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Site Report, Appraisal & Plans

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

Refence:	CV-BS-001
Date:	May 2020
Client:	Step Places
FAO:	Christian Millington
Project:	Chorlton Villas

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1 Introduction

1.1 Instruction

Christians Environmental have been instructed by Step Places (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.
- 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 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 and the trees retained alongside the proposed development.
- The Tree Protection Plan which demonstrates the appropriate protection measures to be implemented for retained trees during the development.

Nb. 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 future 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; therefore 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:

- Topographical Land Survey: provided in drawing file (.dwg) format.
- Development Proposal Plan(s): provided in drawing file (.dwg) format.

2 Site Context

2.1 Site Overview and Surrounding Area

1. The site currently comprises of a disused parcel of land.

2. At the time of writing this report, information regarding the potential for statutory protection in the form of Tree Preservation Orders and/or Conservation Areas for the proposed development site, or concerning any trees or land within the vicinity of the site that have the potential to be affected by proposed development works could not be ascertained from Manchester City Council. Where any trees and/or groups have been specified for removal, this report will serve as the application for removal and will be reviewed for suitability and consent once submitted to the Local Authority concerning the proposed developments.

3. The immediate surrounding area is characterised as urbanised, consisting primarily of residential dwellings with and amenity greenspace. Main topographical features of note include: tram lines situated to the north, the site of Chorlton-cum-Hardy Golf Club to the south and the River Mersey to the south and west.

2.2 Geological Details

Texture:	Sandy and loamy
pH:	Very acidic
Drainage:	Naturally wet
Fertility:	Very low
Carbon:	Medium
Drains to:	Shallow ground water
Notes:	Where exposed and lacking in vegetation, soil is vulnerable to leaching of nitrate and pesticides to groundwater and vulnerable to wind erosion during dry weather

2.3 Proposals

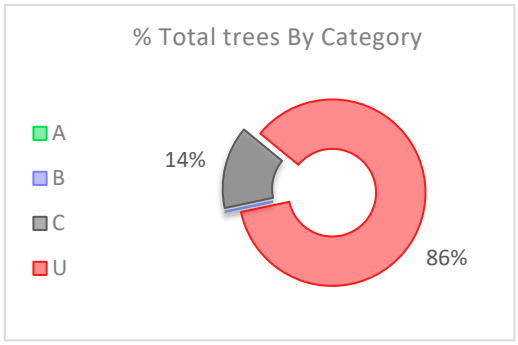
The proposed develop consists of: the erection of a single four bedroom house plus annex, along with related landscaping accessed from the existing Chorlton Villas Estate.

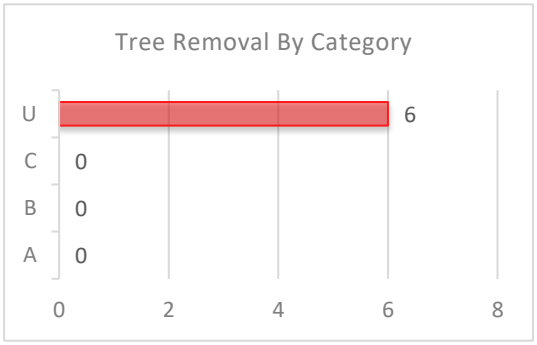
3 Arboricultural Impact Assessment

3.1 Summary of the Impact on Trees, Groups and Hedges

Within the proposed development area and including adjacent land there is a total of 7 individual trees and 1 individual group.

Individual Trees

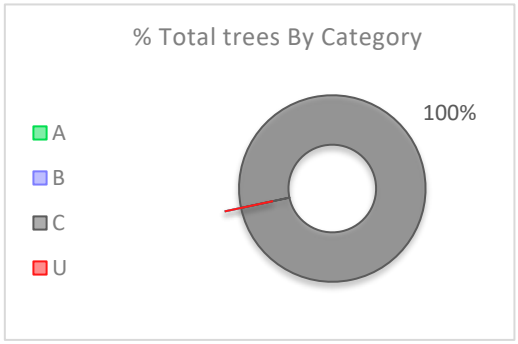


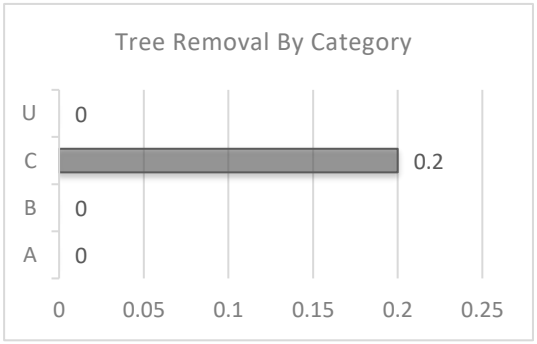


Tree Removal by Tag

Category	Total	Tree Tags
Cat A	0	-
Cat B	0	-
Cat C	0	-
Cat U	6	T2; T3; T4; T5: T6 and T7

