PHELPS ASSOCIATES
Arboricultural Consultants

TREE SURVEY, ARBORICULTURAL IMPLICATION ASSESSMENT & METHOD STATEMENT & TREE PROTECTION PLAN BS5837:2012

Title:	**Arboricultural Report**
Instructed by:	Felix Xylander 25 Hatton Garden London EC1N 8BQ
Site Address:	Christchurch Primary School Christchurch Hill London
Date of Site Visit:	Wednesday 13th August 2014
Prepared by:	Reuben Hayes
Ref:	PA.*S*
Date	

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Reuben Hayes

FOREWORD

BS5837:2012 supersedes BS5837:2005 which has since been withdrawn. The scope of 'BS5837:2012 Trees in relation to design, demolition and construction – Recommendations' is to provide recommendations and guidance on how trees and other vegetation may be satisfactorily integrated into construction and development projects. The overall aim of this is to ensure the continued longevity and quality of amenity contribution that trees appropriate for retention and protection provide. This report and its appendices follow precisely the strategy for arboricultural appraisal and input intended to provide Local authorities with evidence that trees have been properly considered throughout the development process.

Contact details

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1. PARTICULARS OF INSTRUCTION

1.1. This report has been prepared to discharge the instruction of the client, Felix Xylander of SCABAL 'The Client' in respect of detailed planning permission at Christchurch Primary School, Christchurch Hill, London, NW3 1JH 'The Site'

1.2. The Client, has commissioned a Tree Survey in compliance with BS5837: 2012 to prepare a Tree Survey, Arboricultural Constraints Assessment, Arboricultural Impact Assessment, Preliminary Arboricultural Method Statement, Preliminary Tree Protection Plan for the trees at Christchurch Primary School, Christchurch Hill, London, NW3

1.3. The site survey was carried out on the 13th August 2014 at 09:30am. The relevant qualitative and quantitative tree data and information was recorded on order to assess the condition of the trees, their constraints upon the proposed development and a summary on any proposed protection and construction specification required.

1.4. **Qualifications and experience:** I have based this report on my site observations and the provided information, and I have come to conclusions in the light of my experience. I have experience and qualifications in arboriculture, and include a summary in Appendix

1.5. All information given is in accordance with British Standards 5837:2012 – Trees in relation to design, demolition and construction – Recommendations.

2. CAVEAT

2.1. This advice and all appendices are subject to caveat as follows:

2.2. This report is nullified if any remedial works are undertaken on any area of the site, on or after the date of study/survey.

2.3. The report is only valid on the date on inspection and any deletion, editing or alteration will void it in its entirety.

2.4. The responsibility for any works undertaken on the basis of the recommendations of this report does not form part of this contract. No responsibility is assumed by the Author of this report or by Reuben Hayes for any legal matters that may arise as a consequence.

2.5. The Author of the report, will be required to attend court or give testimony as part of this contract. The report is not valid in adverse or unpredictable weather conditions or for any failure due to *Force Majure*.

2.6. No liability is assumed by the Author of the report for any misuse, misinterpretation or misrepresentation of information contained herein.

2.7. This report has been compiled using only the information made available to the Author as at the above date of inspection.

2.8. The assessment, unless described as “detailed” was of a preliminary nature, conducted from ground only; the tree was not climbed or inspected below ground level (inc. roots). There was no use of decay detection equipment, and only basic surveying instruments were used.

2.9. The Author did not have at the time of writing any information as to the integrity of the main structure, its annexes or the drainage system.

2.10. Water supply/drainage systems, if damaged, can allow roots to penetrate, however, if the system is sound, or after repair, roots have little capacity to access/damage underground services.

2.11. Any doubt as to the structural condition of properties would require the advice of a structural engineer.

2.12. Andrew Phelps is not responsible for any works other than those invoiced for.

2.13. The observations are visual in nature and are made from ground level only, no climbing inspections have been carried out nor was there the use of binoculars.

3. INFORMAL GLOSSARY

I. Author of report: Reuben Hayes,
II. Client: Felix Xylander
III. Site: Christchurch Primary School, Christchurch Hill, London, NW3
IV. Standard: BS5837:2012 Trees in relation to design, demolition and construction – Recommendations.
V. Architect: As above
VI. Landscape Architect: N/A
VII. Planning Consultant: N/A.
VIII. Engineer: N/A.
IX. TPO Tree Preservation Order: None
X. CA Conservation Area: Land lies within a Conservation Area
XI. Landscape Scheme: Landscape Layout; Protective Tree Fencing (type 1, 2 or 3)
XII. Documents supplied: Ground Floor Plan – Existing (537 – P010); 1st Floor – Existing – (537 – P011): Ground Floor Proposed – (537 – P110)

4. LEGAL AND POLICY INFORMATION

4.1. The Site falls within the catchment of the following arboricultural constraints as determined by the London Borough of Camden Councils Proposals Map and SPG policies.

4.2. The SPG makes reference to

4.3. Tree Protection Orders: None

4.4. Wildlife protection:

4.5. Conservation Area Protection: Within a Conservation Area

5. FACTUAL INFORMATION RELATING TO THE SITE & APPLICATION

5.1. In strict accordance with the Proposed Application, the Site is to only undergo minimal change. The proposal is mainly contained to a small area to the side of Christchurch Primary School and it to include a storage area, canopy/porch to weather proof part of the playground area.

5.2. An informal telephone conversation with Nick Bell Landscape Officer, at Camden Local authority confirmed that there are no Tree Preservation Orders on the land and that it would be unlikely that any protections would be made. However, the area is covered by a Conservation Area. As such any tree works outside of any approved work contained within the Planning Application, will require notification to the Local Authority. Further information and guidance can be given if needed.

