Arboricultural Survey and Planning Integration Report

at

Trees, Coniston Road, Bromley, Kent. BR1 4JB

FINAL - 21st April, 2018

C O N T E N T S

Arboricultural and Woodland Consultants

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ARBORICULTURAL REPORT

LOCATION	Trees, Coniston Road, Bromley, Kent. BR1 4JB	**REF:**	**AR/3724/jq**
CLIENT	Mr A Dicker 7 Juniper Close, Biggin Hill, Kent. TN16 3LZ	**DATE OF REPORT**	21st April, 2018
REPORT PREPARED BY	J. Quaife, AA Registered Consultant Dip.Arb.(RFS), F.Arbor.A, CEnv.	**DATE(S) OF INSPECTION**	27th September, 2017 24th January, 2018
SURVEY INSPECTOR(S)	J. Quaife, AA Registered Consultant Dip.Arb.(RFS), F.Arbor.A, CEnv.	**SHEET No.**	1 of 11

LOCAL AUTHORITY	London Borough of Bromley		
CONTACT	Arboricultural Officer	Chris Ryder	Christopher.ryder@bromley.gov.uk 0208 313 4516

Please note that abbreviations introduced in [square brackets] *are used throughout the report.*

INSTRUCTIONS

Issued by – Mr Dicker, address as above.

TERMS OF REFERENCE – To survey the subject trees to assess their general condition and to provide a planning integration statement for the proposed development that safeguards the long term well being of the retained trees in a sustainable manner.

Summary

The site is a corner plot with a retaining wall along the frontage to Elstree Hill which is at a lower level. The rear garden is terraced down to the west. The proposal is to demolish the existing house and garage and to construct a terrace of 5 houses facing the Coniston Road frontage.
There is parking provision to the front of each house, but in addition the land within the applicant's ownership along the southern side of Elstree Hill will be used for parking.
The subject trees are arranged around the site periphery and an old Area Tree Preservation Order applies to the eastern half of the site, and another Tree Preservation Order (no reference) appears to apply to the trees along the Elstree Hill frontage. Of the 28 subject trees only ten are to be removed and one stem of two cut off from an eleventh tree. Some incidental pruning will be necessary, but overall the arboricultural impact of the proposal on the landscape will be neutral.

The protection of the retained trees can be effected in accordance with current standards and guidance, and there are no matters of post development pressure upon trees that could not be managed with routine maintenance.
The proposal is sustainable in arboricultural terms.

Documents Supplied

- Extract from the Borough of Bromley Tree Preservation Order No.9 1960
- Brouard Architects Proposed Layout drawing PB772 001 Rev PR4, dated January 2018
- Topographical Survey drawing - untitled and undated

Scope of Survey

1.1 The survey is concerned with the arboricultural aspects of the site only.

1.2 London Borough of Bromley Tree Preservation Order No.9 1960 applies to the eastern half of the subject site, and there are other Tree Preservation Orders as shown at Appendix B and described at Section 6 below.

1.3 I had a telephone conversation with Mr Ryder about the generalities of the site and in particular the potential of the two large trees on the Coniston Road frontage. There was also a client's team meeting on site subsequent to my survey visit.

1.4 The trees were inspected on the basis of the Visual Tree Assessment method expounded by Mattheck and Breloer (The body language of trees, DoE booklet Research for Amenity Trees No. 4, 1994).

1.5 The survey was undertaken in accordance with British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations [BS5837] with modification.

1.6 This report sets out the Root Protection Area [RPA], described by the RPA radius [RPR] derived from Section 4.6 of BS5837.

1.7 Pruning works will be required to be in accordance with British Standard 3998:2010 Tree work - Recommendations [BS3998]. In addition to these recommendations the current best practice relating to bio-security should be observed and in particular the sterilisation of tools, equipment and footwear.

1.8 Hedge planting will be required to be in accordance with Standard 4428:1989 Code of practice for general landscape operations (excluding hard surfaces).

1.9 Reference is made to the Planning Practice Guidance – Tree Preservation Orders and Trees in Conservation Areas (2014) [PPG TPO&CA].

1.10 This report does not cover the arrangements that may be required in connection with the laying or removal of underground services.

1.11 This report does not set out the working specifications of tree protection measures and engineering and design features, but provides enough detail in principle to demonstrate the feasibility of the scheme.

Survey Method

2.1 The survey was conducted from ground level with the aid of binoculars.

2.2 No tissue samples were taken nor was any internal investigation of the subject trees undertaken.

2.3 No soil samples were taken.

2.4 The stem diameters [SD] were measured in centimetres at 1.5 metres above ground level and otherwise in accordance with Annex C of BS5837.

2.5 The height of each subject tree was estimated with a clinometer.

2.6 The crown diameters were estimated by pacing or visually where access was restricted.

2.7 The positions of the subject trees are plotted at Appendix B derived from the supplied plan. Please note that the attached plan is for indicative purposes only.

Ecology Informative

3.1 Bats are protected under the Wildlife & Countryside Act 1981 and subsequent legislation and The Conservation of Habitats and Species Regulations 2010 and it is an offence to deliberately or recklessly disturb them or damage their roosts. Trees should be inspected before any works commence and if the presence of bats is suspected advice will need to be sought from the Natural England Bat Line on 0845 1300228. Further advice on bats is available from The Bat Conservation Trust (020 7627 2629).

3.2 Tree work should as far as is possible avoid the bird nesting season, which officially (natural England) is from February until August, although the busiest time is from 1st March until 31st July.

3.3 Please also be aware that ecology is governed principally by;

- the Wildlife and Countryside Act 1981 (as amended by the CRoW Act 2000),
- the Conservation of Habitats and Species Regulations 2010,
- the Wild Mammals (Protection) Act 1996, and
- the Natural Environment and Rural Communities (NERC) Act 2006.

The Site

4.1 The site is a corner plot bounded to the north by Elstree Hill, the east by Coniston Road, and to the south by a wide grass verge with trees by Hawkshead Close. The western boundary is with No. 42 Elstree Hill.

