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Arboricultural Consultancy
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Site Report, Appraisal & Plans

“BS5837 2012: Trees in Relation to Design, Demolition and Construction”

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Client:	Site Owner
Project:	8 Polygon Road

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1 Introduction

1.1 Instruction

Christians Environmental have been instructed by the client to inspect all trees within the site boundary and trees in adjacent land that may be affected by the proposed development, the aim of which is to prepare the following information to accompany a planning submission for the site:

- Schedule of the relevant trees to include basic data and a condition assessment collected on site during a preliminary survey of the site prior to consideration to proposed development works.
- Appraisal of the impact of the proposed development on the trees and any resulting impact that it has on local amenity.
- The tree constraints plan which identifies any arboricultural constraints on site.
- The tree retention plan which identifies the trees to be removed to facilitate the proposed development.
- An Arboricultural Method Statement setting out any agreed tree removal and/or pruning works, appropriate protection measures or retained trees, construction methods and any post development management required for trees to be retained.
- The tree protection plan which demonstrates the appropriate protection measures to be implemented for retained trees during the development.

The above plans act as a visual aid in the planning stage and are also designed to aid and instruct contractors on site.

1.2 Purpose of the Report

This report provides an analysis of the impact of any proposed development on trees and local amenity with additional guidance on appropriate management and protective measures. Its primary purpose is for the Local Authority to review any tree issues associated with any applicable planning applications and use as a basis for issuing a planning consent or engaging in further discussions towards that end. During the planning process, this document and accompanying data will be available for inspection by people including the general public; we aim to present the information in a format that is easily understandable to people without a general knowledge of the subject area.

1.3 Documents provided by Client

The following plans have been provided:

- Development Proposal Plan and Block Plan(s): provided in drawing file (.dwg) format.
- Development Proposal Elevation Plan(s): provided in drawing file (.dwg) format.

2 Site Context

2.1 Site Overview and Surrounding Area

The development area comprises of the current vacant property: 8 Polygon Rd, Crumpsall, Manchester M8 5DD. The immediate surrounding area comprises of a sub-urban residential road. The wider surrounding area comprises of further sub-urban domestic developments with intermittent greenspaces.

2.2 Proposals

The proposal seeks partial demolition of the current property and development of further apartment buildings with associated car parking, bin storage area, new pedestrian access to Polygon Road and soft landscaping.

3 Arboricultural Impact Assessment

3.1 Summary of the Impact on Trees, Groups and Hedges

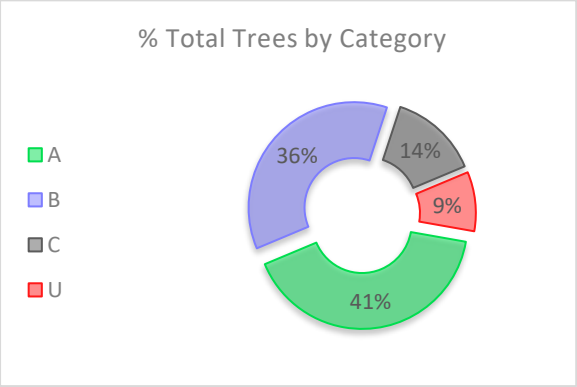


Chart 1: Individual trees by retention category.

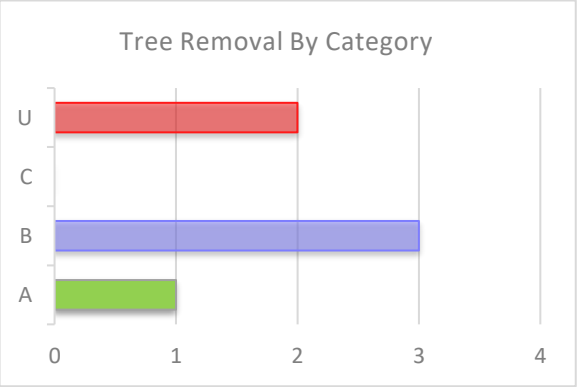
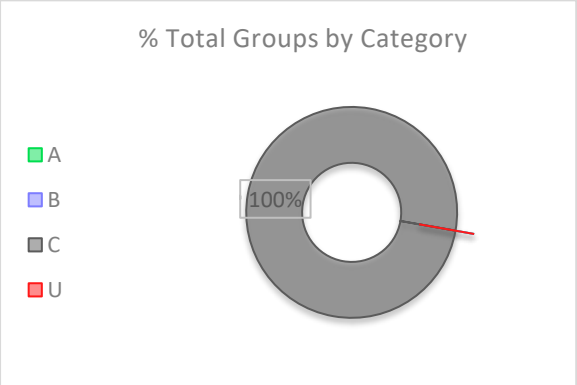


Chart 2: Quantity of tree removals by retention category.

Table 1: Tree removal by number due to development.

Retention Category	Total	Tree Number
A	1	T1
B	3	T2; T3; T4
C	0	-
U	2	T14; T15



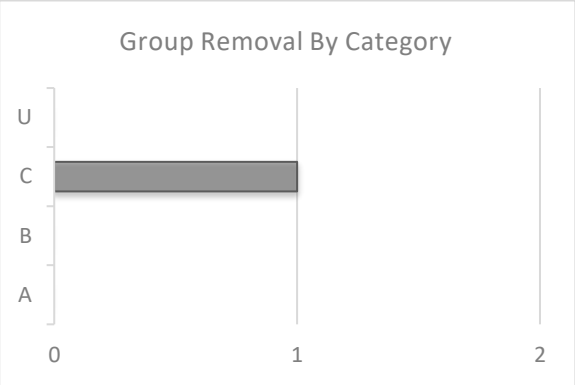


Table 2: Group removal by number due to development.

Retention Category	Total	Group Number
A	0	-
B	0	-
C	1	G2
U	0	-

3.2 Detailed Impact Assessment

(Please refer to the Tree Constraints and Tree Data Section when reading the below information).

Category A trees and groups. (Trees of high quality)		
Removal due to the proposals	Potential affects to rooting by the proposals	Pruning due to the proposals
T1	T5, T7; T9; T11; T12	n/a

1. Tree T1 will require removal to facilitate apartments no.9 and no.10. The required pruning to accommodate the proposed apartments and retain the tree would be too severe and would require constant pruning thus making tree T1 unviable for retention.

