Arboricultural Report
Impact Assessment
&
Method Statement

for planning purposes
at

50 Redington Road
Hampstead
NW3 7RS

on behalf of

Osel Architecture

produced by

Crown Consultants Ltd

Crown
Arboricultural
Consultants

Dashboard

This report present the results of a tree survey to British Standard 5837 (2005). It is designed to accompany a planning application for development proposals at 50 Redington Road. Guidance is given within the Appendices to help the reader interpret our findings. The trees surveyed are described in Section 3 and their locations are plotted on the plans within Appendix 6.

This section of the report provides an overview and summary of our findings. The report author will gladly assist with any queries that may arise. His contact details can be found within the footer sections throughout the report.

Tree Protection Status

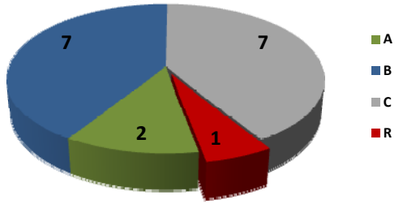
We are informed that:

- The site is within Redington Conservation Area.
- There are no TPO's affecting trees within the site.

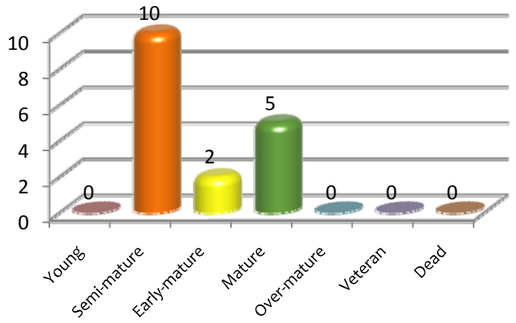
See Section 4 for further details.

Trees surveyed as individual specimens:	17
groups:	0
hedges:	0
shrubs:	0
woodlands:	0

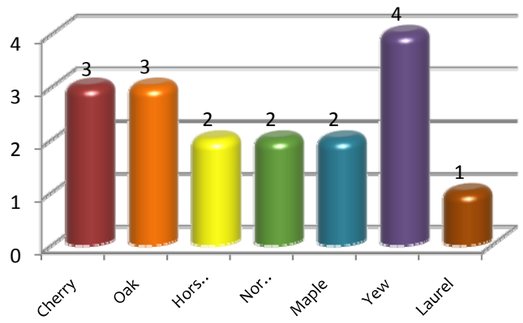
Retention Categories



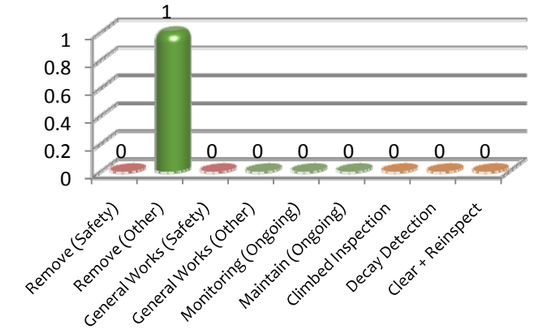
Age Distribution



Species Diversity



Recommended Works



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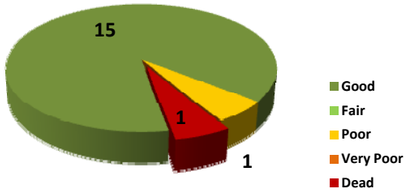
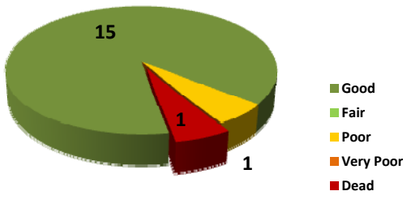
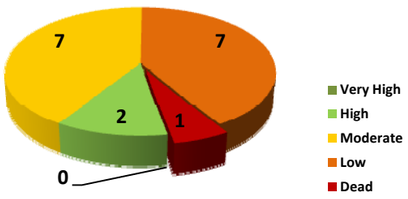


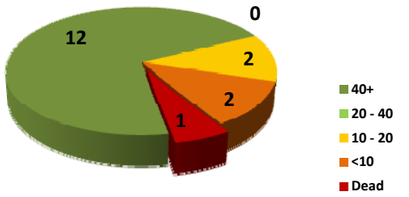
Physiological Condition



Amenity Values



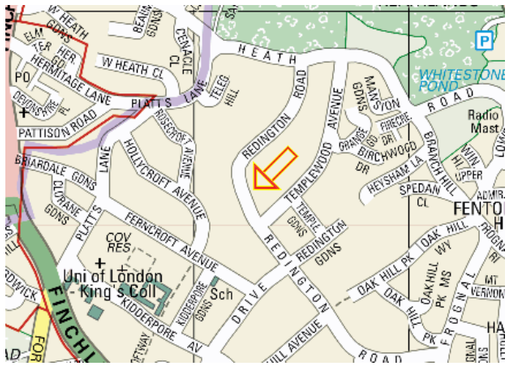
Life Expectancy



Executive Summary.

- It is proposed to demolish the existing building and construct a new detached residence as illustrated on the plans within Appendix 6.
- The condition of all trees on site has been assessed and a Retention Category allocated for each tree. Tree locations, canopy spreads, shade constraints and Root Protection Areas are plotted on a Tree Constraints Plan within Appendix 6.
- In order to facilitate the proposal, it is proposed to remove three small yew trees (one of which is almost dead and another is in decline) and a very low quality cherry tree. The removal of these trees shall not have a significant impact on local levels of visual amenity.
- It is proposed to retain a small oak tree located within the front garden of the property because this tree has good potential and will eventually contribute significantly to the street scene. In order to minimise the impact on this tree, the majority of the Root Protection Area shall remain undisturbed. Where disturbance cannot be avoided, hand tools shall be used and disturbance shall be kept to the absolute minimum.
- In order to minimise potential damage to trees on adjacent land the new proposal has been designed to follow the route of the existing foundations wherever tree rooting activity is anticipated.
- Excavations within the rear garden to facilitate the enlarged footprint shall occur outside of Root Protection Areas.
- So long as the arboricultural method statement is implemented and strictly enforced there shall be no detrimental impact upon trees as a consequence of the proposed development.

Site Location: 50 Redington Road



Extent of the survey

Contact Details

Local Authority:	London Borough of Camden	Tel.	020 797 45283
Local Authority Contact:	Kevin Fisher		
Report Author:	Ivan Button (Crown Consultants Ltd).	Tel.	01422 316660

Contents

1. Introduction

1.1. Instructions and References

1.1.1. Crown Consultants are instructed by Terry Monan of Osel Architecture to undertake an Arboricultural Survey to British Standard 5837: 2005 guidelines, at 50 Redington Road and produce our findings in a report. We are also instructed to include an Impact Assessment and a Method Statement detailing all proposed tree protection measures.

1.1.2. We have plotted tree positions according to measurements taken on site

1.1.3. I have studied plans depicting the development proposals and have transposed the relevant details onto the plans within Appendix 6.

1.1.4. I have liaised with Mr Monan throughout the writing of this report in order to attain an adequate understanding of the project to enable me to carry out an accurate assessment of the proposals and to specify workable tree protection measures.

1.1.5. A résumé of my qualifications and experience is included within Appendix 3.

1.2. Scope and Purpose of the Report

1.2.1. This report is designed to accompany a planning application for development proposals at the above site. Its purpose is to assist and inform the planning process according to guidelines laid out in BS 5837 (2005).

1.2.2. This report is based on the findings of a survey carried out from ground level. No climbed inspections or specialist decay detection were undertaken. Only trees with a stem diameter over 75mm were included, which lie within the site boundary or relatively close to it.

1.2.3. Where appropriate, potentially hazardous trees have been highlighted and appropriate recommendations made. However, this report should not be seen as a substitute for a full *Safety Survey* or *Management Plan* which are specifically designed to minimise risk and liability associated with responsibility for trees.

1.3. Report Format

1.3.1. The main body of the report contains predominantly site specific information. Generic information can be found in the Appendix to help the reader interpret the Tree Constraints Plan which can be found in Appendix 6. Photographs of the site can be viewed in Section 8.

2. Site Overview

2.1. Location

2.1.1. The site lies within a moderately populated residential area. The co-ordinates are 51°33'34.70"N 0°11'20.25"W, the OS reference is: TQ 2564186083 and the altitude is 107 m above sea level.

2.1.2. Our survey was limited to the area shown in Figure 1. I understand that this is sufficient to consider the impact of the proposed development.

Figure 1 Extent of the survey (image is not current).

2.2. Site Use

2.2.1. The site comprises a detached house and surrounding gardens. Vehicular access exists into the front garden and integral garage from Redington Road.

2.3. Topography

2.3.1. The rear garden is approximately flat with a raised planted area close to the north-eastern boundary. The front garden is multileveled with flat terraced areas retained by walls. Steps lead up to the front of the house.

2.4. Vegetation Overview

2.4.1. The largest trees surveyed are located in the adjacent third party owned garden, land beyond the north-western and north-eastern boundaries. Within the rear garden are two small, low quality cherries, a laurel and a dense group of cherry laurels close to the rear boundary.

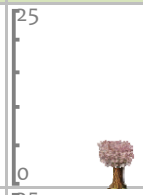
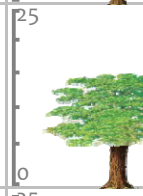
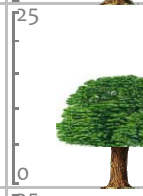
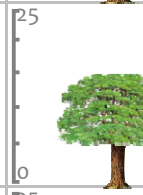
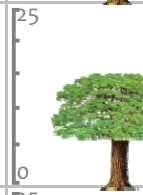
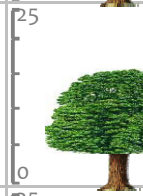
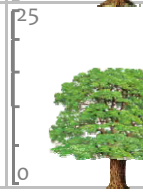
2.4.2. In the front garden are three yew trees located close to the house. These are generally in poor condition and offer little in terms of visual amenity. One is almost dead and another is in decline. There is a small oak tree located close to the front boundary which has good form and good potential.

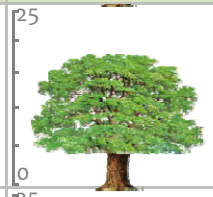
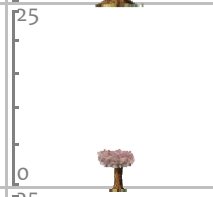
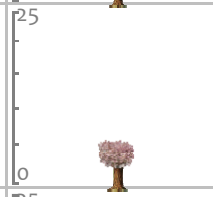
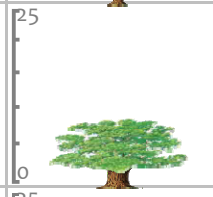
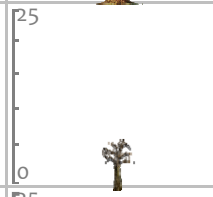
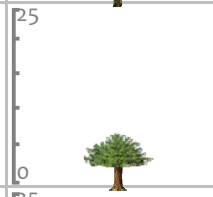
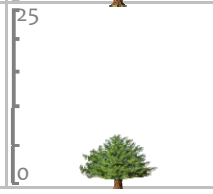
3. Tree Data Schedule

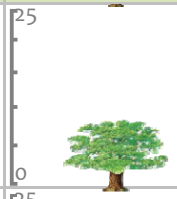
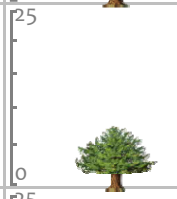
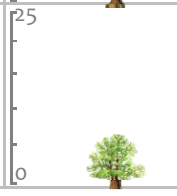
The following pages contain information gathered for each tree during the survey conducted on 15th September 2010.