Individual Groups





Group Removal by Tag

Category	Total	Tree Tags
Cat A	0	-
Cat B	0	-
Cat C	0.2	G1 (partial removal)
Cat 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	Rooting affected by the proposals	Pruning due to the proposals
-	-	-

- There are no Category A trees on the proposed development site.

Category B trees and groups. (Trees of moderate quality)		
Removal due to the proposals	Rooting affected by the proposals	Pruning due to the proposals
-	-	-

- There are no Category B trees on the proposed development site.

Category C trees and groups. (Trees of low quality)		
Removal due to the proposals	Rooting affected by the proposals	Pruning due to the proposals
-	-	-

- There are no Category C trees affected by the proposed development.
- It is proposed that partial removal of the eastern canopy of G1 is removed to facilitate the proposed development.

A number of trees have the potential to be affected by the proposals. It is intended to apply tree protection methods to ensure that trees are adequately protected throughout the construction phase.

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

Category U trees and groups. (Trees Unsuitable for retention)
Removal due to poor quality and/or health and safety requirements
T2; T3; T4; T5; T6 and T7

- It is proposed that the trees identified above are removed for the following reasons:

  (**T2**) It is proposed that this tree will be left open to wind exposure after the removal of trees T4, T6 and T7, thus increasing the risk of potential failure during high wind events significantly. Therefore, it is recommended on safety ground that this tree is removed for the above reasons.

  (**T3**) It is proposed that this tree will be left open to wind exposure after the removal of trees T4, T6 and T7, thus increasing the risk of potential failure during high wind events significantly. Therefore, it is recommended on safety ground that this tree is removed for the above reasons.

  (**T4**) It is proposed that this tree is removed due to the declining canopy condition, suppressed growth and poor vigour. At the rate of decline observed, it is not anticipated that this tree will have a longevity of more that 10-years in the environment. It is also predicted based on the observations made that this tree has the potential to present future hazards to site users.

  (**T5**) It is proposed that this tree will be left open to wind exposure after the removal of trees T4, T6 and T7, thus increasing the risk of potential failure during high wind events significantly. Therefore, it is recommended on safety ground that this tree is removed for the above reasons.

  (**T6**) It is proposed that this tree is removed due to the declining canopy condition, suppressed growth and poor vigour. At the rate of decline observed, it is not anticipated that this tree will have a longevity of more that 10-years in the environment. It is also predicted based on the observations made that this tree has the potential to present future hazards to site users.

  (**T7**) It is proposed that this tree is removed due to the declining canopy condition, suppressed growth and poor vigour. At the rate of decline observed, it is not anticipated that this tree will have a longevity of more that 10-years in the environment. It is also predicted based on the observations made that this tree has the potential to present future hazards to site users.

3.3 Impact on Local Amenity

1. It is proposed that the removal of trees T2; T3; T4; T5; T6 and T7 can be suitably offset through future replacement planting on site with suitable species.

2. It is proposed that partial removal of group G1 will be of little impact on the visual amenity of the surrounding area due to the relatively small volume of canopy requiring removal.

4 Arboricultural Method Statement

4.1 Introduction

1. This Method Statement has been drawn up to assist the Local Authority and the developer in overseeing the construction of the proposed development at: Chorlton Villas, Manchester M21 8DN.

2. This document seeks to list those trees which are proposed for removal and discuss any tree constraints and implications. It describes the proposals for ensuring any retained trees will survive the development process and thrive after the development has taken place. The development and timing of construction operations are described, together with materials which would be used in order 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.

4.2 Programme and Phasing of Tree Management

Stage	Requirement
1	Carry out agreed tree removal works
2	Implement tree protection
3	Carry out construction works
4	Remove tree protection

4.2.1 Stage 1. Carry out agreed tree removal works

1. All trees/vegetation marked for removal are coded on the Tree Retention Plan to aid arboricultural contractors identify the correct trees.

2. 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.

3. 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.