2. For trees T5, T7; T9; T11 and T12, potential exists for impacts on the RPAs from proposed car parking, bin storage and pedestrian access pathway. However, it is proposed that specialist construction methods and solutions can be implemented which will mitigate any long term adverse impact to the rooting environment from the proposed features. This is dealt with further in the Method Statement section of this report.

For more information, please refer to the tree data sheets, tree retention plan, tree protection plan, and method statement.

Category B trees and groups. (Trees of moderate quality)		
Removal due to the proposals	Potential affects to rooting by the proposals	Pruning due to the proposals
T2; T3; T4	T6 and T8	n/a

1. Trees T2; T3 and T4 will require removal to facilitate apartments no.9 and no.10. The required pruning to accommodate the proposed apartments and retain the tree would be too severe and would require constant pruning thus making tree retention unviable for retention.

2. For trees T6 and T8, potential exists for impact on the RPAs from proposed car parking and bin storage area. However, it is proposed that specialist construction methods and solutions can be implemented which will mitigate any long term adverse impact to the rooting environment from the proposed features. This is dealt with further in the Method Statement section of this report.

For more information, please refer to the tree data sheets, tree retention plan, tree protection plan, and method statement.

Category C trees and groups. (Trees of low quality)		
Removal due to the proposals	Potential affects to rooting by the proposals	Pruning due to the proposals
G2	T10	G1

1. It is proposed that group G2 should be removed to facilitate the proposed development along the eastern boundary due to the trees contained within being in an inappropriate position for continued growth and pruning. It is unclear where these trees are rooted, as assessment of this was not possible at the time of inspection due to restricted access from vegetation. There is a possibility that these trees are located on the neighbouring property side in which case, the land owner should be contacted and their permission sought to remove the trees. Pruning of overhanging vegetation from trees is permitted under common law however, the extent of which the trees over hang could cause dieback of the trees longer term. Also, should any regrowth occur, then logistically this will be very difficult to maintain and prevent further conflicts with the proposed developments.

2. For tree T10, potential exists for impact on the RPA from the proposed pedestrian access. However, it is proposed that specialist construction methods and solutions can be implemented which will mitigate any long term adverse impact to the rooting environment from the proposed feature. This is dealt with further in the Method Statement section of this report.

3. For group G1, it is proposed that the southern end tree or canopy flank is pruned/removed to allow for working access during the development process.

For more information, please refer to the tree data sheets, tree retention plan, tree protection plan, and method statement.

Category U trees and groups. (Trees Unsuitable for retention)
Removal due to poor quality and/or health and safety requirements
It is proposed that trees T14 and T15 are removed due to dieback and decline. These works have been specified in line with the sites existing context and use and are not related to the proposed developments. For more information, please refer to the tree data sheets.

3.3 Impact on Local Amenity

1. The development has been designed to accommodate and retain the majority of existing trees on-site applicable to this report. However, due to the incursion of development works occurring across a large area of retained tree Root Protection Areas, sensitive construction methods and materials will have to be adopted to prevent adverse impact to the rooting environment and health of trees. This is further detailed within the Arboricultural Method Statement and accompanied by a Tree Protection Plan.

2. A total of 4x trees will require removal to facilitate the proposed developments however, it is the intention that these trees are replaced at a ratio of 1:1 with trees of more suitable form and eventual mature size in line with the proposed development to both keep the continuity of the tree line of the property along Polygon Road and prevent future conflicts with the development.

3. In accordance with the advice and principles specified within this report, the development proposals are practicable and should be considered for approval from an arboricultural perspective.

4 Arboricultural Method Statement

1. This Method Statement has been drawn up to assist the Planning Authority and the developer in overseeing the construction of the proposed development.

2. This document seeks to discuss any tree constraints and implications. It describes the proposals for ensuring any retained trees will survive the development process and thrive thereafter. Development and timing of operations are described, with materials and techniques discussed to maximize tree protection.

3. This statement will be included as part of the specification and schedule of works issued to the building contractor and will form part of the contract. The accompanying arboricultural statement plans will be available on site for inspection along with this method statement.

4.1 Programme and Phasing of Tree Management

Stage	Requirement
1	Carry out agreed tree removals and/or pruning works
2	Implement tree protection
3	Undertake demolition works
4	Carry out construction works
5	Remove tree protection
6	Undertake tree replacement planting

4.1.1 Stage 1. Carry out agreed tree removals and/or pruning works

1. All arboricultural operations on site including tree removal must be carried out by an arboricultural contractor that is able to comply with British Standards 3998: 2010 – Tree Work Recommendations.

2. All arboricultural contractors should be insured to a minimum of £5 million and able to show competency by means of relevant certification and health and safety policy.

3. All tree works should be undertaken before development begins. Trees should be removed and/or pruned as detailed on the Tree Retention Plan, with remaining stumps ground out. Further specifications for works have been detailed within the Arboricultural Impact Assessment part of this report.

4.1.2 Stage 2. Implement tree protection

1. It is proposed that tree protection fencing in accordance with the Tree Protection Plan is first erected to the specified layout around retained trees. An example of tree protection fencing can be seen in Appendix E of this report. This should also be accompanied by suitable information signage on the rules of the tree protection fencing at 10-meter intervals. Where 10-meter intervals are not feasible, one sign will be appropriate. An example of tree protection signage can be seen in Appendix F of this report.

4.1.3 Stage 3. Undertake demolition works

1. In accordance with sub-section 7.3.4 of BS5837:2012 Trees in Relation to Design, Demolition and construction – Recommendations, demolition of existing structures should be undertaken inwards within the footprint of the existing building (often referred to as ‘top down, pull back’).

2. Removal of demolition waste should be taken off site using the existing vehicular access point to the southwest corner of the site and once existing trees T1-T4 have been removed.

4.1.4 Stage 4. Carry out construction works

1. During the construction phase, it is important that all staff are aware of the tree protection measures and the importance of tree protection. This should be made clear during a site and pre-commencement of works induction. If any breach in the tree protection occurs, it is the site manager's responsibility to report this urgently to the Projects Consultant Arboriculturist (Christians) so the appropriate measures can be taken.