The Schedule includes scaled tree images based on measurements recorded for stem diameter, crown spread, crown height and overall height. Their purpose is to indicate, at a glance, the relative dimensions of each tree

The reader should also refer to the appendices in order to correctly interpret the tree data.

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: Priority	Recommendations: Inspect Freq (yrs)	Vigour: Physiological Condition / Structural Condition	Amenity Value: Life Expectancy (yrs) / Retention Category
T1	Semi-Mature **Cherry** Prunus sp.	6	3	30	W 1.5, N 1.5, E 2, S 1.5		Position: In rear garden. Form: Single stemmed and kinked. Very poor form. History: Main leader gone. **Defects: Almost no canopy remaining.**	No action required. n/a	1.5	Low Poor Poor	Low 40+ C -
T2	Mature **Oak** Quercus robur.	15	6	60	W 6, N 7, E 5, S 6		Position: Situated on third party land, crown overhangs the boundary by 3.5m. Form: Single stemmed with a slight lean and a well-formed crown. History: Occasional pruning wounds, (healing slowly). **Defects: No defects observed.** Other: Limited inspection.	No action required. n/a	1.5	Moderate Good Good	High 40+ A
T3	Mature **Horse Chestnut** Aesculus hippocastanum.	15	6	55	W 5, N 5, E 4, S 5		Position: Situated on third party land, crown overhangs the boundary by approximatley 3m. Form: Twin-stemmed at 3m with a balanced crown. History: Multiple pruning wounds due to crown lifting (cavities developing). **Defects: Several branch stubs to lower crown.** Other: Limited inspection.	No action required. n/a	1.5	Moderate Good Good	Moderate 40+ B
T4	Early-Mature **Norway Maple** Acer platanoides.	15	6	45	W 5, N 4, E 5, S 5		Position: Situated on third party land, crown overhangs the boundary by 3m. Form: Single stemmed with a slight lean and a balanced crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Limited inspection.	No action required. n/a	3	High Good Good	Moderate 40+ B
T5	Mature **Norway Maple** Acer platanoides.	15	7	55	W 6, N 5, E 5, S 5		Position: Situated on third party land, crown overhangs the boundary by 3m. Form: Twin-stemmed at 3.5m with a well-formed crown. History: Multiple pruning wounds due to crown lifting (cavities developing). **Defects: No significant defects.** Other: Limited inspection.	No action required. n/a	3	Moderate Good Good	Moderate 40+ B
T6	Mature **Horse Chestnut** Aesculus hippocastanum.	16	5	65	W 6, N 4, E 6, S 7		Position: Situated on third party land, crown overhangs the boundary by 4m. Form: Twin-stemmed at 1m with a poorly formed crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Limited inspection.	No action required. n/a	1.5	Moderate Good Good	Moderate 40+ B
T7	Early-Mature **Maple** Acer sp.	16	4	50	W 5.5, N 4, E 4, S 8		Position: Situated on third party land. Form: Single stemmed and leaning with an unbalanced crown. History: No evidence of significant pruning. **Defects: No significant defects.** Other: Limited inspection.	No action required. n/a	3	Moderate Good Good	Low 40+ C

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) W / N / S / E	Scaled Tree Diagram (m)	Notes	Recommendations: Priority	Recommendations: Inspect Freq (yrs)	Vigour: Physiological Condition / Structural Condition	Amenity Value: Life Expectancy (yrs) / Retention Category
T8	Mature **Maple** Acer sp.	18	5	75	W 7, N 7, S 7, E 7		Position: Situated on third party land. Form: Single stemmed and vertical with a well-formed crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Ivy covered.	No action required.	n/a	Moderate / Good / Good	High / 40+ / **A**
T9	Semi-Mature **Cherry** Prunus sp.	4	3	25 @ Base	W 4, N 0, S 5, E 0		Position: Situated on third party land. Form: Suppressed specimen. History: No evidence of significant pruning. **Defects: No significant defects.** Other: Poor specimen.	No action required.	n/a	Moderate / Good / Good	Low / 40+ / C
T10	Semi-Mature **Cherry** Prunus sp.	6	3	27	W 4, N 1, S 3, E 0		Position: In rear garden. Form: Multi-stemmed at 2m with an unbalanced crown. History: No evidence of significant pruning. **Defects: No significant defects.** Other: Suppressed specimen.	No action required.	n/a	Moderate / Good / Good	Low / 40+ / C
T11	Semi-Mature **Oak** Quercus robur.	8	2	70	W 6, N 6, S 5, E 5		Position: Situated on third party land. Form: Single stemmed and vertical with a balanced crown. History: No evidence of significant pruning observed. **Defects: No defects observed.**	No action required.	n/a	Moderate / Good / Good	Moderate / 40+ / **B**
T12	Semi-Mature **Yew** Taxus baccata.	5	3	19	W 1, N 1, S 1, E 1		Position: In front garden. Form: Single stemmed and vertical with with a sparse crown. History: No evidence of significant pruning. **Defects: Almost dead tree.**	Remove.	Moderate / N/A	Dead / **Dead** / **Dead**	Dead / Dead / **R**
T13	Semi-Mature **Yew** Taxus baccata.	6	3	25	W 3, N 2, S 2, E 3		Position: In front garden. Form: Single stemmed and vertical with with a sparse crown. History: No evidence of significant pruning. **Defects: Multiple dead twigs.** Other: In decline.	No action required.	n/a	Moderate / Good / Good	Low / 40+ / C -
T14	Semi-Mature **Yew** Taxus baccata.	6	1	2 @ 24	W 3, N 2, S 3, E 3		Position: In front garden. Form: Twin-stemmed at ground level with a balanced crown. History: No evidence of significant pruning. **Defects: No significant defects.**	No action required.	n/a	Moderate / Good / Good	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: Priority	Recommendations: Inspect Freq (yrs)	Vigour: Physiological Condition / Structural Condition	Amenity Value: Life Expectancy (yrs) / Retention Category
T15	Semi-Mature **Oak** Quercus robur.	8	2	43	N 4 / W 4 / E 4 / S 4		Position: In front garden. Form: Multi-stemmed at 2.5m with a well-formed crown. History: No evidence of significant pruning. **Defects: No significant defects.** Other: Good potential.	No action required. n/a	3	Moderate Good Good	Moderate 40+ **B**
T16	Semi-Mature **Yew** Taxus baccata.	7	2	30	N 3 / W 3 / E 3 / S 3		Position: Situated on third party land, on higher ground. Form: Single stemmed and vertical with a balanced crown. History: No evidence of significant pruning. **Defects: No significant defects.**	No action required. n/a	3	Moderate Good Good	Moderate 40+ **B**
T17	Semi-Mature **Laurel** Laurus nobilis.	6	1	32 @ Base	N 2.5 / W 2.5 / E 2.5 / S 2.5		Position: In rear garden. Form: Multi-stemmed at ground level with a full crown. History: No evidence of significant pruning. **Defects: No significant defects.**	No action required. n/a	3	Moderate Good Good	Low 40+ **C**

4. Tree Condition and Recommendations

This section gives an overview of the trees surveyed and highlights any safety concerns. Recommendations are made for management purposes only and are independent of development proposals. The Tree Data Schedule within the previous section should also be consulted as this gives a detailed description of individual specimens.

4.1. Summary of our Findings:

4.1.1. T12 is a dying yew tree which is recommended for removal due to its poor condition.

4.1.2. The adjacent yew tree, T13, is also in decline and contains a high proportion of dead twigs. The cherry, T1, has extremely poor form – having lost its main leader, resulting in a very kinked stem with almost no canopy. These trees are not considered to be hazardous. However, they would require removal in the near future if they were to be retained.

4.1.3. All other trees are deemed to be in an acceptable condition and no further works have been recommended, though it should be noted that third party owned trees have not been inspected in detail.

4.2. Tree Protection Status– Site Specific

4.2.1. On 23rd September 2010, we were informed, by Kevin Fisher of London Borough of Camden that:

- The site is within Redington Conservation Area.
- There are no Tree Preservation Orders affecting trees within the site.

4.3. Tree Protection – General Notes

4.3.1. Heavy fines exist for carrying out unauthorised works to protected trees so we advise that further checks are made in case new Orders have been created since the time of writing this report.

4.3.2. Where trees are located in a Conservation Area, works are not permitted without first giving the local authority 6 weeks notice of intention. During this time the local authority may elect to create a Tree Preservation Order or to inform the applicant that they have no objection to the proposed works. If the local authority does not respond within 6 weeks, then the intended work may be undertaken.

5. Arboricultural Impact Assessment

5.1. Overview of the Development

5.1.1. It is proposed to demolish the existing building and build a new residence on a similar footprint. The proposed building shall extend slightly further forwards along the right hand boundary, and into the existing rear garden at the lower ground floor level. This is indicated on the Impact Assessment Plan in Appendix 6.

5.2. Impact of Tree Loss / Pruning

5.2.1. It is proposed to remove T1, T12, T13 and T14 in order to facilitate the development. The impact of removing these trees is assessed below:

Tree N°	Age + Species	Height	Condition	Amenity Value	BS 5837 Category	Comments
T1	Semi-mature Cherry	6m	Poor	Low	C-	Poor specimen, lost main leader, kinked stem, almost no canopy, hidden from view.
T12	Semi-mature Yew	5m	Almost Dead	Almost Dead	R	This tree should be removed regardless of development proposals due to its poor condition.
T13	Semi-mature Yew	6m	Poor	Low Moderate High	C-	Tree is in decline and has a very short life expectancy.
T14	Semi-mature Yew	6m	Good	Low	C	Visible from Redington Road. However, this is a relatively small tree and its removal shall not have a significant impact on local visual amenity.

5.2.2. Pruning works shall only be undertaken where it is necessary to facilitate access to the roof and upper walls along the north-western flank. Such pruning shall only require the removal of small secondary branches which overhang the existing building. This shall not harm or disfigure the affected trees.

5.2.3. **Summary.** The proposed tree removal shall not have a significant impact on local levels of visual amenity

5.3. Impact on Trees T2, T3, T4, T5, T6 and T16

5.3.1. These trees are all located in the adjacent garden and their roots are likely to extend close to the foundations of the existing building. In order to minimise damage to the roots of these trees, the proposed building has been designed to follow the route of the existing foundations.

5.3.2. Nevertheless, the new foundations shall need to be installed in a sympathetic manner in order to avoid unnecessary root damage.

5.3.3. Because the canopies of some of these trees extend over the roof of the existing (and proposed) building, care will need to be taken when installing scaffolding and working on the roof.

5.3.4. Mitigation strategies are proposed in Section 6.8 to ensure these trees are well protected during the construction phase.

5.4. Impact on T15

5.4.1. It is proposed to retain the majority of the Root Protection Area of this tree undisturbed. It will be necessary to remove the existing retaining structures and to replace them with some modifications. In order to minimise the impact on tree roots it is proposed to utilise hand tools only in the area shaded green on the Tree Protection Plan.

5.4.2. This shall ensure minimal impact on the roots of this tree.

5.5. Impact on Other Trees

5.5.1. All other trees are located away from the proposals and shall be protected from construction activity by temporary fencing.

5.6. Impact of Retained Trees on the Development

5.6.1. Some trees extend over the roof of the existing building. Because the proposal is built largely upon the footprint of the existing house there shall be no increase the potential impact that these trees have on the building.

