

TREE SURVEY, ARBORICULTURAL IMPACT ASSESSMENT AND TREE PROTECTION PLAN

A report to accompany a planning application for the construction of a timber framed parking barn at 34 St Catherines Rd, Hayling Island, PO11 0HF

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On the instructions of Mr M. Walton

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1. Introduction

- 1.1 Martin Dobson Associates Ltd were instructed by Mr M Walton on 6 November 2014 to carry out a survey of trees within and immediately adjacent to 34 St Catherine's Road, Hayling Island, PO11 0HF.
- 1.2 The purpose of the survey was to inform of potential tree-related constraints on the site and to provide advice on design options for the construction of a timber frame parking barn with associated driveway.
- 1.3 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.
- 1.4 The tree survey covered the main trees which might be affected by the proposals but was not an exhaustive survey of all trees on the site. Nine trees were surveyed and this included four mature oaks (T1 – T4) understood to be protected by a Tree Preservation Order. No details of the TPO were provided and the details have not been verified.
- 1.5 Four are considered to be high value category A trees (T1 – T4 oak), one is considered to be a moderate value category B tree (T8 cherry) and the remainder were considered to be low value category C trees (T5 cherry, T6 and T7 bay and T9 griselinia).
- 1.6 It is proposed that the two category C bays (T6 and T7) will be removed. The remaining trees will be retained and protected during the development. Recommended methods of tree protection are described.

