Report on Tree Rooting Activity

To the rear of

26 Netherhall Gardens
Camden
London
NW3 5TL

Dated
28th May 2013

CROWN Consultants

Tree consultants throughout England and Wales

Contents

1. Introduction

1.1. Instruction

1.1.1. We are instructed by Andreas Kaimakamis of Pelican Building Contractors Ltd to undertake a root investigation using an air spade within the rear garden of 26 Netherhall Gardens and produce our findings in a report.

1.2. Scope and Purpose of the Report

1.2.1. The purpose of the investigation was to determine the extent of rooting activity of an oak tree (T1) in a neighbouring garden. This tree is protected by a tree preservation order.

1.2.2. It is hoped to develop the existing property and the root investigation was commissioned to determine at what distance from the oak tree development might occur without significantly impacting on the health of this tree.

1.3. References

1.3.1. This report should be read in conjunction with our earlier arboricultural report to BS 537 (dated 2nd April 2013, reference: 08927) which identified the oak (T1) as one of the principal constraints to potential development.

1.3.2. Photographs of the rooting activity within the trial trenches are reproduced in Section 3.

1.4. Drawings

1.4.1. The *Tree Constraints Plan* from our earlier report forms the basis of the plan accompanying this report (ref CCL 08972 / TPLP, see Appendix 2) which shows the location of the excavated trial trenches and the principal trees on the site.

1.5. Methodology

1.5.1. On 17th May 2013, three trial trenches were excavated n the locations indicated on the accompanying plan. The dimensions of each trench were approximately 1.8m x 0.3m. The trenches were excavated using an air spade which blasted soils away from around the roots but kept all but the finest of roots intact.

1.5.2. The trenches were excavated tangentially in relation to T1.

1.5.3. Loose soils were scooped out from one end of the trench using a hand shovel. This meant that the trenches were longer at the top than at the bottom (Being approximately 1.8m at the top of the trench and 1.2m at the bottom. The depth of each trench was 600mm.

1.5.4. In order to enable excavation deeper than 150mm, it was necessary to cut through the mass of fine roots within the upper soil horizon in Trench 1 and Trench 2.

2. Results

2.1. Existing Vegetation

2.1.1. Woody vegetation whose roots could be encountered in the excavations are the protected oak (T1), the felled oak (T2) and the dense shrubbery (predominantly cherry laurel) marked on the accompanying plan.

2.1.2. A description of each of these trees is included in the tree data schedule reproduced in Appendix 2.

2.2. Trench location

2.2.1. The distance between the centre of each trench and the vegetation is indicated in the table below:

	Distance to each trench (m)		
Tree / Trench	Trench 1 (m)	Trench 2	Trench 3
T1	7.5	9.5	12
T2	11.5	9.5	8.5
Nearest cherry laurel	2	4	6.5

Photographs 8,9 and 17 show the location of each trench.

2.3. Theoretical Expectations and Root Protection Areas

2.3.1. The theoretical Root Protection Areas for trees T1 and T2 have been calculated according to the size of their stem diameters according to the BS 5837 defined formula:

Radius of RPA = 12 x stem diameter.

2.3.2. Since T1 is located in third party owned land, the stem diameter could not be measured and was estimated to be 1m. This gives an RPA with a radius of 12m and an area of 452 m^2 which is indicated as a dashed circle on the accompanying plan.

2.3.3. The shape was modified on the Tree Constraints Plan to account for the fact that few roots are likely to be growing beneath the adjacent buildings or beyond the large retaining wall which runs alongside the light-well adjacent to the building. The extent of the RPA was increased in all other directions and is indicated on the plan as a pink line. This shape has approximately the same area as the dashed circle.

2.3.4. Because T1 has been very heavily pruned in the past, it has a small canopy in relation to its stem. Since a smaller canopy requires less water and less of a root system, the theoretical RPA was reduced accordingly to a distance of 9.5m from T1, and is indicated as a thin green line on the plan. This revised theoretical RPA is still considerably larger than the area of the canopy of T1 when viewed from above. The area of the canopy is approximately 110m^2 whilst the area of the Root Protection Area is approximately 250m^2, or 2.3 times larger.

