

## **TREE SURVEY, ARBORICULTURAL IMPACT ASSESSMENT AND ARBORICULTURAL METHOD STATEMENT**

A report to accompany a planning application for the construction of front and rear single storey extensions at 323 Hanworth Road, Hampton, TW12 3EJ.

**Report by Dr Martin Dobson**

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On the instructions of Bryn and Nathalie Reeves

*16<sup>th</sup> July 2024*

MDA reference T73



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## **1. Instructions**

- 1.1 Martin Dobson Associates Ltd (MDAL) was instructed by Bryn and Nathalie Reeves on 27<sup>th</sup> November 2023 to carry out a BS5837: 2012 compliant survey of trees at 323 Hanworth Road, Hampton, TW12 3EJ, and prepare a tree survey schedule and tree constraints plan, to inform of potential tree-related constraints on the site. MDAL was further instructed to prepare an arboricultural impact assessment to consider potential impacts of the proposal to build front and rear extensions, and to recommend suitable mitigation for any impacts identified. The final instruction was to prepare a tree protection plan and an arboricultural method statement to provide a specification for tree protection during the proposed development.
- 1.2 The documents that have been provided for reference are as follows:
- 1) Encompass architect's drawing No. 22042-PLA-204 REV000
  - 2) Encompass architect's drawing No 22042-PLA-202 REV001

## 2. Introduction

- 2.1 The British Standard 5837: 2012 *Trees in relation to design, demolition and construction – Recommendations* provides a framework for considering trees in the planning process. It gives guidance on categorising the qualities of trees in order to enable decisions to be made as to which trees are appropriate for retention within a development. It then advises on options for protecting trees to be retained during the development (at all stages including demolition, construction and hard landscaping), and the means of incorporating trees into the developed landscape. This report has been prepared with reference to the recommendations of BS5837: 2012.
- 2.2 Trees that are assigned a BS5837: 2012 category of A or B, are considered to be of high value and should be considered for retention. Trees in category C should be retained where possible, but should not be considered a material constraint to development. Trees categorised as U are unsuitable for retention, usually because they are dead or dangerous, or have a very short safe useful life.
- 2.3 The proposed development considered in this report is for the construction of a single storey infill extension at the front, a single storey extension at the rear, and an open-sided glass canopy at the rear.
- 2.4 The site is within the CA65 Hanworth Road Conservation Area, and this means that all trees with a trunk diameter of 75mm or more benefit from statutory protection and no work can be carried out to them (including cutting roots or branches, or felling) without statutory notification to the local planning authority (Richmond Borough Council). Oak T1 is also protected by a Tree Preservation Order T1153 made on 22<sup>nd</sup> December 2022. However, oak T1 has been a cause of subsidence damage and a level distortion survey carried out by Geo-Bear confirmed that the front has subsided relative to the rest of the building by up to about 60mm. The building levels are currently being monitored with a view to submitting an application to fell the tree to mitigate the subsidence damage. For the time being the tree cannot be removed, and thus its protection is considered in this report.
- 2.5 The report considers makes recommendations for methods to ensure that the retained trees will be protected from harm during preparatory works and construction.