5.7. Impact of General Construction Activity

5.7.1. Tree protection measures are specified throughout Section 6 that will ensure that the impact of general construction activity shall be minimal. It is imperative that all site personnel, including temporary contractors, are made aware of the Arboricultural Method Statement and the restrictions which apply.

5.7.2. There is limited room for the siting of cabins and storage of materials / spoil during the construction phase so the logistics of the development shall need to be well organised to ensure that there is adequate space outside of the Tree Protection Zones for construction activity.

5.8. Impact of Demolition / Removal of Surfaces

5.8.1. Demolition of the existing building could impact on adjacent trees if undertaken carelessly. Section 6.11 specifies how the building should be demolished without causing any detrimental impact to adjacent trees.

5.9. Impact of Changes in Ground Levels

5.9.1. The finished ground levels over Root Protection Areas shall approximate the existing ground levels and there shall be no impact on tree roots from land regrading.

5.10. Impact of Changes in Ground Surfaces

5.10.1. No significant changes are proposed to surfaces over tree roots. No additional paths or driveways are proposed over rooting zones.

5.11. Impact of Underground Services and Drainage

5.11.1. Trenches excavated along the north-west flank of the building could impact on the roots of trees in the adjacent garden. Section 6.8 specifies how underground services shall be installed to minimise the impact on retained trees.

5.12. Impact of Foundations

5.12.1. It is important that foundations are installed in a sympathetic manner to avoid damaging the roots of trees in the garden to the north-west of the property. Section 6.8 describes how foundations shall be installed to minimise the damage to these trees.

5.13. Hazardous Materials

5.13.1. All hazardous materials (including cement and petrochemical products) are to be controlled in order to ensure there is no detrimental impact on trees.

5.14. Boundary Treatments

5.14.1. No changes are proposed to the existing boundary features over Root Protection Areas.

6. Method Statement

6.1. Timing of Operations

6.1.1. Activity within the site shall be phased according to the following schedule:

6.1.2. **Phase 1.** Undertake tree removal.

6.1.3. **Phase 2.** Install of the tree protection fencing and ground protection measures.

6.1.4. **Phase 3.** Install scaffolding along the north-west flank wall, and undertake minor pruning of overhanging branches (if necessary to facilitate access to roof area).

6.1.5. **Phase 4.** Demolition phase.

6.1.6. **Phase 5.** Construction phase.

6.1.7. **Phase 6.** Removal of protective fencing. Undertaking of landscaping operations.

Pre-Construction Phase

6.2. Tree Works

6.2.1. The following table depicts the tree works which will be required prior to the erection of protective fencing:

Tree Reference	Action Required	Notes
T1, T12, T13, T14	Fell to ground level.	
T2, T3, T4, T5, T6, T16	Prune branches to create a clearance distance of 2m from the existing building.	This work may be undertaken as the scaffolding is being installed and shall be done prior to commencement of demolition activity.

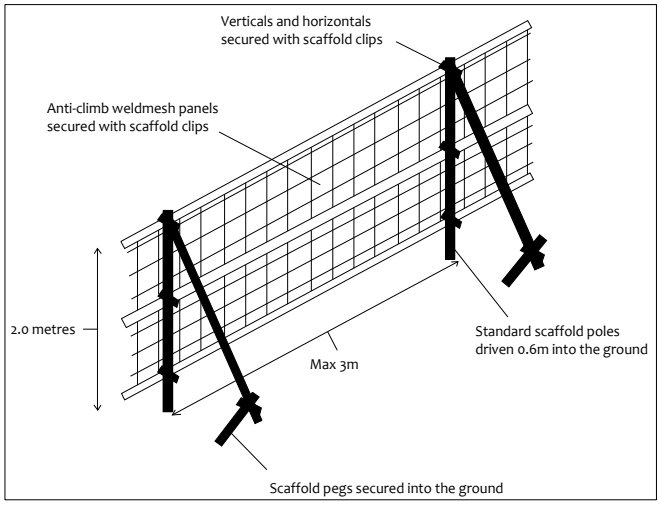
6.2.2. **General:** All tree work shall be carried out to BS 3998. Woodchip may be left on site to facilitate the ground protection measures specified in Section 6.5. The local authority tree officer shall be informed of the intended date of works and invited to inspect the works following completion.

6.3. Tree Protection Fencing

6.3.1. Fencing needs to be installed according to the positions indicated on the Tree Protection Plan (TPP) within Appendix 6. A sturdy *In-Ground System, or Back-Stay System,* shall be installed where indicated by a solid purple line as specified below:

6.3.2. The In-Ground System

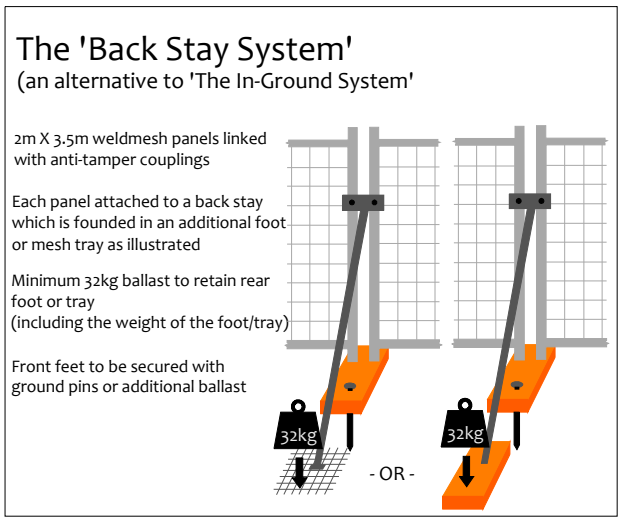
6.3.3. This system involves driving scaffold poles into the ground, onto which are affixed horizontal scaffold poles and diagonal bracing struts. Anti-climb weldmesh panels are secured to this scaffold framework using standard scaffold clips. The system is illustrated in the diagram to the right and is based on BS 5837 guidelines. This kind of system is robust enough to withstand occasional knocks by plant machinery.



6.3.4. The Back-Stay System

6.3.5. This system is robust and may be installed as an alternative to the In-Ground System. It is also more practical over hard surfaces.

6.3.6. Within this system, each anti-climb panel (minimum height 2m) is attached to a diagonal back stay connected to an additional foot or tray with additional ballast. The total weight of the foot/tray plus ballast should total not less than 32kg.



6.3.7. The panel should be secured in the edge holes of the front foot and one foot per two panels should be further secured using ground pins. This system will withstand occasional knocks by machinery and is not easily relocated.

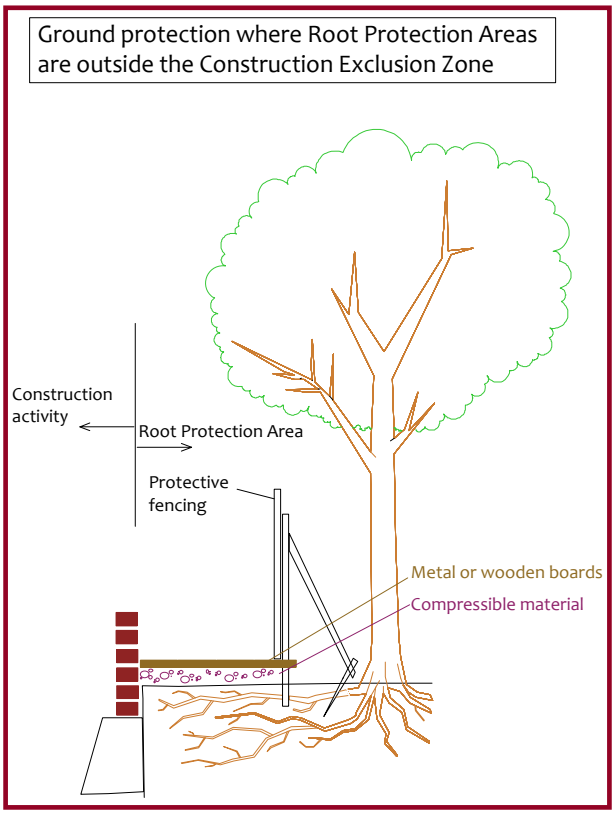
6.4. Limitations on Construction Activity

6.4.1. The Tree Protection Plan indicates zones where all construction activity shall be forbidden (areas shaded purple). Around these areas, notices will be attached to the fencing displaying the words *"Construction Exclusion Zone"* and listing forbidden activities (see Section 6.7).

6.4.2. Also indicated is a *Restricted Activity Zone* where limitations apply to construction activity as detailed in Section 6.8. All personnel shall be made aware of the restrictions that apply in this area.

6.5. Ground Protection Measures

6.5.1. Within the Restricted Zone (shaded orange on the Tree Protection Plan), ground protection measures shall need to be installed, except where existing hard-standing surfaces are to be retained intact. The purpose of the ground protection is to prevent soil compaction and contamination where it is not practicable to fence off Root Protection Areas.



6.5.2. In this area, at least 100mm of a compressible material (e.g. woodchip) shall be evenly distributed. Its purpose is to spread any load placed upon it uniformly over a wide area of ground beneath. Above this, 25mm wooden boards or 12mm road plates shall be secured.

6.5.3. These ground protection measures shall be timetabled before commencement of demolition and construction activity and before the arrival of plant machinery or materials. They shall remain in place until all heavy construction activity is complete or until they are due to be replaced with the new hard surface.

6.6. Pre-Commencement Inspection

6.6.1. Once the above works are completed, the *appointed arborist* (see Section 7.2) shall be invited to inspect the protection measures and tree works.

6.6.2. No work shall commence until the protection measures satisfy the specifications within this report. The local authority shall be informed that this is the case according to the *Inspection and Reporting Schedule* within Section 7.

Demolition and Construction Phase

6.7. Construction Exclusion Zones

6.7.1. The fenced off areas (shaded purple on the Tree Protection Plan) shall be treated as *Construction Exclusion Zones* and the following restrictions shall apply:

- No construction activity whatsoever must occur within these areas.
- No tree works, other than those specified in this report.
- No alterations of ground levels or conditions.
- No chemicals or cement washings.
- No excavation.
- No temporary structures.
- No storage of soil, rubble or other materials.
- No vehicles or machinery to be used or parked.
- No fixtures (lighting, signs etc) to be attached to trees.
- No fires within 10 metres of the canopies of any tree or hedge.

6.8. Restricted Activity Zones

6.8.1. Within the zone shaded orange on the Tree Protection Plan, access will be required to facilitate demolition and construction. The following restrictions shall apply:

- No building works shall be permitted.
- Ground protection measures to be installed as specified in Section 6.5. And to remain in place throughout the entire demolition and construction phases. Where existing hard surfacing is to be retained, additional ground protection shall not be required.
- Ground levels to remain as existing.
- Excavation shall be limited to the adjacent foundations and trenches immediately adjacent to the proposed building foundations (if required for underground services). These trenches shall be excavated using hand tools only.
- If roots are encountered in excess of 25mm diameter, they shall be retained wherever possible and protected with damp sacking during times that they are unearthed. Any roots in excess of 10mm that need to be severed shall be pruned with secateurs.
- No spoil shall be stored.
- Storage of materials shall be limited to that which is required for the task in hand. Heavy materials that require storage for more than two days shall be stored outside the Restricted Zone.
- No fires shall be permitted.
- All hazardous materials (including non-essential cement products) shall be forbidden.
- No driven machinery shall operate in this area.