2.3.5. Given that T2 was a larger tree than T1 (stem diameter 140cm & not heavily pruned, compared to stem diameter 100cm & heavily pruned), it could be expected that more

roots from T2 would be growing in Trench 2 which was equidistant from both trees. Some shrub roots could also be expected since large shrubs were 4m from the trench

2.3.6. In Trench 1, it was considered that a higher proportion of the roots are likely to emanate from T1 than from T2 since T1 is significantly closer. A mass of shrub roots would also be expected in Trench 1 since it was located at the very edge of a large, dense mass of cherry laurels.

2.3.7. In Trench 3 a higher proportion of the roots are likely to emanate from T2 than from T1. No shrub roots would be expected at a distance of 6.5m from the cherry laurels.

2.4. Results

2.4.1. Photographs of rooting activity are included in Section 3. The quantity of roots encountered is summarised in the table below:

	Trench 1	Trench 2	Trench 3
Soil Profile	Upper 150mm – Sandy loam, topsoil. 150mm – 600mm – clay.	Upper 150mm – Sandy loam, topsoil.	Upper 150mm – Sandy loam, topsoil.
Rooting activity in the upper 150mm	Prolific mass of fine roots. Numerous roots at 5 to 10mm diameter. Approx. 20 roots at 10 – 20mm diameter. Three roots at 20 – 30mm diameter. See Photos 1 to 4.	Numerous of fine roots. 25 roots at 5 to 10mm diameter. 3 roots at 10 – 20mm diameter. No roots at 20 – 30mm diameter. See Photographs 10 to 12.	Approximately 40 fine roots. No roots at 5 to 10mm diameter. No roots at 10 – 20mm diameter. No roots at 20 – 30mm diameter.
Rooting activity between 150mm and 600mm.	Numerous fine roots. Approx. 30 roots at 5 – 10mm diameter. 15 roots at 10 – 20mm diameter. No roots greater than 20mm. See photographs 5 to 7.	Occasional fine roots. 3 roots at 5 – 10mm diameter. 1 root at 10 – 20mm diameter. No roots greater than 20mm. See photographs 13 to 16.	Occasional fine roots. 3 roots at 5 – 10mm diameter. 3 roots at 10 – 20mm diameter. 1 root at 20 – 30mm diameter. See photographs 18 to 20.

2.5. Interpretation

2.5.1. Taking each trench in turn, beginning with Trench 3 which is furthest from T1:

2.5.2. **In Trench 3** rooting activity was much lower than the other two trenches. The largest root being 25mm in diameter, its direction of growth strongly suggested that this root emanates from T2. Of the remaining 6 roots (above 5mm diameter) most (or all) are likely to emanate from the nearest and largest oak, T2. It is likely then that only one or two roots (at most) emanate from T1.

2.5.3. It is considered then that excavation for foundations in this area would have no impact on the health of T1.

2.5.4. **In Trench 2** (equidistant from T1 and T2) rooting activity was prolific in the upper soil horizon but less so beneath. Some of these roots will have emanated from the cherry laurels (especially in the upper soil horizon) and more than half of the remainder are likely to emanate from T2 (see 2.3.5 above). In an attempt to ascertain the proportion of roots within this trench that emanate from T1, It is considered fair to assume that 25% of the roots within the upper soils emanate from T1 (the remainder being from T2 and the shrubs), whilst 40% of the roots in the deeper soils emanate from T1 (the remainder being from T2).

2.5.5. Based on the roots exposed and the average length of the trench I have estimated the number of roots encountered per metre that are likely to emanate from T1, at a distance of 9.5m from it. This is summarised below:

	Fine roots	5mm – 10mm roots	10 – 20mm roots	20 – 30mm roots	Greater than 30mm
Upper soil Horizon (0mm – 150mm)	numerous	6	1	0	0
Lower soil horizon (150mm – 600mm	occasional	1	0.25	0	0

2.5.6. I conclude from this, that excavation for foundations would have minimal impact on T1 at a distance of 9.5m, since each metre of foundation would only encounter 7 roots at a diameter of 5 – 10mm, 1.25 roots at 10 – 20mm diameter and no larger roots. The severance of such a low number of small roots would have no noticeable impact on the health and vigour of this tree.

2.5.7. Research has shown that healthy trees of most species are able to withstand the loss of some roots (to a maximum of about 20% of the rooting area) with no long term detrimental impact (Helliwell, D.R. and Fordham, S.F. (1992) Tree Roots and Tree Growth. Reading Agricultural Consultants, Didcot, UK.).