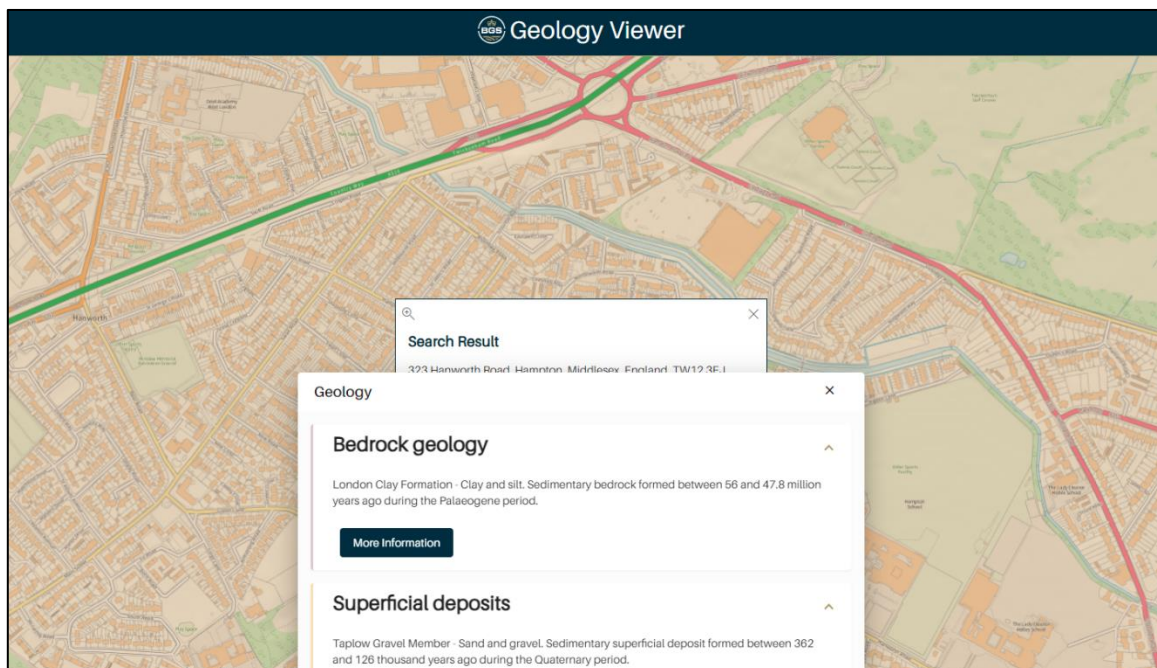
### 3. Tree survey

- 3.1 The tree survey was carried out by Martin Dobson on 8<sup>th</sup> January 2024. Tree heights and crown spreads were measured using a Nikon Range Finder or Trupulse laser, and trunk diameters were measured at 1.5m above ground level using a diameter tape. Dimensions were estimated where access or visibility was restricted (e.g. if the tree was on neighbouring land).
- 3.2 Appended at **MD1** is the tree survey schedule which provides details of the five trees present within the property. A number of saplings were present on neighbouring land, but the boundary wall and its foundations effectively separates these trees from the subject property.
- 3.3 The site survey drawing appended at **MD2**, based on the architect's drawings and on-site measurements of tree positions, shows the locations of the surveyed trees and gives a reasonable indication of their comparative branch spreads. The drawing has been colour coded as follows:
- |  |             |
|--|-------------|
| A trees (high quality and value, minimum 40 years useful life)               | LIGHT GREEN |
| B trees (moderate quality and value, minimum 20 years useful life)           | MID BLUE    |
| C trees (low quality and value, minimum 10 years useful life)                | GREY        |
| U trees (unsuitable or dead/dying/dangerous, less than 10 years useful life) | RED         |
- 3.4 It should be understood that no individual safety inspection has been carried out on any tree. Similarly, any suggestions for tree work should not be taken as a specification for tree works.
- 3.5 Of the five trees surveyed one is considered to be category A and of high value (T1 oak) and the remaining four are category C and of low value.
- 3.6 Adequate protection, both above and below ground, is essential for trees that are to be retained as part of a development. The British Standard BS5837: 2012 *Trees in relation to design, demolition and construction - Recommendations* advises that there should be a root protection area (RPA) around trees which is kept free of construction activities by means of an exclusion zone enforced by protective fencing and/or ground protection. The RPA is calculated as the area equivalent to a circle with a radius of 12 times the trunk diameter at a height of 1.5 m above ground level. Based on the tree survey data root protection areas (and radial distances from the trunk to be protected) have been calculated and these are shown as circles around the trees on the tree constraints plan at **MD2** and are tabulated at **MD3**.

## 4. Soil assessment

- 4.1 BS5837: 2012 advises that soil properties should be considered as part of a tree survey report. This is necessary because trees can cause damage to structures founded on soils that shrink and swell with changes in moisture content (principally clays). Such movement is exacerbated by the influence of trees and therefore if a shrinkable soil is suspected foundations should be designed to extend below the likely zone of seasonal moisture change.
- 4.2 The British Geological Survey 1: 50,000 scale map indicates that the underlying geology of the site is shrinkable London Clay Formation – Clay, Silt and Sand and that this is overlain by the Taplow Gravel Member – Sand and Gravel (Figure 1). The depth of the Taplow gravel is not known, but site investigations carried out by Construction Testing Solutions in March 2023 confirmed that existing foundations of the house are 600mm deep and that the soil below foundations to a depth of 1.3m is 'Very stiff orange-brown silty sandy gravelly CLAY'. Foundations of the new extensions may need to be deepened to take account of trees. Guidance is available in the National House Building Council's Standards Chapter 4.2 *Building near trees*.

**Figure 1.** British Geological Survey 1: 50,000 scale map showing that the site is underlain by the London Clay Formation – Clay, Silt and Sand with superficial deposits of Taplow Gravel Member – Sand and Gravel.



