscape Products

APPENDIX D – CAVAT CALCULATIONS

CAPITAL ASSET VALUE FOR AMENITY TREES (CAVAT)

- 1 CAVAT calculations have been made on the three trees to be removed. This is to comply with Policy G7: Trees and Woodlands, of The London Plan. This states that: *any trees removed as a result of development should be adequately replaced based on the existing value of the benefits of the trees removed. The use of an appropriate valuation system, such as CAVAT or i-tree, should be used for this purpose.*
- 2 The calculations are shown in the spreadsheets below. The value of trees T16 and T17 are the same, so only the spreadsheet of T16 is included.

TECHNICAL REFERENCES

In preparing the analysis in this report, reference has been made to the guidance and advice in the following technical references:

- Climate Change Act (2008) www.legislation.gov.uk/ukpga/2008/27/contents
- Town and Country Planning Act 1990 <http://www.legislation.gov.uk/ukpga/1990/8/contents>
- National Planning Policy Framework ("NPPF"), published by the DCLG www.gov.uk/government/publications/national-planning-policyframework--2
- BS 5837 (2012) Trees in relation to design, demolition and construction – Recommendations, BSI <http://shop.bsigroup.com/>
- BS 8545 (2014) Trees: from nursery to independence in the landscape – Recommendations, BSI <http://shop.bsigroup.com/>
- BS 3998 (2010) Tree work – Recommendations, BSI <http://shop.bsigroup.com/>
- Trees in the Townscape: A Guide for Decision Makers, published by the Trees & Design Action Group <http://www.tdag.org.uk/>
- Trees in Hard Landscapes: A Guide for Delivery, published by the Trees & Design Action Group <http://www.tdag.org.uk/>
- National Joint Utilities Group (2007) Volume 4, Issue 2: Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees www.njug.org.uk/publications/

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The report covers arboricultural issues; however, non-arboricultural matters may be referred to such as soils, ecology, construction methods etc. This should be viewed as provisional and the appropriate expert should be consulted where required.

No assessment has been made of the potential influence of trees upon existing buildings or other structures because of shrinkable soils or from direct damage.

Trees are dynamic living organisms and their condition can change rapidly and therefore this report is valid for a period of 12 months. This period may be reduced if significant changes occur to the trees or the ground conditions close to them.



Underhill Tree Consultancy Ltd
Elizabeth House, 28 Baddow Road, Chelmsford, Essex, CM2 0DG
01245 209928

mail@underhilltc.co.uk

www.underhilltc.co.uk

Registered in England & Wales No. 9492370

Stansted:
Unit 1, The Exchange,
9 Station Road,
Stansted, CM24 8BE

t +44 (0)1279 647044
e office@lizlake.com
www.lizlake.com

Bristol:
1 Host Street,
Bristol, BS1 5BU

t +44 (0)117 927 1786
e office@lizlake.com
www.lizlake.com

Nottingham:
3 Newcastle Chambers
Angel Row
Nottingham
NG1 6HL
t +44 (0)115 784 3566
e office@lizlake.com
www.lizlake.com

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