4.2 The site is level over the eastern side, but there is a terraced slope down to the western boundary. The lower level of Elstree Hill has a retaining wall. The house and garage outbuilding front onto Consiton Road, with a pedestrian gate to the house and a vehicular entrance to the garage through the waist-high brick boundary wall. There is an area of drive to the north of the garage, and the house is surrounded by hard surfacing. There is a path around the garden edge, which is sunken along the southern boundary

4.3 With reference to the British Geological Survey Geology of Britain viewer the indicated soil parent material is Harwich Formation sands and gravels. This soil type is free-draining and has some resistance to compaction, which is harmful to tree roots. For the purposes of this survey I have assumed there to be no presence of clay.

4.4 I am not an expert on soils and although I have some working knowledge of them, if accurate soil analysis is required then a soil specialist should be contacted.

Subject Trees

5.1 The 28 subject trees are listed in the table at Appendix A and plotted at Appendix B. I have summarised them in Table 1 below and have graded them in accordance with BS5837[1].

Table 1. Subject Trees – species and grades

Species	A	B	C	U	Totals
Crab apple	-	-	1	-	1
Norway maple	-	-	1	-	1
Purple plum	-	-	2	-	2
Oak	-	1	1	-	2
Yew	-	-	5	-	5
Holly	-	-	7	-	7
Sycamore	-	1	1	-	2
Hawthorn	-	-	3	-	3
Monterey cypress	-	1	-	-	1
Laburnum	-	-	1	-	1
Rowan	-	-	1	-	1
Cherry	-	-	-	1	1
Whitebeam	-	1	-	-	1
Totals	**0**	**4**	**23**	**1**	**28**

5.2 There are no A grade trees and only 4 at B grade. The U grade cherry is dying and should be removed irrespective of the proposal. Several of the trees have crown asymmetry where they have grown close together. The oak T27 and whitebeam T28 are both growing in a raised bed within a free-standing retaining wall, and following my conversation with Mr Ryder we agreed that their longer-term potential is sufficiently limited that they could be removed.

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[1] BS5837 Tree Category Classes

U – Existing condition is such that any existing value would be lost within 10 years and should therefore be removed for reasons of sound arboricultural management.

A – High quality and value (40 + yrs).
1) Mainly arboricultural values 2) Mainly landscape values 3) Mainly Cultural values including conservation.

B - Of moderate quality and value (20+ years).
1) Mainly arboricultural values 2) Mainly landscape values 3) Mainly Cultural values including conservation.

C – Those of low quality and value (10+ years).
Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a SD of less than 15cm could be considered for relocation.

5.4 Overall the subject trees are in satisfactory condition and none of them presents any significant risk, although some would benefit from some remedial tree surgery to remove dead wood or minor defects as a matter of routine maintenance not directly associated with the proposal.

The Tree Preservation Orders

6.1 The site has an Area Tree Preservation Order over the eastern half of the site, and another Tree Preservation Order (no reference) appears to apply to the trees along the Elstree Road frontage.

6.2 The Tree Preservation Order Map on the Council's website, does not provide references, and I have reproduced the map extract and the citations for each below. The blue pin is the Area TPO and the numbers are mine and do not apply to any TPO documentation. These are included at Appendices B and C.

1. TREES, CONISTON ROAD, BROMLEY, KENT
2 COPPER BEECH, 2 OAKS, 2 SYCAMORES AND 1 MAPLE
Created: 07.07.2010

2. THE GROUNDS OF CEDARHURST ELSTREE HILL APPROXIMATELY 20 FEET FROM THE BOUNDARY WITH TREES CONISTON ROAD AND APPROXIMATELY 16 FEET FROM THE BOUNDARY WITH ELSTREE HILL
FALSE ACACIA
Created: NONE

3. THE GROUNDS OF CEDARHURST ELSTREE HILL ON T HE EASTERN SIDE APPROXIMATELY 34 FEET SOUTH OF THE GATEWAY AND APPROXIMATELY 6 FEET FROM THE BOUNDARY WITH TREES CONISTON ROAD
BEECH
Created: NONE

6.3 With the TPO 1 the maple T2, oak T5, sycamores T8 and T9 are likely to be those protected, but a second oak is not present (please note that the beeches seem to refer to the two purple plums which are present). With TPOs 2 and 3 the off-site trees referred to, the false acacia and beech, appear to be in the reverse of the positions indicated, i.e. TPO 2 is the beech and TPO 3 is the false acacia and their positions are incorrect as they are in the neighbouring property. However, all the trees which appear to be protected are to be retained.

6.4 The trees T14, T15, T18, T20, T21, T22 and T23 are to be removed along the southern boundary to improve the light availability to the rear garden of Plot 1, and also to the southern elevation of the house. They are within the Area TPO, but the TPO was made in 1960, 57 years ago and consequently none of the trees T11 to T24 are old enough to be protected (PPG TPO&CA). Hawthorn T25 could conceivably be old enough, but it is to be retained and is just to have the secondary leaning stem pruned off.

The Proposal

7.1 The proposal is set out at Appendix C. The proposal is to demolish the two existing buildings and to construct a terrace of 5 houses facing the Coniston Road frontage.

7.2 The Coniston Road frontage will be opened up to provide parking to the front of each house, but in addition the land within the applicant's ownership along the southern side of Elstree Hill will be used for parking.

Arboricultural Landscape Integration

8.1 Of the 28 subject trees only 10 are to be removed, one of which is the dying U grade cherry. I have set out the trees to be retained and removed in Table 2 below.

Table 2. Tree Retention and Removal

Trees to be Retained +grade	**Trees to be Removed +grade**	**U Grade Trees to be Removed**
GRADE A (0)	**GRADE A** (0)	T26
GRADE B (2) T9, T16	**GRADE B** (2) T27, T28	
GRADE C (16) T1 - T8, T10, T11, T12, T13, T17, T19, T24, T25	**GRADE C** (7) T14, T15, T18, T20, T21, T22, T23	
Total 18	**Total 9**	**Total 1**

8.2 The primary intention is to retain the peripheral screening so that the arboreal appearance of the site's character is conserved. The three trees on the Coniston Road frontage are to be removed and the proposed terrace will be very similar in appearance to the development on the opposite side of the road.

8.3 The removal of the 7 C grade trees opens up the southern boundary but the trees on the grass verge will continue to provide mitigation screening. In due course a new hedge maintained at head height could be planted if necessary.