Tree Removal Works	
Due To The Proposal	Due To Poor Overall Condition
G1 (partial removal)	T2; T3; T4; T5; T6 and T7

Tree Pruning Works	
Due To The Proposal	Due To Poor Overall Condition
-	-

4.2.2 Stage 2. Implement tree protection

1. Tree protection fencing should first be installed before any construction works on site. The specification for this fencing can be seen in Appendix E contained within this report. This should be accompanied by signs indication what the fencing is. An example of one of these can be seen in Appendix F.

4.2.3 Stage 3. Carry out construction works

1. During the construction phase, it is important that all staff are aware of tree protection measures and tree protection importance. 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 Christians, so the appropriate measures can be taken.

2. The tree protection fencing surrounding the proposed developments should only be moved to facilitate a safe working distance of 1.2-meters when required. The fencing should then be returned to the specified position until all works on site have been completed.

3. Any areas marked on the Tree Protection Plan held within Appendix D of this report as 'sensitive rooting and dig' should be avoided if possible. No mechanical excavation equipment is permitted in these areas. Should the need arise for any excavation or levelling work, only hand-dig tools should be used in these areas, and should not exceed 150-millimters in depth.

4.2.4 Stage 4. Remove tree protection

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

4.3 Design and Construction Guidance

4.3.1 Site Storage, Cement Mixing and Washing Points

A designated area for locating the development sites construction compound has been proposed on the Tree Protection Plan held within Appendix D of this report. This area should be positioned from the RPA of trees and groups to be retained to provide a minimum distance of 10-metres away from the protective fencing in respect to the above. As this may not be entirely feasible, the proposed location should be bonded heavy duty plastic sheeting and sandbags to contain any spillages and prevent contamination: especially if a risk of polluted water runoff exists.

4.3.2 Alteration to pathway and highway layouts

The appointed contractors will 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.

4.3.3 Services

1. All service runs should be designed so that be alignment will pass outside the RPA's of the trees so they will have no effect on the trees.

2. In the rare chance that the need arises to dig within the protective fence lines at any time, the developer's arboriculturist will liaise with the local authority's tree officer in order to implement non-destructive trenching methods (open trenching by use of air spade or a mole dig system).

3. All work to services on site will be undertaken in line with the NJUG "Guidelines for Planning, Installation and Maintenance of Utility Services in Proximity to Trees".

4.3.4 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.

5 Explanatory Notes (BS5837:2012)

5.1 Tree Data Collection

All trees on site which are adjacent to any proposed development areas or fall directly into these areas have been numbered and species identified. Each tree has also been inspected as described in British Standard 5837:2012; this includes information on height, diameter, crown spread, maturity, condition and recommendations. Each tree is also classified as a category A, B, C or U (Summary in the Appendix). This categorization reflects the trees material constraint on the proposed development. Collection of information also takes into consideration any low branches, structural or physiological conditions and any remaining contribution that the tree offers to the site.

5.2 Interpretation of Tree Data

Section 5 of British Standard BS 5837:2012 recommends that the stem diameter taken at breast height is used to calculate the root protection area. This root protection area (RPA) can be interpreted to identify any design constraints to the site. Once site design has taken place this data can be used to form the basis of any exclusion zone and position of protective barriers/fencing.