5.3. The tree survey schedule (appended) assesses all of the trees within the site or where they will be adversely affected by the scheme. The assessment has been carried out in accordance with 'the Standard, BS 5837' and will demonstrate and highlight which trees should be retained.

5.4. It is accepted that one exemption of a TPO/CA is detailed planning permissions and the Standard does not take account of TPOs or CAs. For these reasons, **no further distinction will be drawn between trees with and/or without statutory protection.**

6. SITE HISTORY & APPLICATION BACKGROUND

6.1. The Site is to the East area of Hampstead, London. It is set within a well treed area, and is in a prominent location being at the end of the hill.

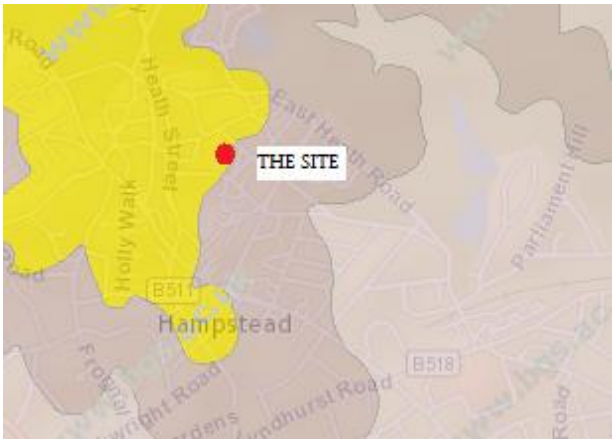
6.2. The Site is contained within the local Church (Christchurch C of E, Hampstead).

6.3. The Site is at a lower level and is set against existing vegetation and mature trees.

6.4. The area is a local feature with a public right of way running between the school and the Church. Both areas serve as a school (nursery and Primary), as well as a serviceable Church. The School also houses several private flats.

6.5. The proposal, to which this report pertains to, involves the inclusion of a canopy/porch area and the removal of an old shed and inclusion of new wall storage.

6.6. The soil conditions are as follows: In terms of the British Geological Survey, the site contains a bed rock of bagshot formation – Sand. It also contains Claygate Member – Clay, Silt and Sand. Both of these bedrock formations were formed in shallow seas with mainly siliciclastic sediments (Comprising of fragments or clasts of silicate minerals) deposited as mud, silt, sand and gravel.



Source: www.BGS.ac.uk

6.7. The data was obtained from a desk top study which provides indications of likely soil types given from the British Geological Survey. As such this information is not comprehensive and any decisions taken with regards to the management, usage, design or construction on any development of this site should be based on a detailed soil analysis.

6.8. Due to the Clay content of the soil, before any future tree planting takes place, advice on the species and location of the tree will be needed from a suitably qualified Arboriculture Consultant. Reason: London clay is highly shrinkable and it is documented that trees can cause structural damage on properties on highly shrinkable clay.

6.9. This report provides no information on the soil shrink ability. It may be necessary for practitioners in other disciplines (e.g. engineers considering foundation designs) to obtain this data as required.

6.10. CONDITION OF THE EXISTING TREES

6.11. The majority of the trees on this site are medium to large sized shrubs. These are in relatively good condition and will require only minor pruning every year to maintain their shape. Some of the Lilac trees near to the flats should be cut down as they are now encroaching over the footway, this is not part of the application process however, it is part of general maintenance.

6.12. The significant trees on or near to the site are the Horse Chestnut tree, Beech tree and the Sycamore tree.

6.13. The Horse chestnut (T1) has high visually amenity value. The itself has a ganoderma spp fungus bracket on the main stem, this is an external sign that decay and rot is occurring on the inside. The tree has also been topped at some point in the recent past (within 10 years), and although new growth is forming, this will be of a weaker attachment. There are also natural branch breaks and sings of further fungus development. Although it is not possible to confirm the fungus, it is likely to be Polyporus squamosus or Ustulina deusta. There are also canker growths at this level on the other side of the main limb.

6.14. The Beech tree (T4) is a striking copper beech tree. This is a large mature tree with extensive lateral root system. It is likely that the roots will extend towards the car park area and the church area as opposed to the school area.

6.15. The Sycamore tree (T22) is on private land and only has a the canopy cover overhanging the footway and the school. There are not visible signs to show that any further works are needed to this tree.

6.16. The Damson tree (T21) is in very poor condition and must be removed on health and safety grounds.

7. CONSTRAINTS POSED BY EXISTING TREES

7.1 There are a number of issues to be addressed within the arboricultural impact assessment, and broadly these are as follows –

7.2 The effect and extent of the proposed re-development of the school playground will have on existing trees and their RPA.

7.3 The potential conflicts of the proposed development with canopies of retained trees.

7.4 The likelihood of further tree removal to re-develop and enhance the character of the school.

7.5 The main tree constraint imposed by the trees is shading issues. The playground area is at a lower level to the trees giving rise to an over bearing feeling and the area in shade throughout most of the day. The Building is to the East of the playground, giving rise to natural shading in the morning time. The Building is also to the South of the playground, again giving rise to midday shading. The trees are to the West of the Building giving rise to afternoon and evening shading.

7.6 The other constraint is to leaf fall, this has been a historic issue and the playground area is an existing catchment area due to the location, original building design and being at a lower level to the rest of the existing ground.

7.7 As the trees and the school have been in cohesion for some time, it not intended that the above issues will have any further impact from the existing trees.

7.8 The original building is outside of the trees RPA however, as the trees have grown towards the light they have natural increased over the playground area. This has given rise to tree canopies being near to existing buildings. These canopies should be pruned back in order to reduce future pressure and potential direct damage to the building. Any works must be carried out in accordance to British Standards 3998:2010 Tree Works – Recommendations.

