

Northern Line Extension Arboricultural Impact Assessment

March 4th 2013

Prepared by John Parker, TfL Arboriculture & Landscape Manager (Central).

Report Reference: NLE-040313-JP-ARB

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1. Introduction

1.1 The purpose of this report is to record basic data and assess the condition of trees which lie within or adjacent to the site boundaries of the proposed Northern Line Extension (NLE) in the London Borough of Lambeth, and to identify those trees which may require removal as part of this development.

1.2 Four sites were inspected in all. For the purposes of this report only these will be referred to as Kennington Green, Kennington Park, Nine Elms Station and Radcot Street. The construction activities at the proposed Battersea Station site will not affect any trees.

1.3 This report contains a schedule of trees on each of the four sites, including measurement data and a condition assessment, and an appraisal of the likely impact of the proposal on these trees.

1.4 This report does not contain a post-construction planting programme, which is to be dealt with elsewhere.

2. Methodology

2.1 Tree inspections were undertaken by John Parker, Transport for London (TfL) Arboriculture & Landscape Manager for Surface Transport (ST) in the Central area, working on behalf of London Underground (LU). Inspections were undertaken between the 12th and the 17th of July, 2012.

2.2 All inspections were made from ground level, and no invasive methods were used. In some situations a complete assessment was not possible due to either the location of the tree (on private land) or as a result of a part of the tree being obscured.

2.3 Measurements relating to tree height and spread are based on estimations unless otherwise stated.

2.4 All trees have been allocated a category of either A, B, C or U in accordance with British Standard 5837 :2012 *Trees in relation to design, demolition and construction - Recommendations* (BS5837). The definitions of the categories are as follows:

- **Category U.** Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.
- **Category A.** Trees of high quality with an estimated remaining life expectancy of at least 40 years.
- **Category B.** Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.
- **Category C.** Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.

2.5 All tree identification numbers supplied in this report are for the purposes of this report only, and will not reflect identification numbers stated elsewhere (for example, in the databases held by the LA or TfL).

3. Additional Considerations

3.1 The trees inspected in this survey are maintained by either the London Borough of Lambeth, TfL or private stakeholders. Before any work is undertaken to any trees, the relevant Arboricultural professional responsible for the maintenance of the tree (or the owner, in the case of private trees) must be consulted.

3.2 Any tree work which is undertaken must be carried out in accordance with industry best practice as specified in British Standard 3998:2010 *Tree work – recommendations* (BS3998), after all necessary consultation has been completed.

3.3 All maps used in this report have been adapted and reproduced from documents GRNLEB-BHD-00-XX-REP-CON-00023 - REV 02-01 and GRNLEB-HGL-TU-XX-REP-CON-00002 - 02-01.

3.4 A site meeting at Kennington Park between John Parker (TfL), Ian Leonard and Dave Paul (Lambeth Tree Officers) was held on February 13th 2013 in order to discuss the proposals. This was in addition to a meeting between John Parker and Ian Leonard at the offices of Lambeth Council on January 25th 2013.

4. Kennington Green, Lambeth

4.1 The site is located adjacent to the junction of Kennington Park Road and Montford Place, Lambeth.

4.2 Eleven trees were surveyed in total. TfL are responsible for maintaining four (T1, T2, T10 and T11), and the London Borough of Lambeth for the other seven.

4.3 The proposal requires the removal of eight trees from this site. These are T1, T2, T3, T5, T6, T7, T8 and T9.

4.4 Four of the trees (T3, T6, T7 and T9) are in poor condition and have been classified as Category U trees. Removal would be recommended independently of the NLE proposal.

4.5 T5 has been classified as a British Standard 5837 Category C tree. Please see the Appendices of this report for details relating to BS5837 Categorisation.

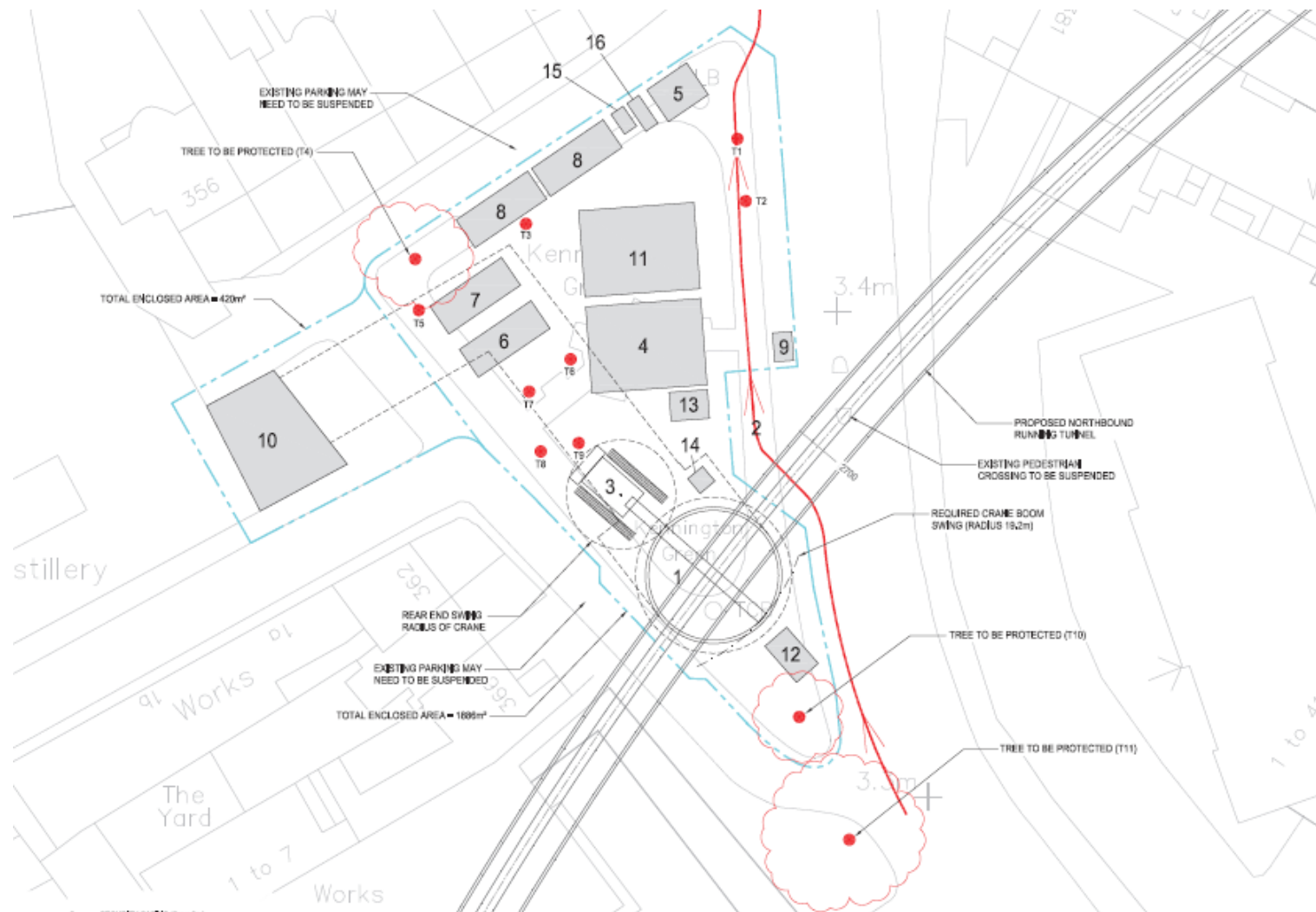
4.6 T8 has been classified as a Category B tree.