8.4 The hawthorn T25 has a secondary stem arching to the north-west and this is to be pruned off, leaving the main part of the tree which leans to the south-east. The indicative extent of pruning is indicated at Appendix C with the dark green crown outline.

8.5 The dark green crown outlines indicate the proposed pruning of trees T17, T19 and T24 to reduce the lateral spread toward Plot 1. Tree T5 is to have its crown asymmetry reduced where it overhangs the road, and T6 is to have the lateral spread reduced into the garden of Plot 4.

8.6 T9 and T8 are to be pruned to reduce the lateral spread into the site, and are to have the ivy severed by cutting the stems as near as possible to ground level (or above basal shoots where present), and again at least 40 centimetres above so as to leave a clear gap on the tree's stem. This gap ensures that all ivy stems can be seen to have been cut and subsequent new growth can be rubbed off. The severed ivy will die and fall off in due course and if it does provide wildlife habitats the transition will be gradual.

8.7 The pruning specification for issue to a tree surgeon can be agreed by condition. The leaning forsythia (a shrub which is not a material consideration) adjacent to T22 is to be removed.

8.8 There is no necessity to plant new trees, but new hedging is to be planted along the Elstree Hill road frontage and to separate the front and rear gardens. The hedging species can be agreed by condition, but the principle will be to use evergreen shrub species, with interspersed flowering varieties (see the hedge at Appendix C). The western end of the site is at a lower level.

8.9 In summary, the loss of the two trees T27 and T28 and the few along the southern boundary will not detract from the landscape and will not have a detrimental visual impact upon the character and appearance of the area.

Post Development Pressure

9.1 The concept of post development pressure is not that routine maintenance work to maintain clearances and the proportionality of trees is unacceptable. The term should more accurately be one of irresistible post development pressure where the spatial or physical relationship of a retained tree to a structure or feature demands pruning or removal that is inappropriate, but to which the local planning authority could not reasonably refuse consent.

9.2 The orientation of the site is helpful as the gardens face the west, as well as there being good space and ambient light. There will be some sense of enclosure but the seclusion of the rear gardens is an important and material consideration. The large sycamore T9 will cast shade later in the afternoon, but the removal of the ivy will lessen the effect.

9.3 The crowns of the trees adjacent to the southern elevation of Plot 1 will be close to the building’s roof and so it would be prudent to include filtration for rainwater guttering of either mesh or “bristle” inserts. This should include the incorporation of discreet ladder attachment points under the eaves and the provision of sufficient clearance between the edge of the roof and the guttering to facilitate ease of maintenance. In addition, the downpipes should be fitted with easily cleanable traps.

9.4 In consideration of these matters, there will be no appreciable post development pressure, and certainly none that would oblige the Council to give consent to inappropriate tree works.

Tree Protection Measures

10.1 The BS5837 gives a Root Protection Area [RPA] for each retained tree by reference to Section 4.6 in the BS. The RPA is an estimation of the area of the root system that would need to be retained to sustain the condition of the tree if all the other roots outside it were to be severed. The RPA represents a smaller proportion, (on average only a third), of a tree's root system and consequently whilst the RPA is particularly important to ensure that there are no adverse effects upon stability, if an encroachment does not reduce the overall assimilative function of the root system significantly it is unlikely to cause harm. However, as with any factor relating to trees each individual situation must be justified in site-specific terms.

10.2 The RPA is usually described as a circle with a radius (Root Protection Area Radius [RPR]) of the prescribed distance within which no unspecified activity should occur, though the shape and position of the RPA can be modified by an arboriculturist to meet individual site conditions according to the probable distribution of the tree roots. Intrusion into the RPA can take place only where the ground is adequately protected in accordance with the requirements of Section 6.2.3 of BS5837 or where work is carried out to an agreed design and working method.

10.3 Quaife Woodlands uses a tabular method to derive rounded-up RPA radii in half-metre graduations (Appendix D). I have drawn the shape of the RPA of sycamore T9 to reflect the topography, the road, and the presence of the mature beech and acacia at 42 Elstree Hill. The RPAs of the trees along the top of the retaining wall to Elstree Hill are also displaced into the site.

10.4 **RPA Encroachment** The only encroachment into RPAs is by the proposed new house at Plot 1. The trees in this section will have root severed along the foundation line, but there is open ground to the south and in terms of the overall root systems, the loss of roots is unlikely to cause the trees any harm. The new buildings will shield the trees from high winds from the north, but the tensile support roots to the south will continue to support the trees against high winds from that direction. The crowns of T19 and T24 growing to the north are to be pruned back and consequently the trees' juxtaposition with the building is not liable to be problematic

10.5 **Tree Protection Fencing** The combined zones of RPAs form the Construction Exclusion Zone [CEZ] and will be protected by a Tree Protection Fence [TPF] comprising steel mesh panels of 1.8 metres in height ('Heras'). These panels can be mounted on a scaffolding frame as shown at Figure 2 of BS5837 (Appendix E), but where the TPF will not be under any pronounced construction pressure is can be erected with block supports and bracing as shown at Figure 3 of BS5837 (Appendix F). I have differentiated the fencing specifications in the Key at Appendix C.

10.6 The TPF (Appendix E specification) adjacent to trees T17, T24 and T25 will have to be positioned carefully once the ground protection is in place (see paragraph 10.8 below).

10.7 The TPF is to be erected before any work commences on site, is to remain in situ undamaged for the duration of all work or each phase, and only to be removed once all work is completed. The only exception is the completion of soft landscaping, but if any excavations however minor, are to be carried out as part of soft landscaping within RPAs, an arboricultural assessment must be carried out beforehand and any additional arboricultural protection measures incorporated. The TPFs are to carry waterproof warning notices denying access within the CEZ.

10.8 **Ground Protection** The zones shaded pink at Appendix C are to be protected in accordance with Section 6.2.3 of BS5837 as described at Appendix F to prevent ground compaction from the erection of scaffolding and other construction use.

10.9 Where scaffolding is to be erected within the RPA of a retained tree it may be necessary to place the feet directly onto the ground to achieve a stable working structure. The collective footprint of the scaffolding feet on the soil will represent a minor proportion of the RPA and will not be a significant factor in terms of ground compaction.