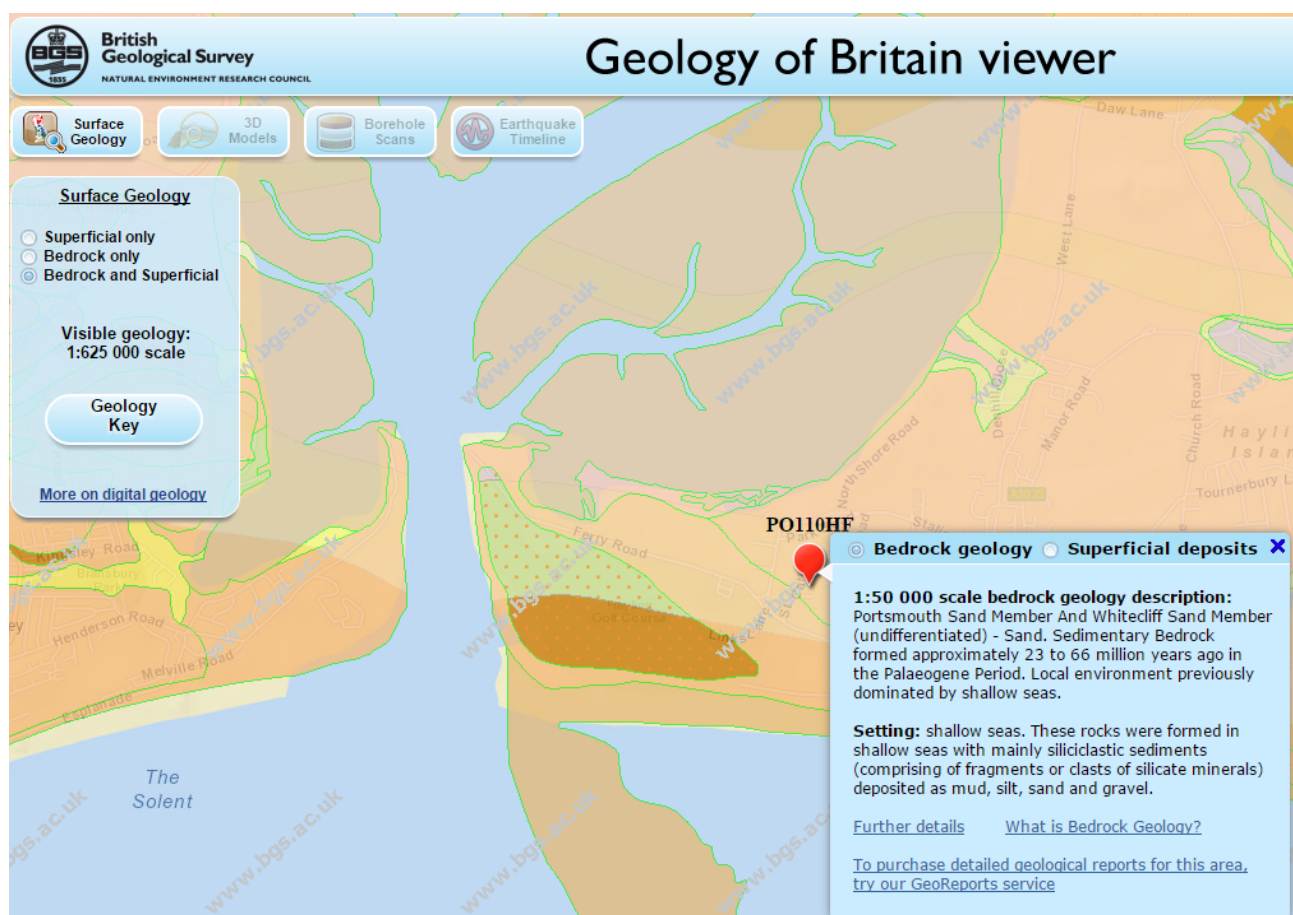
2. Tree Survey

- 2.1 The tree survey was carried out by Dr Martin Dobson on 11 November 2014.
- 2.2 Appended at **MD1** is the tree survey schedule which provides details of the trees present within or immediately adjacent to the application land.
- 2.3 The tree constraints plan appended at **MD2** shows the positions of the trees surveyed 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 |
- 2.4 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.
- 2.5 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 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**.

3. Soil assessment

- 3.1 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.
- 3.2 The British Geological Survey 1: 50,000 scale map (Figure 1) indicates that the underlying geology of the site is non-shrinkable Portsmouth Sand Member. Site specific soil investigations may need to be undertaken to establish the precise nature of the soil. If it is confirmed that the site is underlain by non-shrinkable soil then no special foundations will be required to take account of trees. But if shrinkable clay is discovered then foundations should be designed with reference to the National House Building Council's Standards Chapter 4.2 *Building near trees*.
- 3.3 Sandy soils are much more resistant to soil compaction than soils containing a high proportion of clay and have a high bearing capacity even when wet.

Figure 1. British Geological Survey 1: 50,000 scale map showing that St Catherine's Road is underlain by non-shrinkable Portsmouth Sand Member.



4. Arboricultural Impact Assessment

- 4.1 The area of land the subject of this report is a domestic garden which contains a number of young and mature trees. The most important of these are four mature category A oak trees (T1 – T4), three of which are located within the garden and one within the garden of a neighbouring property to the north. The proposed parking barn and access driveway falls partially within the root protection areas of T3 and T4. The driveway also falls within the root protection area of T5 cherry. In view of this it is proposed that the construction of the areas of driveway that fall within the RPA will be formed of an above-ground no-dig construction. The foundations for the barn will be partially conventional strip footings but within the RPA will be of pad and beam construction to minimise root disturbance. Alternatively the ground slab could be cast entirely onto piles without the need for strip footings.
- 4.2 Two small category C bay trees (T6 and T7) are to be removed. It is considered that the loss of these trees is not significant as they have no public amenity value. The trees are young enough that they could easily be transplanted within the site.
- 4.3 Retained trees will be protected by an exclusion zone marked by protective fencing.
- 4.4 Minor crown lifting of T3 oak will take place to raise the crown from 3 m to 6 m by shortening low hanging branches back to a suitable growth point.
- 4.5 It is considered that the tree protection recommended in this report will ensure that there will be no material impact of the proposed development on trees to be retained.

5. Tree Protection Plan

- 5.1 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 600 mm of soil and so even relatively shallow trenches can sever the majority 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.
- 5.2 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.
- 5.3 Tree protection will comprise of temporary fencing installed in the positions shown at **MD4** before any construction machinery is permitted onto the site. Protection for trees on development sites usually takes the form of protective fencing to exclude people, machinery and materials from the root zone. The British Standard states at 6.2.2.1 that:

Barriers should be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s). Barriers should be maintained to ensure that they remain rigid and complete.

- 5.4 It goes on to state at 6.2.2.3 that:

Where the site circumstances and associated risk of damaging incursion into the RPA do not necessitate the default level of protection, an alternative specification should be prepared by the project arboriculturist.