6.8.2. Within the zone shaded green on the Tree Protection Plan, the existing structures shall require demolition and new walls and steps shall need to be installed. The following restrictions shall apply:

- Excavation shall be limited to removal of earth outside the adjacent Construction Exclusion Zone.
- Only hand operated tools shall be used for demolition and excavation. Plant machinery shall not be permitted to operate in this area.
- Excavation shall be limited to the absolute minimum required to install the foundations for the new retaining structures.

- Where possible eccentric foundations shall be used to minimise excavation into the Root Protection Area.
- Demolition and excavation in this area shall be overseen by the appointed arborist as detailed in Section 7.

6.9. Scaffolding

6.9.1. Where scaffolding is required in areas containing ground protection measures, the protective boards should remain in-situ and be strengthened / stabilised to bear the weight of scaffold poles.

6.10. Demolition

6.10.1. The following restrictions shall apply during the demolition of the existing buildings:

- Demolition shall not commence until the protective fencing and ground protection measures are installed to the satisfaction of the appointed arborist and the local authority.
- Mechanical excavators shall not operate beneath the canopy or within the Root Protection Area of any tree. Instead hand tools will be used in such circumstances.
- No significant masonry or timber shall be permitted to fall outside of buildings towards adjacent trees.
- Foundations within (or immediately adjacent to) Root Protection Areas will be removed by excavating on the inside of the foundation first and pulling away from the trees. No excavation shall take place between the foundation and the tree.

6.11. Canopy Protection

6.11.1. In order to protect tree canopies outside of *Construction Exclusion Zones* the following restrictions shall apply:

- No machinery in excess of 4m shall pass beneath the canopy of any tree without being carefully marshalled in order to ensure that no branches are damaged. This includes the use of piling rigs.
- If materials require installation or delivery beneath tree canopies, this shall be done without the use of overhead cranes.

6.11.2. If materials are to be installed or delivered close to tree canopies (but not beneath them) and a crane is required, they are to be carefully marshalled in order to ensure

6.12. Boundary Treatments

6.12.1. If fencing is to be installed through Root Protection Areas, the following restrictions apply:

- All post holes shall be excavated by hand and kept as narrow as possible (maximum diameter 300mm).
- Exploratory post holes shall be dug before committing to post/panel positions. If any roots in excess of 25mm are encountered they are to remain intact and the post hole shall be relocated. The fencing system must permit such flexibility (i.e. fixed panel widths will not be acceptable).
- Any roots in excess of 10mm which are severed shall be neatly pruned back with secateurs. This will encourage healing and reduce the likelihood of infection.

6.12.2. Walls shall be avoided unless their foundations may be spanned over roots using a beam system.

6.12.3. Use of Heavy Plant

6.12.4. All machinery operatives are to be made aware of the Construction Exclusion Zones and Restricted Zones.

6.12.5. All machinery operatives are to respect these zones and ensure that no damage occurs to trees due to the careless use of machinery.

6.13. Siting of Cabins and Storage of Materials

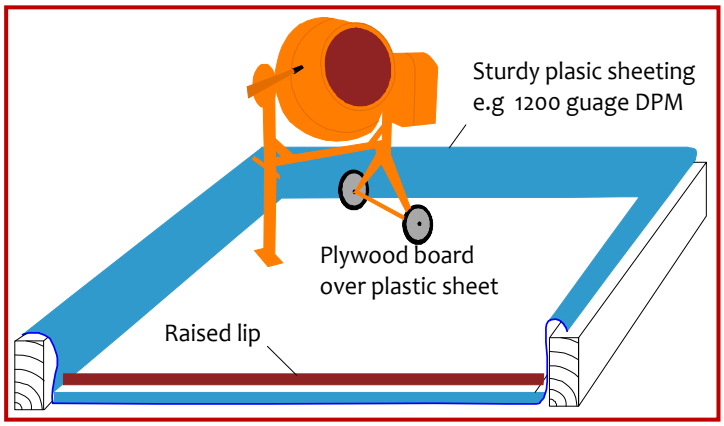
6.13.1. Cabins and heavy building materials may be located or stored anywhere outside of the Construction Exclusion Zones and Restricted Activity Zones.

6.13.2. Any proposal to install cabins or materials within Restricted Zones or Exclusion Zones shall be agreed in writing with the local authority prior to installation.

6.14. Pedestrian Paving

6.14.1. Any pedestrian paving or patios that may be installed over Root Protection Areas, as part of a post construction landscaping scheme, shall be constructed in a manner sympathetic to tree roots. Excavation shall be limited to 100mm. Paving with a thickness of 50mm bedded on mortar, or sand, bearing directly onto the ground, with a finished surface level with existing ground levels will be acceptable. No retaining kerbs shall be used.

6.15. Hazardous Materials



6.15.1. All mixing of cement based materials is to take place outside the Construction Exclusion Zones and Restricted Zone. Provision shall be made to ensure that the mixing area is contained so that no water run-off enters the Root Protection Area of any trees (see diagram for example). Mixers and barrows shall be cleaned within this area.

6.15.2. Cleaning water shall be removed from site.

6.15.3. All other chemicals hazardous to tree health, including petrol and diesel, are to be stored in suitable containers as specified by current COSHH Regulations, and kept away from Root Protection Areas.

Post-Construction Phase

6.16. Removal of Fencing

6.16.1. This will be done after all major construction work is complete. Vehicular access will not be permitted within the Root Protection Areas.

6.16.2. The local authority tree officer shall be made aware that the fencing is to be removed.

6.17. Landscaping

6.17.1. No machinery used within landscaping operations is to operate within the Root Protection Areas of retained trees.

6.18. Tree Works

6.18.1. It is anticipated that no remedial works will be required if the Arboricultural Method Statement is implemented since the trees shall be well protected. However, the trees shall be inspected after completion of all major construction activity as indicated in the Inspection Schedule within Section 7, in case any unforeseen damage has occurred and remedial works are required.

7. Inspection and Reporting

7.1. General

7.1.1. In order to ensure that the trees are adequately protected it shall be necessary to periodically monitor the works. This will be done by the appointed arborist (see Section 7.2 below) who will provide the tree officer with a copy of the inspection details. At each stage of inspection the tree officer will be invited to attend.The following inspection schedule shall be kept on site and available to interested parties at all times.

Inspection	Attendees	Comments
Pre-Construction Meeting To occur after tree works are completed and fences and ground protection measures are installed, but before commencement of any other activity, including demolition	Site manager and appointed arborist to attend. Tree officer to be invited	Tree protection fencing locations & specification checked. Additional ground protection measures checked. Further protection measures / restrictions agreed
Intermediate Reporting Throughout the entire project. At least once per month	N/A	Site manager to liaise with the appointed arborist via telephone or email regarding any issues which may affect trees. General site photos indicating tree protection measures to be provided monthly
Removal of existing foundations along the north-west flank wall	Site manager and appointed arborist to attend. Tree officer to be invited	Entire operation to be overseen
Excavation of service trenches adjacent the north-west flank wall	Site manager and appointed arborist to attend. Tree officer to be invited	Entire operation to be overseen
Demolition of walls and excavation adjacent to T15 (in area shaded green on the Tree Protection Plan)	Site manager and appointed arborist to attend. Tree officer to be invited	Entire operation to be overseen
Post-Construction Meeting Post major construction activity but prior to removal of fencing & landscaping operations	Tree officer to be invited	Retained trees inspected. Landscaping operations and restrictions to be agreed

7.2. The Appointed Arborist

7.2.1. The appointed arborist must be acceptable to the local authority. He / she must have a good understanding of the project requirements and be suitably qualified to understand the hazards associated with development near to trees.

7.2.2. The appointed arborist should work closely with the site manager and shall have the authority to insist upon work stoppage until resolution of any major issues arising which could be detrimental to the health of protected or important trees.

7.2.3. The appointed arborist must keep the local authority updated at each of the stages within the inspection schedule and will report any unexpected issues arising throughout the project which could impact on trees.

7.2.4. Crown Consultants are able to offer these services or to nominate suitably qualified persons.

8. Photographs

Refer to the plan in Appendix 6 for photo locations

Photo 1.

Photo 2.

Photo 3.

Photo 4.

Photo 5.

Photo 6.

Photo 7.

Photo 8.

9. Signature

This report represents a true and factual account of the trees and potential impact of development along with proposed protection measures at

50 Redington Road
Hampstead
NW3 7RS

Signed

.....

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

on behalf of

Crown Consultants Ltd

Dated

1st February 2011

Arboricultural Consultants

Appendix 1: Understanding BS 5837: 2005

Aimed predominantly at arboriculturalists, architects, developers and planners, this Standard offers a balanced approach to harmonising development with existing trees. It acknowledges the positive contribution trees may offer to a site, as well as the negative aspects of retaining inappropriate trees. The stresses that development may place on existing trees are recognised, and guidance is offered regarding solutions. The Standard suggests a three stage approach:

A1.1 Stage 1: Initial Survey and Report

This identifies the existing trees and allocates to each a ***Retention Category*** which takes into account amenity value, condition and realistic life expectancy. The categories are allocated independently of development proposals. Our interpretation of the retention categories is explained below:

A1.1.1 Retention Categories

A Category: Trees of high quality and amenity. Usually, mature trees with a significant life expectancy which would enhance any development. Retention of these trees is strongly encouraged.

B Category: Trees of moderate quality and amenity. Usually mature trees, or younger trees with exceptional form. Retention of these trees is desirable though the removal of occasional specimens may be acceptable.

C Category: Trees of low quality and amenity. The removal of these trees should generally be seen as acceptable in order to facilitate development.

R Category: Trees whose structural condition is such that they should be removed if development is to proceed.

A1.1.2 Occasionally trees are borderline and do not fall neatly into one of the categories A, B or C. In such cases we apply a superscript ($^{+/-}$) such that:

C^{+} Indicates borderline C/B, though Category C is deemed to be the most appropriate.

B^{-} Indicates borderline C/B, though Category B is deemed to be the most appropriate.

A1.1.3 The British Standard suggests that each of the A, B and C categories may be further subdivided (A1, A2, A3, B1, B2, B3 etc) such that subcategory 1 denotes mainly arboricultural values, subcategory 2 denotes mainly landscape values and subcategory 3 denotes mainly cultural values (including conservation). Multiple subcategories may be used.

Our experience suggests that these subdivisions lack clarity and can confuse the reader. Within this report subcategories are **not** denoted. Where appropriate, the use of phrases such as '*Part of a formal group*', or '*Has a high ecological value*', or '*Offers good screening to the site*' are incorporated into the observation section of the Tree Data Schedule. We believe this conveys all relevant landscape and cultural information without unnecessary confusion. Any person wishing clarification regarding subcategories of any trees surveyed should contact the author.

A1.1.4 Tree Constraints Plan (TCP). This indicates the position, crown spread, retention category and root protection area (RPA) of each tree and is used to inform where development may proceed without causing damage to trees.

The RPA marked on the TCP is the area within which the majority of roots are expected to lie. No significant detrimental effects are expected if the RPA can be completely avoided. The Standard suggests a simple formula whereby "radius of RPA" = "12 x stem diameter". This is modified (according to the Standard) to take into account specific factors which influence rooting activity, e.g. underground structures. In exceptional circumstances it may be acceptable to make incursions into the RPA, though this should be discussed with an arboriculturalist and may ultimately lead to the refusal of planning consent.