## **5. Arboricultural impact assessment**

- 5.1 The purpose of an arboricultural impact assessment (AIA) is to evaluate the direct and indirect effects of proposed development on trees and, where necessary, to consider appropriate mitigation. It should set out which, if any, trees are to be removed to facilitate the development and should consider the possible effects on retained trees of potentially damaging activities on the site (for example changes in ground level and installation of below ground services). Requirements for access around trees should be considered and potential conflicts identified, for example, where branches overhang the development area and may require pruning.
- 5.2 Mitigation for any issues identified should be proposed and addressed in the arboricultural method statement (AMS).
- 5.3 In response to a request from the planning authority the RPA of T1 has been modified to take account of the road and buildings. The RPA can be accommodated within front gardens of 325 – 329 Hanworth Road. My professional opinion is that no modification is needed, and that is because roots are clearly growing under the foundations of the house and garage, as they have caused subsidence. I have experience of multiple cases where roots of an oak tree have crossed beneath a road and caused subsidence on the far side of the road, and therefore I consider that the roadway does not constitute a barrier to rooting, and that it would have been entirely legitimate to use the default circular root protection area specified by BS5837: 2012.

### ***Tree removals***

- 5.4 The proposed development does not require the removal of any trees.

### ***Tree pruning***

- 5.5 No pruning work is required to facilitate the proposed development as there is sufficient space between the building and retained trees for all works to take place without conflicts arising.

### ***Tree protection***

- 5.6 All of the surveyed trees are to be retained and will be protected from mechanical damage to their trunks, branches and roots by the installation of 2m high protective fencing to create a construction exclusion zone (CEZ) to exclude site workers, machinery and storage of materials. There is sufficient space outside the CEZ for all construction activities to take place, without creating pressure on tree protection.
- 5.7 The RPA of T1 overlaps with the existing driveway and paving. The driveway has been in use for many years, and is formed of a concrete slab. This should protect the underlying ground from soil compaction, and no further protection is considered necessary.
- 5.8 In response to a request by the planning authority for details of root protection beneath the front single storey extension(outside the RPA of T1), it is proposed that a trench will be hand excavated to a depth of 500mm (the depth of the majority of larger woody roots of oak) to check for the presence of any roots larger than 25mm diameter. If none are detected, trench-fill foundations will be used. But if roots are detected a piled raft foundation will be installed instead.

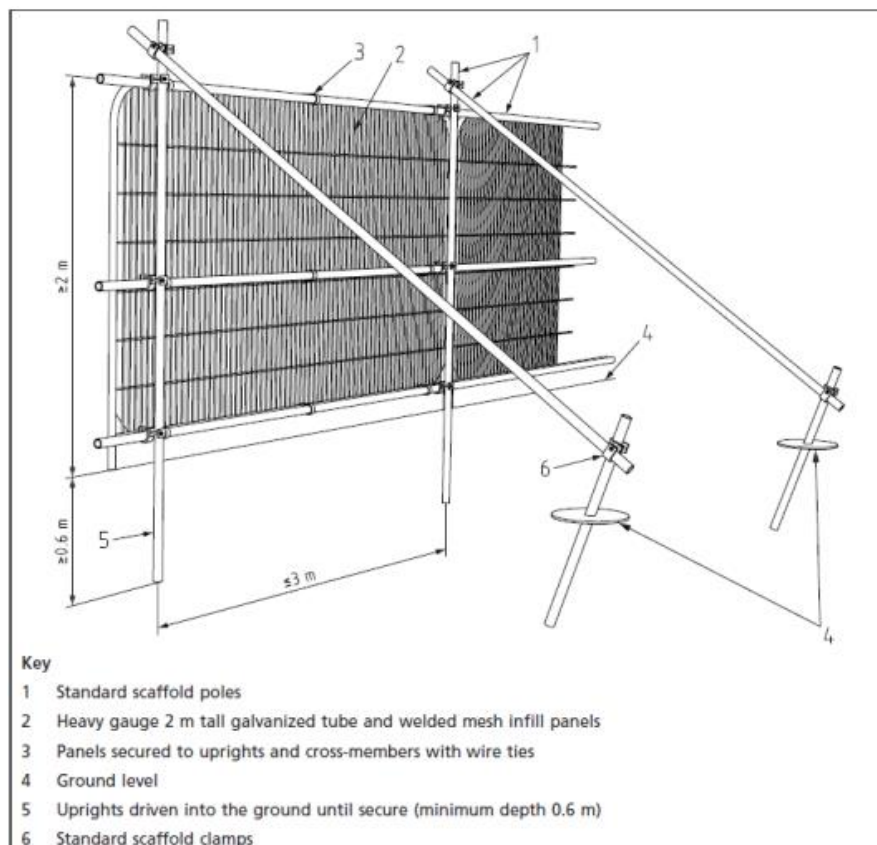
## 6. Arboricultural method statement and tree protection plan

- 6.1 Trees can very easily be damaged during construction activities through their branches being broken by construction traffic passing close to the canopy or by root severance during the digging of foundation or service trenches. The majority of roots are to be found in the upper 600mm of soil and so even relatively shallow trenches can sever a significant number of roots growing across the direction of the trench. Similarly, the diameter of tree roots tapers sharply within a few metres of the trunk of a tree, so that what might seem to an uninitiated site worker to be an insignificant root (perhaps only a few centimetres in diameter) may actually be highly important.
- 6.2 Tree roots can also be damaged indirectly, often inadvertently, through soil compaction, which disrupts soil structure and can lead to root death through the development of anaerobic soil conditions. Spillage of toxic materials (e.g. oil or diesel) can also result in root damage and ultimately the death of a tree. Protection of the soil around trees by means of a construction exclusion zone (CEZ) is therefore vitally important in order to preserve roots undamaged.