8. EXECUTIVE SUMMARY

8.1. Some trees of moderate or low quality are to be removed to facilitate the proposals.

8.2. Some trees of moderate or low quality should be removed for reasons of sound arboricultural management.

8.3. The proposed development involves some earthworks, landscaping and hard standing improvements. For this reason adequate provisions must be implemented to protect retained trees to the fullest standard throughout the development process.

8.4. London Borough of Camden should fully support this application as sound from the view of a competent and qualified arboriculturist.

8.5. Over view of tree categorisation

Tree No.	Species (Common Name)	Category	
		U: A: B: C	1; 2; 3
T1	Horse Chestnut	C	2
T2	Holly	B	2
T3	Holly	B	2
T4	Copper Beech	B	2
T5	Cotoneaster Spp	C	1
T6	Privet	C	1
T7	Beech	C	1
T8	Rhododendron	C	1
T9	Rhododendron	C	1
T10	Cherry	C	1
T11	Rhododendron	C	1
T12	Rhododendron	C	1
T13	Rhododendron	C	1
T14	Forsythia	C	1
T15	Forsythia	C	1
T16	Lilac	C	1
T17	Lilac	C	1
T18	Lilac	C	1
T19	Lilac	C	1
T20	Lilac	C	1
T21	Damson	U	1
T22	Sycamore	B	2

8.6. Overview of trees to be removed

Tree No.	Species (Common Name)	General Observations: Condition and Preliminary Management Recommendations; Physical Condition and Structural defects	Works
T1	Horse Chestnut	Ganoderma Spp bracket on East side of trunk: Possible Polyporus squamosus or Ustulina deusta within the trunk	Remove
T5	Cotoneaster Spp	Suppressed	Remove
T10	Cherry	Bacterial cankers, old pruning wounds, included forks, top graft, possible basal bottle (smell of fungus behind trunk, no visible signs)	Remove
T21	Damson	Snapped limb, 80% dead, in decline	Remove

8.7. Overview of tree works

Tree No.	Species (Common Name)	General Observations: Condition and Preliminary Management Recommendations; Physical Condition and Structural defects	Works
T6	Privet	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T7	Beech	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T8	Rhododendron	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T9	Rhododendron	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T11	Rhododendron	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T12	Rhododendron	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T13	Rhododendron	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T14	Forsythia	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T15	Forsythia	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T16	Lilac	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T17	Lilac	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T18	Lilac	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T19	Lilac	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T20	Lilac	Pruned as a small shrub	Yearly Maintenance to prune as a shrub

8.9. Overview of RPA of retained trees

Tree No.	Species (Common Name)	RPA Radius (m)	RPA (m2)
T2	Holly	0.9	3
T3	Holly	0.9	3
T4	Copper Beech	12.6	499
T6	Privet	0.9	3
T7	Beech	0.9	3
T8	Rhododendron	0.9	3
T9	Rhododendron	0.9	3
T11	Rhododendron	0.9	3
T12	Rhododendron	0.9	3
T13	Rhododendron	0.9	3
T14	Forsythia	0.9	3
T15	Forsythia	0.9	3
T16	Lilac	0.9	3
T17	Lilac	0.9	3
T18	Lilac	0.9	3
T19	Lilac	0.9	3
T20	Lilac	0.9	3
T22	Sycamore	4.8	72

9. ARBORICULTURAL IMPACT ASSESSMENT (AIA)

9.1. Before continuing it is useful at this point to outline the main aspects of the AIA, namely this evaluates the direct and indirect effects of the proposed design against the tree(s). As well as the potential future maintenance of the tree(s) against the proposed development, and where necessary recommends mitigation. The assessments follows the outline process set within the BS 5837: 2012: Trees in relation design, demolition and construction – Recommendations.

9.2. Shading from trees can be of benefit in some cases such as allowing for shaded areas for people, and a hindrance where over shading can be negative such as loss of direct sunlight into properties. This report will assess the benefits of trees within the site and look at current and future issues that may arise from trees.

9.3. Trees also help to create privacy and screening, and in some cases this will be highly desirable for an increase in the tree stock. This will be looked at and addressed.

9.4. Season nuisance can have a major impact on people's lives where there is a cyclical pattern. This can be leaf fall on to properties, shading of roofs in summertime, falling of fruit and nuts. All due care and consideration will be given to the future impact of trees near new structures. The report will outline any future pressure to the best of the authors' ability.

9.5. RPA INCURSION & BELOW GROUND CONSTRAINTS

9.5.1. It is anticipated that material will need to be transported within the RPAs of retained trees. This is due only to the location of the Beech tree T4 and the possible contractors parking area and material off loading area. The surrounding area around the Beech tree is laid to stone chips. In order to ensure no damage occurs to the ground conditions a simple weight spreading system can be used in RPA area. This is to form part of the specification for "Special RPA Incursion" in the AMS to follow. (Reason): to ensure good quality retained trees are protected to the fullest standard throughout the demolition and construction processes.

9.5.2. Where possible, Tree Protective Fencing (TPF) of an appropriate specification can be erected to exclude demolition/construction processes from harming the retained trees. (Reason): to protect RPAs of good quality retained trees. A specification for TPF will form part of the AMS to follow.

9.5.3. Where the RPAs of trees do not enter the Site on the TCP, this has been a conclusion drawn by the assessing project arboriculturalist.

9.5.4. Soils within RPAs of retained trees and re planting areas should ideally be ameliorated following the construction process. This can be achieved by radial air spade trenching or other methods as per the local authority agreement, and incorporating well composted mulch into the soils following air spade de compaction.

9.6. REMOVAL OF EXISTING STRUCTURES AND HARD STANDING

Although the playground area is to be re-surfaced, the only trees near to it are shrubs and the Cherry tree in decline. If approved the Cherry tree will be removed, allowing the hard standing to take place.