2.5.8. **In Trench 1** the results are harder to interpret due to the mass of roots from the cherry laurels.

2.5.9. This trench was located so close to the shrub group (see Photograph 8) that the upper soil horizon is likely to be dominated by the roots of the cherry laurels.

2.5.10. Based on the roots exposed and the average length of the trench, I have estimated the number of roots encountered per metre that are likely to emanate from T2, at a distance of 7.5m from it. This is summarised below:

	Fine roots	5mm – 10mm roots	10 – 20mm roots	20 – 30mm roots	Greater than 30mm
Upper soil Horizon (0mm – 150mm)	numerous	40	3	1	0
Lower soil horizon (150mm – 600mm	occasional	12	0.5	0	0

2.5.11. I conclude from this, that excavation for foundations would have some impact on T2 at a distance of 7.5m, since each metre of foundation would encounter approximately 52 roots at a diameter of 5 – 10mm, 13.5 roots at 10 – 20mm diameter and one larger root. The severance of roots at this rate could have an observable impact on the health and vigour of this tree. I anticipate that if the property were to be extended out half way towards the rear boundary at a distance of 7.5m from T2, there would probably be a noticeable reduction in vigour during the following growing season. However, due to the low number of large roots encountered at this distance, I would anticipate that T2 would recover within one or two additional growing seasons. The heavy reduction in the canopy which has been recently undertaken will mean that tis tree shall have a relatively large root:shoot ratio, so the loss of part of its rooting environment will probably be tolerated without any resulting death of foliage.

2.6. Summary of Conclusions

2.6.1. At a distance of 12m from T1, any proposed development would have no impact on the health or vigour of this tree.

2.6.2. At a distance of 9.5m from T1. any proposed development would have negligible impact on the health or vigour of this tree.

2.6.3. At a distance of 7.5m from T1, any proposed development would have some impact on the health and vigour of this tree. The extent of the impact would depend on the length and depth of the foundations. A deep excavation extending from the existing building half way to the rear boundary is not considered likely to result in the death of any foliage, rather the vigour is likely to be reduced for one or two growing seasons whilst the tree establishes a balanced root:shoot ratio.

2.6.4. Excavation closer than 7.5m could have a significant impact on T2 and should be kept to a minimum.

2.7. Mitigation Strategies.

2.7.1. The removal of the competing vegetation within the dense shrub group, would benefit T1 immensely, since root competition is fierce in the upper soil horizons (where nutrients and oxygen are most prolific). This should be borne in mind when assessing the potential impact of any proposed development. If ideal rooting conditions were encouraged in the area where the shrubs are currently growing (by aerating the soils and providing an organic layer of mulch plus earth worms) the long term impact of root severance beyond the shrub group (i.e. beyond 7.5m) would be lessened.

2.7.2. T1 has been inexpertly pruned in the past and would benefit from a small amount of pruning to remove dead stubs and to encourage a good shape and form for the emerging canopy. If such pruning were undertaken within 1 year of any proposed development, the impact of root severance would be lessened.

2.7.3. If it is proposed to install foundations close than 9.5m, consideration should be given to utilising shallow foundations, and to improving sol conditions for T1, by removing competing vegetation, and improving the rooting environment.

3. Photographs

Photograph 1.

Photograph 2. Trench 1: Roots between 0mm and 150mm depth.

Photograph 3. Trench 1: Roots between 0mm and 150mm depth.

Photograph 4. Trench 1: Roots between 0mm and 150mm depth.

Photograph 5. Trench 1: Roots between 150mm and 600mm depth.

Photograph 6. Trench 1: Roots between 150mm and 600mm depth.

Photograph 7. Trench 1: Roots between 150mm and 600mm depth.

Photograph 8. Location of Trench 1.

Photograph 9. Location of Trench 2.

Photograph 10. Trench 2: Roots between 0mm and 150mm depth.

Photograph 11. Trench 2: Roots between 0mm and 150mm depth.

Photograph 12. Trench 2: Roots between 0mm and 150mm depth.

Photograph 13. Trench 2: Roots between 150mm and 600mm depth.

Photograph 14. Trench 2: Roots between 150mm and 600mm depth.

Photograph 15. Trench 2: Roots between 150mm and 600mm depth.

Photograph 16. Trench 2: Roots between 150mm and 600mm depth.