### Fencing and ground protection

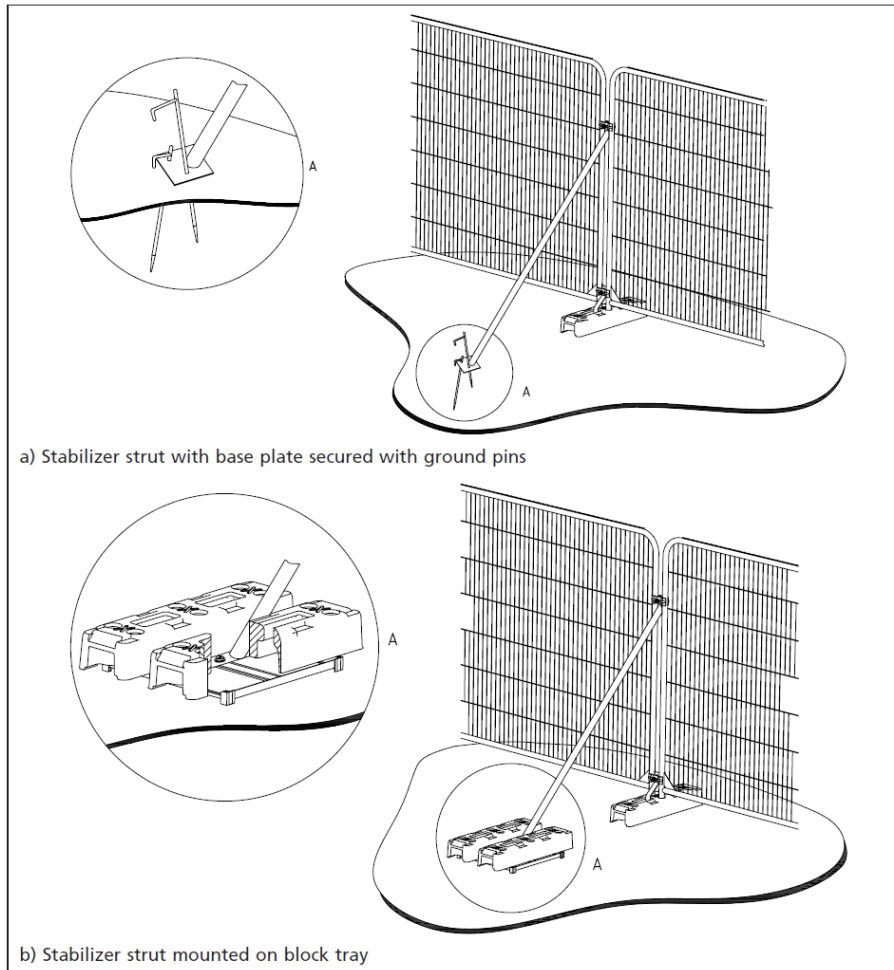
- 6.3 Tree protection will comprise of 2m tall fencing installed in the positions shown at **MD4** before materials are delivered to site or construction commences. The fencing will consist of a scaffold framework, well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3 m (Figure 2). Onto this, weld mesh panels or 2 m high shuttering board will be securely fixed with wire or scaffold clamps. Un-braced weld mesh panels on unsecured rubber or concrete feet will not be used as these are not resistant to impact and are too easily removed by site operatives. An alternative system of bracing which does not require a scaffold framework is shown in Figure 3.

**Figure 2.** Diagram to illustrate design of protective fencing with scaffolding anchored into the ground.





**Figure 3.** Diagram to illustrate alternative design of protective fencing.



**Figure 4.** Photograph to illustrate installed protective fencing



6.4 High visibility all weather notices at a size no less than A3 will be securely attached to every second panel of the barrier around the CEZ with wording as shown in Figure 5.

**Figure 5.** Wording to be included in high visibility all-weather sign attached to protective fencing



## **Foundations**

6.5 It is intended that conventional strip foundations will be used. But in order to check for the possible presence of significant roots of T1 (>25mm diameter) a trench will be carefully hand-dug along the front face of the proposed extension, supervised by the project arboriculturist. If any roots larger than 25mm diameter are encountered, foundations will be modified to a piled-raft scheme, with excavation of no more than 100mm of soil in pile locations. If roots are encountered (>25mm) in pile locations, the pile position will be moved. Piling creates minimal disturbance of roots as each pile will occupy an area of no more than 0.07m<sup>2</sup> (assuming 0.3m diameter piles).