4.7 T1 and T2 have been classified as Category A trees.

4.8 T4, T10 and T11 must all be adequately protected during the construction phase. Suitable methods of tree protection are to be found in BS5837, extracts of which are contained within the Appendices of this report.

4.9 All tree removals are to be mitigated by an extensive post-construction replanting programme – to be agreed with the Local Authority/TfL Tree Officer – with the intention of restoring the landscape to a higher standard than that which currently exists.

Kennington Green



Kennington Green, Lambeth

Surveyed 10/07/12 by JP

T#	Location	Common name	Botanical name	Ht	DBH	N,S,E,W	Age	Phys Con	Stru Con	5837 Cat	Notes	Work Recommendations
1	Opp 344, on Kennington Road	Plane	Platanus	13	390	5,5,4,5	SM	G	G	A	No visible defects. Tfl tree.	Remove
2	On Kennington Rd, opp black entrance gates	Plane	Platanus	12	300	5,5,5,5	SM	G	G	A	No visible defects. Tfl tree.	Remove
3	Opp 350, on grass	Cherry	Prunus	7	330	3,4,5,2	M	P	P	U	Canopy decline, lean, dog damage, old pruning wounds	Remove
4	Opp 352, on pavement	Tree of Heaven	Ailanthus	14	680	5,4,5,6	M	F	F	B	Minor deadwood	No work required
5	Opp 354, on pavement	Ash	Fraxinus	12	390	5,4,5,5	SM	F	F	C	Basal damage, vehicle strikes, sparse foliage at top of crown	Remove
6	Opp Montford Place, adjacent central paving	Cherry	Prunus	7	420	6,1,4,3	M	P	P	U	Deadwood, tree generally in decline, old pruning wounds, black exudations from stem	Remove
7	Opp Montford Pl, adjacent pavement	Cherry	Prunus	6	330	2,3,4,3	M	P	P	U	Cavities, deadwood, unbalanced crown, dieback	Remove
8	Opp 362, on pavement	Tree of Heaven	Ailanthus	15	740	6,7,6,5	M	F	F	B	Minor deadwood, extensive suckering and epicormic growth	Remove
9	Opp 362, on grass	Cherry	Prunus	5	290	3,2,4,1	M	P	P	U	Canopy is 50% dead, fungal fruting bodies all over stem, lean, overshadowed by adjacent Ailanthus, stem decay, dog damage	Remove
10	Opp 366, on pavement	Maidenhair Tree	Gingko	11	210	4,4,4,4	SM	F	G	B	Sparse foliage towards top of crown, several crossing branches throughout. Tfl tree.	No work required
11	On Kennington Rd, adjacent to Clayton Street	Plane	Platanus	14	540	8,6,7,8	M	G	G	A	No visible defects. Tfl tree.	Remove

Key

Ht: Estimated height in metres. **DBH:** Diameter at breast height in millimetres. **N,S,E,W:** Estimated spread of branches at cardinal points in metres.

Age: Young (less than ten years old), Semi-mature (within 1/5-2/5 of species-typical life expectancy), Mature (3/5-5/5 of life expectancy).

Phys/Stru Con: General assessment of the physiological/structural condition of the tree, either Good, Fair, Poor or Dead.

5837 Cat: U, A, B or C in accordance with BS5837. **Notes:** Relevant comments about the tree. **Work Recommendations:** Required works in the context of the proposal.