2. Due to there being a potential for a large proportion of RPA to be within the existing exterior landscaping of retained trees, the proposed area for car parking and bin storage must be carried out to the following specification.

    a) Exterior works including surfacing of the carpark and bin storage must be completed after demolition of existing structures and proposed apartment construction and refurbishment of existing building. This is so the existing hardstanding of the site can act as an in-situ ground protection layer.

    b) Removal of the existing hardstanding wearing course (and sub-base if present) is only permitted to the existing soil layer beneath. No further depths required beyond this point into the soil are permitted due to potential root damage. Should it be found that no sub-base is present, then any additional depth required to construct to the required specification will have to be accounted for building upwards.

    c) The installation of a cellular confinement system (such as the Cellweb® Tree Root Protection system by Geosynthetics) for the proposed car parking/entrance and bin storage area should be considered for contribution to improved rooting environment and longevity in retention of retained trees T5-T8; the area extents of this have been highlighted on the Tree Protection Plan. A permeable finished surface material would be preferable to allow for enhanced water permeation and gaseous exchange of rooting.

    d) Should any roots of less than 25-millimeters in diameter be encountered within these areas, pruning using bypass loppers or secateurs is permitted. Should roots larger than 25-millimeters be encountered, these roots are to remain in situ and recovered with top soil with there locations marked on site; this also applies for the soft landscaping areas.

3. The proposed pedestrian access pathway from the site to Polygon Road has been routed to lie at the point of least conflict with retained trees and their Root Protection Areas: specifically, trees T9-T12. It is proposed that the discussed trees will have the ability to offset and peripheral root loss from the excavations needed to install the pathway to within the exterior garden area. It is again proposed that the use of a cellular confinement system should be implemented here also for the reasons as discussed above previously. The extents of this have been detailed further on the Tree Protection Plan.

4. Except for the above as detailed, no excavation other than removal of existing hardstanding and vegetation layer within the areas of proposed soft landscaping are permitted when working within the Root Protection Areas, esp. of trees T5-T10.

5. The existing raised planter that the tree T5 through to T13 must remain in-situ other than for the area required for the pedestrian access pathway. No changes in level or footprint of this feature or excavations may otherwise occur. Caution should be paid to changes of exterior materials and finishing and the ability of the planter to drain and not become water logged. Please see the Tree Protection Plan for further display of where this areas has been accommodated in the design.

4.1.5 Stage 5. Remove tree protection

Upon successful completion of the developments, all tree protection shall be removed from site in reverse order of implementation.

4.1.6 Stage 6. Undertake tree replacement planting

1. Due to trees T1-T4 requiring removal as part of the scheme, replacement tree planting is proposed along the frontage of Polygon Road within the site; proposed planting location and species have been displayed on the Tree Protection Plan with replacement trees referenced “RT.1-RT.4”. The following guidance principles for planting of these trees is detailed below.

    a) It has been proposed that 4x Liriodendron tulipifera Fastigiata (upright tulip tree) are planted in replacement of the existing trees.

    b) Planting should occur after all development and refurbishment works have been completed. The trees should be planted within the accepted planting season within the United Kingdom between the months of November – March.

    c) Replacement trees should be of “light-standard” in size, with an approximate stem girth of no less than 6-8 centimetres.

d) Trees should be adequately supported until establishment, with any posts and tree ties removed once deemed they are no longer required. After the first 18-months, a follow up check should be undertaken on the trees to assess whether these can be removed.

4.2 Design and Construction Guidance

4.2.1 Construction Compound and Site Office

No storage of materials, mixing or washing will be carried out within the Root Protection/Ground Protection Area. If there is a risk of run off leaching into the soil area from such operations, these areas should be bordered by sandbags and a non-permeable membrane to prevent contamination.

4.2.2 Services

All work to services on site should be guided by the principles discussed within the NJUG "Guidelines for Planning, Installation and Maintenance of Utility Services in Proximity to Trees".

4.2.3 Trees in Close Proximity to Structures

When building new structures of any kind within close proximity to trees, it is recommended that a civil engineer should be appointed to specify the correct foundations and any further measures which may be required.

4.2.4 Alteration to pathway and highway layouts

The appointed contractors should adhere to the guidance set in the *Traffic Sign Manual Chapter 8: Traffic Safety Measures and Signs for Road Works and Temporary Situations* should works dictate that any plant, vehicles or machinery placed upon the highway interferes with the free, unobstructed passage of vehicles and/or pedestrians.

5 Appendices

APPENDIX A: TREE DATA

APPENDIX B: TREE CONSTRAINTS PLAN

APPENDIX C: TREE RETENTION PLAN

APPENDIX D: TREE PROTECTION PLAN

APPENDIX E: TREE FENCING SPECIFICATION

APPENDIX F: TREE PROTECTION SIGNAGE

APPENDIX G: GLOSSARY OF ARBORICULTURAL TERMS

Within this section is the tree and group survey data. Also included is a chart explaining how trees are classed when carrying out a *BS 5837:2012 Trees in Relation to Design demolition and Construction – Recommendations* report. Within the appendix is also a glossary of arboricultural terms. **N.b.** Where group survey data is discussed, measurement variables of height, crown clearance and canopy spread are discussed as an average.

Category A	*Those of high quality and value: in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested).*
Category B	*Those trees of moderate quality and value: those in such a condition as to make a significant contribution (a minimum of 20 years is suggested).*
Category C	*Those trees of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested).*
Category U	*Those in such a condition that any existing value would be lost within 10 years, and which should, in the current context, be removed for reasons of sound arboricultural management.* *Ash dieback advisory note: If an ash tree does not currently present any symptoms of ash dieback, removal will not be recommended at the time of survey. Ash trees should be monitored on a 12-monthly cycle to assess any deterioration in health. However, in the context of the development site and surrounding areas, life expectancy of ash trees may be viewed as having less than 10-years contribution to the landscape. In these instances, ash trees should not pose any significant constraints at planning should removal be required to facilitate future development.*

KEY:

Tree Numbers/Tags	*Individual tree = T + number* *Group of trees = G + number*
Species	*Common and or scientific names where appropriate*
Height	*Overall tree height*
Crown Clearance	*Distance between lowest point of canopy and ground level*
Diameter at breast height	*Measurement of tree stem*
Canopy spread	*Extents of tree branches taken in compass points*
Age Class	*(Y=Young) (SM= Semi Mature) (M=Mature) (OM=Over Mature) (V=Veteran)*
Tree Condition	*Comments on trees overall health etc…*
Comments	*Any further details that may be of importance*
Management recs	*List of urgent works or further investigation that may be needed*
Life Expectancy (years)	*How long the tree will offer a contribution*
Category Rating	*See opposite table*
Abbr. FOB	*First Order Branch (height in meters from ground level and directional orientation from north (8 possible cardinal points)*

Tree No.	Species	Height (m)	Crown Clearance (m)	No. of Stems	DBH (cm)	North Canopy Spread (m)	East Canopy Spread (m)	South Canopy Spread (m)	West Canopy Spread (m)	Age Class	Physiological Condition	Structural Condition	Conditional Comments	Preliminary Management Recommendations	Life Expectancy (years)	Retention Category
1	Tilia cordata	13	2	1	47	4	6	6	7	M	Good	Moderate	Rooted on raised planter. Minor deadwood. Epicormic growth. Buttressing. Unbalanced canopy.	Null	21-30	A.2
2	Tilia cordata	14	5	1	37	5	3	3	7	M	Good	Moderate	Rooted on raised planter. Minor deadwood. Epicormic growth. Buttressing. Unbalanced canopy. Lapsed pollard. Upper decay points.	Null	21-30	B.2

Tree No.	Species	Height (m)	Crown Clearance (m)	No. of Stems	DBH (cm)	North Canopy Spread (m)	East Canopy Spread (m)	South Canopy Spread (m)	West Canopy Spread (m)	Age Class	Physiological Condition	Structural Condition	Conditional Comments	Preliminary Management Recommendations	Life Expectancy (years)	Retention Category
3	Tilia cordata	8	3	1	35	2	5	3	2	M	Good	Moderate	Rooted on raised planter. Minor deadwood. Epicormic growth. Buttressing. Unbalanced canopy. Upper canopy reduction.	Null	21-30	B.2
4	Tilia cordata	13	4	1	48	5	7	6	6	M	Good	Moderate	Rooted on raised planter. Minor deadwood. Epicormic growth. Buttressing. Unbalanced canopy. Lapsed pollard. Upper decay points.	Null	21-30	B.2
5	Tilia cordata	16	3	1	49	6	7	7	8	M	Good	Moderate	Rooted on raised planter. Minor deadwood. Epicormic growth. Buttressing. Unbalanced canopy. Lapsed pollard. Upper decay points.	Null	21-30	A.2
6	Tilia cordata	13	4	1	34	3	7	5	7	M	Good	Moderate	Rooted on raised planter. Minor deadwood. Epicormic growth. Buttressing. Unbalanced canopy. Lapsed pollard. Upper decay points.	Null	21-30	B.2
7	Tilia cordata	16	6	1	52	4	4	5	6	M	Good	Moderate	Rooted on raised planter. Minor deadwood. Epicormic growth. Buttressing. Unbalanced canopy.	Null	21-30	A.2
8	Tilia cordata	16	6	1	35	3	6	2	4	M	Good	Moderate	Rooted on raised planter. Minor deadwood. Epicormic growth. Buttressing. Unbalanced canopy.	Null	21-30	B.2

Tree No.	Species	Height (m)	Crown Clearance (m)	No. of Stems	DBH (cm)	North Canopy Spread (m)	East Canopy Spread (m)	South Canopy Spread (m)	West Canopy Spread (m)	Age Class	Physiological Condition	Structural Condition	Conditional Comments	Preliminary Management Recommendations	Life Expectancy (years)	Retention Category
9	Tilia cordata	19	5	1	42	8	5	4	8	M	Good	Moderate	Rooted on raised planter. Minor deadwood. Epicormic growth. Buttressing. Unbalanced canopy. Stem lean. Lapsed pollard. Minor decay points.	Null	21-30	A.2
10	Chamaecyparis pisifera	5	1	2	13; 13	1	1	1	1	M	Good	Moderate	Rooted on raised planter.	Null	21-30	C.2
11	Tilia cordata	15	4	1	44	3	6	4	6	M	Good	Moderate	Rooted on raised planter. Minor deadwood. Epicormic growth. Buttressing. Unbalanced canopy. Stem lean. Lapsed pollard.	Null	21-30	A.2
12	Tilia cordata	17	5	1	51	6	5	4	7	M	Good	Moderate	Rooted on raised planter. Minor deadwood. Dense epicormic growth. Buttressing. Unbalanced canopy. Lapsed pollard.	Null	21-30	A.2
13	Sorbus aria	10	3	1	28	4	5	4	5	M	Good	Moderate	Rooted on boundary. Minor deadwood. Suppressed.	Null	21-30	B.2
14	Fraxinus excelsior	12	6	1	25	3	4	5	4	M	Poor	Poor	Rooted on boundary. Terminal decline from ash dieback.	Remove.	<10	U
15	Salix caprea	6	3	1	45	4	3	3	4	M	Dead	Dead	Rooted on boundary. Dead tree. Large basal Ganoderma.	Remove.	<10	U
16	Rhododendron sp.	3	1	1	15	1	1	1	1	M	Good	Good	Mature ornamental shrub.	Null.	11-20	C.2

Tree No.	Species	Height (m)	Crown Clearance (m)	No. of Stems	DBH (cm)	North Canopy Spread (m)	East Canopy Spread (m)	South Canopy Spread (m)	West Canopy Spread (m)	Age Class	Physiological Condition	Structural Condition	Conditional Comments	Preliminary Management Recommendations	Life Expectancy (years)	Retention Category
17	Salix caprea	7	2	1	36	1	4	7	3	M	Good	Poor	Significant stem lean and unbalanced canopy into site. Bark inclusions. Storm damages.	Null	11-20	B.2
18	Prunus sp.	5	2	2	11; 15	4	1	1	2	M	Moderate	Moderate	Unbalanced canopy. Stem dysfunction.	Null	11-20	C.2
19	Prunus sp.	5	2	1	14	3	2	1	2	SM	Moderate	Moderate	Unbalanced canopy.	Null	11-20	C.2
20	Salix caprea	9	4	1	80	7	4	6	6	OM	Moderate	Moderate	Unbalanced canopy. Storm damages. Large codominance. Buttressing/bolling. Basal flare. Gall. Entwining limbs.	Null	21-30	A.3
21	Tilia cordata	20	6	1	44	6	4	4	5	M	Good	Good	Unbalanced canopy. Minor deadwood. Highway tree. Buttressing.	Null	21-30	A.1
22	Prunus avium	11	6	1	58	7	6	6	7	M	Good	Good	Unbalanced canopy. Minor deadwood. Neighboring tree. Buttressing. Restricted rooting in raised planter.	Null	21-30	B.2