Photograph 17. Location of Trench 3.

Photograph 18. Trench 3: Roots between 0mm and 600mm depth.

Photograph 19. Trench 3: Roots between 0mm and 600mm depth.

Photograph 21. Trench 3: Roots between 0mm and 600mm depth.

4. Signature

This report represents a true and factual account of the results of an investigation into the rooting activity of trees at

Rear of 26 Netherhall Gardens
Camden
London
NW3 5TL

Signed

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Ivan Button N.C.H. (Arb), FDSc (Arb), BSc (Hons), P.G.C.E., M. Arbor. A.

on behalf of

Crown Consultants Ltd

Dated

28th May 2013

CROWN Consultants
Tree consultants throughout England and Wales

Appendix 1: Author's Qualifications

Qualifications & Experience of Ivan Button N.C.H. (Arb), FDSc (Arb), BSc (Hons), P.G.C.E., M. Arbor. A.

Construction

Between 1983 and 1995 Ivan worked primarily within the construction industry and received training in a broad range of practical building skills and general construction principles. During this time he obtained a BSc (Hons) at Leeds University followed by a P.G.C.E at The University of Wales.

Arboriculture

He obtained a NCH (Arboriculture) at the University of Lincoln and became a member of the Arboricultural Association. He then worked for an Arboricultural Consultancy for one year before establishing a tree surgery and landscaping business in 1998. In 2005 Ivan commenced full time employment with a leading Arboricultural Association approved consultancy and soon adopted a senior role responsible for five consultants.

He obtained a FDSc in arboriculture at the University of Lancashire, which he passed with distinction and is now a Director and Principal Consultant of Crown Consultants Ltd. He is accredited as a LANTRA *Professional Tree Inspector*. A qualification produced in association with the Arboricultural Association and generally recognised as appropriate for all levels of tree inspection.

He is a member of the Consulting Arborist Society and is listed within their areas of professional expertise for QTRA and as an expert witness.

Ivan is a professional member of the Arboricultural Association and the International Society of Arboriculture.

He is a licensed Quantified Tree Risk Assessment user.

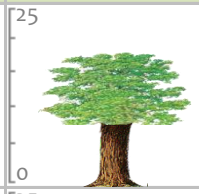
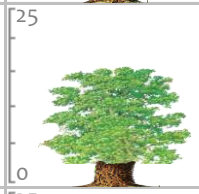
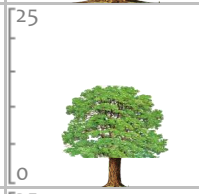
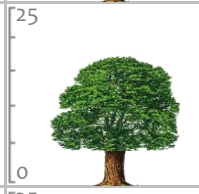
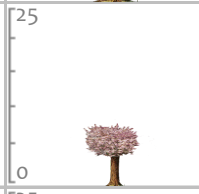
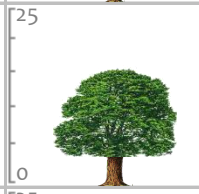
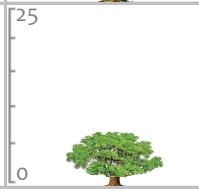
Ivan has undertaken professional expert witness training and has been registered as a Sweet and Maxwell Checked Expert Witness since 2008.

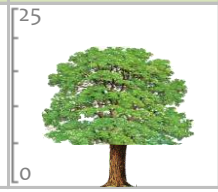
Throughout 2009 acted as the principal Tree Officer for Barnsley Metropolitan Borough Council.