10.10 **New Surfacing** None of the new surfacing proposed will compromise RPAs and consequently no special surfacing method is necessary.

10.11 **Surfacing uptake within RPAs** Where the existing drive and paths are to be taken up within RPAs the method set out at Appendix H will be followed.

10.12 **General Matters** The surface water run-off and soil drainage have not been studied. However, due to the site topography and soil type, I do not foresee any detrimental effects on the trees in hydrological terms as a result of this development.

10.13 I have not been advised of the underground service routes, but it seems logical to suppose that they will connect to existing service runs in Coniston Road. If other underground service routes are required which pass through RPAs the excavation will be carried out in accordance with the manual digging method at Appendix I, and invoke the provisions of BS5837 and NJUG 4 and if necessary, further arboricultural advice will be sought.

10.14 Where existing or proposed drains pass within the root system of a tree (not just the RPA), technical advice must be sought to assess the root-tightness of joints. Modern compression joints do not reliably prevent root ingress and it may be necessary to upgrade them.

10.15 The hard landscaping operations are part of the construction works and will be planned and carried out within the construction phase tree protection measures.

10.16 The protection of the trees will also include recognition of other types of potentially damaging activities, such as the storage of materials (and other substances likely to be toxic to plants), parking, site-building requirements, and the use and parking of plant. Particular care and planning is necessary to accommodate the operational arcs of excavation and lifting machinery, including their loads, especially large building components such as beams and roof trusses. Operations like these have the potential to cause incidental damage and logistical planning is essential to avoid conflicts.

10.17 One of the main tree protection considerations will be the logistical management of the site. The access to the elevations of buildings that face trees will be restricted and careful materials handling and storage, vehicle and plant access, and personnel accommodation will need attentive planning.

Conclusions

11.1 Of the 28 subject trees only 10 are to be removed, one of which is a U grade tree that should be removed irrespective of this proposal. Consequently the peripheral trees will be retained and maintain the arboreal character of the site, and provide good screening into and out of the rear gardens. The primary design objective of retaining the peripheral tree screening is achieved.

11.2 There are some minor pruning requirements but they will not cause any of the trees physiological harm, nor be readily discernible from without the site. New hedges are to be planted and with all these matters in consideration the arboricultural landscape impact of the proposal will be neutral.

11.3 The retained trees do not cause any significant conflicts in terms of construction activities, nor will any significant issues of post development pressure be likely to emerge that could not be managed with routine maintenance.

11.4 The retained trees will all be protected in accordance with current standards and guidance, particularly with logistical planning.

11.5 For trees to be sustainable within a development proposal they must be compatible with their surroundings, not just in terms of long-term spatial relationship but also in respect of minimising any potential conflicts to matters of routine maintenance. This proposal achieves this objective.

11.6 I have taken account of the information given to me and my own observations on site and I am satisfied that this scheme is arboriculturally sound and that the long-term well-being of the retained trees will be safeguarded in a sustainable manner.

Recommendations

12.1 The successful integration of the proposal with retained trees will need to take account of the following points:

i) Plan of underground service routes.

ii) Implementation of the tree protection measures and methods set out in this Report.

iii) Site logistics plan to include storage, plant parking/stationing, materials handling.

iv) Site supervision – Following an induction meeting conducted by the project arboriculturist with all those involved in attendance, an individual, e.g. the Site Agent, will be nominated to be responsible for all arboricultural matters on site. This person must:

a) be present on site for the majority of the time,
b) be aware of the arboricultural responsibilities,
c) have the authority to stop any work that is causing, or has the potential to cause harm to any tree,
d) be responsible for ensuring that all site operatives are aware of their responsibilities toward trees on site and the consequences of any failure to observe those responsibilities,
e) make immediate contact with the local authority and/or the project arboriculturist in the event of any tree related problems occurring, whether actual or potential.

12.2 As a matter of course these points will be resolved in consultation with and subject to the approval of the planning authority through their Arboricultural Officer.

12.3 The sequence of works should be as follows:

i) initial tree works – tree removal and pruning
ii) installation of TPF
iii) site preparation
iv) installation of underground services
v) construction of new drive and other hard surfaces
vi) main construction, including hard landscaping
vii) removal of TPF
viii) soft landscaping including hedge planting

KEY

Pre: Prefix: **T** = Tree **G** = Group **H** = Hedge

No Tree reference number.

Ht Tree Height in metres.

SD Stem diameter in centimetres at 1.5 metres above ground level or immediately above the root flare for multi-stemmed trees.

***** Estimated. **m** Multi-stemmed **(**bracketed number is single-stem equivalent diameter**)**.

N-S-E-W Branch spread in metres to the four compass points – **Ø** average crown diameter.

CrB Height in metres of crown clearance above adjacent ground level.

AC Age Class **Y** – Young. **E** – Early mature. **M** – Mature. **O** – Over-mature. **V** – Veteran.

PC Physiological Condition **G** – Good **F** – Fair **P** – Poor **D** – Dead

SC Structural Condition **G** – Good **F** – Fair **P** – Poor **D** – Dead

BS Category grading

U – Existing condition is such that any existing value would be lost within 10 years and should therefore be removed for reasons of sound arboricultural management.

A – High quality and value (40 + yrs).
1) Mainly arboricultural values 2) Mainly landscape values 3) Mainly cultural values incl. conservation.

B - Moderate quality and value (20+ years).
1) Mainly arboricultural values 2) Mainly landscape values 3) Mainly cultural values incl. conservation.

C – Low quality and value (10+ years).
Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a SD of less than 15cm should be considered for relocation.

Rad Root Protection Radius in metres.

RPA Root Protection Area in square metres.