The British Standard suggests that shading should be indicated on the TCP, denoted as a circle-segment drawn northwest to due-east with a radius equal to the height of the tree. We deem this to be misleading since it does not reflect true shading patterns which vary dramatically according to tree form, time of year and time of day. For these reasons we do not generally illustrate shade constraints according to this formula, though if requested we will provide them.

A1.2 Stage 2: Arboricultural Impact Assessment

This type of report identifies and evaluates the impact that development may have on existing trees and vice versa.

A1.3 Stage 3: Arboricultural Method Statement

This type of report indicates the necessary methodology required to protect trees from potential damage during the development process. Typical issues addressed are direct damage to trunk and branches, by cranes or other equipment, damage to roots caused by installation of underground services or foundations, and the use of chemicals which are hazardous to tree health, e.g. cement.

One of the primary concerns of this type of report is soil compaction caused by traffic passing over tree rooting areas. This is easily overlooked by developers, though it prevents roots from accessing oxygen and may lead to a significant deterioration in tree health.

A *Method Statement* is often requested by local authorities during the latter stages in the planning process and may be enforceable as part of the planning conditions. It is essential that a realistic proposal is put forward which balances tree protection requirements with the practicalities of construction or demolition.

Appendix 2: Survey Methodology

A2.1 A ground level visual survey was carried out using the *Visual Tree Assessment* technique described by Mattheck and Broeler (1994) and endorsed by the Arboricultural Association (LANTRA Professional Tree Inspection course, 2007).

A2.2 Structural condition is assessed by inspecting the stem and scaffold branches from all angles looking for weak branch junctions or symptoms of decay. Particular attention is paid to the stem-base. Cavities are explored using a metal probe in order to assess the extent of any decay. If this is not possible further inspection is recommended in the form of a climbed inspection or using specialist decay detection equipment.

A2.3 The physiological condition is assessed by inspecting the stem, branches and foliage for symptoms of disease. The overall vigour of the tree is also taken into account.

A2.4 Where the condition of a tree is deemed to be unacceptable, recommendations are made according to a scale of priority in order to reduce the liability of the owner. The position of the tree and its potential targets are taken into account.

A2.5 Measurements are obtained using a diameter tape, clinometer, distometer and loggers tape. Where this is not practical measurements are estimated.

A2.6 Some trees are surveyed as groups, though this is avoided close to areas likely to be developed.

A2.7 Finally, a *Retention Category* was allocated as described in Appendix 1.1.1.

Appendix 3: 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 1990 Ivan worked within the construction industry and received training in a broad range of practical building skills and general construction principles. In 1989 Ivan obtained a BSc (Hons) at Leeds University followed by a P.G.C.E at The University of Wales in 1990. Ivan returned to work within the construction industry and expanded his understanding of construction principals.

Arboriculture

In 1996 Ivan obtained a NCH (Arboriculture) at the University of Lincoln and became a member of the Arboricultural Association. He then trained as an Arboricultural Consultant 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.

Ivan is now the Director and Principal Consultant of Crown Consultants Ltd.

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

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 obtained a foundation degree in arboriculture at the University of Lancashire, which he passed with distinction.

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 accredited by the University of Cardiff and is registered as a Sweet and Maxwell Checked Expert Witness 2008.

Ivan currently acts as Local Authority Tree Officer for Barnsley Metropolitan Borough Council.

Appendix 4: Explanation of Tree Data and Glossary

This section explains the terms used in the **Tree Data Schedule** within Section 3.

A4.1 General Observations

A4.1.1 **Numbering System:** Each item of vegetation has its own unique number prefixed by a letter such that T1=Tree 1, G2=Group 2, H3=Hedge 3 and W4=Woodland 4, S5=Shrub 5.

A4.1.2 **Age Categories:**

Young	Usually less than 10 years old.
Semi-Mature	Significant future growth to be expected, both in height and crown spread (typically below 30% of life expectancy).
Early-Mature	Full height almost attained. Significant growth may be expected in terms of crown spread (typically 30-60% of life expectancy).
Mature	Full height attained. Crown spread will increase but growth increments will be slight (typically 60% or more of life expectancy).
Veteran	A level of maturity whereby significant management may be required in order to keep the tree in a safe condition.
Over Mature	As for veteran except management is not considered worthwhile.

A4.1.3 **Species:** Common names and Latin names are given.

A4.1.4 **Height:** Measured from ground level to the top of the crown.

A4.1.5 **Stem Diameter:** Taken at 1.5m above ground level where possible. On multi-stemmed trees this measurement may be taken at ground level, though usually an indication of the number of stems and average diameter is given, e.g. 3 x 30cm.

A4.1.6 **Crown Height:** Measured from ground level to the height at which the main crown begins. Where the crown is unbalanced it is measured on the side deemed to be most relevant. This is usually the side facing the area of anticipated development.

A4.1.7 **Tree Diagram:** This scaled drawing is computer generated based on measurements taken for stem diameter, crown height and spread, and overall height. It is designed to help the reader rapidly assess the data. It is not an accurate representation of the form of the tree.

A4.1.8 **Crown Spread:** Measured N, E, S & W, taken from the centre of the stem and usually rounded up to the nearest metre.

A4.1.9 **Observations:** If a tree's position is considered to be relevant it will be commented upon (e.g. overhanging a children's play area). Tree form and pruning history are also recorded along with an account of any significant defects. Defects and descriptive terms are dealt with in more detail at the end of this section.

A4.1.10 **Recommendations:** Usually based on any defects observed and intended to ensure that the tree is in an acceptable condition.

A4.1.11 **Priority Scale:** Depending upon the threat posed by the tree, and the likelihood of failure, recommendations should be carried out according to the following priority scale:

Urgent	To be carried out as soon as possible.
Very High	To be carried out within 1 month.
High	To be carried out within 3 months.
Moderate	To be carried out within 1 year.
Low	To be carried out within 3 years.

A4.1.12 **Inspection Frequency:** An interval of 6 months, 1 year, 1.5 years or 3 years is allocated before the next inspection is due. Wherever practical, consideration should be given to seasonal changes so that deciduous trees are not always surveyed in winter when they have no leaves, or in summer when leaves may obscure branches within the upper crown.

A4.1.13 **Vigour:** An indication of growth rate and the tree's ability to cope with stresses:

High	Having above average vigour.
Moderate	Having average vigour.
Low	Having below average vigour.
Very Low	Tree is struggling to survive and may be dying.

A4.1.14 **Physiological Condition:**

Good	Healthy and with no symptoms of significant disease.
Fair	Disease present or vigour is impaired.
Poor	Significant disease present or vigour is extremely low.
Very Poor	Tree is dying.

A4.1.15 **Structural Condition:**

Good	Having no significant structural defects.
Fair	Some defects observed though no high priority works are required.
Poor	Significant defects found. Tree requires monitoring or remedial works.
Very Poor	Major defects which will usually require significant remedial works or tree removal.

A4.1.16 **Amenity Value:**

Very High	Exceptional specimen, observable by a large number of people.
High	Attractive specimen, observable by a significant number of people.
Moderate	One of the above factors is not applicable.
Low	Unattractive specimen or largely hidden from view.

A4.1.17 **Life Expectancy:** The estimated number of years before the tree may require removal. Classified as (<10), (10 – 20), (20 – 40), or (40+).

A4.1.18 **Retention Category:** These are explained in detail in Appendix 1.

A4.2 Evaluation of Defects

A4.2.1 Cavities, wounds, deadwood etc are all evaluated as follows:

Major	Such that structural integrity is, or will become, compromised and the tree is, or will inevitably become, hazardous.
Significant	A defect that may over time become a major defect, though not necessarily so. This will depend on the vigour of the tree and its ability to deal with decay etc.
Minor	A defect that is not likely to compromise the tree's structural integrity.

General Glossary

Adaptive growth	In tree biomechanics, the process whereby wood formation is influenced both in quantity and quality by the action of gravitational forces and mechanical stresses on the cambial zone.
Aerobic	Conditions in which oxygen is freely available, or to biomechanical processes that depend on the presence of oxygen.
Anaerobic	A condition marked by the absence of oxygen; Generally such areas are unsuitable for normal life and growth of plant tissues. These sites tend to be populated by bacteria capable of surviving low oxygen conditions often associated with Slime Flux.
Arboriculture	The culture and management of trees as groups and individuals primarily for amenity and other non-forestry purposes.
Arborist	A person possessing the technical competence through experience and related training to provide management of trees or other woody plants in a landscape setting. Generally involved with the development or management of trees for visual amenity or land management rather than the growth of trees for product or profit.
Barrier zone	A layer within an annual increment of wood which contains abnormal xylem cells, laid down by the cambium in response to wounding or other trauma.
Body language	In trees, the outward display of growth responses and or deformation in response to mechanical stress.
Bole	Or Trunk, the main stem of a tree below its first major branch.
Bracket	A type of fruiting body produced by various fungal species, plate like to hoof like in shape and often a one sided attachment to the wood or bark.
Branch bark ridge	A ridged area located at the union of a branch to a trunk or stem.
Branch Collar	Trunk tissue that forms around the base of a branch between the main stem and the branch, or between a main branch and a lateral branch. As a branch decreases in vigour or begins to die, the collar usually becomes more pronounced and completely encircles the branch.
Brown Rot	Form of decay where cellulose is degraded, while lignin is only modified.
Buttress Root	Roots that emerge from the base of the tree stem, normally large and well developed that rapidly reduce in diameter to create the Root Plate this offers structural support for the tree. Buttress roots divide rapidly forming the connection between the stem and the transport roots.
Cabling Bracing	Installing cables within the crown of a tree to prevent collapse.
Callus	Undifferentiated cells often formed at the edges of recent injuries. This tissue quickly becomes differentiated, forming cells of the type characteristic of that position on the tree (e.g. forming wood, bark, roots, etc.) see wound response tissue.
Cambium	A thin layer of actively growing and dividing cells, located between the xylem (sapwood) and bark of a plant; the part responsible for radial growth of a tree stem or branch.
Canopy	The topmost layer of twigs and foliage in a woodland, tree or group of trees.
Canker	A localised area of dead bark and cambium on a stem or branch, caused by fungal or bacterial organisms, characterised by woundwood development on the periphery. This may be annual or perennial.
Cavity	An open and exposed area of wood, where the bark is missing and internal wood has been decayed and dissolved.
Chlorotic	Also Chlorosis. A condition of the plant marked by yellowing of normally green foliage, often indicating nutrient deficiency or plant dysfunction.
Clinometer	Devices that measures vertical angles, and provides direct height measurements of objects by triangulation.
Co-dominant stems/trunk	Are forked branches or trunks of nearly the same size in diameter and lacking a normal branch union.
Compacted soils	Soils in which the air-space (oxygen space) has been reduced or eliminated, reducing water infiltration and percolation, reducing root presence and inhibiting new root development.
Compartmentalisation	The physiological process that creates the chemical and mechanical boundaries that act to limit the spread of disease and decay organisms.
Compression Failure	Localized buckling of fibres and other longitudinal elements produced by compression of wood along the grain; compression failures sometimes develop in standing trees.
Compression Strength	The ability of a material or structure to resist failure when subjected to compressive loading; measurable in trees using special drilling devices
Compression Wood	Abnormal wood formed on the lower side of branches and curved stems, with physical properties different from normal wood.
Conservation Area	In Great Britain, designated areas of architectural or historical interest, in which there are special procedures for planning applications. Additionally tree works cannot generally be undertaken without prior notification (Currently 6 weeks) to the relevant local planning authority. See also Tree Preservation Orders.
Core Sample	A sample of wood extracted from a trunk or branch, using an increment borer tool. The resulting core can be analysed for characteristics of growth, wood strength, structure, decay, and for species identification.
Crotch	The union of two or more branches; the auxiliary zone between branches.
Crown	The upper canopy of a tree, including upper trunk, scaffold branches, secondary branches, stems and leaves.
Crown lifting / raising	Crown Lift The removal of the lowest branches, usually to a given height. It allows more residual light and greater clearance underneath for vehicles etc.
Crown reduction	The reduction of a tree's height or spread while preserving its natural shape.
Crown thinning	The removal of some of the density of a tree's crown, usually 5-25% allowing more light through its canopy and reducing wind resistance.
Deadwood (noun)	Deadwood is often present within the crown or on the stems of trees. It may be an indication of ill health, however, it may also indicate natural growth processes. If a target is present beneath the tree, deadwood may fall and cause injury or damage and should be removed, otherwise deadwood can remain intact for conservation purposes (insects, fungi, birds etc.).
Deadwood (verb)	The removal of dead branches from a tree's canopy, usually of a specified size (in diameter).
Decay	Progressive deterioration of organic tissues, usually caused by fungal or bacterial organisms, resulting in loss of cell structure, strength, and function. In wood, the loss of structural strength.
Decay Detection	The assessment of decay within a tree has been traditionally difficult, but recent advances have made it possible to achieve accurate representations of the internal section of a tree in both 2D and 3D, removing doubt over the condition of the tree and allowing accurate management decisions.
Decurrent	In trees a, system of branching in which the crown is borne on a number of major widely spreading limbs of similar size. In fungi relates to toadstools whose gills run down the stem and leaves and other plant organs, which extend down the stem.
Defect	In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment.
Defoliation	The losing of plants foliage.