5. Radcot Street, Lambeth

5.1 The site is the length of Radcot Street, as well as the eastern sections of Methley Street and Ravensdon Street.

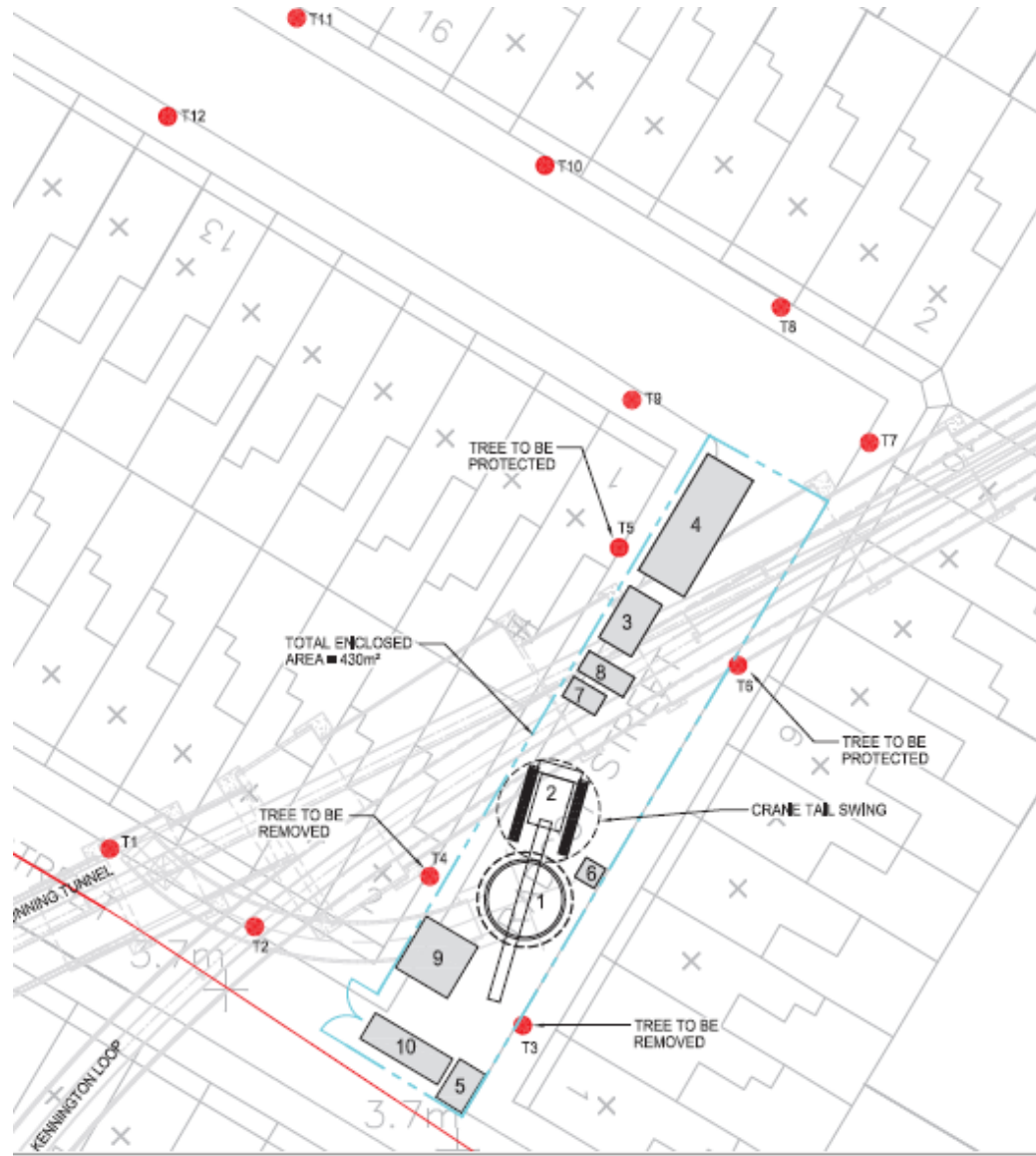
5.2 Twelve trees were surveyed in total, all of which are the responsibility of LB Lambeth. Only four of these trees (T3, T4, T5 and T6) are to be affected by the proposal.

5.3 Two trees (T3 and T4) require removal. They have been classified as Category B and U respectively.

5.4 Two trees (T5 and T6) require crown lifting to facilitate the installation of hoarding. Works are to be agreed with the LB Lambeth Tree Officer. They must be adequately protected during the construction phase. Suitable methods of tree protection are to be found in BS5837, extracts of which are contained within the Appendices of this report.

5.5 All tree removals are to be mitigated by an extensive post-construction replanting programme – to be agreed with the Local Authority/TfL Tree Officer – with the intention of restoring the landscape to a higher standard than that which currently exists.

Radcot Street



Radcot Street, Lambeth

Surveyed 12/07/12 by JP

T#	Location	Common name	Botanical name	Ht	DBH	N,S,E,W	Age	Phys Con	Stru Con	5837 Cat	Defects	Work Recommendations
1	Os 6/8 Ravensdon	Photinia	Photinia	4	60	1,1,1,1	Y	G	G	C	No visible defects	No work required
2	Os 2 Ravensdon	Ash	Fraxinus	6	120	2,2,2,2	Y	G	F	C	Apparent weakness at graft point at 2m, weak branch unions	No work required
3	Os 2 Radcot	Birch	Betula	10	170	3,3,2,3	SM	G	F	B	Co-dominant stem from 3m	Remove
4	Opp 2 Radcot	ear	Pyrus	9	260	3,1,1,3	SM	P	P	U	Lean, dieback, conflicting with overhead cables, vehicle damage, significant torn-out limbs	Remove
5	Opp 5 Radcot	Honey Locust	Gleditsia	12	370	4,4,5,5	SM	G	F	B	Low crown, touching buildings, roots causing damage to pavements	Crown lift to facilitate hoarding
6	Os 6 Radcot	Pear	Pyrus	10	300	3,2,3,3	SM	F	F	C	Conflicting with overhead cables	Crown lift to facilitate hoarding
7	Os 9/10 Radcot	Whitebeam	Sorbus	10	380	4,2,3,3	SM	F	F	C	Black exudations at base	No work required
8	Os 2 Methley	Pear	Pyrus	8	180	3,4,2,2	SM	F	F	C	Minor vehicle damage on limb	No work required
9	Os 1 Methley	pear	Pyrus	10	150	2,2,2,2	SM	G	G	B	No visible defects	No work required
10	Os 8/10 Methley	pear	Pyrus	5	60	1,1,1,1	Y	G	G	C	No visible defects	No work required
11	Os 12 Methley	Golden Rain Tree	Koelreuteria	6	90	2,2,2,2	Y	G	G	C	No visible defects	No work required
12	Os 11 Methley	Hawthorn	Crataegus	7	270	4,2,2,1	M	P	P	U	Sparse crown, lean, cavity at base, substantial old pruning wounds, growing into overhead cables	No work required