9.7. REMOVAL OF EXISTING SERVICES

All services will be existing and will not need to be moved. No new services will be within the RPA of any retained trees.

9.8. LOCATION OF STORAGE COMPOUND

The only area available for this scheme is the car park area outside the Church itself. It is likely that all material will be offloaded in this area and moved on to the site to then be stored on the existing hard standing. Ground protection will be needed within the RPA of the Beech tree due to the stone chips. This will be simple weight spreading plastic boards (Such as Enduramat from Oxford Plastic) as these will not compact the ground underneath. They are also able to take the weight of large vehicles and lorries.

All welfare facilities can be addressed through the use of the School. The site has adequate welfare facilities including toilet provisions, bad weather rooms, site office and food eating areas.

9.9. TREE WORKS

Tree No.	Species (Common Name)	General Observations: Condition and Preliminary Management Recommendations; Physical Condition and Structural defects	Works
T1	Horse Chestnut	Ganoderma Spp bracket on East side of trunk: Possible Polyporus squamosus or Ustulina deusta within the trunk	Remove
T5	Cotoneaster Spp	Suppressed	Remove
T10	Cherry	Bacterial cankers, old pruning wounds, included forks, top graft, possible basal bottle (smell of fungus behind trunk, no visible signs)	Remove
T21	Damson	Snapped limb, 80% dead, in decline	Remove

Tree No.	Species (Common Name)	General Observations: Condition and Preliminary Management Recommendations; Physical Condition and Structural defects	Works
T6	Privet	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
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T16	Lilac	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T17	Lilac	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T18	Lilac	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T19	Lilac	Pruned as a small shrub	Yearly Maintenance to prune as a shrub
T20	Lilac	Pruned as a small shrub	Yearly Maintenance to prune as a shrub

10. CONCLUDING STATEMENT

10.1. After assessing the site in full I have determined the following:

10.2. There are 2 significant trees, one being the Beech tree and the other being the Horse Chestnut tree.

10.3. The Horse Chestnut tree T1, is in full public view and on land which boarders a road. The tree has been reduced in the past (see photos), and the canopy is in full bloom and not showing signs of decline. However, there is a *ganoderma* spp. bracket near the base of this tree, it also has a large cavity with possible *ustulina deusta* and/or *Polyporus squamosus*. There are also other signs of bacterial infections and cankers appearing on one of the main leading branches. Due to the condition of the tree it is advisable as part of the application to remove this tree.

10.4. The Beech tree T4 has large lateral roots which spread in either direction of the path. There is no evidence that the roots have crossed the path by any major degree and as such it is unlikely that there will be main roots within the School area. In any case the development is some distance away and outside of the tree root protection area (RPA).

10.5. The Cherry tree has bleeding canker and is showing signs of a top graft. This has produced tight forks liable to splitting. The tree is also bottled at the base and there is a strong smell of fungus around the back. Although no fungus was found during the inspection it is possible that this has over wintered and is now part of the soil composition. Due to the defects present in this tree and that it is next to a highly used play area, it is a conclusion that this tree could be removed as part of the development and a replacement planted within the bank area.

10.6. The Cherry tree has limited visual amenity value and cannot be seen from the roadside.

10.7. The Damson tree forks into two main branches, one side is dead and looks to have a crack on the top side. The rest is about 80% dead, again due to its location, this tree should be removed.

10.8. The other vegetation and shrubs are maintained on a yearly basis. Its is proposed that the Lilac shrubs should be cut right down due to their location near the building. These should be maintained as small shrubs.

10.9. Having appraised the proposals and balanced the Standard's thinking against the will of our clients proposals; the author of the report can fully support this application as sound from the view of a competent, independent arboriculturist. (Reason): all reasonable concerns have been satisfied to the fullest standard.

10.10. This application will require an Arboricultural Method Statement (AMS) to address the ground protection within the RPA of the Beech Tree T4. (Reason): if accepted by the Local authority the AMS will bind the developer to the thinking of the Standard and the retention and protection of good quality trees.

10.11. The AMS will require a Tree Protection Plan (TPP). (Reason): if accepted by the Local authority the TPP will bind the developer to the thinking of the Standard ensuring the retention of the good quality trees.

11. DRAFT ARBORICULTURAL METHOD STATEMENT

A detailed Arboricultural Method Statement will be needed if the application is approved. The below is an outline of possible requirements to be included within the AMS.

11.1. There will be a need to submit a detailed method statement for the inclusion of heavy duty road mats within the RPA of the Beech T4.

11.2. There will be a need to outline the phasing of works, and the erection of tree protection.

11.3. All tree works recommended are to be carried out prior to any Site personnel being present or commencing works or any materials being delivered. (Reason): to ensure the Site is prepared and ready for the demolition and construction processes to commence.

11.4. Tree protection will be required in order to protect the remaining trees, these will include:

Tree No.	Species (Common Name)	Category		RPA Radius (m)	RPA (m2)	Type of Tree Protection
		U: A: B: C	1; 2; 3			
T2	Holly	B	2	0.9	3	2
T3	Holly	B	2	0.9	3	2
T4	Copper Beech	B	2	12.6	499	4
T6	Privet	C	1	0.9	3	3
T7	Beech	C	1	0.9	3	3
T8	Rhododendron	C	1	0.9	3	3
T9	Rhododendron	C	1	0.9	3	3
T11	Rhododendron	C	1	0.9	3	3
T12	Rhododendron	C	1	0.9	3	3
T13	Rhododendron	C	1	0.9	3	3
T14	Forsythia	C	1	0.9	3	3
T15	Forsythia	C	1	0.9	3	3
T16	Lilac	C	1	0.9	3	3
T17	Lilac	C	1	0.9	3	3
T18	Lilac	C	1	0.9	3	3
T19	Lilac	C	1	0.9	3	3
T20	Lilac	C	1	0.9	3	3
T22	Sycamore	B	2	4.8	72	5

11.5. Types of tree protection:

Type 2 – Is an example of tree protection taken from BS5837: 2012, Figure 3. That being the use of weldmesh fencing with stabilizer struts and base plates.