Dieback	Progressive death of buds, twigs and branch tissues, on individual limbs resulting in Deadwood, or throughout the canopy, extreme cases can result in Stag Heading.
Dripline	A projected line on the ground that corresponds to the spread of branches in the canopy; the farthest spread of branches.
Epicormic shoots	Fast growing, weakly attached shoots/branches that often grow as a response to stress factors upon a tree or branch removal.
Excurrent	In trees, a system of branching that a single leader remains dominant, through the control of lateral branches.
Failure	In connection with tree hazards, a partial or total fracture within the wood tissue or loss of cohesion between roots and soil. (In total failure affected parts will snap or tear away completely, Partial failure there is a crack or deformation, which results in an altered distribution of mechanical stress.
Feeder Roots	Fine fibrous Water and nutrient absorbing roots located in the outer root system.
Flush-Cut	In trees and shrubs, a pruning cut close to the parent stem, which removes the branch bark ridge.
Foliage	The live leaves or needles of the tree; the plant part primarily responsible for photosynthesis.
Formative pruning	The trimming of a tree to remove weaknesses and irregularities which may lead to problems. The formative pruning operation is aimed at reducing the potential for future weaknesses or problems within the tree's crown.
Gall	An abnormal, disorganized growth of plant tissues, caused by parasitic or infectious organisms such as insects, fungi, bacteria, or viruses.
Girdling	In woody plants, any form of damage that destroys the bark and / or the Cambium all the way around the stem, branch or root, normally resulting in death of the damaged section.
Girdling Root	In woody plants, a root that grows across the buttress, or across other roots, eventually causing constriction of the radial growth.
Growth Increment	The incremental growth added as new annual ring develops each season over existing wood. This is seen as (growth) rings in cross-sections of wood.
Hazard beam	An upwardly curved branch in which strong internal stresses may occur without the compensatory formation of extra wood (longitudinal splitting may occur in some cases).
Heartwood	Inner non functioning tissues that provide structural support to trunk.
Heave	In relation to shrinkable clay soils, expansion due to rewetting of a volume of soil previously subjected to the removal or water by plant / trees following felling or root severance. Also in relation to root growth, the lifting of pavements and other structures by radial expansion. Also in relation to tree stability, the lifting of one side of a wind rocked root plate.
Herbicide	A chemical compound that causes the death of a plant.
Included Bark	Bark that becomes embedded in a crotch between branch and trunk or between co-dominant stems, usually found in narrow or tight crotches, and causes a weak structure.
Increment Borer	A tool that cuts and extracts a narrow cylinder of wood from a tree for analysis of the wood tissue and growth increments.
Leader	The primary terminal shoot or trunk of a tree.
Limb	A large lateral branch growing from the main trunk or from another larger branch.
Lion Tailing	Often the result of poor pruning practices; the main leader or branches are largely devoid of side branches, growth is restricted to the end of branches and is likely to suffer damage through end loading.
Lopping	In trees, a general term that related to the removal of branches from a tree.
Monitoring	Due to the relative life span of trees in relation to our own, long-term monitoring provides a valuable insight to the health of trees, identifying decline and or stabilisation and or improvement.
Mulch	A material laid over the root system of a tree to help conserve moisture within the soil. Additionally it may help control the development of weeds close to the tree.
Mycelium	A mass of growing filaments (hyphae) formed by fungi.
Mycorrhizae	The symbiotic relationship between roots and certain beneficial fungi. Mycorrhizae are the combined root / fungal growth.
Natural Pruning	The shedding of a branch or twig that has died back naturally and has become decayed at or near its base.
Necrosis	The failure and subsequent death of a branch, leader or tree.
Negligence	A failure to take reasonable action to deal with a hazard to prevent damage to property or person.
Nutrient	Substances that are absorbed by living organisms for the maintenance of internal processes.
Occluding tissue	The general tern of wood, cambium and bark that develop around the site of a wound on a woody plant
Pathogen	A microorganism that causes diseases within another organism.
Phloem	The principle conductive tissue that the products of Photosynthesis are transported around the plant
Photosynthesis	The process were light energy is used to create energy (Carbohydrate) for use within the plant.
Pollard	A term for a pollarded tree.
Pollard head	The swollen section of branch / stem that forms behind the pollarding cut.
Pollarding	The complete or partial removal of the crown of a young tree so as to encourage the development of numerous branches either for amenity or historically as fodder, repeated management is required cyclically to maintain the feature
Prune or Pruning	Selective removal of woody plant parts of any size, using saws, Loppers, Secateurs, or other pruning tools.
Reaction Wood	Wood with distinctive anatomical characteristics, formed in parts of leaning or crooked stems and in branches to provide additional strength / support. In hardwoods, tension wood usually forms. In conifers, compression wood is usually found.
Reaction Zone	A zone normally darker than surrounding wood that denoted the boundary often a defensive one between functional sapwood and dysfunctional or decaying wood.
Re-grading	The raising or lowering of a soil profile from its original grade.
Rejuvenation pruning	Where historically or environmentally important trees are to be retained, their life spans can be significantly extended through the adoption of particular pruning regimes.
Rejuvenation root treatment	Management of the root zone can have a significant positive effect upon the health of trees. Physical, mechanical and biological approaches are available and can be prescribed in accordance within the constraints of individual sites.
Remedial pruning	The removal of old stubs, deadwood, epicormic growth, rubbing or crossing branches and other unwanted items from the tree's crown.
Resistograph	Invasive decay detection technique whereby the resistance offered by the timber to a spinning probe is measured and plotted.
Rib	In tree body language, a long narrow, axial protuberance which often over lays a crack.
Ring Barking	Artificial Girdling of the stem, to result in the death of a tree. May be used in habitat creation were the retention of dead standing trees is required.
Rod Bracing / Bolting	Traditionally, this has relied upon the Installation of steel rods or bolts through the stems or limbs, to reduce twisting or splitting of the wood. The installation of such features does require legal interpretation.
Root Barriers	Both Buildings and services can benefit from the installation of root barriers to protect a soil volume from the ingress of roots.

Root Collar	**The basal area of the tree; transition zone from trunk to root. Also sometimes called trunk flare.**
Root Plate	**The primary support area for the tree; an area of the root system close to the base that structurally anchors the tree to the soil.**
Root Rot	**Either a general term for decay within the wood of the lower stem / buttress roots, or a disease in which the fine roots are killed.**
Root System	**The portion of the tree containing the root organs, including buttress roots, transport roots, and fine absorbing roots; all underground parts of the tree.**
Root Zone	**The area and volume of soil around the tree in which roots are expected. May extend to three or more times the branch spread of the tree, or several times the height of the tree.**
Sail Area	**That area or the tree subjected to wind load.**
Sanitation	**In plant disease control, the removal of material that could a source of infection by a pathogen. Removal of diseased plant parts, such as fallen leaves and twigs, and pruning of dead and diseased branches. Diseased parts should be burned or buried under soil or active compost.**
Sapwood	**Xylem wood tissue, usually light in colour, representing the outer growth rings of the wood. Usually living, reactive wood tissue, in a healthy tree. See heartwood**
Scaffold limbs / scaffold Branches	**The branches that from the main network framework of the crown of a tree.**
Senescent	**A decline in growth and vigour due to age or stress factors.**
Shrub	**A woody plat that branches at or close to the ground level and so does not have a single stem.**
Slime Flux	**Relating to a toxic condition from the spreading of bacteria or their products from a source of infection; characterized by malodorous gases, or salt deposits upon the bark. If these products enter the sap stream, localised vessel necrosis can result, usually associated with anaerobic conditions.**
Soft Rot	**A kind of wood decay, were a fungi degrades cellulose within the cell wall, without causing overall degradation.**
Soil Compaction	**The compression of soil, causing a reduction of pore space and an increase in the density of the soil. Air is squeezed out and nutrients become locked. Tree roots cannot grow in compacted soil.**
Soil Profile	**The characteristics of a soil as regards to relative depth; the changes in soil texture and composition that occur with depth.**
Soil Texture	**The classification of the constituent particles of soil; includes sand, silt and clay particles. Directly related to soil porosity, permeability, and aeration.**
Sonic Decay Detection	**Non invasive method whereby sound waves are passed through the tree and the speed is measured. Slow speeds indicate decay and a tomography picture representing the inner stem is produced.**
Stag Heading	**In a tree, a state of dieback were dead branches protrude beyond the current living crown.**
Stress	**In plant physiology, conditions were one or more physiological functions Are not working within normal parameters.**
Stump Grinding	**The removal of a tree stump using a specialist grinding machine.**
Subsidence	**In relation to vegetation, the removal of water by plant growth resulting in localised shrinkage in the soil volume.**
Sucker	**Same as sprout.**
Suppressed	**Trees which are dominated by surrounding vegetation and whose crown development is restricted from above.**
Systemic	**Affecting the whole plant or organism. A systemic compound is carried throughout the entire plant to all parts through the vascular system.**
Target	**Any person or object within reach of a falling tree or part of a tree that may be injured or damaged.**
Target Pruning	**The pruning of a branch were the wound affects only branch material, often result in a target shaped wound.**
Tension Wood	**Reaction wood typically formed on the upper side of limbs or curved stems; characterized by lack of cell wall lignifications (higher ratios of cellulose to lignin).**
Tight Union / Tight Crotch	**Also, narrow crotch. A crotch with a narrow angle between branches, often having included bark.**
Tomography	**The comparison of sound or stress waves through the tree allows the creation of a 2D or 3D representation of the internal structure of a stem or branch section and highlights areas of damage. Virtually non-injurious.**
Topography	**The configuration of surface features, including the vertical and horizontal relationships of the ground and other features.**
Topping	**Cutting large limbs back severely, without regard to form or habit of the tree. Cuts are usually made between lateral branch nodes. This practice is extremely injurious to trees, and promotes decay and structural weakness within the crown.**
Tree	**A woody plant that typically has a single stem, at maturity has a height of a least 4 metres and a stem diameter at breast height of at least 75mm.**
Tree Preservation Order	**In Great Britain, an order made by the local planning authority, were consent must be gained before undertaking all but exempt works to a tree.**
Trunk Flare	**The basal area of the trunk that flares or widens, and merges with the main roots. See root collar**
Veteran Tree	**Veteran trees are often found in large parks or estates and commonly affected by extensive decay or have been subject to extensive works. These trees are retained for historical importance and often pose greater risk than normal, which is generally justified. They need careful management and often propping or bracing to support them, some require fencing to limit access.**
Vigour	**Active, healthy growth of plants: ability to respond to stress factors.**
Visual Tree Assessment (VTA)	**An assessment of the mechanical condition of trees based upon their 'body language'. Trees are dynamic and respond to faults / decay / environmental factors in various ways, these responses can be indicative of structural integrity.**
Wetwood	**An infection caused by bacteria living inside the plant tissues. The bacteria ferment the plant fluids, resulting in death of nearby cells, and often causing exudations of fluid from the bark, often referred to as a Slime Flux.**
White Rot	**A kind if wood decay were a fungi attacks the lignin within the wood matrix**
Wind loading	**Forces placed upon tree canopy, branches, trunk and roots of a tree under windy conditions.**
Wind Throw	**The failure of a tree due to wind loading.**
Witches Broom	**A deformed or unusual growth of twigs from adventitious buds, caused by insects, disease, or dieback of twigs and buds.**
Wood	**Secondary Xylem; the main structural support and water conducting tissue of trees and shrubs.**
Wound Response Tissue	**Also Occluding Tissue, Wound Wood or Callus. Differentiated wood tissue that grows around the margins of a wound or injury.**
Wound Wood	**Wood with atypical features, formed in the vicinity of a wound and a term to describe the occluding tissues around a wound**
Xylem	**Plant tissues with special function of translocation of water and dissolved nutrients.**