Key

Ht: Estimated height in metres. *DBH*: Diameter at breast height in millimetres. *N,S,E,W*: Estimated spread of branches at cardinal points in metres.

Age: Young (less than ten years old), Semi-mature (within 1/5-2/5 of species-typical life expectancy), Mature (3/5-5/5 of life expectancy).

Phys/Stru Con: General assessment of the physiological/structural condition of the tree, either Good, Fair, Poor or Dead.

5837 Cat: U, A, B or C in accordance with BS5837. *Notes*: Relevant comments about the tree. *Work Recommendations*: Required works in the context of the proposal.

6. Kennington Park, Lambeth

6.1 The site is located at the junction of Kennington Park Road and St Agnes Place.

6.2 Twenty nine trees were surveyed in total, all of which are the responsibility of LB Lambeth.

6.3 T1, T2, T3, T4, T5, T6 and T21 are to be protected during construction. Suitable methods of tree protection are to be found in BS5837, extracts of which are contained within the Appendices of this report. Very minor pruning may be required in order to facilitate the installation of the hoarding, to be agreed with the LB Lambeth Tree Officer.

6.4 Twenty two trees require removal in order to accommodate this proposal. These are T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T22, T23, T24, T25, T26, T27, T28 and T29.

6.5 None of the twenty two trees are of sufficient quality individually to warrant retention at the expense of this development.

6.6 Fourteen trees are located behind a fence within the allocated dog area. These are T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19 and T20.

6.7 Four trees in the dog area (T14, T16, T18 and T20) have been classified as BS5837 Category U; T14 and T18 are dead. The other ten trees in the dog area have been classified as Category C.

6.8 T22, T23, T24, T25, T26, T27, T28 and T29 are within the garden of Kennington Lodge.

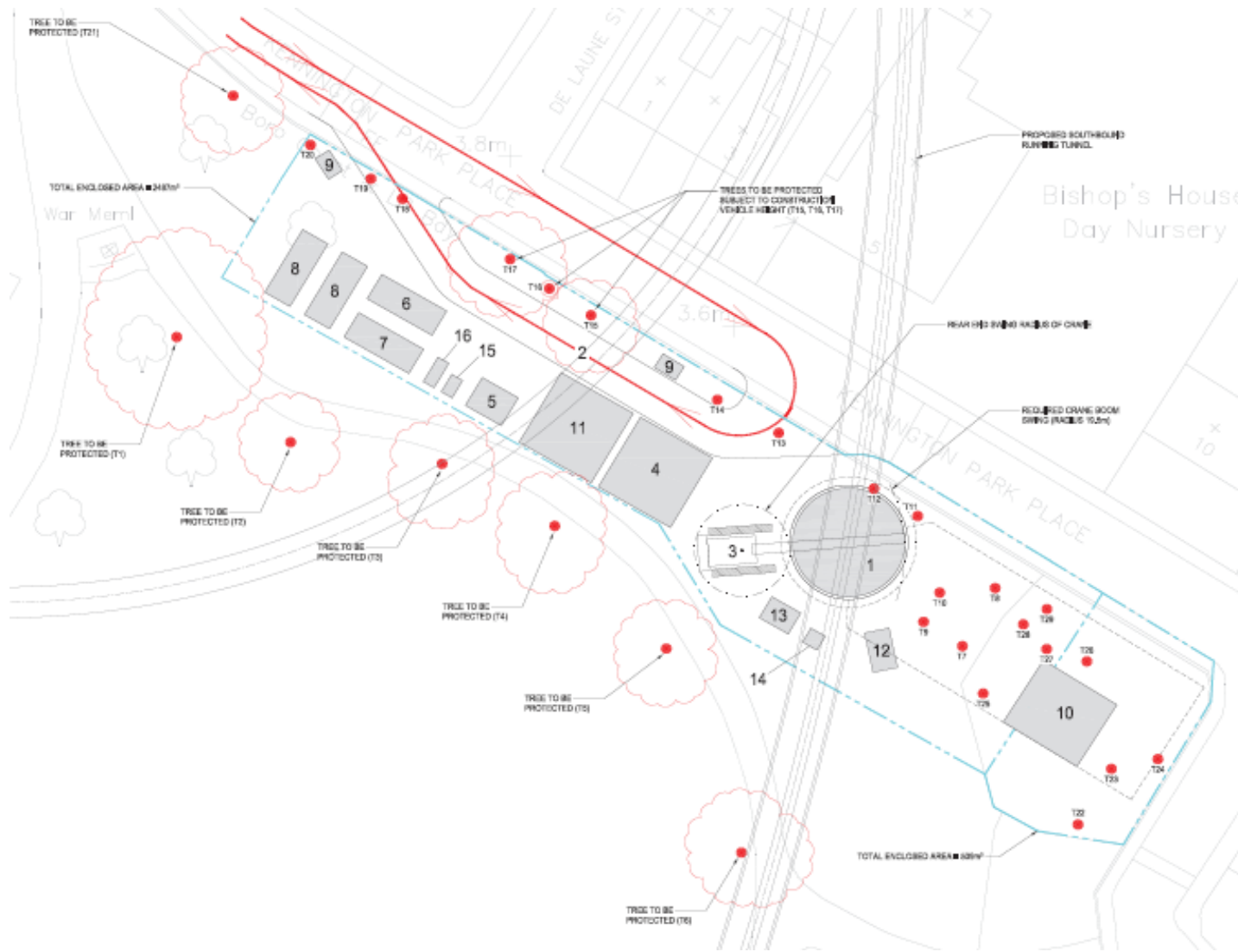
6.9 T24, T26 and T28 are very large overgrown shrubs rather than trees. In addition to these three there are several more specimens which could reasonably be defined as either a large shrub or a small tree, which have not been included in this survey.