- 5.5 The scale of the development does not warrant the erection of 2 m high fencing as is normally recommended by BS5837 and it is considered that plastic fencing such as Netlon on metal stakes will be sufficiently robust (Figure 2).

Figure 2. Diagram and photograph to illustrate design of protective fencing



- 5.6 High visibility all weather notices no smaller than A3 will be securely attached to the barrier around each protection zone with wording as shown in Figure 3. Where long lengths of barrier are erected a sign will be attached at intervals of no less than 6 m.

Figure 3. Wording to be included in high visibility all-weather sign attached to protective fencing



- 5.7 Fencing will not be taken down 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.
- 5.1 The sequence of events to be followed for installation of the above-ground no-dig driveway (shaded purple at **MD4**) is as detailed below:
- 5.2 Stones, bricks and no more than 100 mm of topsoil will be removed from within the driveway area using hand tools and the area will be approximately levelled using hand tools only. Tracked or wheeled vehicles must not be used on unprotected ground.
- 5.3 Once soil has been levelled a layer of geotextile (e.g. Terram 2000) will be laid over the ground.
- 5.4 A cellular confinement system such as Geocell¹ or Geosynthetics Cellweb² approximately 200 mm thick will be laid out and pegged in place. Wooden or concrete edging laid above ground will be used and may be anchored by the use of wooden or metal pegs driven into the ground.
- 5.5 The cellular confinement system will be filled with Type 1 no-fines aggregate. Filling must take place working from outside the root protection area (i.e. from the road) inwards so that any machinery required works on filled rather than empty cells (Figure 4).

Figure 4. Photographs illustrating cellular confinement system used to form an above-ground no-dig driveway

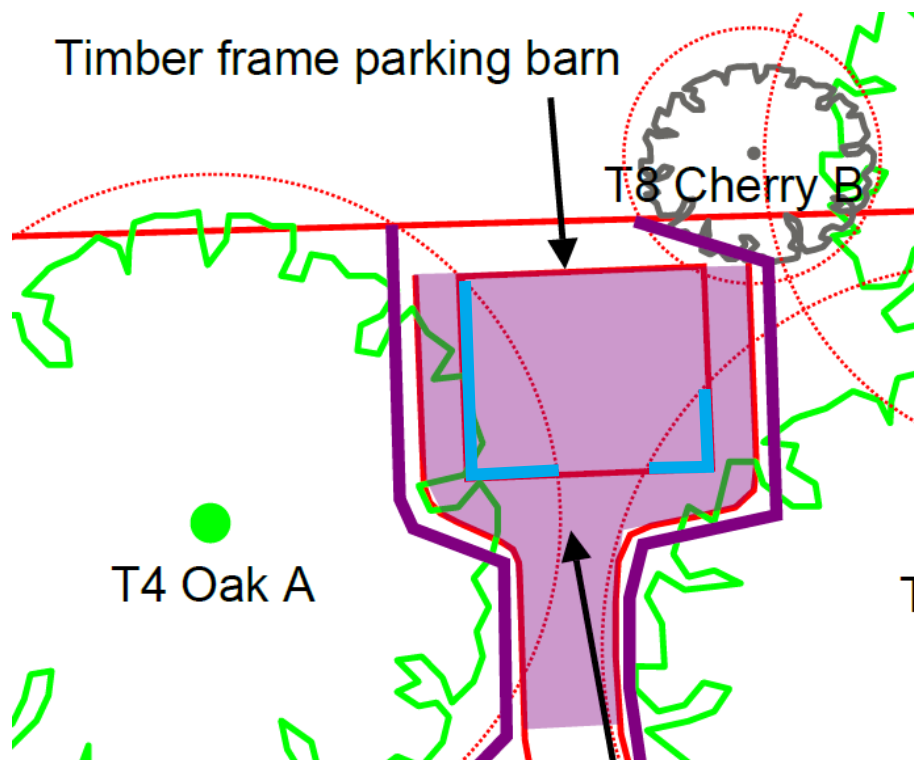


¹ <http://www.terram.com/products/geocells/tree-root-protection-geocell.html>

² http://www.geosyn.co.uk/products/cellweb-trees.asp?product_id=21

- 5.6 A temporary wearing surface covering the cellular confinement system may be required for the duration of the works and this can comprise of plywood, metal or heavy duty plastic sheets.
- 5.7 Once construction works have been completed on the site the temporary wearing surface may be removed and can be replaced with a final surface of a porous material such as gravel.
- 5.8 It is not appropriate to dig strip footings within root protection areas. Thus in the areas shaded blue in Figure 5 foundations will be of a pad and beam construction which will minimise root disturbance. Alternatively the entire floor slab can be cast onto mini piles above existing ground level in the area shaded purple at **MD4**. In this latter case the superstructure will be built from the reinforced floor slab.

