MARTIN DOBSON ASSOCIATES
ARBORICULTURAL CONSULTANCY

● Ivy House, 49 Liphook Road, Whitehill, Bordon, Hants, GU35 9DA
● Telephone: 01420 488342 ● Mobile: 07787 530983
● Email: info@martindobson.org.uk
● www.martindobson.org.uk

TREE SURVEY, ARBORICULTURAL IMPACT ASSESSMENT AND TREE PROTECTION PLAN

Report to accompany a planning application for the refurbishment and creation of a basement extension at 6 Albert Terrace Mews, London, NW1 7TA

Report by

Dr Martin Dobson
BSc (Hons) Biol, DPhil, FArborA, MEWI
Registered Consultant of the Arboricultural Association

On the instructions of Mark Golinsky

24th May 2018

MDA reference J21

Contents

There are seven appendices

1. Introduction

1.1 Martin Dobson Associates Ltd were instructed by Mark Golinsky on 3rd March 2018 to carry out a survey of trees on or immediately adjacent to land at 6 Albert Terrace Mews, London, NW1 7TA. The purpose of the survey was to inform architects of potential tree-related constraints on the site and to provide advice on tree protection issues during the proposed construction of a new basement extension under the property.

1.2 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.

1.3 The property is within the Primrose Hill Conservation Area and this means that all trees with a trunk diameter of 75 mm 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.

1.4 Two trees T1 and T2 were surveyed, both of them limes, and they are considered to be Category B and of moderate value

1.5 The proposed development does not require the removal of either of the lime trees and the retained trees will be protected during development. Details of tree protection are contained in this report.

2. Tree survey

2.1 The tree survey was carried out by Martin Dobson on 12th March 2018.

2.2 Appended at **MD1** is the tree survey schedule which provides details of the two trees within the boundaries of the property. Both trees are growing immediately adjacent to the boundary wall (Figure 1).

Figure 1. Photographs of lime trees T1 (left) and T2 (right) in the front garden adjacent to the boundary wall.

2.3 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 a construction exclusion zone (CEZ) 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 tabulated at **MD2** and are shown as circular polygons around the trees on the Tree Constraints Plans (TCP) at **MD3**/**MD4**.

2.4 The TCPs show the positions of the surveyed trees and give a reasonable indication of their comparative branch spreads. The drawing has been colour coded as follows:

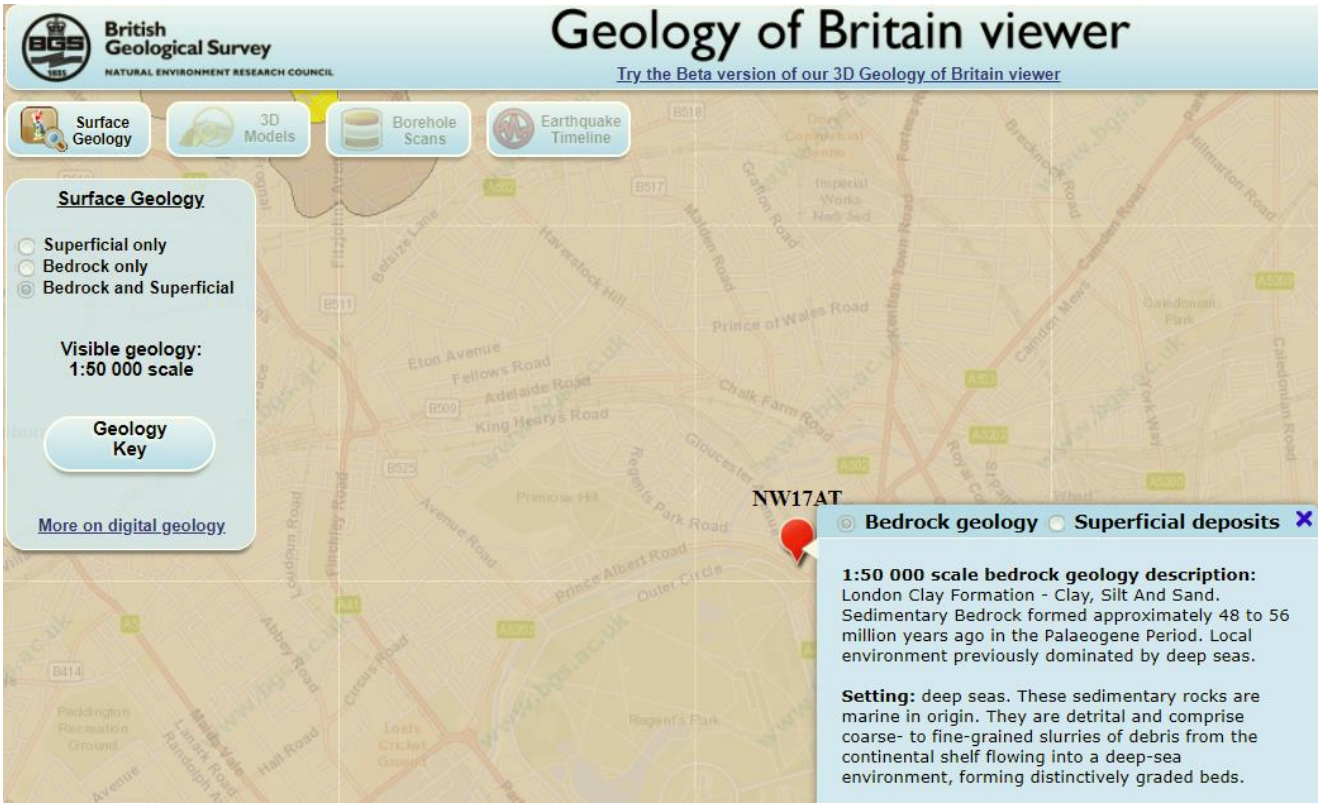
A trees (high quality and value, minimum 40 years useful life)	LIGHT GREEN
B trees (moderate quality and value, minimum 20 years useful life)	MID BLUE
C trees (low quality and value, minimum 10 years useful life)	GREY
U trees (unsuitable or dead/dying/dangerous, less than10 years useful life)	RED