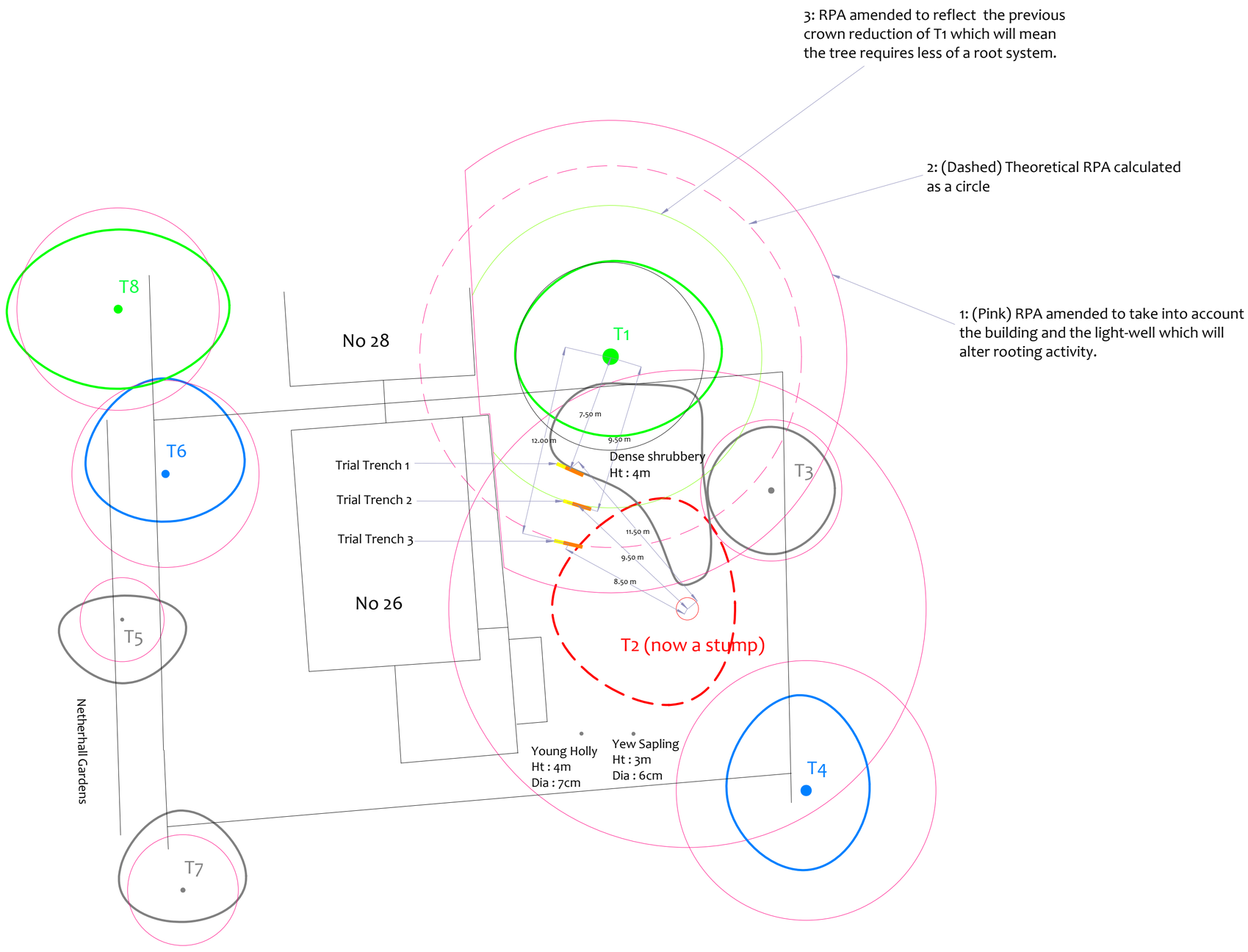
Ivan has produced several hundred Arboricultural Reports for the purposes of Development, Safety, Management, Mortgage, Subsidence, Mitigation and Litigation.

Appendix 2: Tree Data Schedule and Site Plan(s)

The Tree Data Schedule and all plans accompanying this report follow this page. They are also provided as separate documents for ease of printing and referring between when viewing on a screen.