Appendix 5: Further Information

Building Near Trees – General

National Joint Utilities Group publication # 10 (1995), *Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees. Downloadable at www.njug.demon.co.uk/pdf/NJUG%20Publication10.pdf*

NHBC Standards Chapter 4.2., *Trees and Buildings.*

Horticulture LINK project 212. (*University of Cambridge,* 2004), *Controlling Water Use of Trees to Alleviate Subsidence Risk.*

Tree Planting and aftercare

See www.trees.org.uk/leaflets.php# for downloadable leaflets on selecting a garden tree, planting, aftercare and veteran tree management.

British Standards

BS 5837: 2005. Trees in Relation to Construction – Recommendations.
Bs 3998: 1989. Recommendations for Tree Work.
BS 3936: 1992. Nursery Stock. Part 1: Specification for Trees and Shrubs.
BS 3936: 1992. Nursery Stock. Part 10: Specification for Groundcover Plants.
BS 4043: 1989. Transplanting Root-balled Trees.
BS 8004: 1986. Foundations.
BS 8103: 1995. Structural design of Low-Rise Buildings.
BS 8206: 1992. Lighting for Buildings.
BS 3882: 2007. Topsoil.
BS 4428: 1989. General Landscaping Operations (excluding hard surfaces).

Permission to do Works to Protected Trees / Tree Law

Forestry Commission (Edinburgh, 2003), *Tree Felling – Getting Permission.* Country Services Division - Forestry Commission. Downloadable at www.forestry.gov.uk/website/pdf.nsf/pdf/wgsfell.pdf/$FILE/wgsfell.pdf

Transport and the Regions (Department of the Environment, 2000), *Tree Preservation Orders, A Guide to the Law and Good Practice*. Downloadable at www.communities.gov.uk/publications/planningandbuilding/tposguide

C. Mynors, *The Law of Trees, Forests and Hedgerows* (Sweet and Maxwell, London, 2002)

Communities and Local Government website with numerous downloadable documents, from: http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/

Lighting Levels

P.J. Littlefair, *B.R.E. 209: Site layout planning for daylight and sunlight A guide to good practice.* B.R.E. Bookshop, London.

British Standards Institution. Code of practice for day lighting. *British Standard* BS 8206: Part 2 (1992).

Chartered Institution of Building Services Engineers. *Applications manual: Window Design* (London, 1987).

NBA Tectonics. A study of passive solar housing estate layout. *ETSU Report* S-1126. Harwell, Energy Technology Support Unit (1988).

I.P. Duncan; D. Hawkes, Passive solar design in non-domestic buildings. *ETSU Report* S-1110. Harwell, Energy Technology.

P. J. Littlefair, Measuring Daylight, *BRE Information Paper 23/93 f3.50.* (Advises on measuring daylight under the real sky or an artificial sky, allowing for the changing nature of sky light).

High Hedges

Communities and Local Government website with numerous downloadable documents, from: http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/

Tree Specific Websites

www.crowntrees.co.uk	Crown Consultants site containing useful information
www.trees.org.uk	Arboricultural Association
www.rfs.co.uk	Royal Forestry Society of England, Wales and N. Ireland
www.treehelp.Info	The Tree Advice Trust
www.woodland-trust.org.uk	The Woodland Trust
www.treecouncil.org.uk	The Tree Council

Appendix 6: Site Plan

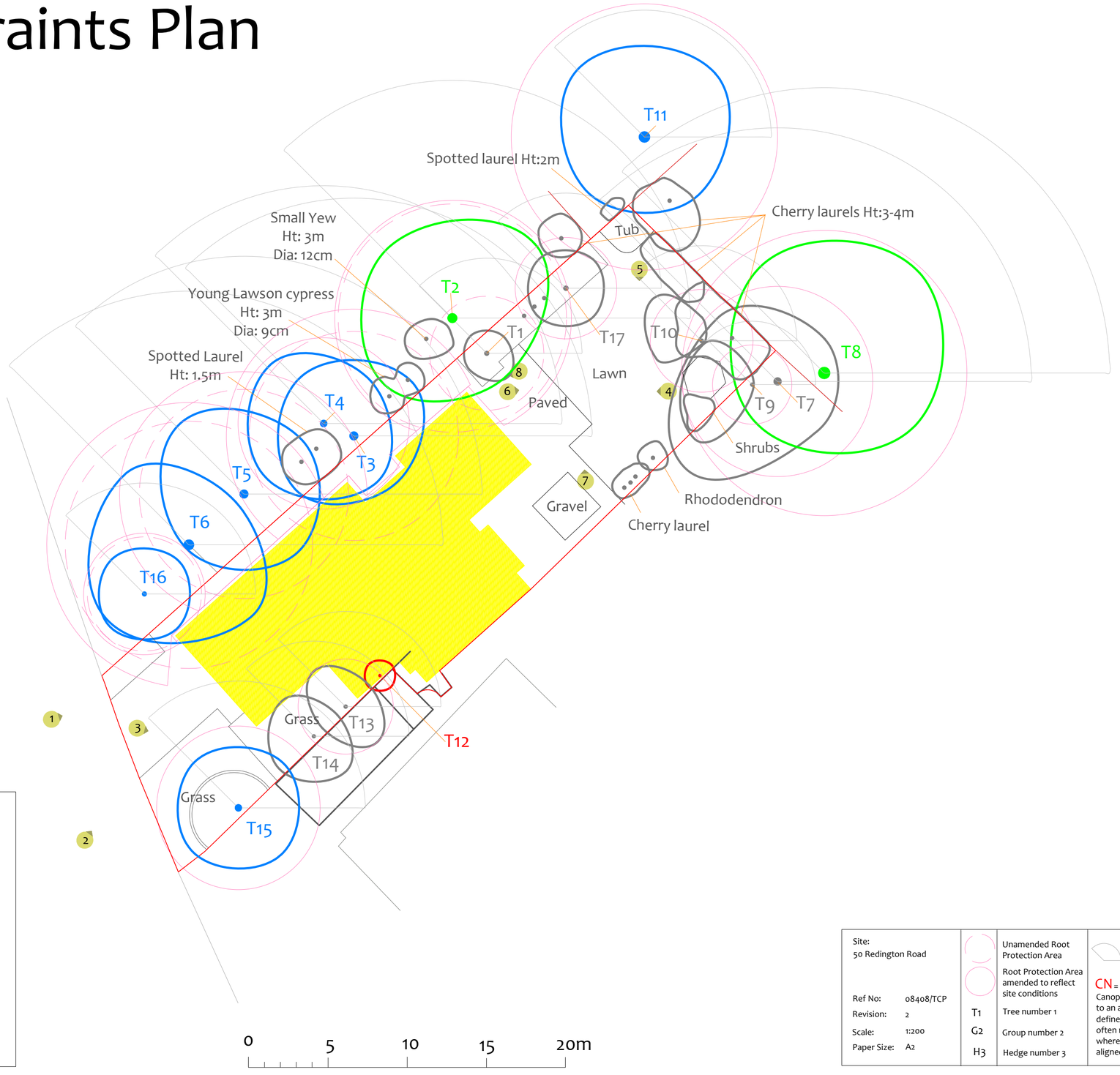
The plan(s) referred to within the report follow this page.

Appendix 6

Crown Consultants Arboricultural Report Ref 08408

Tree Constraints Plan

(Existing Layout)



BS 5837 Retention Categories

Category A:

Trees of high quality and amenity. Usually, mature trees with a significant life expectancy which would enhance any development. Retention of these trees is strongly encouraged.

Category B:

Trees of moderate quality and amenity. Usually mature trees, or younger trees with exceptional form. Retention of these trees is desirable though the removal of occasional specimens may be acceptable.

Category C:

Trees of low quality and amenity. The removal of these trees should generally be seen as acceptable in order to facilitate development.

Category R:

Trees whose structural condition is such that they should be removed if development is to proceed.