Group No.	Species	Av. Height (m)	Av. Crown Clearance (m)	No. of Stems	Av. DBH (cm)	Av. North Canopy Spread (m)	Av. East Canopy Spread (m)	Av. South Canopy Spread (m)	Av. West Canopy Spread (m)	Av. Age Class	Av. Physiological Condition	Av. Structural Condition	Conditional Comments	Preliminary Management Recommendations	Av. Life Expectancy (years)	Av. Retention Category
1	Cupressus x leylandii	5	1	15	10	2	2	2	2	SM	Moderate	Moderate	Unmanaged boundary hedge comprised mainly of leylandii with 8x beech to northern flank of hedge.	Null	11-20	C.2
2	Cupressus x leylandii	5	1	15	10	2	3	2	3	SM	Moderate	Moderate	Unmanaged boundary hedge comprised of leylandii. Unable to access to ascertain stem positions and ownership.	Null	11-20	C.2

Ref. 21 Tilia cordata
Ref. 13 Sorbus aria
Ref. 14 Fraxinus excelsior
Ref. 15 Salix caprea
Ref. 19 Prunus sp.
Ref. 18 Prunus sp.
Ref. 16 Rhododendron sp.
Ref. 12 Tilia cordata
Ref. 17 Salix caprea
Ref. 11 Tilia cordata
Ref. 20 Salix caprea
G1
Ref. 10 Chamaecyparis pisifera
Ref. 22 Prunus avium
Ref. 9 Tilia cordata
Ref. 8 Tilia cordata
Ref. 7 Tilia cordata
Ref. 6 Tilia cordata
Ref. 5 Tilia cordata
Ref. 4 Tilia cordata
Ref. 3 Tilia cordata
Ref. 2 Tilia cordata
Ref. 1 Tilia cordata
G2
STUMP

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DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS TO BE CHECKED ON SITE

KEY:

- Surveyed tree - category A
- Surveyed tree - category B
- Surveyed tree - category C
- Surveyed tree - category U
- Surveyed tree - extents of root protection area (RPA)
- Surveyed group of trees - Category A
- Surveyed group of trees - Category B
- Surveyed group of trees - Category C
- Surveyed group of trees - Category U
- Existing building and/or topographical feature

BS5837:2012 Trees in relation to construction – Categories and definitions

Trees for removal
U: Identification on Plan = RED - Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed for reasons of sound Arboricultural management.

Criteria
Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become enviable after removal of other U category trees (i.e. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning)
Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline
Trees infected with pathogens of significance to the health and/or safety of other trees nearby (e.g. Dutch elm disease),or very low quality trees suppressing adjacent trees of better quality

NOTE: Habitat reinstatement may be appropriate (e.g. U category tree used as a bat roost; installation of bat box in nearby tree)

Trees to be considered for retention

A: Identification on Plan = LIGHT GREEN - Those of high quality and value: in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested)

B: Identification on Plan = MID BLUE - Those of moderate quality and value: those in such a condition as to make a significant contribution (a minimum of 20 years is suggested)

C: Identification on Plan = GREY - Those of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested), or young trees with a stem diameter below 150mm

Category C trees will usually not be retained where they would impose a significant constraint on development. Young trees with a stem diameter of less than 150 mm should be considered for relocation. Category A and B trees will normally be retained

Criteria – Subcategories
The following subcategories are applied. Trees may be allocated more than one subcategory, but this will not increase their overall value

1: Mainly Arboricultural values
A1: Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or formal or semi-formal Arboricultural features (e.g. the dominant and/or principal trees within an avenue)
B1: Trees that might be included in the high category, but are downgraded because of impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage)
C1: Trees not qualifying in higher categories

2: Mainly landscape values
A2: Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups)
B2: Trees present in numbers, usually as groups or woodlands, such that they form distinct landscape features, thereby attracting a higher collective rating than they might as individuals but which are not, individually, essential components of formal or semi-formal arboricultural features (e.g. trees of moderate quality within an avenue that contains trees of high quality), or trees situated largely or mainly internally to the site, therefore individually having little visual impact on the wider locality
C2: Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit

3: Mainly cultural values, including conservation
A3: Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)
B3: Trees with clearly identifiable conservation or other cultural benefits
C3: Trees with very limited conservation or other cultural benefits.

rev	date	description	by
A	Apr 2024	Tree Constraints Plan	CEL-RC

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client
Site Owner

project
Polygon Road

drawing title
Tree Constraints Plan

scale	drawn	date
1:100 @ A1	CEL-RC	Apr 2024

drawing number
PR-TCP-001

rev
A

APT-11 3B-5P APT 86.03M2 / 926.0SQ.FT.
APT-12 3B-5P APT 86.59M2 / 932.0SQ.FT.
APT-13 3B-5P APT 86.03M2 / 926.0SQ.FT.
APT-14 3B-5P APT 86.59M2 / 932.0SQ.FT.