Figure 5. Pad and beam foundations will be installed in the locations coloured blue. Alternatively a reinforced floor slab will be cast onto mini piles under the whole structure.



- 5.9 Fencing 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.

Burning of waste

- 5.10 No fires will be lit within 3 m of the crowns of trees in order to ensure that leaves and branches of trees are not scorched.

Changes in level

- 5.11 No changes in level are proposed within root protection areas.

Services

- 5.12 Any new services, e.g. electricity, must be installed outside root protection areas.

Tree works

- 5.13 Tree works will be carried out in accordance with the guidance contained in BS3998: 2010
Tree works – recommendations.

6. Conclusions

- 6.1 A survey of nine trees at 34 St Catherine's Rd, Hayling Island, PO11 0HF has been carried out.
- 6.2 Four trees are considered to be category A and of high value (T1 – T4 oak), one is considered to be category B and of moderate value (T8 cherry) and the remainder are low value category C trees.
- 6.3 Two category C trees are to be removed – T6 and T7 bay.
- 6.4 Methods for ensuring the protection of the trees to be retained have been described.
- 6.5 It is considered that the proposed development will pose no threat to trees to be retained and is sympathetic to the character of the area.

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APPENDIX MD1

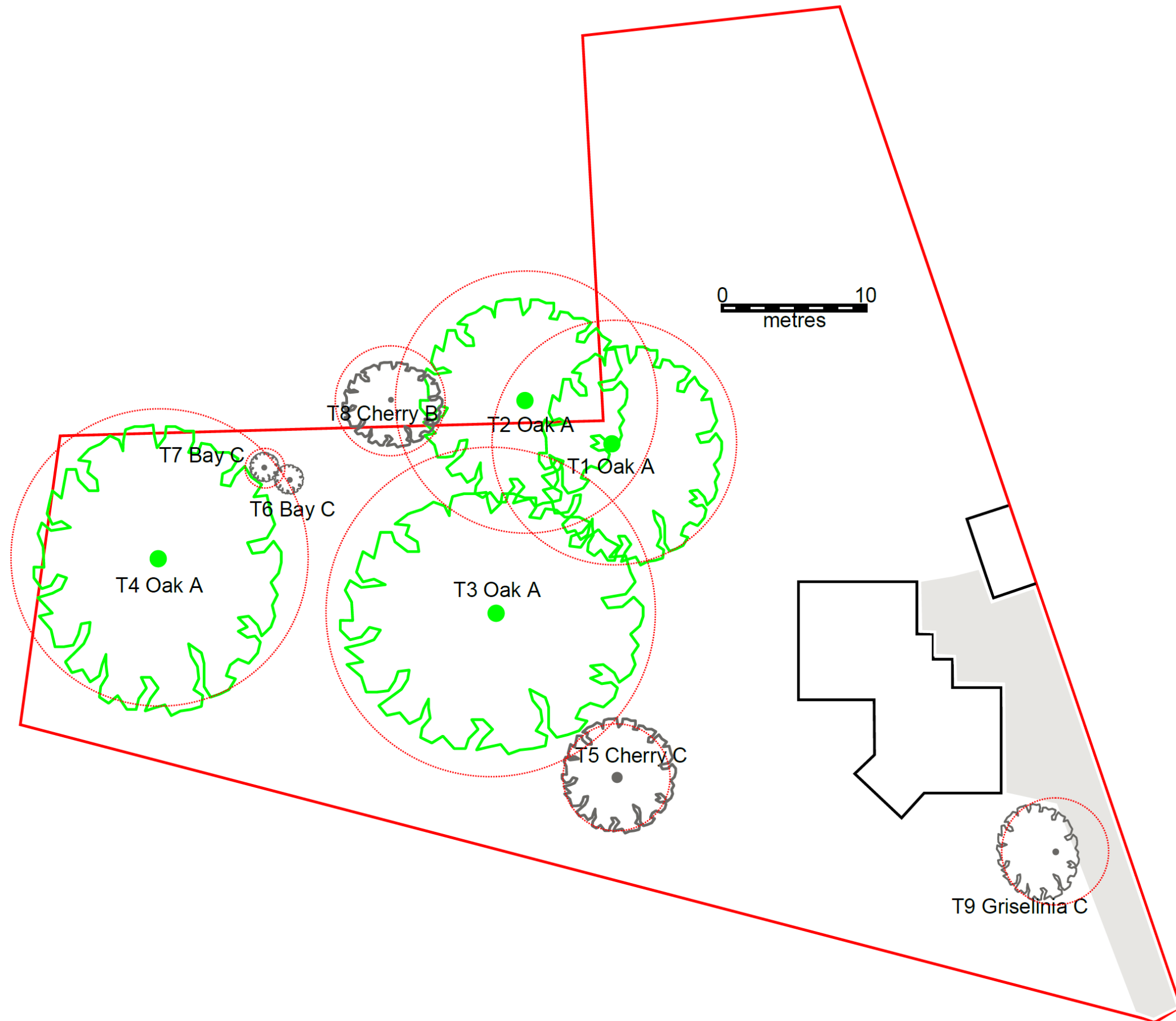
Tree survey schedule (BS5837: 2012) for trees at 34 St Catherine's Road