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 deigned to extend below the likely zone of seasonal moisture change.

3.2 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 (Figure 2). Thus, foundation design will need to take account of trees. The National House Building Council's Standards Chapter 4.2 *Building near trees* provides advice and recommendations. Lime is a moderate water demand species.

Figure 2. British Geological Survey 1: 50,000 scale showing that the site is underlain by London Clay Formation.



4. Arboricultural impact assessment

4.1 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.

4.2 Mitigation for any issues identified should be proposed and addressed in the arboricultural method statement (AMS).

Tree removals

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

Tree pruning

4.4 No pruning work is required to facilitate the proposed development as there is sufficient space between the proposed building works and retained trees that there are considered to be no conflicts. Both lime trees have been pollarded and therefore their crowns are much smaller than they would otherwise be. The trees will continue to be managed under a regular crown reduction/pollarding cycle as is common for trees of this kind in this area.

Tree protection

4.5 T1 and T2 will be protected from mechanical damage to their trunks, branches and roots by the installation of 2 m high hoarding 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 protective fencing.

4.6 The calculated RPAs of both trees indicate overlap with the existing building and therefore there is the potential that the soil below the building will contain roots. However, a trial pit investigation carried out by RSK on 12th March 2018 (see Figure 3 for site plan) confirmed that there are no significant roots. Foundations of the main house were discovered to be 1.18 m deep in TP1A, were 0.85 m deep in TP2A and 0.76 m deep in TP3A. In TP1A roots were observed with a diameter of up to 5 mm at a depth of 0.3 m below ground level but below that roots were only 1 – 2 mm in diameter. In TP2A frequent roots and rootlets were encountered (diameters less than 5 mm) down to the base of foundations. A root of 50 mm diameter was noted above foundations at a depth of 0.54 m (Figure 4). No roots were observed in TP3A.

4.7 It is well established that the great majority of the roots of trees, including most of the structural woody roots, are to be found in the upper 600 mm of soil[1]. Some roots may achieve greater depths but they are usually only a few millimetres in diameter. Small non-woody roots are ephemeral lasting from a few weeks to a year or two. Thus, it is the structural woody roots that are important for long-term health of a tree as it this network from which the smaller short-lived roots emanate. The British Standard 5837 at paragraph 7.2.3 advises that roots

[1] Dobson, M.C. (1995) *Tree Root Systems.* Arboriculture Research and Information Note 130/95/ARB. AAIS, Farnham.

larger than 25 mm diameter should be regarded as significant, and that, by implication, roots smaller than 25 mm diameter are not essential for a tree's health and stability:

7.2.3 *Roots smaller than 25 mm diameter may be pruned back, making a clean cut with a suitable sharp tool (e.g. bypass secateurs or handsaw), except where they occur in clumps. Roots occurring in clumps or of 25 mm diameter and over should be severed only following consultation with an arboriculturist, as such roots might be essential to the tree's health and stability*

Figure 3. Site plan prepared by RSK showing location of trial pits.