6.10 There are a number of fruit trees in the garden which have not been surveyed individually as they are rather small, less than 5cm DBH. There are other items of arboricultural and landscape interest such as the Kiwi Fruit Vine alongside the cottage.

6.11 The garden around Kennington Lodge has a reasonable level of biodiversity value, described in the Ecology Chapter of the Environmental Statement.

6.12 All tree removals are to be mitigated by an extensive post-construction replanting programme – to be agreed with the Local Authority/TfL Tree Officer – with the intention of restoring the landscape to a higher standard than that which currently exists.

Kennington Park



Kennington Park, Lambeth

Surveyed 11/07/12 by JP

T#	Location	Common name	Botanical name	Ht	DBH	N,S,E,W	Age	Phys Con	Stru Con	5837 Cat	Notes	Work Recommendations
1	South of memorial	Plane	Platanus	23	1300	13,11,10,10	M	G	G	A	Minor deadwood, risk of compaction from adjacent path	No work required
2	South of dog area, in avenue	Oak	Quercus	12	710	6,6,6,6	M	G	G	A	Minor deadwood	No work required
3	South of dog area, in avenue	Oak	Quercus	12	800	6,8,6,6	M	G	G	A	Black exudations from lowest scaffold limb, which has developed a large rib	No work required
4	South of dog area, in avenue	Oak	Quercus	12	670	6,8,5,6	M	G	G	A	No visible defects	No work required
5	South of dog area, in avenue	Oak	Quercus	12	740	6,7,6,6	M	G	G	A	No visible defects	No work required
6	South of dog area, in avenue	Oak	Quercus	12	730	7,6,8,6	M	G	G	A	No visible defects	No work required
7	North east corner of dog area	Birch	Betula	7	110	3,3,3,3	SM	F	F	C	No visible defects	Remove
8	North east corner of dog area	Birch	Betula	7	110	3,3,3,3	SM	F	F	C	No visible defects	Remove
9	North east corner of dog area	Birch	Betula	7	110	3,3,3,3	SM	F	F	C	No visible defects	Remove
10	North east corner of dog area	Birch	Betula	7	110	3,3,3,3	SM	F	F	C	No visible defects	Remove
11	Northern boundary of dog area	Tree of Heaven	Ailanthus	10	280	4,4,4,4	SM	F	F	C	Minor snapped limbs	Remove
12	Northern boundary of dog area	False Acacia	Robinia	8	190	2,2,2,2	SM	F	F	C	Sparse crown, very close to retaining wall	Remove
13	Northern boundary of dog area	Ash	Fraxinus	12	350	5,5,5,4	SM	F	F	C	Crossing branches, climbing plants up stem, very close to retaining wall	Remove
14	Northern boundary of dog area	DEAD	DEAD	9	150	3,3,3,3	D	D	D	U	Dead	Remove
15	Northern boundary of dog area	Ash	Fraxinus	12	460	4,7,5,5	SM	F	F	C	Sparse crown, slow recovery to previous pruning wounds	Remove
16	Northern boundary of dog area	False Acacia	Robinia	5	60	1,1,1,1	Y	P	P	U	Dead from 2m upwards	Remove
17	Opp De Cavne Street	Ash	Fraxinus	10	400	5,7,7,7	SM	F	F	C	Minor deadwood, sparse crown	Remove

18	Northern boundary of dog area	DEAD	DEAD	5	60	1,1,1,1	D	D	D	U	Dead	Remove
19	Northern boundary of dog area	Ash	Fraxinus	10	390	5,6,5,5	SM	F	F	C	Sparse crown	Remove
20	Northern boundary of dog area	Ash	Fraxinus	4	70	1,1,1,1	Y	P	P	U	Poor specimen, overshadowed by neighbours, no dominant leader	Remove
21	Northern boundary of dog area	Ash	Fraxinus	12	500	6,7,6,6	SM	F	F	C	Dog damage at base	No work required
22	Kennington Lodge, south of cottage adjacent to fence	Tree of Heaven	Ailanthus	12	530	7,4,8,7	SM	F	P	C	Substantial stem damage from 0.5m to 3m, twin stemmed from 3m, poor historic pruning, cavities, torn branches, relatively sparse crown	Remove
23	Kennington Lodge, south of cottage adjacent to path	Holly	Ilex	10	530	3,3,3,3	SM	F	F	B	Twin stemmed from 1m, poor historic pruning, top of tree has been removed in the past	Remove
24	Kennington Lodge, south of cottage adjacent to door	Thorn	Crataegus	8	280	4,3,4,4	M	F	F	B	Deadwood and old pruning stubs throughout crown, canopy is touching the cottage roof	Remove
25	Kennington Lodge, west of cottage adjacent to gate	Cherry	Prunus	7	450	6,6,5,5	M	F	F	B	Twin stemmed from 2m, stem features numerous decay pockets	Remove
26	Kennington Lodge, north of cottage	Thorn	Crataegus	10	590	9,4,4,4	M	F	F	B	Twin stemmed from 1m, triple stemmed from 1.5, substantial historic pruning wounds at base	Remove
27	Kennington Lodge, northwest of cottage	Magnolia	Magnolia	8	180	2,3,2,2	SM	F	F	B	No visible defects	Remove
28	Kennington Lodge, northwest of cottage	Pyracantha	Pyracantha	6	230	4,3,3,3	M	F	P	C	Substantial historic pruning wounds at base	Remove
29	Kennington Lodge, northwest of cottage	Magnolia	Magnolia	7	160	0,5,3,6	SM	F	F	C	Stem leans towards west but tree is attempting to compensate by straightening out over the fence	Remove