Type 3 – Due to the location of the majority of the shrubs outside of the development and the use of Type 2 would constrict the access into and around the site. Type 3 protection should be of lighter protection of either chestnut fencing or hard plastic barrier fencing with metal stakes.

Type 4 – As material will need to be handled over the RPA of the Beech tree a specialized tree protection will be needed. This is likely to include ground mats as listed above with hard protection around the stem of the tree by use of timber supports. Reason: access will be needed and the movement of material will be constricted if full RPA protection is needed. By the use of ground mats will help to eliminate ground compaction and the inclusion of hard protection around the truck will give the tree the maximum protection. Signs will also be needed and details given to the site manager to ensure materials are not stored in the area.

Type 5 – The RPA and trunk is already protect by use of a 3rd party wall. RPA is also protected on the School side due to the public path. The only protection needed will be a height barrier. Reason: to ensure no machinery can damage the lower branches.

Issue/Revision:	Draft	Final
Date:	13th August 2014	
Comments:		
Prepared by:		Reuben Hayes
Signature:		
Authorised by:		Andrew Phelps
Signature:		
File reference:		

I hope that you find this report satisfactory, please do not hesitate to contact if I can be of further assistance.

PHELPS ASSOCIATES
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12. TERMS AND DEFINITIONS

12.1. An “arboriculturist” is a person who has, through relevant education, training and experience, gained recognized qualifications and expertise in the field of trees in relation to construction.

12.2. A “Competent person” is someone who has had training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached. A competent person is expected to be able to advise on the best means by which the recommendations of the BS 5837: 2012 may be implemented.

12.3. A “tree survey” in the context of planning and development is taken to mean an assessment of the tree stock on site (or within area shown where appropriate), as individuals or groups. **(This is undertaken independent of and prior to any knowledge of a scheme being produced.)** Management recommendations in the tree survey schedule reflect the structural and physiological condition of the trees only. It is essential that the trees are assessed objectively and without reference to site layout proposals.

12.4. The “Construction” is a site-based operation with the potential to affect existing trees.

12.5. A “root protection area”, or RPA, is a layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree’s viability, and where the protection of the roots and soil structure is treated as a priority. The RPA area is worked out on a mathematical basis and listed in appendix III

12.6. “Construction Exclusion Zone” (CEZ) is based upon the RPA above and forms the exclusion zone to which access is prohibited during the project phase.

12.7. A “tree constraints plan”, or TCP, is a scaled plan prepared by an arboriculturist showing the RPA and the accurate canopy spread of a tree, along with information to identify the tree by reference to a survey schedule, this will indentify any under and above ground constraints. Author to produce this in AutoCAD.

12.8. An “arboricultural impact assessment”, or AIA, is a study or report undertaken by the project arboriculturaist to include detailed information to evaluate the direct and indirect effects of the proposed design against the tree(s). As well as the potential future maintenance of the tree(s) against the proposed development, and where necessary recommends mitigation. The assessment should take account of the effects of any tree loss required to implement the design, and any potentially damaging activities proposed in the vicinity of retained trees.

12.9. An “arboricultural method statement”, or AMS, is a methodology for the implementation of any aspect of development that has the potential to result in loss of or damage to a tree. NOTE The AMS is likely to include details of an on-site tree protection monitoring regime

12.10. A “tree protection plan”, or TPP, is a scale plan and should be superimposed on a layout plan, based on the topographical survey, showing all hard surfacing and other existing structures within the RPA. The plan should clearly indicate the precise location of protective barriers to be erected to form a construction exclusion zone around the retained trees.

12.11. Other plans and documents may be referred to and annexed where appropriate.

12.12. Access facilitation pruning is a one-off tree pruning operation, the nature and effects of which are without significant adverse impact on the tree(s) physiology or amenity value, which is directly necessary to provide access for operation on site.

12.13. Services are any above- or below- ground structure or apparatus required for utility provision. Examples include drainage, gas supplies, ground source heat pumps, CCTV and satellite communications.

12.14. Stem is the principal above-ground structural component(s) of a tree that supports its branches.

12.15. Structures are manufactured objects, such as a building, carriageway, path, wall, service run and built or excavated earthworks.

12.16. A ‘Veteran tree’ is recognized by a set criteria as set by British Standards 2998; 2010, Tree Work – Recommendations. This must show signs of biological, cultural or aesthetic value that are characteristic of, but not limited to, individuals surviving beyond the typical age range for the species concerned.

APPENDIX I – TREE SURVEY

TREE SURVEY TO THE BRITISH STANDARD 5837:2012 "TREES IN RELATION TO CONSTRUCTION - RECOMMENDATIONS"

FIELD KEY:

- TREE No.	Tree identification method in sequential order – 22,XXX=Existing trees, TX=newly planted, GX=Group of trees, HX=Hedgerow
- SPECIES	Species and/or common name;
- HEIGHT in (m)	Approximate height of tree in metres;
- DBH in (mm)	Stem diameter in millimetres taken at 1.5 metres above ground level; AV=average diameter (see appendix III)
- Branch Spread in (m) N - E - S - W	Branch spread in metres reflecting the spread at the four principal compass points; N/A= Not Applicable in woodland settings
- Existing height above ground in (m)	Height in metres of crown clearance above existing ground level: To include first significant branch and direction of growth (e.g. 2.5 – N) Height of lower form of Canopy to inform current ground clearance, crown/stem ratio and shading
- Life Stage	Age classification (Y=young, SM=semi-mature, EM=early-mature, M=mature, LM=late-mature, OM=over-mature)
- Est. remain years	Approximate years remaining (+40=minimum of 40 years, +20=minimum of 20 years, +10=minimum of 10 years, <10 less than 10 years)
- General Observations	Condition of tree (good, fair, poor, dead); Structural and/or physiological condition, and/or preliminary management recommendations.
- Preliminary management recommendations	Works needed in order to retain tree in current setting or where works would be needed in order to facilitate development.
- Physical Condition and Structural Condition	Physiological condition (good, fair, poor, dead); to include and Structural defects such as the presence of any decay, fungal issues, pathogens, defects)
- RPA in (m^2)	Area directly calculated from the DBH measurement (single stem/multiple stem variant, as outlined within the Standard, see appendix III);
- TPO/CA	Presence of Tree Preservation Orders, catchment within a Conservation Area - when instructed/informed;
- Location	Either co-ordinates or visual markings to identify the tree in its current setting.
-	Structural condition (notes);
-	BS CATEGORY: See table below

Tree No.	Species (Common Name)	Height (m)	Stem Dia @ 1.5m (mm)	Branch spread (m)				Exisiting height above ground (m)		Life stage Y: SM: EM: M: OM	Estimated Remaining contribution (yrs) <10: 10+: 20+: 40+	General Observations: Condition and Preliminary Management Recommendations; Physical Condition and Structural defects	Category		RPA Radius (m)	RPA (m2)	TPO /CA
				N	E	S	W	1st branch & direction	Canopy				U: A: B: C	1; 2; 3			
T1	Horse Chestnut	20	1550	4	4	6	6	S	2.5	OM	10+	Ganoderma Spp bracket on East side of trunk: Possible Polyporus squamosus or Ustulina deusta within the trunk, has been in the past and there are also signs of decay on some of the stems.	C	2	15	707	CA
T2	Holly	4	75	1	1	1	1	N/A	0	Y	20+		B	2	0.9	3	CA
T3	Holly	6	85	1.5	1.5	1.5	1.5	N/A	0	Y	20+		B	2	0.9	3	CA
T4	Copper Beech	22	1050	8	6	10	9	S	3.5	OM	20+	Fused leaders, lateral raised roots, previous pruning works healed	B	2	12.6	499	CA

Tree No.	Species (Common Name)	Height (m)	Stem Dia @ 1.5m (mm)	Branch spread (m)				Exisiting height above ground (m)		Life stage Y: SM: EM: M: OM	Estimated Remaining contribution (yrs) <10: 10+: 20+: 40+	General Observations: Condition and Preliminary Management Recommendations; Physical Condition and Structural defects	Category		RPA Radius (m)	RPA (m2)	TPO /CA
				N	E	S	W	1st branch & direction	Canopy				U: A: B: C	1; 2; 3			
T5	Cotoneaster Spp	4	150	0	3	0	0	E	4	Y	10+	Suppressed	C	1	1.8	10	CA
T6	Privet	4	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA
T7	Beech	1	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA
T8	Rhododendron	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA

Tree No.	Species (Common Name)	Height (m)	Stem Dia @ 1.5m (mm)	Branch spread (m)				Exisiting height above ground (m)		Life stage Y: SM: EM: M: OM	Estimated Remaining contribution (yrs) <10: 10+: 20+: 40+	General Observations: Condition and Preliminary Management Recommendations; Physical Condition and Structural defects	Category		RPA Radius (m)	RPA (m2)	TPO /CA
				N	E	S	W	1st branch & direction	Canopy				U: A: B: C	1; 2; 3			
T9	Rhododendron	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA
T10	Cherry	7	570	N/A	4.5	5.7	6.5	S	3	M	<10	Bacterial cankers, old pruning wounds, included forks, top graft, possible basal bottle (smell of fungus behind trunk, no visible signs)	C	1	6.9	150	CA
T11	Rhododendron	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA
T12	Rhododendron	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA

Tree No.	Species (Common Name)	Height (m)	Stem Dia @ 1.5m (mm)	Branch spread (m)				Exisiting height above ground (m)		Life stage Y: SM: EM: M: OM	Estimated Remaining contribution (yrs) <10: 10+: 20+: 40+	General Observations: Condition and Preliminary Management Recommendations; Physical Condition and Structural defects	Category		RPA Radius (m)	RPA (m2)	TPO /CA
				N	E	S	W	1st branch & direction	Canopy				U: A: B: C	1; 2; 3			
T13	Rhododendron	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA
T14	Forsythia	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA
T15	Forsythia	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA
T16	Lilac	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA

Tree No.	Species (Common Name)	Height (m)	Stem Dia @ 1.5m (mm)	Branch spread (m)				Exisiting height above ground (m)		Life stage Y: SM: EM: M: OM	Estimated Remaining contribution (yrs) <10: 10+: 20+: 40+	General Observations: Condition and Preliminary Management Recommendations; Physical Condition and Structural defects	Category		RPA Radius (m)	RPA (m2)	TPO /CA
				N	E	S	W	1st branch & direction	Canopy				U: A: B: C	1; 2; 3			
T17	Lilac	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA
T18	Lilac	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA
T19	Lilac	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA
T20	Lilac	2	<75	1	1	1	1	N/A	N/A	Y	10+	Pruned as a small shrub	C	1	0.9	3	CA