Figure 4. Photograph of trial pit TP2A with 50 mm diameter root highlighted.

4.8 The site investigation demonstrates that there are no roots of 25 mm diameter or more below foundation depth, indeed where roots were observed at the base of foundations they were only 1 – 2 mm. Digging underneath the footprint of the existing house to create a basement will therefore not cause any undue harm to lime trees T1 and T2.

4.9 The existing hard standing will provide protection for roots in the small courtyard and fencing will be used to protect the trunks of trees from impact damage.

4.10 Installation of the protection described in the Method Statement below and illustrated in the Tree Protection Plans (**MD4** – **MD5**) will ensure that no harm is caused to retained trees by the proposed development.

5. Arboricultural method statement and 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 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 25 mm 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. 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

5.3 Tree protection will comprise of 2 m tall fencing installed in the positions shown at **MD4** – **MD5** before the building is stripped out or materials are delivered to site. The fencing will consist 20mm thick plywood attached to a timber frame. The frame will be braced against/attached to the perimeter wall (Figure 5).

Figure 5. Photograph illustrating hoarding to protect lime trees T1 and T2 from impact damage.

5.4 High visibility all weather notices at a size no less than A3 will be securely attached to the barrier around the CEZ with wording as shown in Figure 6.

Figure 6. Wording to be included in high visibility all-weather sign attached to protective fencing

5.5 In order to allow access for construction workers at the side and rear of the house it is proposed that part of the RPA will be protected by ground protection. This area, shaded blue on the Tree Protection Plans (**MD5** – **MD5**), will be protected by retaining the existing hard surfacing which will act as a barrier preventing soil compaction. No mixing of cement/concrete will be permitted on the ground protection due to the risk of toxic alkaline leachate entering the ground.

5.6 Arboricultural supervision

5.7 It is recommended that a project arboricultural consultant is appointed to oversee tree protection for the duration of the construction/landscaping contract(s). Alternatively, a designated person (e.g. site manager) should take on the responsibility of overseeing tree protection. If appointed, 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:

- Prior to contractors commencing works on site in order to meet with the supervising architect and/or the contractor's nominated site manager to provide induction and ensure that the principles of tree protection are understood and the procedure, timescale and materials for installation of tree protection are agreed;

- Following installation of tree protection but prior to any works commencing on site to confirm that it is fit for purpose;

- At any time that there are potential conflicts with tree protection and/or at monthly intervals during lower ground works and at two-monthly intervals during above ground works;

- At the completion of construction works to confirm that tree protection may be removed to enable final landscaping;

5.8 A pre-start meeting should be held on site with the project arboriculturist and the contractor's representative(s) so that the precise details of the schedule of works together with details of installation of tree protection can be agreed and personnel induction carried out. 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 (**MD6**) will be provided to and be signed by the site manager in recognition of acceptance of their role in enforcing day to day tree protection.

5.9 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 and be required to sign an Induction Sheet confirming they have understood the protection measures. Signed sheets will be kept on site for inspection.

5.10 No enabling works will take place until after the meeting has been held and tree protection has been installed, inspected and approved as fit for purpose. Tree 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.

Burning of waste

5.11 No fires will be lit on site at all 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

5.12 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.

5.13 Delivery vehicles will park on the road and materials will be carefully offloaded with a banksman present at every delivery to ensure no conflict with trunk/branches of the protected trees.

Services

5.14 The proposed layout of incoming (water, gas and electricity) and outgoing (foul sewer) services is not yet established although it is understood that existing service runs will be used. 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 25 mm diameter.

6. Conclusions

6.1 A BS5837: 2012 survey of two trees has been carried out at 6 Albert Terrace Mews, London, NW1 7TA.

6.2 Both lime trees T1 and T2 are considered to be Category B and of moderate value and will be retained and protected during development. Methods for ensuring their protection have been described.