Key

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Age: Young (less than ten years old), Semi-mature (within 1/5-2/5 of species-typical life expectancy), Mature (3/5-5/5 of life expectancy).

Phys/Stru Con: General assessment of the physiological/structural condition of the tree, either Good, Fair, Poor or Dead.

5837 Cat: U, A, B or C in accordance with BS5837. **Notes:** Relevant comments about the tree. **Work Recommendations:** Required works in the context of the proposal.

7. Nine Elms Station (Wandsworth Road), Lambeth

7.1 The site is located at the junction of Pascal Street and Wandsworth Road, and includes the Sainsbury's car park.

7.2 Eight trees were surveyed in total, four of which are located within the car park and therefore likely to be the responsibility of Sainsbury's. The other four are the responsibility of the London Borough of Lambeth.

7.3 Seven trees (T1, T2, T3, T5, T6, T7 and T8) require removal in order to facilitate the proposal.

7.4 This development does not require the removal of T4. However, it is a poor specimen in decline and should be considered for removal and replanting.

7.5 All tree removals are to be mitigated by an extensive post-construction replanting programme – to be agreed with the Local Authority/TfL Tree Officer – with the intention of restoring the landscape to a higher standard than that which currently exists.

Nine Elms Station



Nine Elms Station Lambeth

Surveyed 17/07/12 by JP

T#	Location	Common name	Botanical name	Ht	DBH	N,S,E,W	Age	Phys Con	Stru Con	5837 Cat	Notes	Work Recommendations
1	South western corner of Sainsbury's car park	Maple	Acer	8	25	4,3,4,3	SM	F	F	C	No visible defects	Remove
2	Opp 55 Pascal St	Maple	Acer	8	20	3,2,3,3	SM	F	F	C	Sparse crown, minor limbs torn out	Remove
3	Opp Bramley Crescent	Rowan	Sorbus	6	14	2,2,2,2	SM	F	F	C	Minor vehicle damage	Remove
4	Os Lockyer House	Hawthorne	Crataegus	7	36	3,3,3,3	M	P	P	U	Sparse crown, cavities, decay pockets, snapped limbs	No work required
5	South eastern corner of car park	Maple	Acer	6	17	3,3,3,3	SM	F	F	C	Guying system needs adjusting	Remove
6	Opp Wilcox Road	Maple	Acer	7	19	3,3,3,3	SM	F	F	B	No visible defects	Remove
7	Centre of car park, adjacent to petrol station	Plane	Platanus	12	36	5,3,4,4	SM	G	F	B	No visible defects	Remove
8	Centre of car park, adjacent to petrol station	Plane	Platanus	12	38	3,4,4,4	SM	G	F	B	No visible defects	Remove

Key

Ht: Estimated height in metres. *DBH*: Diameter at breast height in millimetres. *Sd*: Estimated spread of branches at cardinal points in metres.

Age: Young (less than ten years old), Semi-mature (within 1/5-2/5 of species-typical life expectancy), Mature (3/5-5/5 of life expectancy).

Phys/Stru Con: General assessment of the physiological/structural condition of the tree, either Good, Fair, Poor or Dead.

5837 Cat: U, A, B or C in accordance with BS5837. *Notes*: Relevant comments about the tree. *Work Recommendations*: Required works in the context of the proposal.

8. APPENDICES

BS5837:2012 Figure 1 *The design and construction process and tree care*

BS5837:2012 Table 1 *cascade chart for tree quality assessment*

BS5837:2012 Figure 2 *Default specification for protective barrier*

National Joint Utilities Guidelines 4 (NJUG4) *Summary sheet*

For all information relating to CAVAT, please visit the London Tree Officers Association website where methodology and the documents can be found:

<http://www.ltoa.org.uk/resources/cavat>

Figure 1 The design and construction process and tree care

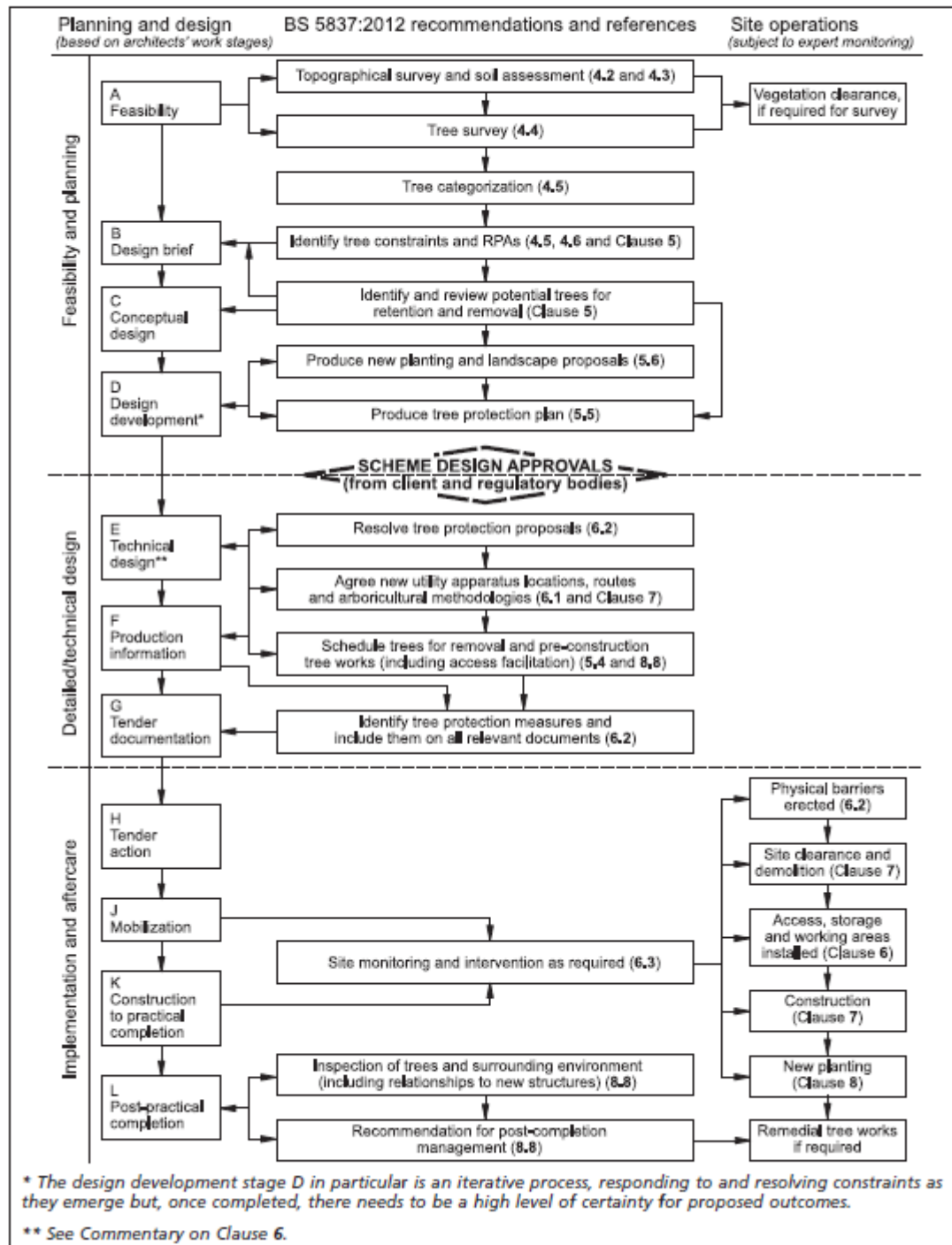
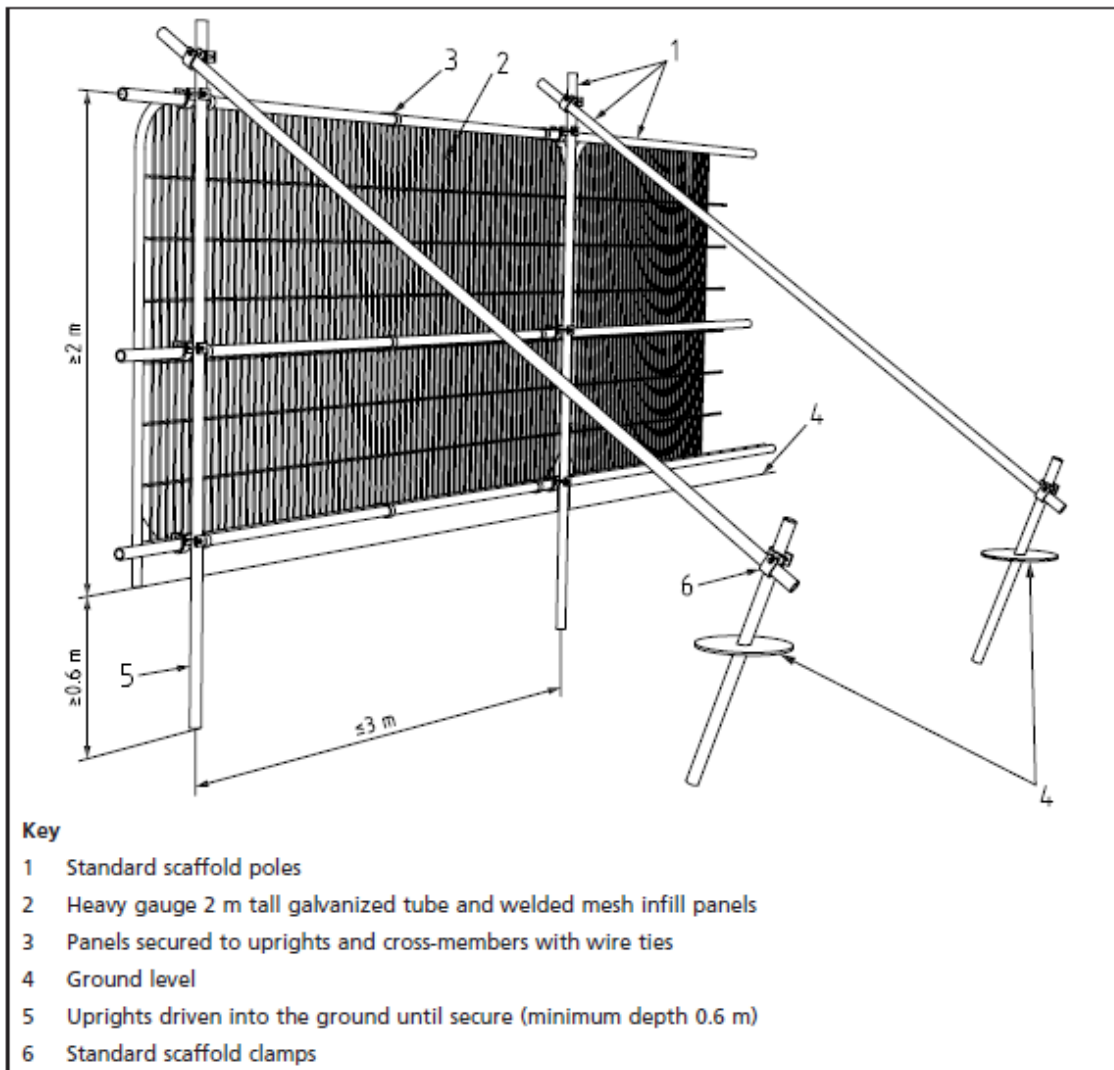
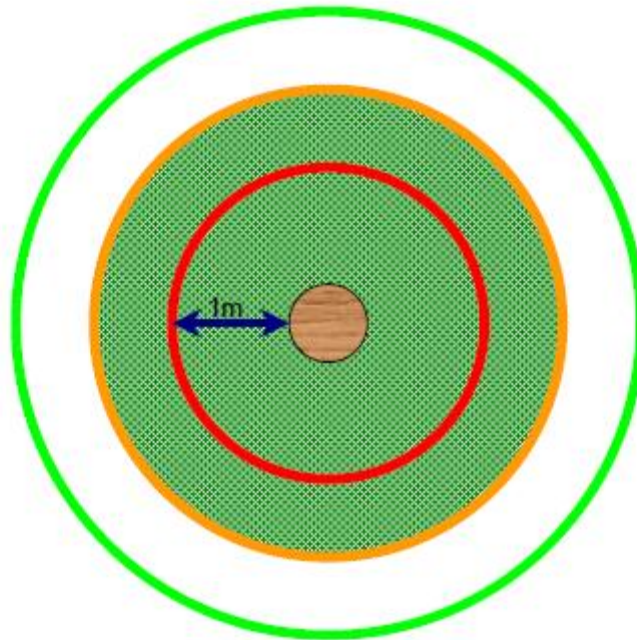


Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	<ul style="list-style-type: none"> Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unstable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p>			See Table 2
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
Trees to be considered for retention				
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Figure 2 Default specification for protective barrier





TREE PROTECTION ZONE

Key to Diagram



Trunk of Tree



Spread of canopy or branches



PROHIBITED ZONE – 1m from trunk. Excavations of any kind must not be undertaken within this zone unless full consultation with Local Authority Tree Officer is undertaken. Materials, plant and spoil must not be stored within this zone.



PRECAUTIONARY ZONE – 4 x tree circumference. Where excavations must be undertaken within this zone the use of mechanical excavation plant should be prohibited. Precautions should be undertaken to protect any exposed roots. Materials, plant and spoil should not be stored within this zone. Consult with Local Authority Tree Officer if in any doubt.



PERMITTED ZONE – outside of precautionary zone. Excavation works may be undertaken within this zone however caution must be applied and the use of mechanical plant limited. Any exposed roots should be protected.



NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees – Issue 2

DAMAGE TO TREES

Tree roots keep a tree healthy and upright. Most roots are found in the top 600mm of soil and often grow out further than the tree's height. The majority of these roots are very fine; even close to a tree few will be thicker than a pencil. Most street tree roots grow under the footway but may also extend under the carriageway. If roots are damaged the tree may suffer irreversible harm and eventually die.

PROTECTING ROOTS - DO'S and DON'TS

There are three designated zones around a tree each of which has its own criteria for working practices.

THE PROHIBITED ZONE

- Don't** excavate within this zone.
- Don't** use any form of mechanical plant within this zone
- Don't** store materials, plant or equipment within this zone.
- Don't** move plant or vehicles within this zone.
- Don't** lean materials against, or chain plant to, the trunk.
- Do** contact the local authority tree officer or owner of the tree if excavation within this zone is unavoidable.
- Do** protect any exposed roots uncovered within this zone with dry sacking.
- Do** backfill with a suitable inert granular and top soil material mix as soon as possible on completion of works.
- Do** notify the local authority tree officer or the tree's owner of any damage.

THE PRECAUTIONARY ZONE

- Don't** excavate with machinery. Where excavation is unavoidable within this zone excavate only by hand or use trenchless techniques.
- Don't** cut roots over 25mm in diameter, unless advice has been sought from the local authority tree officer.
- Don't** repeatedly move / use heavy mechanical plant except on hard standing.
- Don't** store spoil or building material, including chemicals and fuels, within this zone.
- Do** prune roots which have to be removed using a sharp tool (e.g. secateurs or handsaw). Make a clean cut and leave as small a wound as possible.
- Do** backfill the trench with an inert granular material and top soil mix. Compact the backfill with care around the retained roots. On non highway sites backfill only with excavated soil.
- Do** protect any exposed roots with dry sacking ensuring this is removed before backfilling.
- Do** notify the local authority tree officer or the tree's owner of any damage.

THE PERMITTED ZONE

- Don't** cut roots over 25mm in diameter, unless advice has been sought from the local authority tree officer.
- Do** use caution if it is absolutely necessary to operate mechanical plant within this zone.
- Do** prune roots which have to be removed using a sharp tool (e.g. secateurs or handsaw). Make a clean cut and leave as small a wound as possible.
- Do** protect any exposed roots with dry sacking ensuring this is removed before backfilling.
- Do** notify the local authority tree officer or the tree's owner of any damage.