6 Appendices

APPENDIX A: TREE DATA

APPENDIX B: TREE CONSTRAINTS PLANS

APPENDIX C: TREE RETENTION PLANS

APPENDIX D: TREE PROTECTION PLANS

APPENDIX E: TREE PROTECTION FENCING SPECIFICATION

APPENDIX F: TREE PROTECTION SIGN

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*

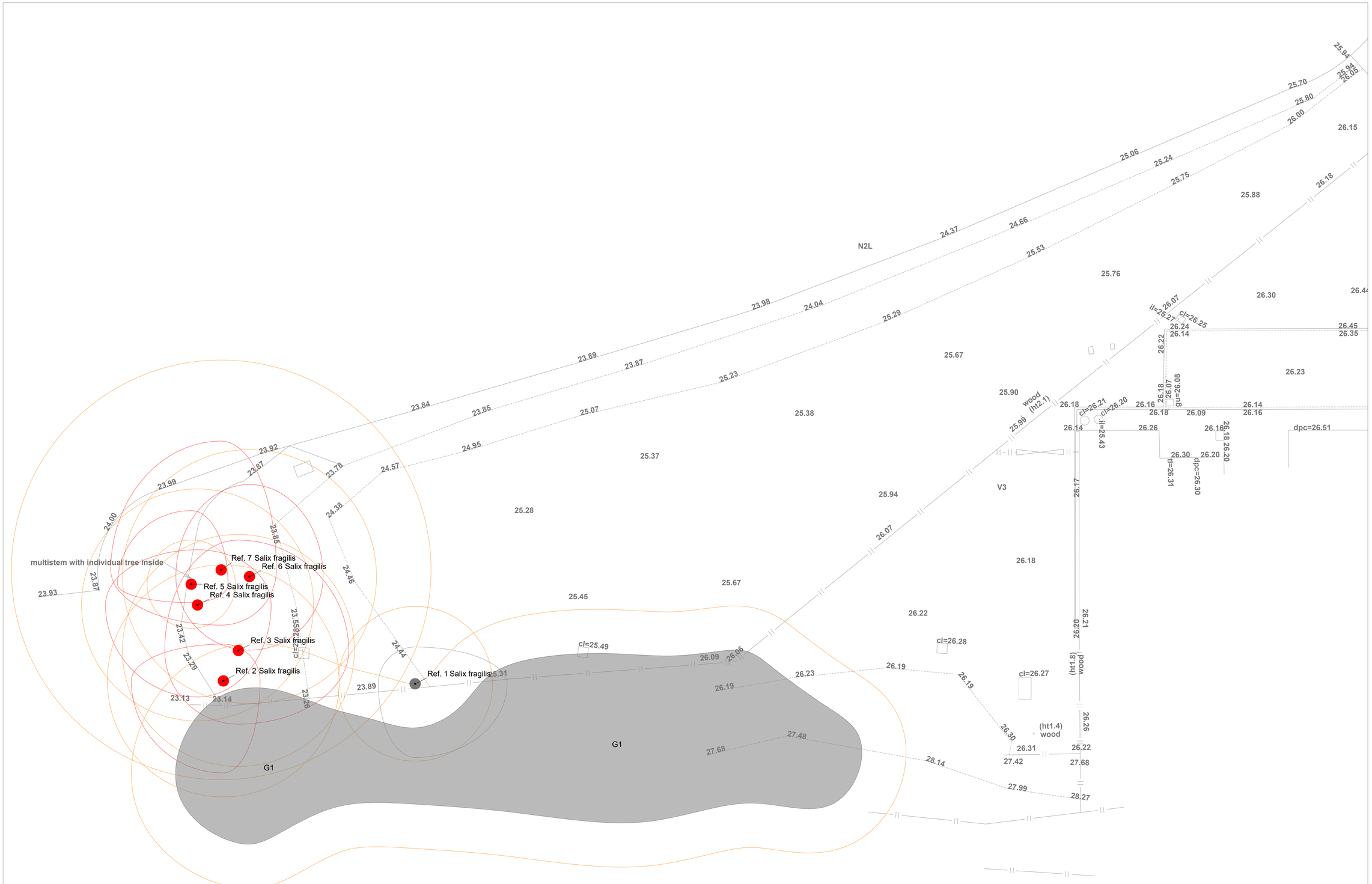
KEY:

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	*Overall height of lowest branches from the 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*
Remaining contribution	*How long the tree will offer a contribution*
Category Rating	*See opposite table*

Tree no.	Species	Height (m)	Crown clearance (m)	No. of stems	DBH (cm)	N (m)	E (m)	S (m)	W (m)	Age Class	Physiological Condition	Structural Condition	Condition comments	Preliminary management recommendations	Remaining contribution (years)	Category
1	*Salix fragilis*	11	4	1	34	2	5	4	2	M	Moderate	Moderate	-Recent change in ground level. -Unbalanced canopy. -Minor deadwood. -Ivy preventing full inspection.	-Sever and strip ivy to enable future tree safety inspections that may be required.	11-20	C.2
2	*Salix fragilis*	16	8	1	53	2	2	5	5	M	Moderate	Moderate	-Recent change in ground level. -Unbalanced canopy. -Minor deadwood. -Ivy preventing full inspection. -Dead stem with decay occluding at base. -Hard standing now present in RPA. -Stem lean. -Sparse canopy. -Tree will be left exposed to wind throw once companion trees have been removed.	-Dismantle and remove.	11-20	U