Tree No.	Species	Height (m)	Trunk diameter (mm)	N (m)	S (m)	E (m)	W (m)	Height of crown clearance (m)	Age class	Physiological condition	Structural condition	Useful life	BS5867 Grade	Comments
T1	Oak	19	700	7	8	7	4	7	MA	Good	Good	40+	A	Slight lean to E
T2	Oak	21	750	7	7	7	7	4	M	Good	Good	40+	A	
T3	Oak	23	940	8	10	11	10	3S and 3E	M	Good	Good	40+	A	
T4	Oak	22	850	8	12	9	8	7	M	Good	Good	40+	A	
T5	Cherry*	9	310	4	4	4	4	3	Y	Good	Good	20 to 40	C	Three stems below 1.5m. Some soil compaction over roots caused by dumper
T6	Bay	7	120	1	1	0.5	1.5	1	Y	Good	Good	20 to 40	C	
T7	Bay	7	130	1.5	2	2	1.5	1	Y	Good	Good	20 to 40	C	
T8	Cherry	320		3	3	4	3	8	MA	Good	Good	20 to 40	B	Two stems below 1.5 m
T9	Griselinia	6	300	4	2	1.5	3	2	M	Good	Good	10 to 20	C	Large shrub

* multi stem. # trunk measured at ground level. Age class: OM – over mature; M – mature; MA – mid-aged; Y - young

APPENDIX MD2

Tree constraints plan showing existing plot layout with tree numbers, BS5837: 2012 colour codes (A – Green, B – Blue, C – Grey, U - Red) and root protection areas (dashed circles).