14 APARTMENTS IN TOTAL

100% CP SPACES + 1 DISABLED PARKING SPACE SUBJECT TO FULL SITE SURVEY AND LOCAL AUTHORITY APPROVAL

S

Ref. 21 Tilia cordata
Ref. 13 Sorbus aria
Ref. 14 Fraxinus excelsior
Ref. 15 Salix caprea
Ref. 19 Prunus sp.
Ref. 18 Prunus sp.
Ref. 17 Salix caprea
Ref. 16 Rhododendron sp.
Ref. 12 Tilia cordata
Ref. 11 Tilia cordata
Ref. 10 Chamaecyparis pisifera
Ref. 9 Tilia cordata
Ref. 8 Tilia cordata
Ref. 7 Tilia cordata
Ref. 6 Tilia cordata
Ref. 5 Tilia cordata
Ref. 4 Tilia cordata
Ref. 3 Tilia cordata
Ref. 2 Tilia cordata
Ref. 1 Tilia cordata
Ref. 22 Prunus avium

G1
G2

NEW PEDESTRIAN ENTRANCE
GRADUAL RAMP UP TO ENTRANCE
LEVEL ACCESS
+ THL82.24
INCREASE WIDTH OF EX VEHICULAR ACCESS
CLOSE OFF EX VEHICULAR ACCESS AND MAKE GOOD PAVEMENT
POLYGON RD
CYCLE STORE
APT-01
APT-02
APT-03
APT-04
APT-10
LOUNGE
KITCHEN
BED 2
HALL
UTILITY
WC
RISER
DP
ST
1
2
3
4
6
7
8
9
10

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KEY:

- Retained Tree
- Tree to be Removed Due to the Proposal
- Tree to be Removed Due to Overall Poor Condition
- Retained Group
- Group to be Remvoed Due to the Proposal
- Group to be Removed Due to Poor Overall Condition
- Building and/or Topographical Feature
- Retained tree - extents of root protection area (RPA)

rev	date	description	by
A	Apr 2024	Tree Retention Plan	CEL-RC

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drawing title
Tree Retention Plan

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KEY:

- Proposed Tree Protection Fencing
- Proposed soft landscape
- Retained raised tree planter
- Potential area of Cellweb required
- Retained Tree Canopy
- Retained Tree Root Protection Area

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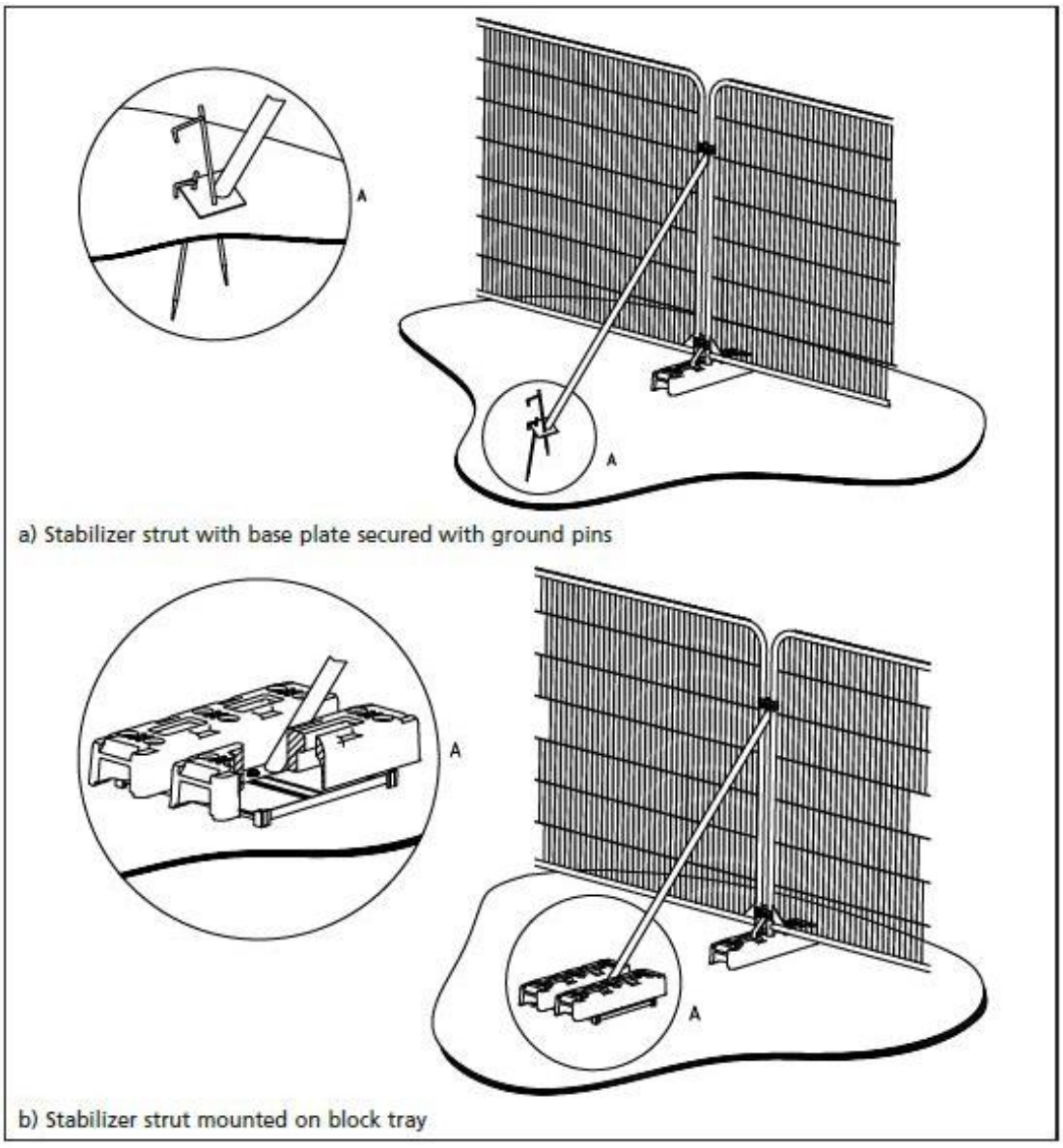
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Tree Protection Plan

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A

TREE PROTECTION FENCING EXAMPLES



British Standards Institute. 2012. BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations. sine loco: BSI.

TREE PROTECTION SIGN



TREE PROTECTION FENCING. THIS FENCING MUST BE MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS FOR THIS DEVELOPMENT.



TREE PROTECTION AREA KEEP OUT!
(TOWN AND COUNTRY PLANNING ACT 1990)
TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY PLANNING CONDITIONS AND/OR BY A TREE PRESERVATION ORDER. CONTRAVENTION OF THESE CONDITIONS AND PROTECTION UNDER THE ABOVE LEGISLATION MAY LEAD TO CRIMINAL PROSECUTION. INCURSION INTO THE PROTECTED AREA MUST BE AUTHORISED BY THE LOCAL PLANNING AUTHORITY WITH WRITTEN PERMISSION.