## **Burning of waste**

6.6 No fires will be lit on site within 3 m of root protection areas due to the danger of scorching of leaves and branches of overhanging trees.

## **Space for machinery, parking of vehicles, storage of materials and site huts**

6.7 All machinery required on site will operate outside of root protection areas or from the ground protection or the driveway. Site accommodation, if required, will be located outside root protection areas.

6.8 Delivery vehicles will park in the road and storage of materials will be outside root protection areas. At each delivery, where materials are unloaded by crane, a banksman will be present to ensure that sufficient clearance is allowed for to avoid conflict with branches of T1. Any incidents will be reported to the project arboriculturist.

## **Services**

6.9 Existing services will be used. However, if circumstances require new incoming (water, gas and electricity) or outgoing (foul sewer) services they should be installed outside root protection areas. If it is necessary for a trench to be dug through an RPA a specific method statement will be required which will need to specify that the trench will be hand dug and that care will be taken to preserve all roots encountered which are larger than 25mm diameter.

## **Arboricultural supervision**

6.10 It is recommended that a project arboricultural consultant is appointed to oversee tree protection for the duration of the construction contract. The project arboriculturist will be consulted on any issues that may arise concerning trees and will visit the site as often as necessary to ensure that trees are protected and/or at the following key stages:

- Following installation of tree protection but prior to any works commencing on site, to confirm that it is fit for purpose;
- During excavation of trial foundation trench;
- At any time that there are potential conflicts with tree protection.

6.11 A pre-start meeting will be held on site during which the site manager will be fully briefed on tree protection measures and procedures before any workers or sub-contractors are permitted onto the site. Following induction, a copy of the Induction Sheet (**MD5**) will be provided to and be signed by the site manager/foreman in recognition of acceptance of their role in enforcing day to day tree protection.

- 6.12 All contractors involved in the project have a duty to comply with all the specified tree protection measures and all workers will be provided with induction by the site manager/foreman and be required to sign an Induction Sheet confirming they have understood the protection measures. Signed sheets will be kept on site for inspection.
- 6.13 No enabling works will take place until after tree protection has been installed, inspected and approved as fit for purpose.
- 6.14 Fencing and ground protection will not be removed under any circumstances during construction unless with the express approval of the local authority. If in any doubt the site manager must contact the project arboricultural consultant.

## **7. Conclusions**

- 7.1 A BS5837: 2012 survey of five trees has been carried out on land at 323 Hanworth Road, Hampton, TW12 3EJ. One tree is considered to be category A and of high value (T1 oak) and the remaining four are considered to be category C and are of low value.
- 7.2 The proposed development does not require the pruning or removal of any trees.
- 7.3 The retained trees will be protected during development and methods for ensuring their protection have been described.
- 7.4 It is considered that the proposed development will pose no threat to trees to be retained and is sympathetic to the character of the Conservation Area.