BRP Bat Roost Potential **H** – High, very likely **M** – Medium, possible **L** – Low, very unlikely

TPO Trees in the TPO Area – **A, (A) (**trees less than 57 years old**)**, Trees in TPO 1 - **(1)**

Arboricultural Survey AR/3724/jq – Trees, Coniston Road, Bromley, BR1 4JB Appendix A

No	Species	Ht	SD	N E S W	CrB	AC	PC	SC	BS	RPA	Rad	Observations	TPO
T1	Crab apple	5	<20	7Ø	1.0	M	G	F	C	20	2.5	Ivy 80%	-
T2	Norway maple	9	<30	10Ø	1.0	E	G	G	C	38	3.5	Ivy 60%	1
T3	Purple plum	5	<20	6Ø	GL	E	G	F	C	20	2.5	45° lean over road, Ivy 50%	-
T4	Purple plum	6.5	28	8Ø	1.5	M	G	G	C	38	3.5	Slight lean over road, Ivy 50%	-
T5	Oak	4	<35	3-2-0-6	0	E	G	F	C	64	4.5	Ivy 90%	1
T6	Yew	8	17	7Ø	1.5	E	G	G	C	20	2.5	Crown asymmetric crown to E	-
T7	Holly	8	19	7Ø	1.5	M	G	G	C	20	2.5	Ivy growth from T22	-
T8	Sycamore	17	45*	12Ø	4.0	M	G	G	C	95	5.5	Forked x 2 at 4m,, Ivy60%, asymmetric crown to W	1
T9	Sycamore	19	80*	16Ø	4.0	M	G	G	B	284	9.5	Forked x 5 at 3m,, Ivy80%	1
T10	Yew	4	<15	7Ø	GL	Y	G	G	C	13	2.0	Top suppressed	-
T11	Holly	14	29	10Ø	2.0	M	G	G	C	38	3.5	Lean and asymmetric crown to NW	(A)
T12	Hawthorn	15	15	2Ø	1.0	E	F	F	C	20	2.5	Truncated at 2,4m	(A)
T13	Holly	12	25	6Ø	2.0	M	G	G	C	28	3.0	Lean and asymmetric crown to NW	(A)
T14	Holly	7	10/12	4Ø	1.0	E	F	F	C	13	2.0	Forked x 2 at GL	(A)
T15	Yew	9	<30	8Ø	2.0	E	G	G	C	38	3.5	Forked x 3 at 0.8m	(A)
T16	Monterey cypress	15	35	6Ø	3.0	M	G	G	B	64	4.5		(A)
T17	Laburnum	5	<20	5 NW	1.0	E	F	F	C	20	2.5		(A)
T18	Rowan	12	30*	9Ø	4.0	M	F	F	C	50	4.0	Forked x 3 at 1.7m, Ivy 15%	(A)
T19	Holly	7	12	6Ø	2.0	E	F	F	C	13	2.0	Crown asymmetric to NE	(A)

No	Species	Ht	SD	N E S W	CrB	AC	PC	SC	BS	RPA	Rad	Observations	TPO
T20	Yew	6	<15	6Ø	GL	S	G	G	C	13	2.0		(A)
T21	Yew	6	12	7Ø	1.0	E	F	F	C	13	2.0	Crown asymmetric to N	(A)
T22	Holly	5	<20	4Ø	1.5	E	F	F	C	20	2.5	Forked x 2 at 0.4m	(A)
T23	Hawthorn	7	<30	7Ø	2.0	M	F	G	C	38	3.5		(A)
T24	Holly	6	15	5Ø	1.0	E	F	F	C	13	2.0		(A)
T25	Hawthorn	9.5	35/31	10Ø	1.5	M	G	G	C	79	5.0	Forked x 2 at GL	(A)
T26	Cherry	4	35	8Ø	1.5	M	D	D	U	-	-	Dying	(A)
T27	Oak	13	37	12Ø	2.0	M	G	G	B	64	4.5	Growing on 1m high raised bed	A
T28	Whitebeam	11	18-18-16-22	10Ø	2.5	M	G	F	B	64	4.5	4 Stems at GL, growing on 1m high raised bed	A

Existing vehicular surfacing

Existing pedestrian surfacing

BS 5837:2012 Tree Categories

- U Tree that should be removed
- A Tree that is highly desirable for retention
- B Tree that is desirable for retention
- C Tree of no particular merit, could be retained
- Tree not surveyed
- Tree off site not surveyed