Tree No.	Species (Common Name)	Height (m)	Stem Dia @ 1.5m (mm)	Branch spread (m)				Exisiting height above ground (m)		Life stage Y: SM: EM: M: OM	Estimated Remaining contribution (yrs) <10: 10+: 20+: 40+	General Observations: Condition and Preliminary Management Recommendations; Physical Condition and Structural defects	Category		RPA Radius (m)	RPA (m2)	TPO /CA
				N	E	S	W	1st branch & direction	Canopy				U: A: B: C	1; 2; 3			
T21	Damson	4	220	0	2	0	0	E	N/A	Y	<10	Snapped limb, 80% dead, in decline	U	1	2.7	23	CA
T22	Sycamore	16	*400	N/A	N/A	10	N/A	S	3	M	30+	Private tree overhanging site by around 3m	B	2	4.8	72	CA

APPENDIX II - BIBLIOGRAPHY

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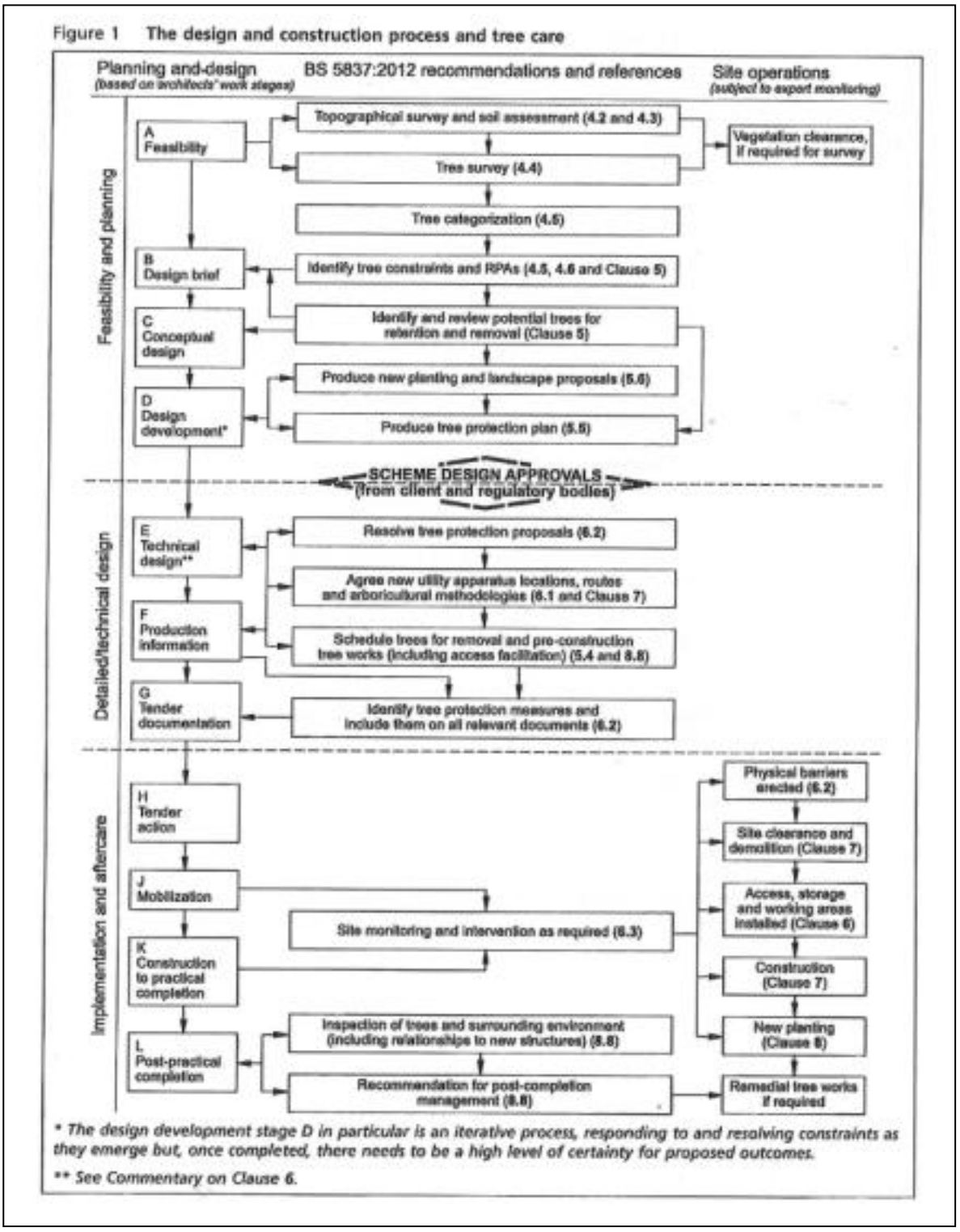
APPENDIX III



Exert taken from the BS5837:2012 Trees in relation to design, demolition and construction – Recommendations