## APPENDIX MD1

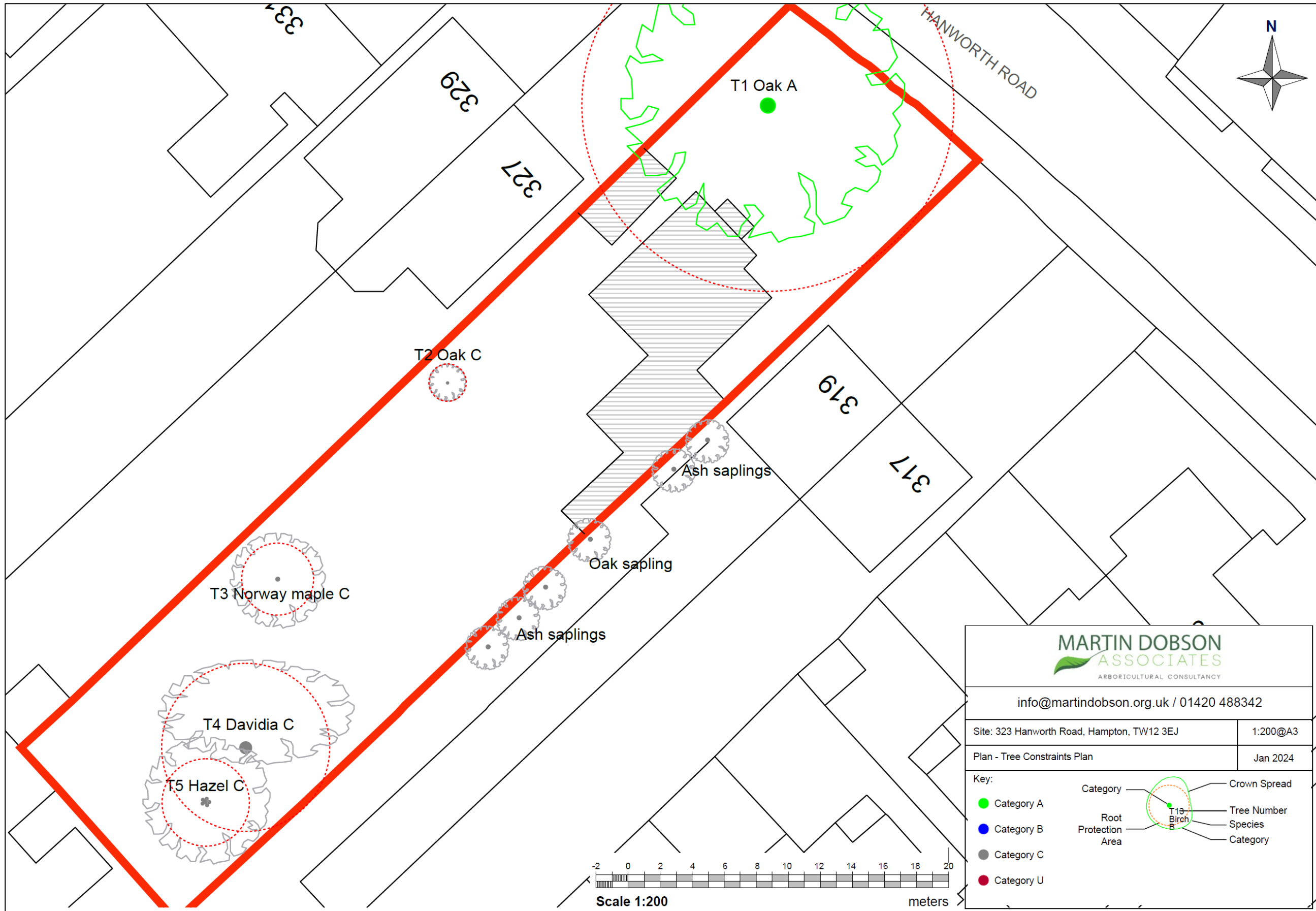
### Tree survey schedule (BS5837: 2012)

Tree No.	Species	Height (m)	Trunk diameter (mm)	Crown spread				Height of crown clearance (m)	Age class	Physiological condition	Structural condition	Useful life	BS5837 Category	Comments
				N (m)	E (m)	S (m)	W (m)							
T1	Oak	22	970	9.0	9.0	9.0	9.0	4	M	Good	Fair	>40	A	Mature tree protected by a TPO and alleged to be a cause of subsidence damage at the front of the property. Cracks consistent with clay-shrinkage subsidence visible externally, particularly in front bay
T2	Oak	4	100	1.2	1.2	1.2	1.2	1	Y	Poor	Fair	>40	C	Very young tree
T3	Norway maple	9	190	3.0	3.0	3.0	3.0	2	Y	Good	Good	20 - 40	C	Young tree
T4	Davidia	8	270, 260, 230	5.5	6.7	1.0	5.5	0	M	Fair	Poor	10 - 20	C	Collapsing branches touching the ground.
T5	Hazel	9	100 x 5	4.0	4.0	4.0	4.0	1	M	Good	Good	20 - 40	C	Mature coppiced hazel

Y= young (<one-third of life expectancy), MA = mid-aged (one-third to two-thirds of life expectancy), M = mature (> two thirds of life expectancy), OM = over-mature (reaching the end of life expectancy).

**APPENDIX MD2**

Tree constraints plan (TCP) showing existing plot layout with tree numbers, BS5837: 2012 colour codes (A – Green, B – Blue, C – Grey, U - Red) and root protection areas (dashed red circles). The plan has been provided separately as a PDF at a scale of 1: 200 @ A3.