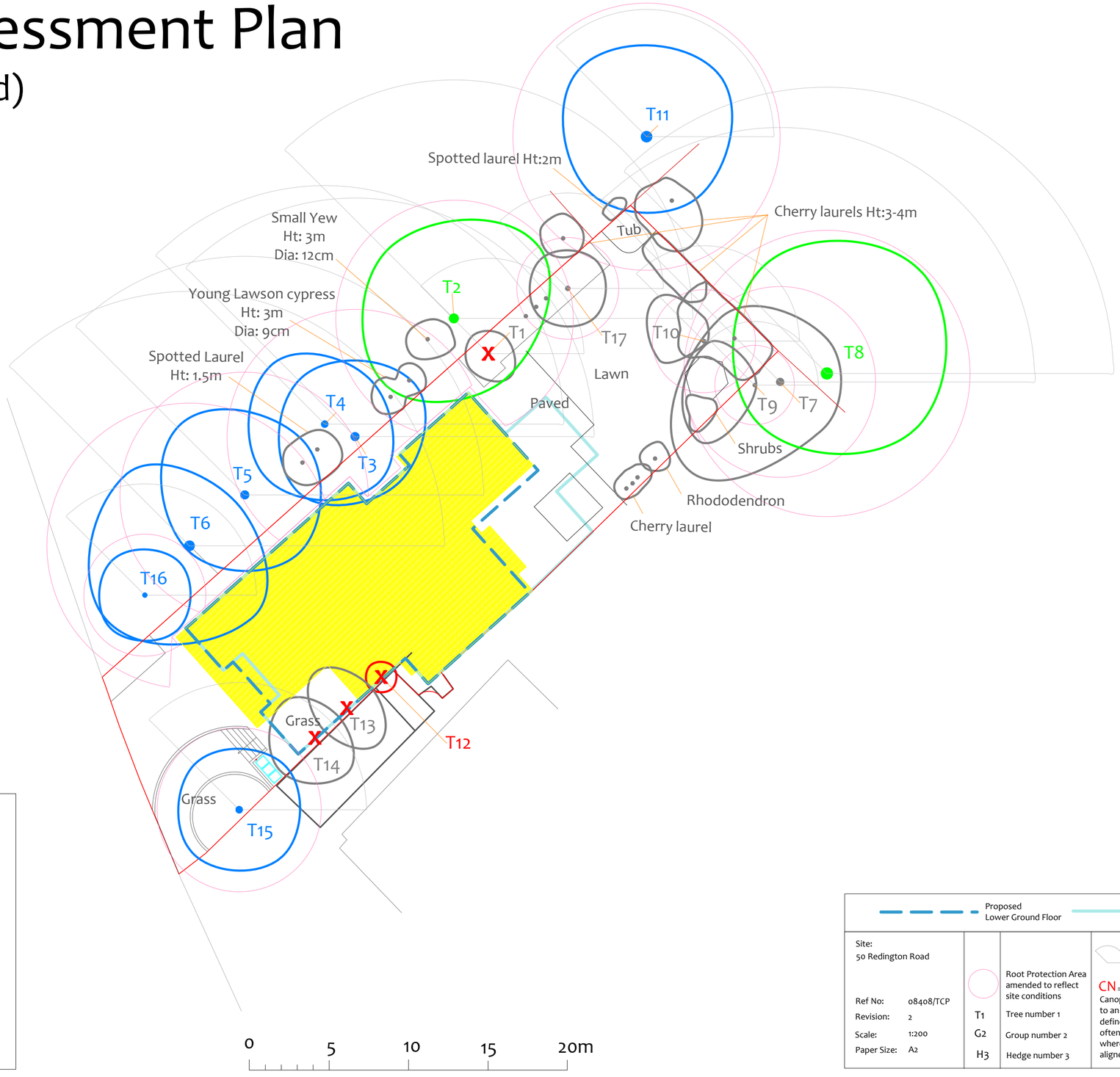
Site: 50 Redington Road		Unamended Root Protection Area	BS 5837 Shade Pattern	1	Location of photo No 1
Ref No:	08408/TCP	Root Protection Area amended to reflect site conditions	CN = Canopy North: Canopy spreads are measured to an approximate north which is defined by site features. This is often more accurate, especially where rows of trees are not aligned N-S or E-W.		Stem & canopy of Category A tree
Revision:	2	T1 Tree number 1			Stem & canopy of Category B tree
Scale:	1:200	G2 Group number 2			Stem & canopy of Category C tree
Paper Size:	A2	H3 Hedge number 3			Stem & canopy of Category R tree

Appendix 6

Crown Consultants Arboricultural Report Ref 08408

Impact Assessment Plan

(Proposals Overlaid)



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Trees whose structural condition is such that they should be removed if development is to proceed.

Proposed Lower Ground Floor

Proposed Upper Ground Floor

Existing Building

Site:
50 Redington Road

Ref No: 08408/TCP
Revision: 2
Scale: 1:200
Paper Size: A2

Root Protection Area amended to reflect site conditions

T1 Tree number 1

G2 Group number 2

H3 Hedge number 3

BS 5837 Shade Pattern

CN = Canopy North: Canopy spreads are measured to an approximate north which is defined by site features. This is often more accurate, especially where rows of trees are not aligned N-S or E-W.

X Tree to be removed

Stem & canopy of Category A tree

Stem & canopy of Category B tree

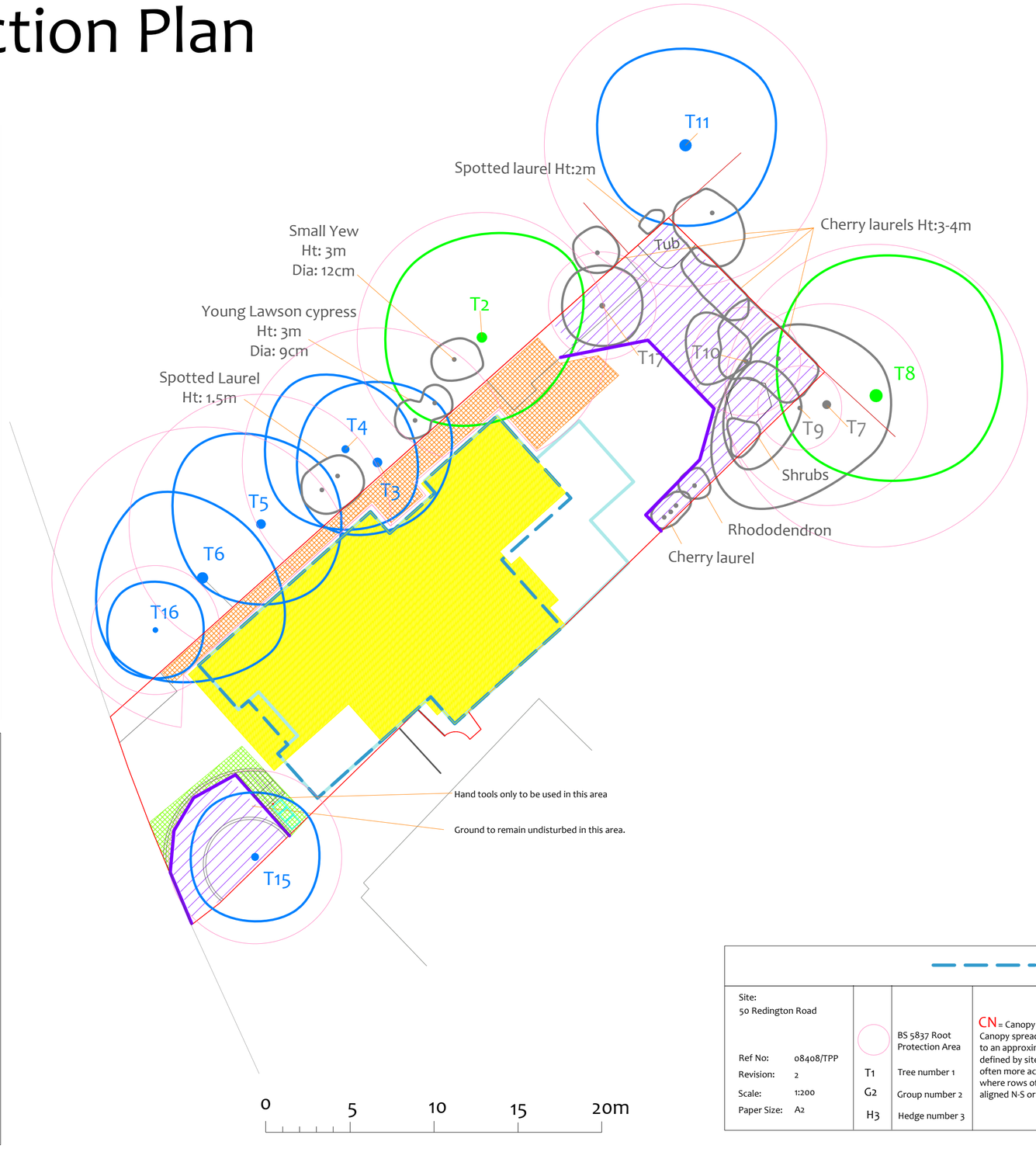
Stem & canopy of Category C tree

Stem & canopy of Category R tree

Appendix 6

Crown Consultants Arboricultural Report Ref 08408

Tree Protection Plan



N

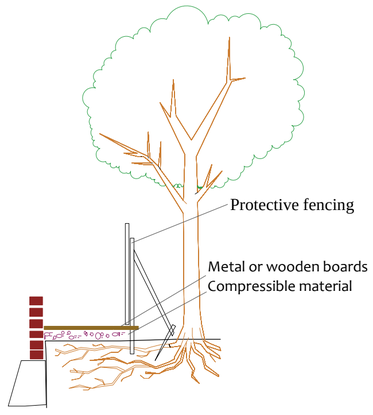
CN

Restricted Activity Zone

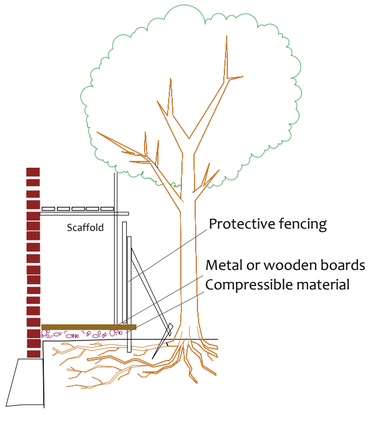
Within this area the following restrictions shall apply:

No excavation or land regrading whatsoever.
No storage of materials, rubble, soil or spoil.
No fires within the restricted zone or within 10m of any tree canopy.
No site cabins or other temporary structures.
No discaharge of polluted water, cement or chemicals of any kind.
No use of any machinery, or passage or parking of vehicles.
No tree works.
Ground protection measures to be installed,
except where hard surfaces are retained.
See Section 6.8

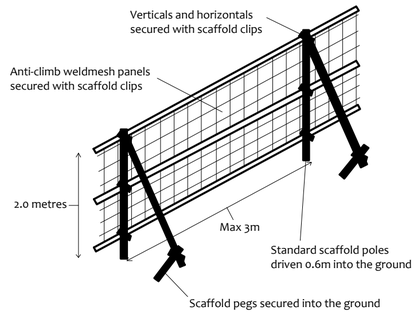
Ground Protection in Restricted Zone



Scaffolding in Restricted Zone



Tree Protection Fencing
The 'In-Ground' System



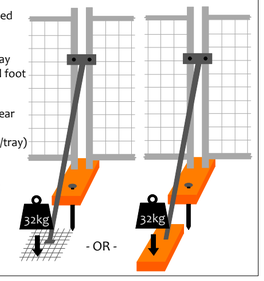
The 'Back Stay System'
(an alternative to 'The In-Ground System'

2m X 3.5m weldmesh panels linked with anti-tamper couplings

Each panel attached to a back stay which is founded in an additional foot or mesh tray as illustrated

Minimum 32kg ballast to retain rear foot or tray
(including the weight of the foot/tray)

Front feet to be secured with ground pins or additional ballast



Construction Exclusion Zone

Within this area the following restrictions shall apply:

No excavation or land regrading whatsoever.
No storage of materials, rubble, soil or spoil.
No fires within the exclusion zone or within 10m of any tree canopy.
No site cabins or other temporary structures.
No discaharge of polluted water, cement or chemicals of any kind.
No use of any machinery, or passage or parking of vehicles.
No tree works without council consent.

Proposed Lower Ground Floor
Proposed Upper Ground Floor
Existing Building

Site:
50 Redington Road

Ref No: 08408/TPP
Revision: 2
Scale: 1:200
Paper Size: A2

BS 5837 Root Protection Area
T1 Tree number 1
G2 Group number 2
H3 Hedge number 3

CN = Canopy North:
Canopy spreads are measured to an approximate north which is defined by site features. This is often more accurate, especially where rows of trees are not aligned N-S or E-W.

Stem & canopy of Category A tree
Stem & canopy of Category B tree
Stem & canopy of Category C tree
Stem & canopy of Category R tree

Fixed protective fencing
The 'In-Ground System'
or the 'Backstay System'
To remain in place for all construction activity
Restricted Activity Zone
Construction Exclusion Zones