APPENDIX IV

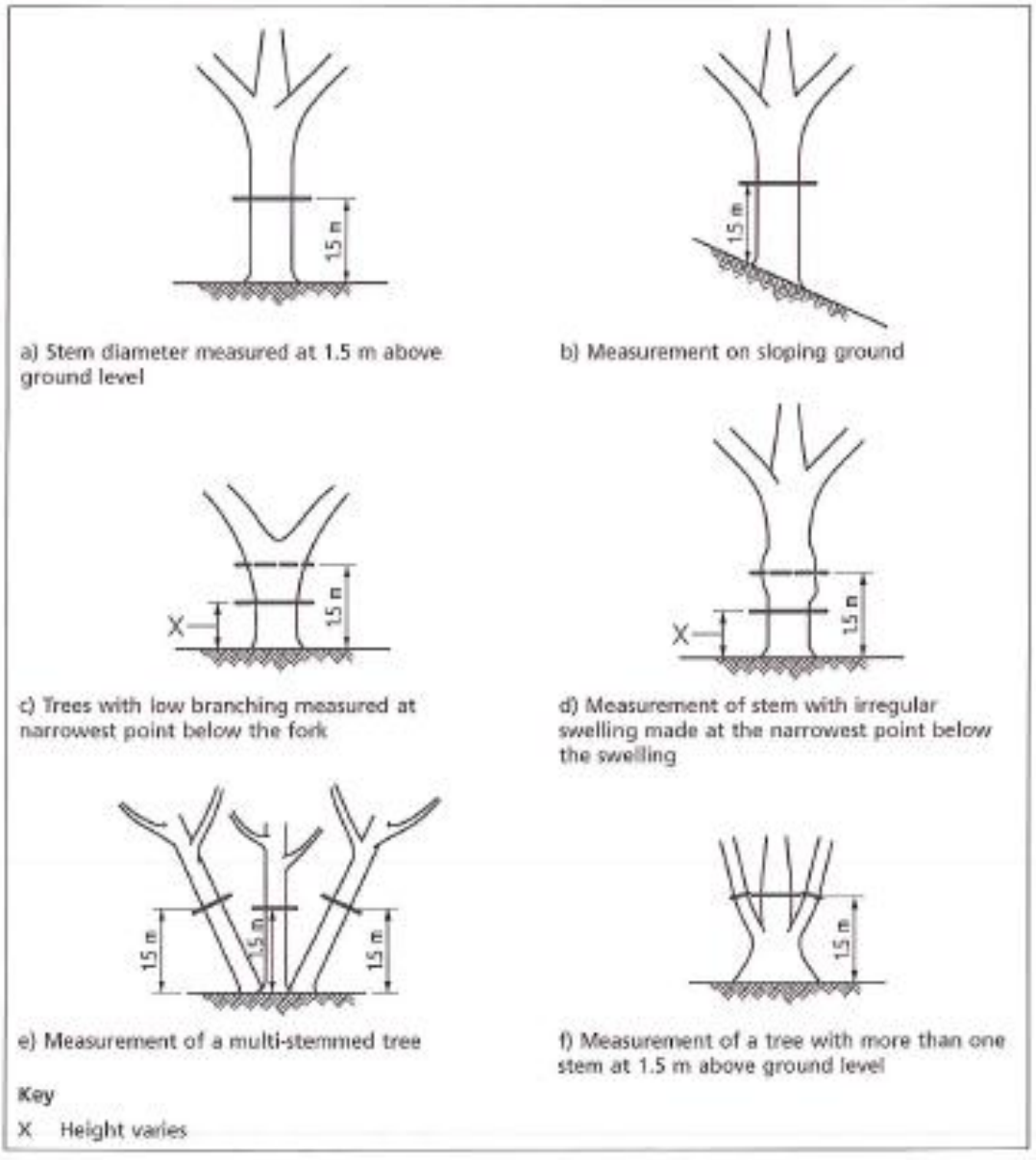
Annex C
(normative)

Measurement of tree stems

Diameters of single stem trees on level ground should be measured in accordance with Figure C.1a). Diameters of other commonly encountered tree stems should be measured in accordance with Figures C.1b) to C.1f).

NOTE The thick black line indicates where the measurement is taken.

Figure C.1 **Measurement of tree stems**



Exert taken from the BS5837:2012 Trees in relation to design, demolition and construction – Recommendations

Annex D
(normative)

Root protection area

The RPAs given in Table D.1 should be used for single stem trees and the equivalent resultant combined stem diameter for multi-stemmed trees.

Table D.1 **Root protection areas**

Single stem diameter mm	Radius of nominal circle m	RPA m²	Single stem diameter mm	Radius of nominal circle m	RPA m²
75	0.90	3	675	8.10	206
100	1.20	5	700	8.40	222
125	1.50	7	725	8.70	238
150	1.80	10	750	9.00	255
175	2.10	14	775	9.30	272
200	2.40	18	800	9.60	290
225	2.70	23	825	9.90	308
250	3.00	28	850	10.20	327
275	3.30	34	875	10.50	346
300	3.60	41	900	10.80	366
325	3.90	48	925	11.10	387
350	4.20	55	950	11.40	408
375	4.50	64	975	11.70	430
400	4.80	72	1 000	12.00	452
425	5.10	81	1 025	12.30	475
450	5.40	92	1 050	12.60	499
475	5.70	102	1 075	12.90	519
500	6.00	113	1 100	13.20	547
525	6.30	124	1 125	13.50	573
550	6.60	137	1 150	13.80	598
575	6.90	150	1 175	14.10	625
600	7.20	163	1 200	14.40	652
625	7.50	177	1 225	14.70	679
650	7.80	191	1 250+	15.00	707

NOTE These figures are derived from the calculations described in 4.6.

4.6 Root protection area (RPA)

4.6.1 For single stem trees, the RPA (see **3.7**) should be calculated as an area equivalent to a circle with a radius 12 times the stem diameter. For trees with more than one stem, one of the two calculation methods below should be used. In all cases, the stem diameter(s) should be measured in accordance with Annex C, and the RPA should be determined from Annex D. The calculated RPA for each tree should be capped to 707 m².

a) For trees with two to five stems, the combined stem diameter should be calculated as follows:

$$\sqrt{(\text{stem diameter 1})^2 + (\text{stem diameter 2})^2 \ldots + (\text{stem diameter 5})^2}$$

b) For trees with more than five stems (not illustrated in Annex C), the combined stem diameter should be calculated as follows:

$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

APPENDIX V
Photos taken from site

Horse Chestnut tree (T1)

Ganoderma on Horse chestnut tree (T1)

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Decay and cankers on Horse Chestnut tree (T1)

Lateral roots on Beech tree (T4)

Suppressed Cotoneaster (T5)

Cherry tree trunk with cankers, poor pruning and possible canker (T9)