6.3 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)

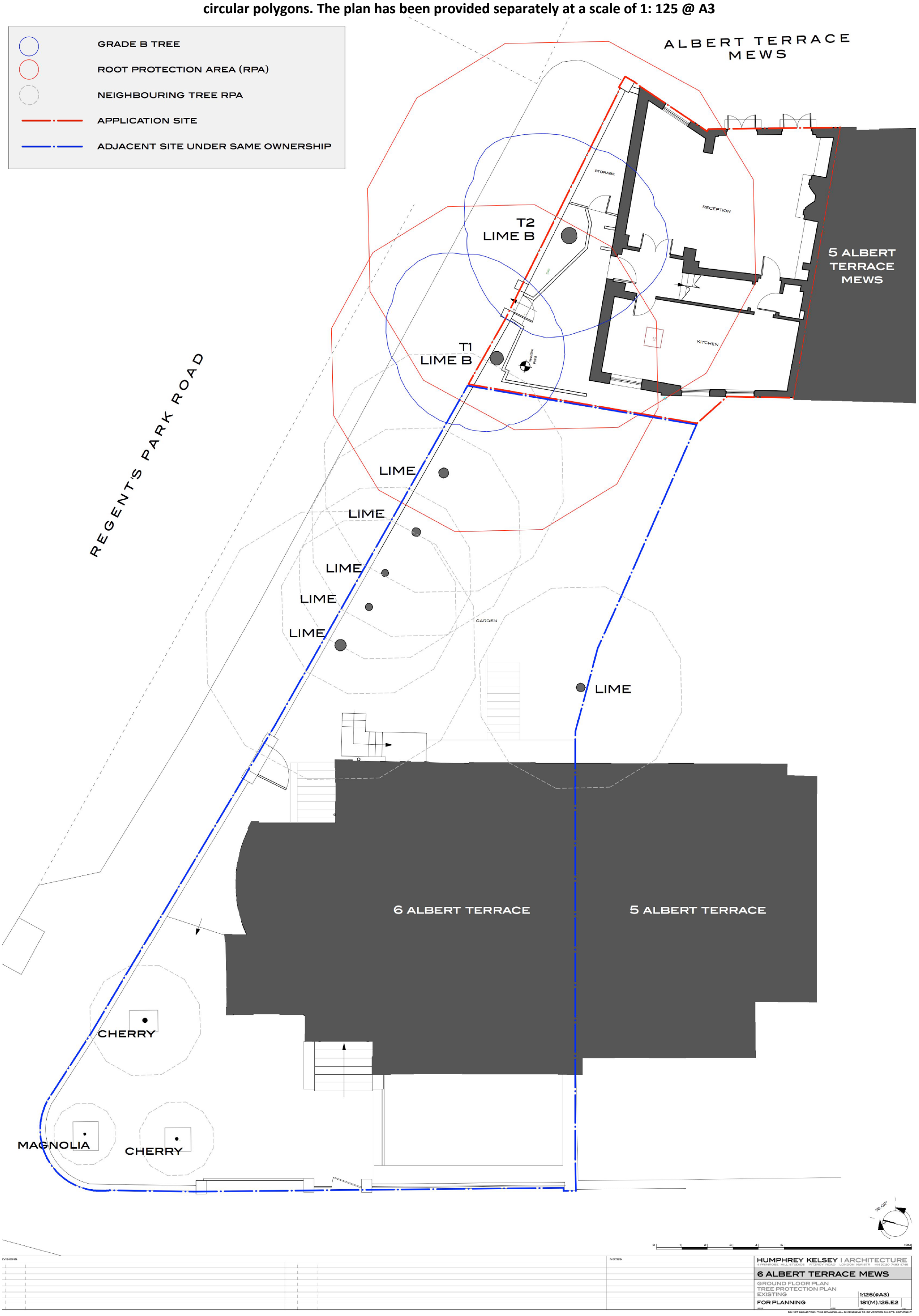
Tree No.	Species	Height (m)	Trunk diameter (mm)	N (m)	E (m)	S (m)	W (m)	Height of crown clearance (m)	Age class	Physiological condition	Structural condition	Useful Life (y)	BS5867 Grade	Comments
T1	Lime	20	530	4.5	4	3	3	12	MA	Good	Good	20 - 40	B	Pollarded
T2	Lime	19	630	4	4	4	4	12	MA	Good	Good	20 - 40	B	Pollarded

APPENDIX MD2
BS5837 schedule of root protection areas

Tree No.	Species	Trunk diameter (mm)	BS5837: 2012 Root protection area, RPA, (m^2)	BS5837: 2012 Radial protection distance (m)
T1	Lime	530	127.1	6.4
T2	Lime	630	179.6	7.6