Quaife Woodlands **Arboricultural Survey AR/3724/jq**

'Trees', Coniston Road, Bromley, Kent, BR1 4JB

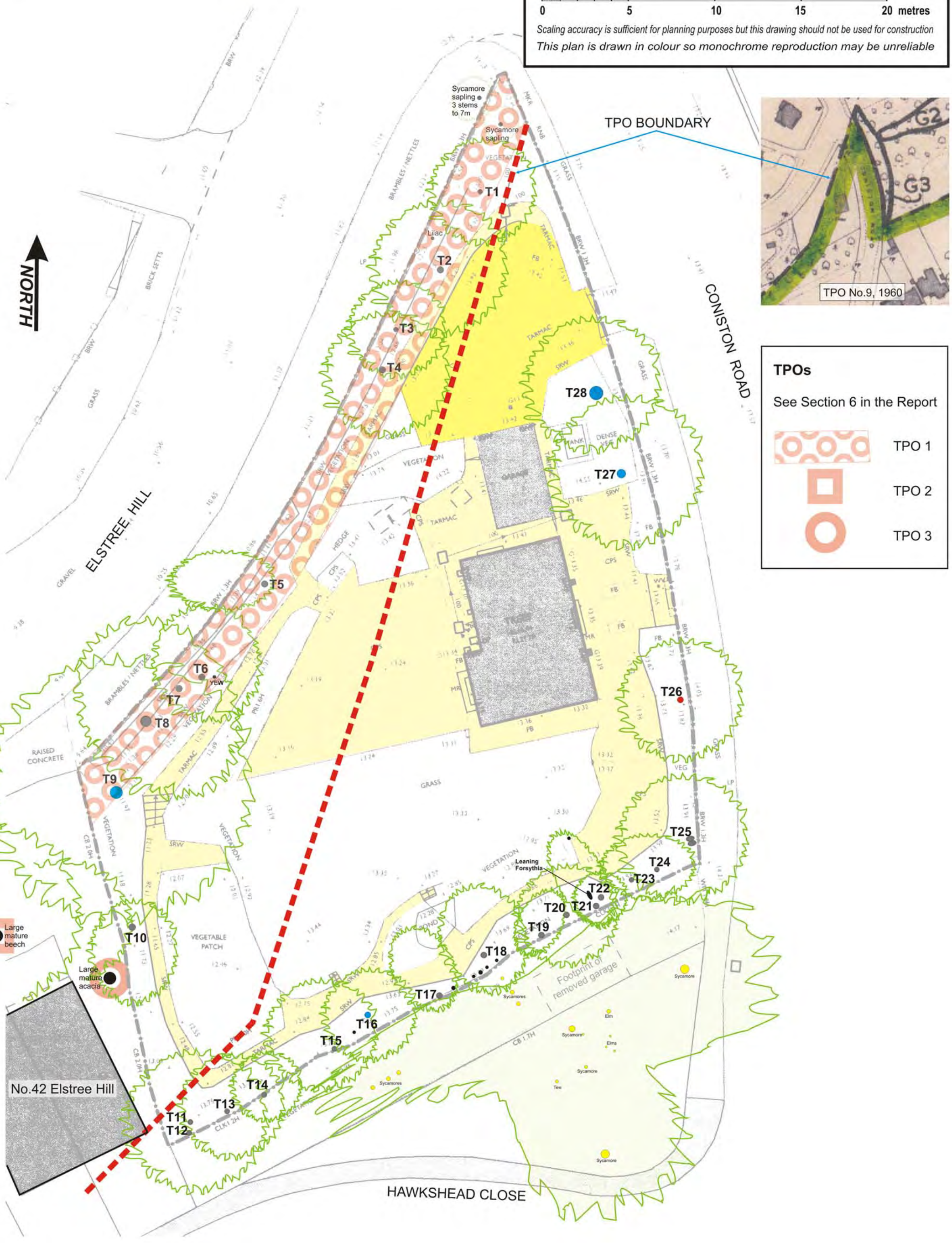
Site Plan - Existing Layout

Scale 1:200 approximately @ A3 12th January, 2018

0 5 10 15 20 metres

Scaling accuracy is sufficient for planning purposes but this drawing should not be used for construction

This plan is drawn in colour so monochrome reproduction may be unreliable



TPOs

See Section 6 in the Report

TPO 1

TPO 2

TPO 3

Existing vehicular surfacing

Existing pedestrian surfacing

Retained Tree

Removed Tree

Removed Tree (not surveyed)

Proposed Crown Reduction

Quaife Woodlands **Arboricultural Survey AR/3724/jq**

'Trees', Coniston Road, Bromley, Kent, BR1 4JB

Site Plan - Proposed Layout with Tree Protection Measures

Scale 1:200 approximately @ A3 21st April, 2018

0 5 10 15 20 metres

Scaling accuracy is sufficient for planning purposes but this drawing should not be used for construction

This plan is drawn in colour so monochrome reproduction may be unreliable

NORTH

AREA TPO BOUNDARY

CONISTON ROAD

ELSTREE HILL

PARKING

PROPOSED NEW FENCE to 1.4m

Sycamore sapling 3 stems to 7m

Sycamore sapling

Lilac

YEW

Leaning Forsythia

Large mature beech

Large mature acacia

No.42 Elstree Hill

Footprint of removed garage

Sycamores

Elm

Elms

Yew

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12 T13 T14 T15 T16 T17 T18 T19 T20 T21 T22 T23 T24 T25 T26 T27 T28

PLOT 1 PLOT 2 PLOT 3 PLOT 4 PLOT 5

HAWKSHEAD CLOSE

Proposed New House

Proposed Patio

Proposed Cycle Store

Root Protection Area Indicative Circular

Adjusted Actual

Tree Protection Fence

Appendix **F** specification

Appendix **E** specification

Construction Exclusion Zone

Ground Protection

TPOs

See Section 6 in the Report

TPO 1

TPO 2

TPO 3

Proposed New Hedge

Suggested species mix

Eleagnus ebbingei	50%
Eleagnus ebbingei 'Limelight'	20%
Escallonia iveyi (red flowering)	10%
Embothrium coccinea	5%
Garrya elliptica	*15%*

Appendix D

BS5837:2012 (Paragraph 4.6.1)
Root Protection Area radii in ½ metre graduations

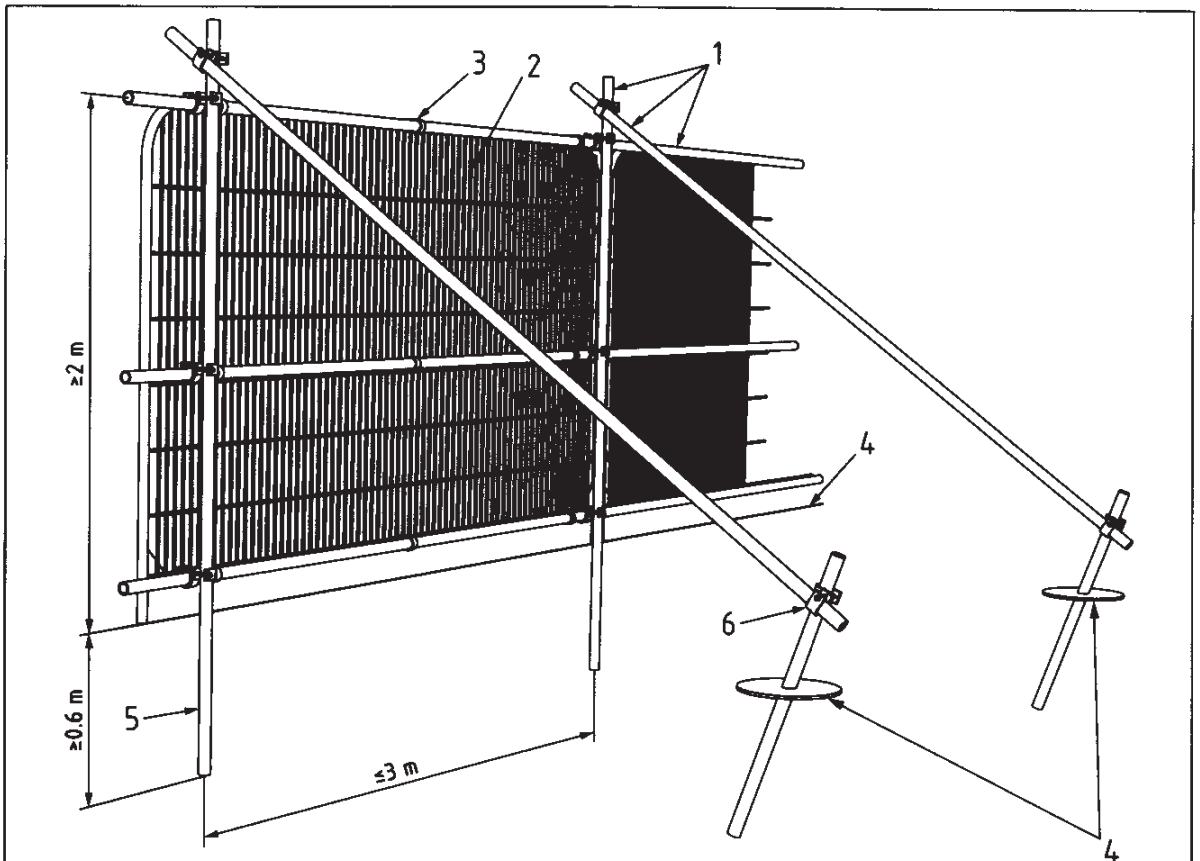
The ½ metre graduations of RPA radii have been calculated back to produce diameter dimensions, which in turn have been rounded down to the nearest centimetre. If the BS5837 multiplier factor is plotted on a graph it produces a straight gradient and if the ½ metre steps are plotted they are all above that line, thus ensuring that the RPA radii err on the generous side.