British Standards Institute. 2012. BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations. sine loco: BSI.

Abscission. The shedding of a leaf or other short-lived part of a woody plant, involving the formation of a corky layer across its base; in some tree species twigs can be shed in this way

Abiotic. Pertaining to non-living agents; e.g. environmental factors

Absorptive roots. Non-woody, short-lived roots, generally having a diameter of less than one millimetre, the primary function of which is uptake of water and nutrients

Adaptive growth. In tree biomechanics, the process whereby the rate of wood formation in the cambial zone, as well as wood quality, responds to gravity and other forces acting on the cambium This helps to maintain a uniform distribution of mechanical stress

Adaptive roots. The adaptive growth of existing roots; or the production of new roots in response to damage, decay or altered mechanical loading

Adventitious shoots. Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage. The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Architecture. In a tree, a term describing the pattern of branching of the crown or root system

Ascomycota (Ascomycetes). One of the major taxonomic groups of fungi; their spores are borne on microscopic structures called asci, which in many types are in turn borne upon the fruit body of the fungus usually taking the form of a crust or cup. These fungi have particular importance in arboriculture, as some can cause significant decay and dysfunction in the live tissue of trees.

Axil. The place where a bud is borne between a leaf and its parent shoot

Bacteria. Microscopic single-celled organisms, many species of which break down dead organic matter, and some of which cause diseases in other organisms

Bark. A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Bark included union [BI]. When two or more branches or stems are held static or where normal movement is inhibited causing a weak branch attachment. This is usually caused by a 'natural-brace' or artificial structure above the point to where the branch attach to the stem.

Basidiomycota (Basidiomycetes). One of the major taxonomic groups of fungi; their spores are borne on microscopic peg-like structures (basidia), which in many types are in turn borne on or within conspicuous fruit bodies, such as brackets or toadstools. Most of the principal decay fungi in standing trees are basidiomycetes

Bolling. A term sometimes used to describe pollard heads

Bottle-butt. A broadening of the stem base and buttresses of a tree, in excess of normal and sometimes denoting a growth response to weakening in that region, especially due to decay involving selective delignification

Bracing. The use of rods or cables to restrain the movement between parts of a tree

Branch:

- **Primary.** A first order branch arising from a stem
- **Lateral.** A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
- **Sub-lateral.** A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch bark ridge. The raised arc of bark tissues that forms within the acute angle between a branch and its parent stem

Branch collar. A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot. A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling. An irreversible deformation of a structure subjected to a bending load

Buttress zone. The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium. Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker. A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Canopy species. Tree species that mature to form a closed woodland canopy

Cleaning out. The removal of dead, crossing, weak, and damaged branches, where this will not damage or spoil the overall appearance of the tree

Compartmentalization. The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compression strength. The ability of a material or structure to resist failure when subjected to compressive loading; measurable in trees with special drilling devices

Compressive loading. Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition. An indication of the physiological vitality of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree

Construction exclusion zone. Area based on the Root Protection Area (in square metres) to be protected during development, by the use of barriers and/or ground protection

Crown/Canopy. The main foliage bearing section of the tree

Crown lifting. The removal of limbs and small branches to a specified height above ground level

Crown thinning. The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping. A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

Crown reduction/thinning. Reduction of the canopy volume by thinning to remove dominant branches whilst preserving, as far as possible the natural tree shape

Deadwood. Dead branch wood

Decurrent. In trees, a system of branching in which there is a well-defined central main stem, bearing branches which are limited in their length, diameter and secondary branching (cf. excurrent) In fungi with toadstools as fruit bodies, the description of gills which run some distance down the stem, rather than terminating abruptly

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

Delamination. The separation of wood layers along their length, visible as longitudinal splitting

Dieback. The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease. A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Distal. In the direction away from the main body of a tree or subject organism (cf. proximal)

Dominance. In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also, the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud. An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction. In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height). Stem diameter measured at a height of 1.5 metres (UK) or the nearest measurable point. Where measurement at a height of 1.5 metres is not possible, another height may be specified

Deadwood. Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Endophytes. Micro-organisms which live inside plant tissues without causing overt disease, but in some cases capable of causing disease if the tissues become physiologically stressed, for example by lack of moisture

Epicormic shoot. A shoot having developed from a dormant or adventitious bud and not having developed from a first-year shoot

Excrescence. Any abnormal outgrowth on the surface of tree or other organism

Excurrent. In trees, a system of branching in which the crown is borne on a number of major widely-spreading and secondarily branched limbs (cf. excurrent)

Felling licence. In the UK, a permit to fell trees in excess of a stipulated number of stems or volume of timber

Flush-cut. A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root. A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Guying a form of artificial support with cables for trees with a temporarily inadequate anchorage

Habit. The overall growth characteristics, shape of the tree and branch structure

Hazard beam. An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Heartwood/false-heartwood/ripe wood. Sapwood that has become dysfunctional as part of the natural aging processes

Heave. A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also, the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

High canopy tree species. Tree species having potential to contribute to the closed canopy of a mature woodland or forest

Incipient failure. In wood tissues, a mechanical failure which results only in deformation or cracking, and not in the fall or detachment of the affected part

Increment borer. A hollow auger, which can be used for the extraction of wood cores for counting or measuring wood increments or for inspecting the condition of the wood

Infection. The establishment of a parasitic micro-organism in the tissues of a tree or other organism

Internode. The part of a stem between two nodes; not to be confused with a length of stem which bear nodes but no branches

Lever arm. A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin. The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing. A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end loading

Loading. A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Longitudinal. Along the length (of a stem, root or branch)

Lopping. A term often used to describe the removal of large branches from a tree, but also used to describe other forms of cutting

Mature Heights (approximate)**:**

- **Low maturing** – less than 8 metres high
- **Moderately high maturing** – 8 – 12 metres high
- **High maturing** – greater than 12 metres high

Micro drill. An electronic rotating steel probe, which when inserted into woody tissue provides a measure of tissue density

Minor deadwood. Deadwood of a diameter less than 25mm and or unlikely to cause significant harm or damage upon impact with a target beneath the tree

Mulch. Material laid down over the rooting area of a tree or other plant to help conserve moisture; a mulch may consist of organic matter or a sheet of plastic or other artificial material

Mycelium. The body of a fungus, consisting of branched filaments (hyphae)

Natural brace. This feature can be defined as where two or more branches or stems connect, join, rub, fuse or entwine in the canopy of the tree. This can restrict normal movement lower down the branch which inhibits movement at the point of where the branch attaches to the stem of the tree; this is commonly known as the union, but also the junction or fork. As the tree grows and thickens, this will cause a bark included union due to the branch being tied up. If the rubbing branches are removed or die-back, this can open the union up to excessive stress and possibly cause the branch to fail. This is because the union has not been able to produce the necessary adaptive (or strengthening) growth through natural movement.