### APPENDIX MD3

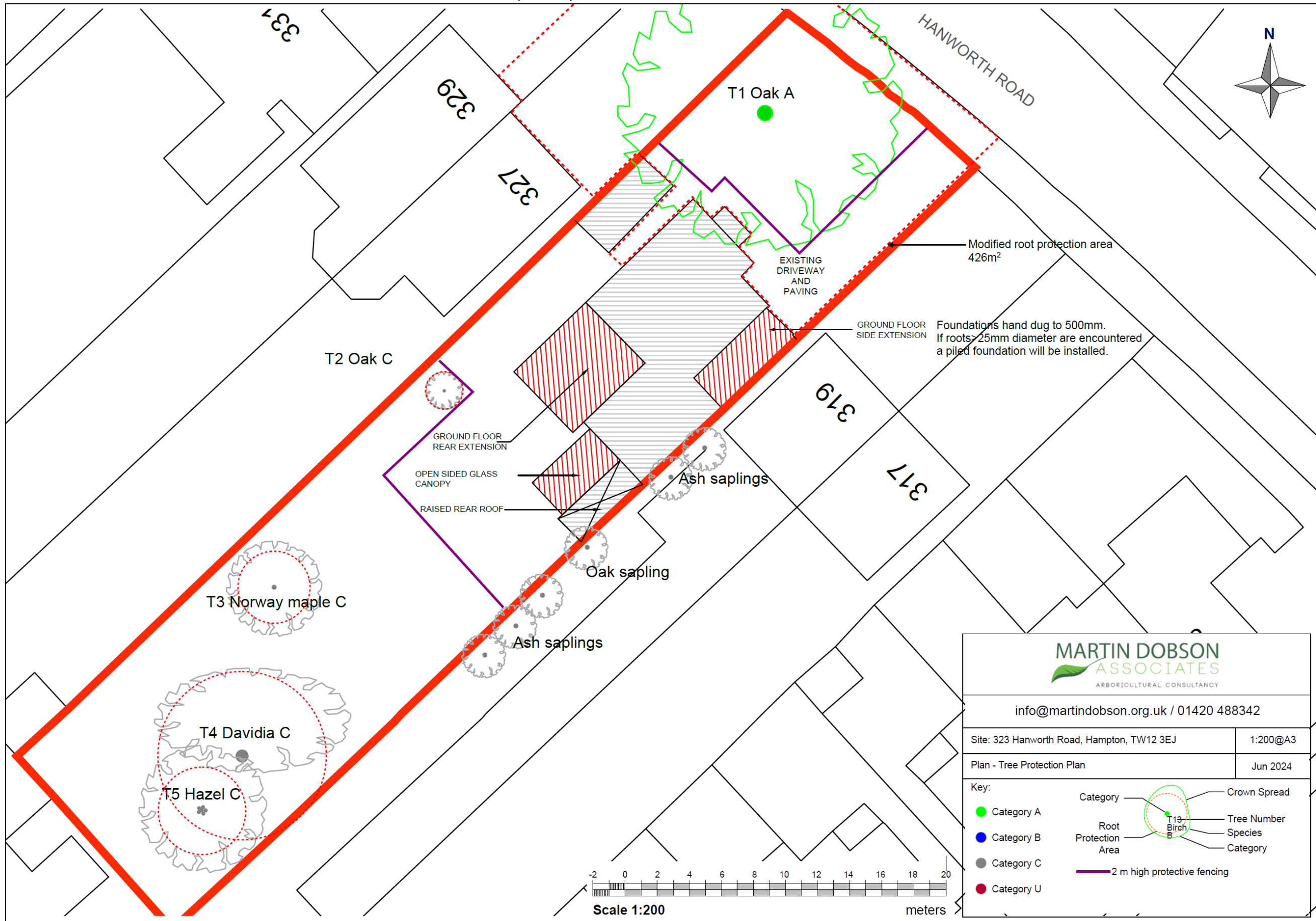
#### BS5837: 2012 schedule of root protection areas

Tree No.	Species	Trunk diameter (mm)	BS5837: 2012 Root protection area, RPA, (m <sup>2</sup> )	BS5837: 2012 Radial protection distance (m)
T1	Oak	970	425.7	11.6
T2	Oak	100	4.5	1.2
T3	Norway maple	190	16.3	2.3
T4	Davidia*	440	87.6	5.3
T5	Hazel*	230	23.9	2.8

\*aggregate trunk diameter calculated for multi-stemmed trees.

**APPENDIX MD4**

Tree protection plan (TPP) showing retained trees, tree numbers and root protection areas (dashed red circles). The location of protective fencing is shown as purple lines. The plan has been provided separately as a PDF at a scale of 1: 200 @ A3.





## APPENDIX MD5

### TREE AWARENESS – SITE INDUCTION SHEET

SITE NAME: 323 Hanworth Road, Hampton, TW12 3EJ

**Trees are an important part of this development and all trees noted on the Tree Protection Plan are protected by planning conditions and by virtue of being in a Conservation Area. Trees must not be damaged in any way, including indirectly through compaction/contamination of soil, so that they can fully integrate into the finished project and stay healthy well into the future. All persons working on this site have a responsibility to be aware of trees and to abide by tree protection procedures.**

#### How can trees be damaged?

*Above the ground* – contacts and impacts with branches and trunk (for example by machine operations: piling rigs, high-sided vehicles, crane use, fixings to trunk, unauthorised cutting back of branches). Make sure there is adequate clearance under the tree canopy and don't stray close to the trunk. Damage to bark allows infections to enter the tree.