Single Stem up to diameter (mm)	*RPA Radius (m)*	*RPA (m^2)*
1250	**15.0**	**707**
1210	**14.5**	**660**
1170	**14.0**	**616**
1120	**13.5**	**573**
1080	**13.0**	**531**
1040	**12.5**	**491**
1000	**12.0**	**452**
960	**11.5**	**416**
920	**11.0**	**380**
870	**10.5**	**346**
830	**10.0**	**314**
790	**9.5**	**284**
750	**9.0**	**255**
710	**8.5**	**227**
670	**8.0**	**201**
620	**7.5**	**177**
580	**7.0**	**154**
540	**6.5**	**133**
500	**6.0**	**113**
460	**5.5**	**95**
420	**5.0**	**79**
370	**4.5**	**64**
330	**4.0**	**50**
290	**3.5**	**38**
250	**3.0**	**28**
210	**2.5**	**20**
160	**2.0**	**13**

Appendix E

Extract from British Standard 5837: 2012
Trees in relation to design, demolition and construction
- Recommendations

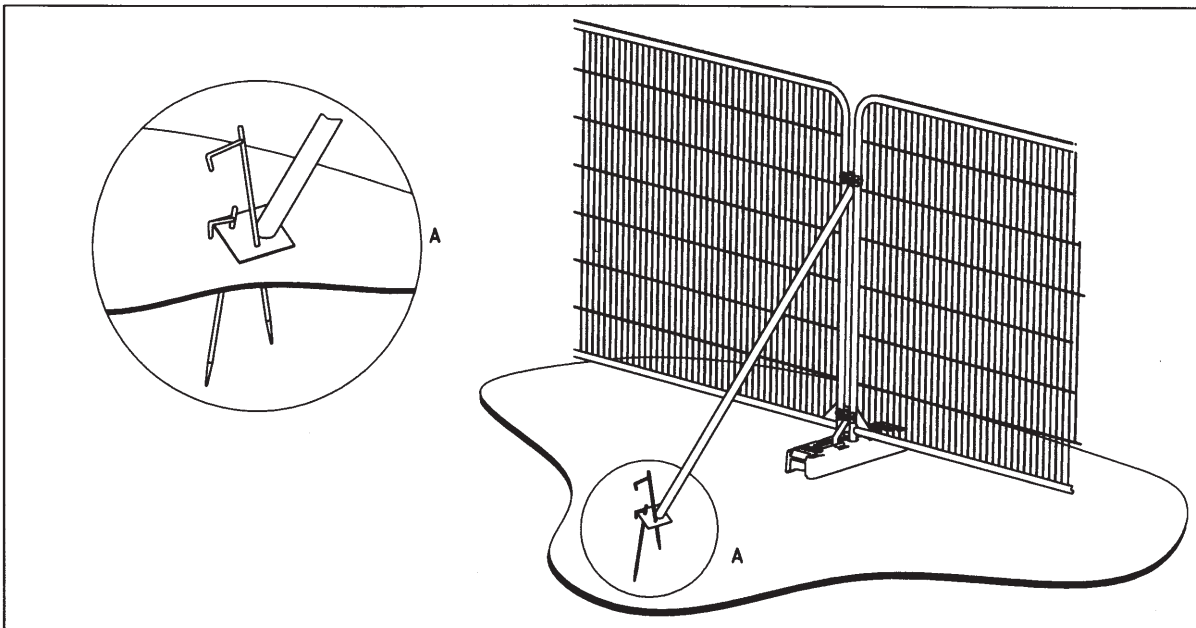
Figure 2. **Default specification for Tree Protection Barrier**
Indicated framework support as the usual method of support for steel mesh panels ('Heras'). Some variation can be employed if appropriate, such as support by wooden posts (75mm x 75mm x 2.75m) dug or concreted into the ground (dry mix concrete contained within a plastic bag), or if there is no pressure of access a lighter form of netting on driven stakes.