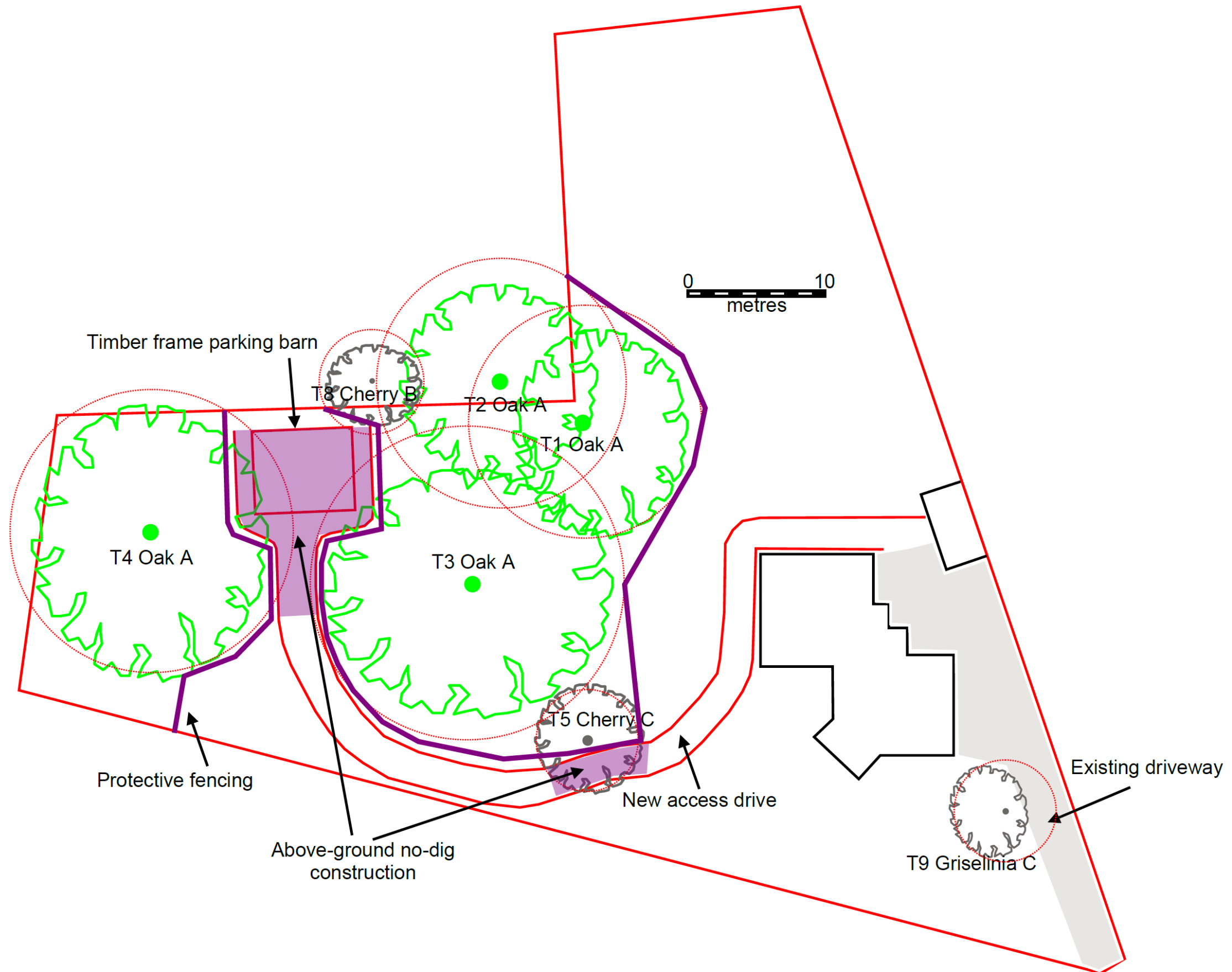


APPENDIX MD3
BS5837 schedule of protection areas

Tree No.	Species	Trunk diameter (mm)	BS5837: 2012 Root protection area, RPA, (m²)	BS5837: 2012 Radial protection distance (m)
T1	Oak	700	221.7	8.4
T2	Oak	750	254.5	9.0
T3	Oak	940	399.8	11.3
T4	Oak	850	326.9	10.2
T5	Cherry*	310	43.5	3.7
T6	Bay	120	6.5	1.4
T7	Bay	130	7.6	1.6
T8	Cherry	320	46.3	3.8
T9	Griselinia	300	40.7	3.6

APPENDIX MD4

Tree protection plan with retained trees, tree numbers and root protection areas (dashed circles). The location of protective fencing is shown as purple lines and ground protection as purple shading.



APPENDIX MD5

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. During the next six years he was responsible for Department of Environment research contracts focussing on air pollution, climate change, de-icing salt damage to trees, woodland establishment on landfills and tree root research. 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 as Project Manager for 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 recent cases he has been involved in include *Robbins v London Borough of Bexley* and *Khan v London Borough of Harrow* and *Kane*.

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 an assessor for the Arboricultural Association Registered Consultant scheme. He has been a guest lecturer for the Middlesex University Countryside Management MSc course and for Portsmouth University. Together with Dr Giles Biddle he has devised and teaches introductory and advanced courses on trees and subsidence and co-presents seminars on trees and climate change with Professor Andy Moffat for the Arboricultural Association.

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.