*Below the ground* – roots spread out from the trunk horizontally at shallow depth and are therefore easily damaged. Vehicle and pedestrian movements and storage of materials on unprotected ground causes compaction, especially in wet weather, and must be avoided. Soil stripping during site clearance or landscaping is prohibited in root protection areas. The effects of root damage may take some time to become obvious, but can result in disfiguring dieback of leaves and branches, or even death.

#### Tree protection procedures

Provided that the simple steps below are followed most tree protection is straightforward:

- Stay out of tree Construction Exclusion Zones (CEZs). These are the areas of ground surrounding retained trees that are protected by barriers and/or ground protection. If you need to go into a CEZ, you must first gain authorisation from the Site Manager.
- No construction activity of any description within CEZs, e.g. soil stripping, cement mixing, services installation, storage of materials etc.
- No fires within 20m of trunk of any retained tree.
- If authorised to work within a CEZ, for example, for installation of an above-ground no-dig driveway you must follow the procedures set out in the **Arboricultural Method Statement**.
- If damage occurs, you must inform the Site Manager who must, in turn, inform the project arboriculturist.

#### Planning Authority enforcement action needs to be avoided:

- 'Breach of Conditions' notices can prevent a site from being signed-off.
- 'Temporary Stop Notices' halt site operations and result in associated high costs.
- Wilful damage/destruction of TPO/Conservation Area trees can result in company and/or individual prosecutions - fines can be anything up to £20,000 (County Court fines are unlimited). Remember that fines may apply to the person committing the offence as well as the site owner and main contractors!

I have received site induction in tree awareness and tree protection procedures

PRINT NAME

SIGN

DATE

## APPENDIX MD6

### Qualifications and Experience

Dr Martin Dobson has been engaged in research and advisory work on trees since graduating in 1986 with a BSc (Hons) Degree in Biology. Subsequent postgraduate research led to the award of a Doctor of Philosophy (DPhil) Degree in Tree Physiology in 1990.

Postgraduate studies began in 1986 at the University of Ulster and continued in 1987 at the Forestry Commission's Research Station in Hampshire and focussed on the influence of air pollution on trees. Upon completion of this research in 1989 Dr Dobson was employed by the Forestry Commission and worked in both the Tree Pathology and Environmental Research Branches carrying out research on air pollution, climate change, de-icing salt damage to trees, woodland establishment on landfills and tree root development. He has authored two books: *De-icing Salt Damage to Trees and Shrubs* and *The Potential for Woodland Establishment on Landfill Sites*. He concluded his time at the Forestry Commission with research into the interaction between trees, roots and clay soils which included laboratory investigations, testing of root barriers and a three-year field-scale monitoring programme investigating the influence of woodland and grassland on the moisture status of clay soils.

In 1995 Martin joined the Arboricultural Advisory and Information Service as a senior Arboricultural Advisor. The AAIS advised the (then) Department of the Environment on matters concerning amenity trees and was the principal source of technical advice and information to the arboricultural profession as well as landscape architects, engineers, the horticultural industry and private individuals. A large proportion of advisory work focussed on issues relating to tree diseases and interactions between trees and buildings.

In 1997 Martin started an arboricultural consultancy practice specialising in subsidence and tree root claims, planning and development, tree safety and disease diagnosis. He was a local authority retained consultant providing expertise on tree protection practice and legislation from 1999 - 2006 and has dealt with several thousand Tree Preservation Order and Conservation Area applications.

He has extensive experience as an Expert Witness in the High Court, County Court and Magistrates Court. Notable cases he has been involved in include *Raphael v London Borough of Brent*, *Khan v London Borough of Harrow and Kane* and *Hoyle v Hampshire County Council and others*.

From 1995 to 2011 he was an examiner for the Professional Diploma in Arboriculture for the Royal Forestry Society/ABC Awards and he is currently the Lead Assessor and chairman of the Quality Assurance panel for the Arboricultural Association's Registered Consultant scheme. He has been a guest lecturer for the Middlesex University Countryside Management MSc course and for Portsmouth University. He teaches introductory and advanced courses on trees and subsidence for the Arboricultural Association and a course on professional report writing skills.

In addition to over 30 publications in scientific and technical journals he is the author of Arboriculture Research and Information Note 130/95/ARB *Tree Root Systems*, and leading author of:

*Driveways Close to Trees*. Arboricultural Practice Note 1. AAIS, Farnham.

*Trees in Dispute*. Arboricultural Practice Note 3. AAIS, Farnham.

*Root Barriers and Building Subsidence*. Arboricultural Practice Note 4. AAIS, Farnham.

He is a Fellow and Registered Consultant of the Arboricultural Association and is a Member by examination of the Expert Witness Institute.