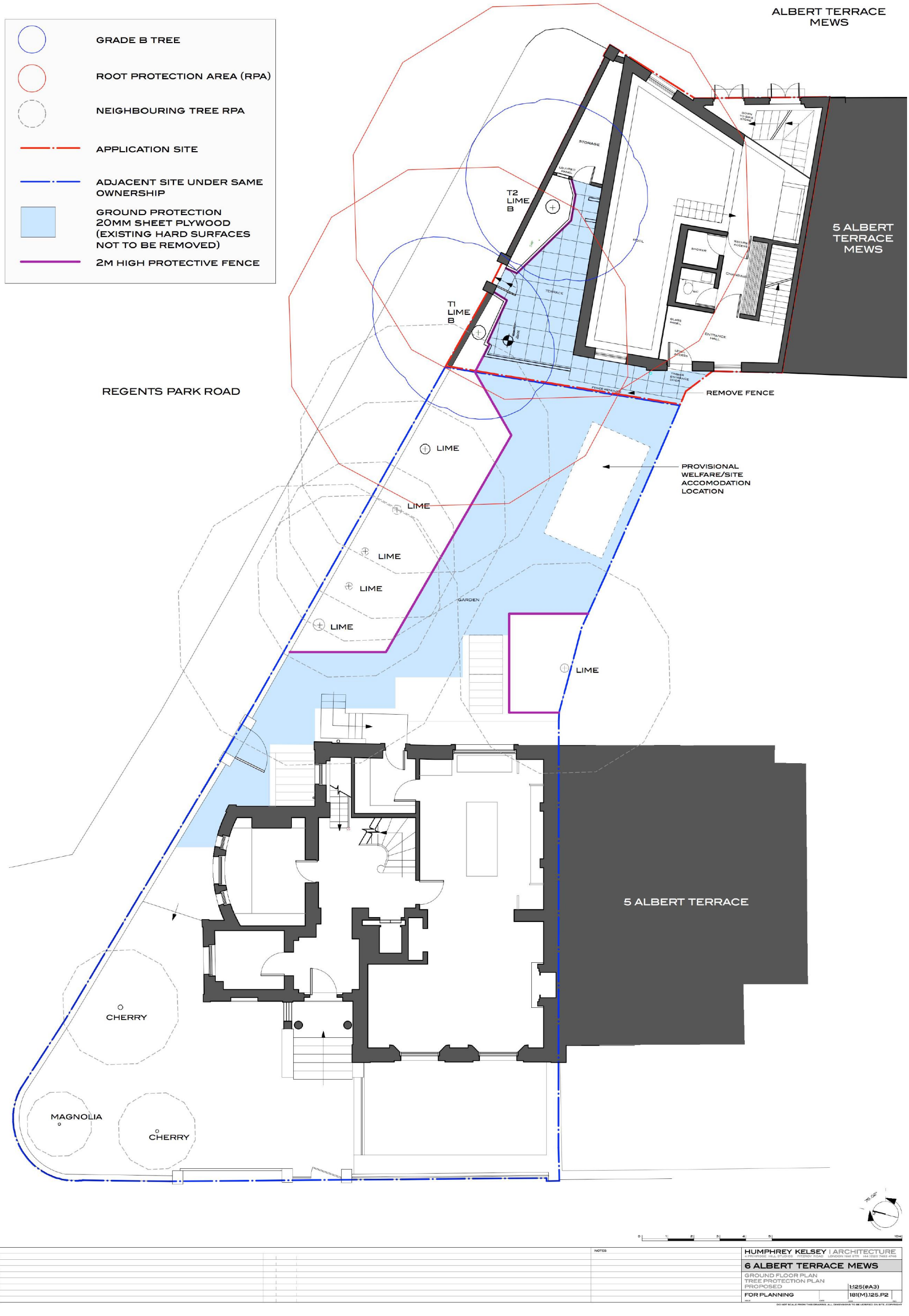
APPENDIX MD3

Tree constraints plan (TCP) showing existing ground floor and locations of trees (category B trees outlined in blue) with root protection areas as red circular polygons. The plan has been provided separately at a scale of 1: 125 @ A3