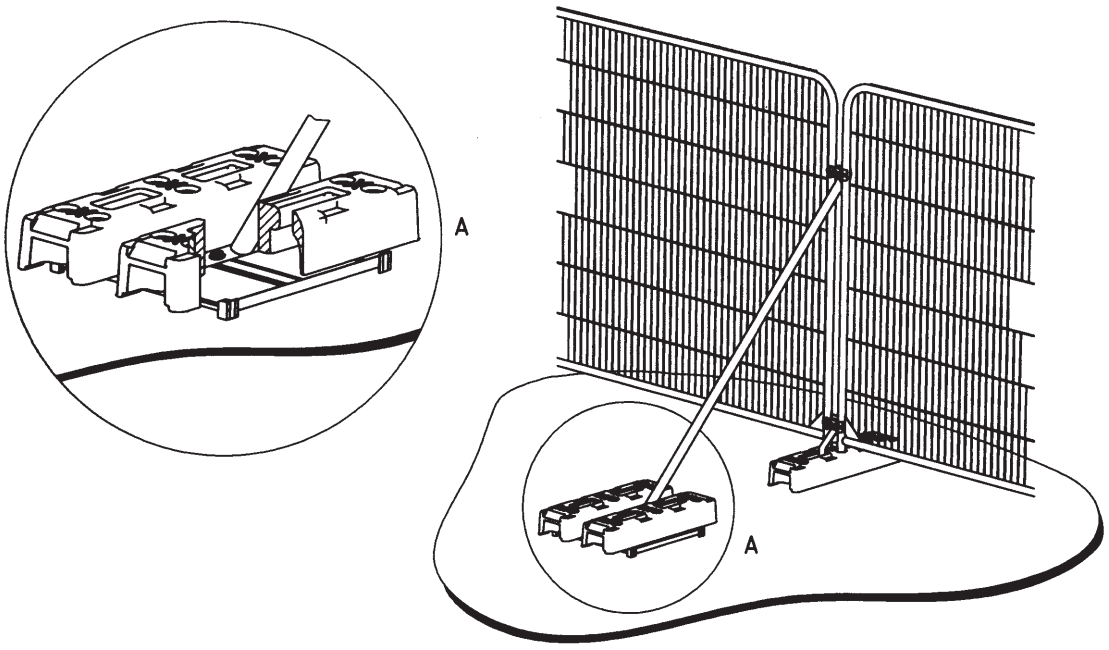
Key

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

Figure 3 **Examples of above-ground stabilizing systems**



a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

Appendix G

Extract from British Standard 5837: 2012 Trees in relation to design, demolition and construction - Recommendations

Ground Protection

6.2.3.3 New temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.

NOTE The ground protection might comprise one of the following:

a) for pedestrian movements only, a single thickness of scaffold boards placed 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 membrane;

b) for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;

c) for wheeled or tracked construction traffic exceeding 2 t 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.

6.2.3.4 The locations of and design for temporary ground protection should be shown on the tree protection plan and detailed within the arboricultural method statement (see **6.1**).

6.2.3.5 In all cases, the objective should be to avoid compaction of the soil, which can arise from the single passage of a heavy vehicle, especially in wet conditions, so that tree root functions remain unimpaired.

Scaffolding

Where scaffolding is to be erected within an RPA of a retained tree, it may be necessary to place the feet directly onto the ground to achieve a stable working structure.
The collective footprint of the scaffolding footings on the soil will represent a minor proportion of the RPA and will not be a significant factor in terms of ground compaction.

Appendix H

Method Statement for the uptake of hard surfacing and buildings near to trees

[RPA refers to the Root Protection Area as specified in the Report]

1. The uptake of the existing surfacing and buildings should be carried out from outside the RPA whenever possible and from within the footprint of the existing surfacing or building where within the RPA of a tree.

2. The excavation of the material must not extend into the soil underneath. In practical terms the bucket of the excavator must be used so that the teeth are horizontal so that any disturbance of the underlying soil is kept to an absolute minimum. Where the surfacing is very thin and/or roots are very near the surface, the digging should be done manually.

3. The rubble must not be stockpiled within the RPA of the tree and must be exported without crossing the RPA.

4. Due care and planning must be taken to ensure that the operational arcs of excavators do not damage the crowns of retained trees.

5. Where new surfacing is to be installed, if the depth of the old surface is insufficient, the wearing surface may need to be higher than existing in order to accommodate the appropriate thickness. There may be a requirement for a geo-textile membrane to be laid on the soil surface, but this is an engineering matter dependent upon soil type. The separation is beneficial for root development.

6. Where the old surface is taken up and not replaced, the infill should be of good quality topsoil laid without compaction.

Appendix I

Method Statement for Manual Digging through Tree Roots

1. Prior to any such work beginning, all personnel engaged in manual digging must be made aware of:

   i) the purpose of manual digging through roots – *to ensure that all significant roots are exposed*

   ii) why it is important - *to ensure that no significant harm is caused to a tree's root system*

   iii) why the excavation of a length of trench or number of trial holes are necessary before any roots are cut – *in order to enable an arboriculturist to make an assessment to decide which need to be protected and which may be severed*

   iv) once the roots to be severed are identified by an arboriculturist the correct pruning method must be employed - *to ensure that the pruning cuts cause the least possible physiological harm to the roots*

   v) the importance of the soil type – *to ensure that the correct precautions are taken in respect of the protection of roots as advised by an arboriculturist*

2. Prior to the excavation the position of spoil must be agreed with an arboriculturist and if it is to be exported, also the means and route of exportation.

3. Prior to the excavation the ground on one or both sides of, or around the excavation should be protected against compaction by pedestrian traffic or spoil exportation plant to the agreement of an arboriculturist.

4. Prior to the excavation the contingency arrangements for the protection of roots in the event of accidents or other occurrences must be agreed with an arboriculturist.

5. Prior to the excavation the maximum size of root that may be severed without reference to an arboriculturist must be agreed with an arboriculturist.

6. The soil must be worked loose with a digging fork and "bottomed up" with a shovel, or if space is restricted a "shove-holer", scoop or other such tool. There may be occasions when soil needs to be scooped out by hand.

7. When a root that is to be retained is found the soil around it should be removed with care, and when exposed it should be protected an against impact damage by being wrapped in hessian. (This will also protect it against drying out.)

8. The roots are not likely to be found to the full depth of the trench or hole (although they might be) and digging underneath them will require care. If the number of roots obstruct digging beneath them, the soil should be "tunnelled" from gaps each side, or if this is not practicable an arboriculturist's advice should be obtained to determine where access gaps can be created through the roots.

9. Roots to be severed must be pruned with a sharp cutting tool (secateurs or hand saw) as near to 90° to the axis of the root as possible. Whether the position of the cut should be flush with the excavated soil face or further in, will depend upon the type of backfill and will need to be agreed with an arboriculturist.

10. Where backfill soil is around and above the roots it must not be firmly compacted. If the load-bearing requirement of the backfill requires hard compaction an appropriate method of achieving this will be agreed with an arboriculturist.

11. If a trench has been opened for the installation of underground services an appropriate method of feeding in the cable or pipework under or through the roots will be agreed with an arboriculturist.