Tree no.	Species	Height (m)	Crown clearance (m)	No. of stems	DBH (cm)	N (m)	E (m)	S (m)	W (m)	Age Class	Physiological Condition	Structural Condition	Condition comments	Preliminary management recommendations	Remaining contribution (years)	Category
3	*Salix fragilis*	15	7	1	53	6	6	4	4	M	Moderate	Moderate	-Recent change in ground level. -Unbalanced canopy. -Minor deadwood. -Ivy preventing full inspection. -Stem lean. -Hard standing now present in RPA. -Tree will be left exposed to wind throw once companion trees have been removed.	-Dismantle and remove.	<10	U
4	*Salix fragilis*	16	10	1	53	3	4	5	5	M	Poor	Moderate	-Recent change in ground level. -Unbalanced canopy. -Minor deadwood. -Ivy preventing full inspection. -Stem lean. Hard standing now present in RPA. -Western flank of canopy in decline.	-Dismantle and remove.	<10	U
5	*Salix fragilis*	8	6	1	20	4	2	1	4	SM	Moderate	Moderate	-Recent change in ground level. -Unbalanced canopy. -Minor deadwood. -Stem lean. -Hard standing now present in RPA. -Northern flank of canopy in decline. -Suppressed. -Tree will be left exposed to wind throw once companion trees have been removed.	-Dismantle and remove.	<10	U
6	*Salix fragilis*	16	8	2	53; 25	5	4	4	4	M	Poor	Moderate	-Recent change in ground level. -Unbalanced canopy. -Minor deadwood. -Ivy preventing full inspection. -Stem lean. Hard standing now present in RPA. -Northeastern flank of canopy in decline. -Suppressed.	-Dismantle and remove.	<10	U
7	*Salix fragilis*	16	8	4	55; 53; 40; 38	7	3	3	6	M	Poor	Moderate	-Recent change in ground level. -Unbalanced canopy. -Minor deadwood. -Ivy preventing full inspection. -Stem lean. -Hard standing now present in RPA. -Northern flank of canopy in decline. -Suppressed. -2x main stem leaders on Northern flank of canopy have been reduced to ~3-meters in height; epicormic growth present.	-Dismantle and remove.	<10	U

Group no.	Species	Height (m)	Crown clearance (m)	No. of stems	DBH (cm)	N (m)	E (m)	S (m)	W (m)	Age Class	Physiological Condition	Structural Condition	Condition comments	Preliminary management recommendations	Remaining contribution (years)	Category
1	*Crataegus monogyna, Prunus avium, Sambucus nigra*	7	1	20+	20	3	3	3	3	SM	Good	Moderate	-Group forms mixed deciduous screen	>Null<	11-20	C.2



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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 R category trees (i.e. where, for whatever reason, theloss 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. R 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 subategories 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. Their collective landscape quality 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 includes better, 'A' category specimens), or trees situated 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	May 2020	Tree Constraints Plan	CEL-RC

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client
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project
Chorlton Villas

drawing title
Tree Constraints Plan

scale	drawn	date
1:100 @ A1	CEL-RC	May 2020

drawing number
CV-TCP-001

rev
A

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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	May 2020	Tree Retention Plan	CEL-RC

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client
Step Places

project
Chorlton Villas

drawing title
Tree Retention Plan

scale	drawn	date
1:100 @ A1	CEL-RC	May 2020

drawing number	rev
CV-TRP-001	A

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KEY:

- Proposed Tree Protection Fencing
- Proposed Stem Protection Fencing
- Sensitive Rooting and Dig Area
- Retained Tree Canopy
- Retained Tree Root Protection Area
- Proposed material storage, mixing and washing area