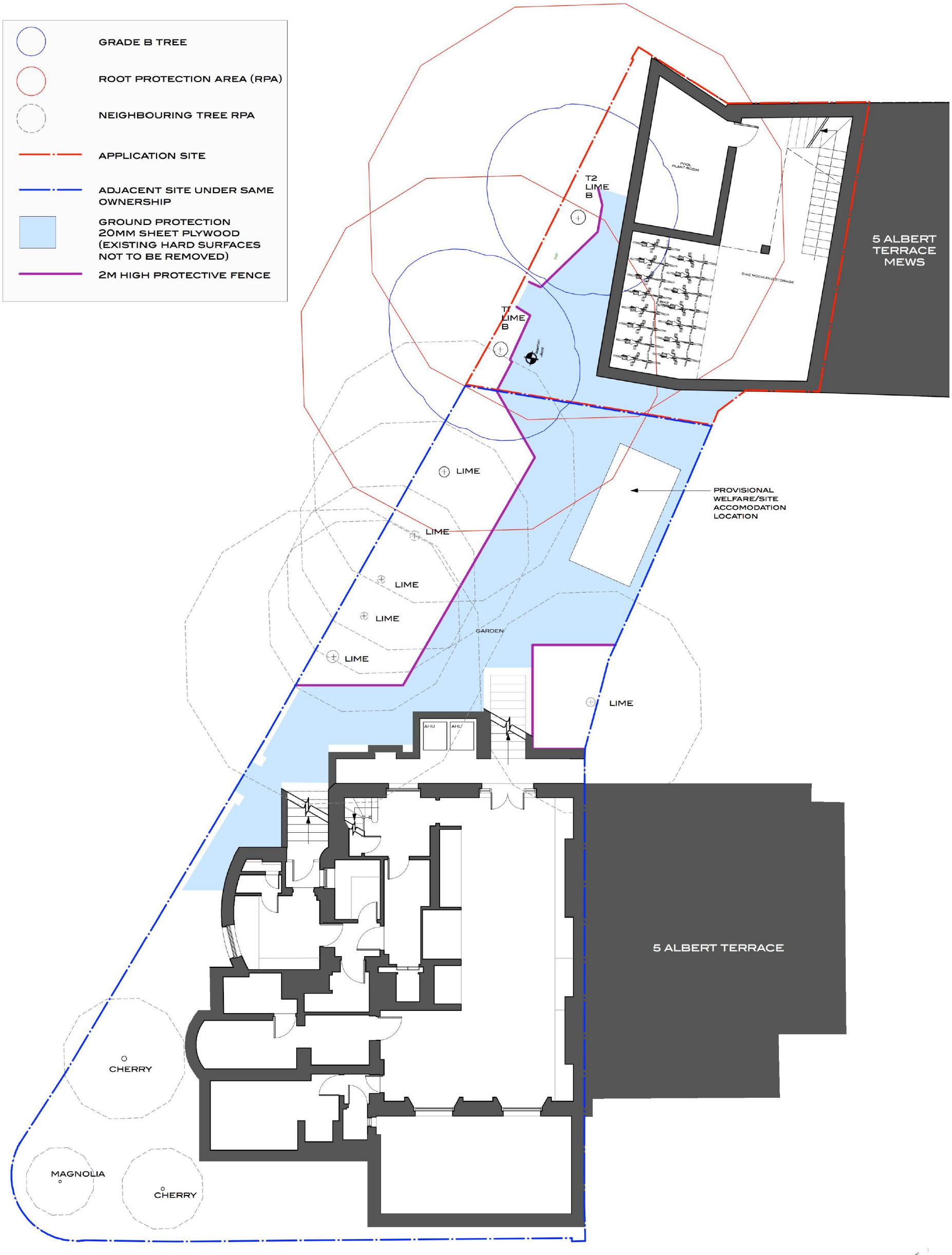
APPENDIX MD4

Tree protection plan (TPP) for ground floor showing retained trees, tree numbers and root protection areas (red circular polygons). The location of protective fencing is shown as purple lines and ground protection as blue shading. The plan has been provided separately as a PDF at a scale of 1: 125 @ A3



APPENDIX MD5

Tree protection plan (TPP) for basement floor showing retained trees, tree numbers and root protection areas (red circular polygons). The location of protective fencing is shown as purple lines and ground protection as blue shading. The plan has been provided separately as a PDF at a scale of 1: 125 @ A3



APPENDIX MD6

TREE AWARENESS – SITE INDUCTION SHEET

SITE NAME: 6 Albert Terrace Mews, London NW1 7TA

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 can 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 me 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 MD7

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.