Occluding tissues. A general term for the roll of wood, cambium and bark that forms around a wound on a woody plant (cf. wound wood)

Occlusion. The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen. A micro-organism which causes disease in another organism

Photosynthesis. The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products.

Phytotoxic. Toxic to plants

Pollarding. The removal of the tree canopy, back to the stem or primary branches. Pollarding may involve the removal of the entire canopy in one operation, or may be phased over several years. The period of safe retention of trees having been pollarded varies with species and individuals. It is usually necessary to re-pollard on a regular basis, annually in the case of some species.

Primary branch. A major branch, generally having a basal diameter greater than 0.25 x stem diameter

Primary root zone. The soil volume most likely to contain roots that are critical to the health and stability of the tree and normally defined by reference to Table 1 of BS5837 (1991) Guide for Trees in Relation to Construction.

Priority. Works may be prioritised, 1. = high, 5. = low

Probability. A statistical measure of the likelihood that a particular event might occur.

Proximal. In the direction towards from the main body of a tree or other living organism (cf. distal)

Pruning. The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial. In the plane or direction of the radius of a circular object such as a tree stem

Rams-horn. In connection with wounds on trees, a roll of occluding tissues which has a spiral structure as seen in cross-section

Rays. Strips of radially elongated parenchyma cells within wood and bark. The functions of rays include food storage, radial translocation and contributing to the strength of wood

Red-rot. A form of decay in which reddish pigments are present but which is biochemically a white-rot; not to be confused with brown-rots which sometimes also have a reddish-brown colour

Reactive Growth/Reaction Wood. Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Removal of dead wood. Unless otherwise specified, this refers to the removal of all accessible dead, dying and diseased branch wood and broken snags

Removal of major dead wood. The removal of, dead, dying and diseased branch wood above a specified size

Respacing. Selective removal of trees from a group or woodland to provide space and resources for the development of retained trees.

Residual wall. The wall of non-decayed wood remaining following decay of internal stem, branch or root tissues

Root-collar. The transitional area between the stem/s and roots

Root-collar examination. Excavation of surfacing and soils around the root-collar to assess the structural integrity of roots and/or stem

Root protection area. An area of ground surrounding a tree that contains sufficient rooting volume to ensure the tree's survival. Calculated with reference to Table 2 of BS5837 (2005) and shown in plan form in square metres

Root zone. Area of soils containing absorptive roots of the tree/s described microscopic and dispersed in air or water. The **Primary** root zone is that which we consider of primary importance to the physiological well-being of the tree

Sapwood. Living xylem tissues

Secondary branch. A branch, generally having a basal diameter of less than 0.25 x stem diameter

Selective delignification. A kind of wood decay (white-rot) in which lignin is degraded faster than cellulose

Shedding. In woody plants, the normal abscission, rotting off or sloughing of leaves, floral parts, twigs, fine roots and bark scales

Silvicultural thinning. Removal of selected trees to favour the development of retained specimens to achieve a management objective

Simultaneous white-rot. A kind of wood decay in which lignin and cellulose are degraded at about the same rate

Snag. In woody plants, a portion of a cut or broken stem, branch or root which extends beyond any growing-point or dormant bud; a snag usually tends to die back to the nearest growing point

Soft-rot. A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Spores. Propagules of fungi and many other life-forms; most spores are **Shrub species.** Woody perennial species forming the lowest level of woody plants in a woodland and not normally considered to be trees **Sporophore.** The spore bearing structure of fungi

Sprouts. Adventitious shoot growth erupting from beneath the bark

Stem/s. The main supporting structure/s, from ground level up to the first major division into branches

Stress. In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

Stress. In mechanics, the application of a force to an object

Stringy white-rot. The kind of wood decay produced by selective delignification

Storm. A layer of tissue which supports the fruit bodies of some types of fungi, mainly ascomycetes

Structural roots. Roots, generally having a diameter greater than ten millimetres, and contributing significantly to the structural support and stability of the tree

Subsidence. In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Subsidence. In relation to branches of trees, a term that can be used to describe a progressive downward bending due to increasing weight

Taper. In stems and branches, the degree of change in girth along a given length

Target canker. A kind of perennial canker, containing concentric rings of dead occluding tissues

Targets. In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping. In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Torsional stress. Mechanical stress applied by a twisting force

Translocation. In plant physiology, the movement of water and dissolved materials through the body of the plant

Transpiration. The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

Understory. A layer of vegetation beneath the main canopy of woodland or forest or plants forming this

Understory tree species. Tree species not having potential to attain a size at which they can contribute to the closed high canopy of a woodland **Vascular wilt.** A type of plant disease in which water-conducting cells become dysfunctional

Vessels. Water-conducting cells in plants, usually wide and long for hydraulic efficiency; generally, not present in coniferous trees

Veteran tree. A loosely defined term for an old specimen that is of interest biologically, culturally or aesthetically because of its age, size or condition and which has usually lived longer than the typical upper age range for the species concerned

White-rot. A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure. The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure. The force exerted by a wind on a particular object

Wind throw. The blowing over of a tree at its roots

Wound dressing. A general term for sealants and other materials used to cover wounds in the hope of protecting them against desiccation and infection; only of proven value against fresh wound parasites

Wound wood. Wood with atypical anatomical features, formed in the vicinity of a wound'