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) W / N / E / S	Scaled Tree Diagram (m)	Notes	Recommendations (independent of proposals)		Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
								Priority	Inspect Freq (yrs)		
T1	Mature **Oak** Quercus robur.	18	9	Est 100	W 6, N 6, E 7, S 5		Position: Situated on third party land. Form: Twin-stemmed at 3m with a balanced crown. History: Reduced. **Defects: No defects observed.** Other: Ivy prevented detailed inspection.	Remove ivy and inspect stem for defects.	Moderate / 1.5	Moderate Good Good	High 40+ A
T2	Mature **Oak** Quercus robur.	16	3	140	W 8.5, N 7, E 3, S 6		Position: Situated within the rear garden. Form: Single stemmed and vertical with a well-formed crown. History: No evidence of significant pruning. **Defects: Major advanced decay to stem (ground level to 1m, 40% of stem diameter).** Other: Decay is extensive, **hazardous** tree.	Remove.	High / N/A	Moderate Good **Very Poor**	High <10 U
T3	Semi-Mature **Sycamore** Acer pseudoplatanus.	13	4	37	W 4, N 4, E 4, S 4		Position: Situated within the rear garden. Distance to property is 17.6m. Form: Twin-stemmed at 2.5m with a balanced crown. History: No evidence of significant pruning. **Defects: No significant defects.**	No action required.	n/a / 3	High Good Good	Low 40+ C
T4	Mature **Lime** Tilia sp.	18	5	68	W 5, N 6, E 4, S 5		Form: Single stemmed and vertical with a slightly unbalanced crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Ivy prevented detailed inspection.	Remove ivy and inspect stem for defects.	Moderate / 1.5	Moderate Fair Fair	Moderate 40+ B
T5	Semi-Mature **Cherry** Prunus sp.	8	4	22	W 4, N 1.5, E 4, S 4		Position: Street tree. Form: Single stemmed and vertical with a well-formed crown. History: No evidence of significant pruning. **Defects: No significant defects.** Other: Bark wound at base.	No action required.	n/a / 3	High Good Good	Moderate 40+ C +
T6	Early-Mature **Lime** Tilia sp.	16	4	49	W 5, N 6, E 5, S 3		Position: Situated within the front garden. Form: Twin-stemmed at ground level with a balanced crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Ivy prevented detailed inspection.	Remove ivy and inspect stem for defects.	Moderate / 1.5	High Good Fair	High 40+ B
T7	Semi-Mature **Sycamore** Acer pseudoplatanus.	6	1	29	W 4, N 5, E 4, S 2		Position: Situated on third party land. Form: Multi-stemmed at 2m with a slightly unbalanced crown. History: No evidence of significant pruning. **Defects: No significant defects.**	No action required.	n/a / 3	High Good Fair	Low 40+ C

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N / W / E / S	Scaled Tree Diagram (m)	Notes	Recommendations (independent of proposals)		Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
								Priority	Inspect Freq (yrs)		
T8	Early-Mature **Silver Maple** Acer saccharinum.	19	6	53	N 5 / W 7 / E 7 / S 5		Position: Street tree. Form: Single stemmed and vertical with a well-formed crown. History: No evidence of significant pruning. **Defects: No significant defects.**	No action required.	n/a / 3	High / Good / Good	High / 40+ / **A**



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Trench Location Plan

(Existing Layout)

Drawing No:	CCL 08927/RS / TPLP Rev: 1
Title:	Tree Constraints Plan (Existing Layout)
Site:	26 Netherhall Gardens Camden, NW3 5TL
Scale: 1:200	Paper Size: A2

0 5 10m

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Tree Retention Categories
Stems & canopies shown

Category A tree	Trees of high quality with an estimated life expectancy of 40+ years. Usually large trees with significant presence or smaller trees with excellent form. Retention of these trees is highly desirable.
Category B tree	Trees of moderate quality with a life expectancy of 20+ years. Usually maturing trees, or younger trees with good form. Retention of these trees is desirable though less than Category A trees
Category C tree	Unremarkable trees of low quality and merit. Individual specimens are not considered to be a material planning consideration.
Category U tree	Trees unsuitable for retention due to their very poor condition.

Tree Constraints Plan

BS 5837 Root Protection Area (radius = 12xstem diameter)

Root Protection Area needing amendment due to site conditions, e.g. presence of exising road or building.

Root Protection Area having been amended to account for for site conditions

T1 = Tree No 1 G2 = Group No 2 H3 = Hedge No 3

BS 5837 Shade Pattern

Photo 1

Tree to be removed to facilitate the proposal

Tree to be removed due to its low quality

Proposed pruning

MN = Measured North:

Canopy spreads are sometimes measured to an approximate N defined by site features. Often more accurate, especially where rows of trees are not aligned N-S or E-W.

Tree Ref.	Species	Height (m)	Root Protection Area		
			Radius (m)	m²	Square (m)
T1	Oak	18	12.0	452	21.3
T2	Oak	16	16.8	887	29.8
T3	Sycamore	13	4.4	62	7.9
T4	Lime	18	8.2	209	14.5
T5	Cherry	8	2.6	22	4.7
T6	Lime	16	5.9	109	10.4
T7	Sycamore	6	3.5	38	6.2
T8	Silver Maple	19	6.4	127	11.3