rev	date	description	by
A	May 2020	Tree Protection Plan	CEL-RC

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client
Step Places

project
Chorlton Villas

drawing title
Tree Protection Plan

scale
1:100 @ A1

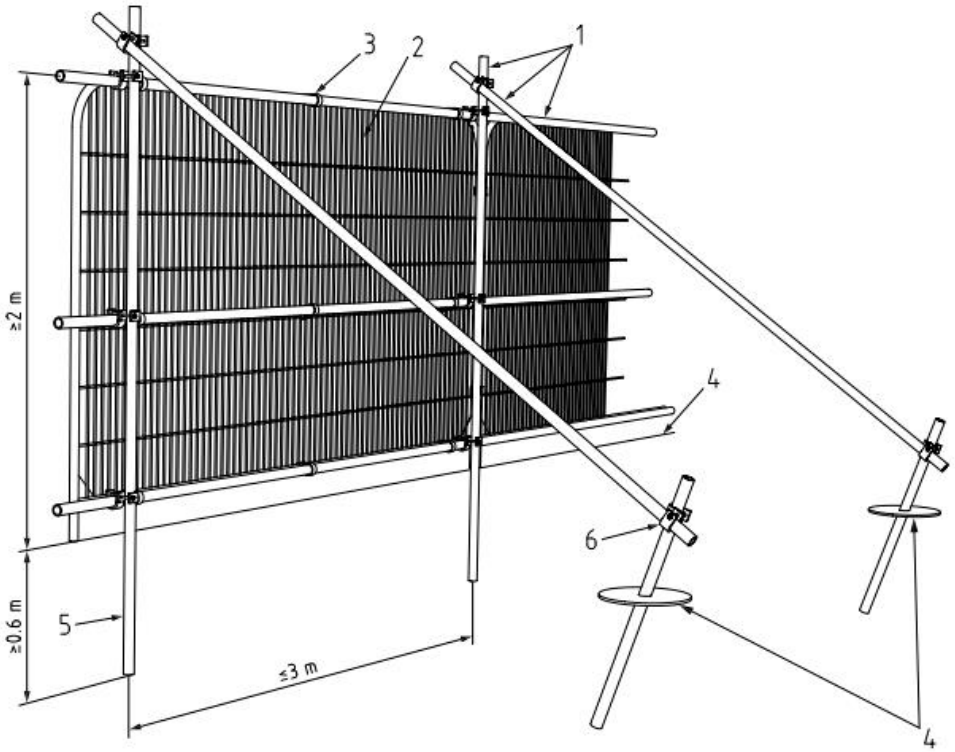
drawn
CEL-RC

date
May 2020

drawing number
CV-TPP-001

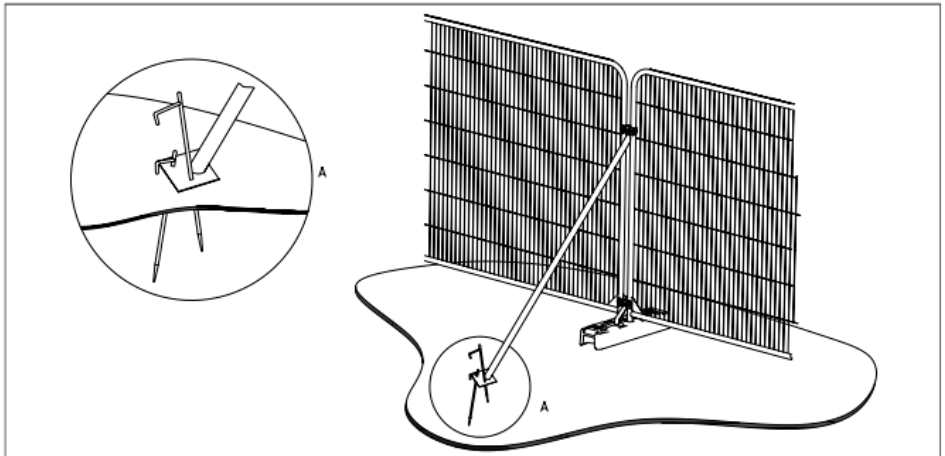
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APPENDIX E: TREE PROTECTION FENCING SPECIFICATION

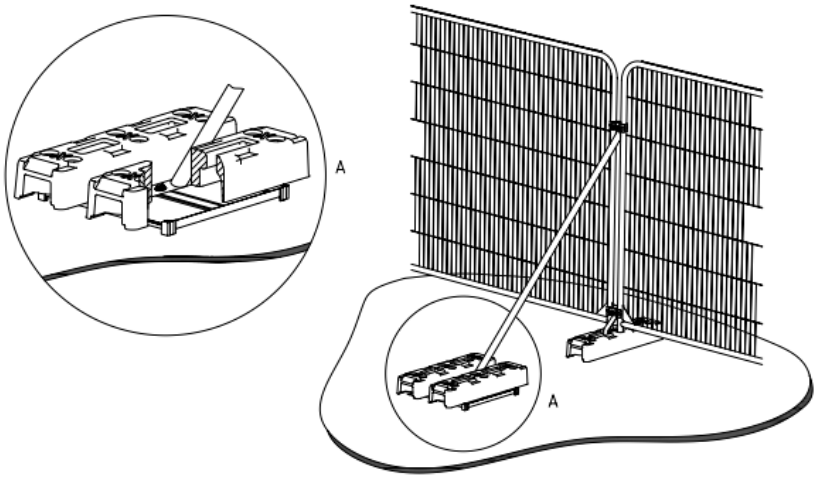


Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps



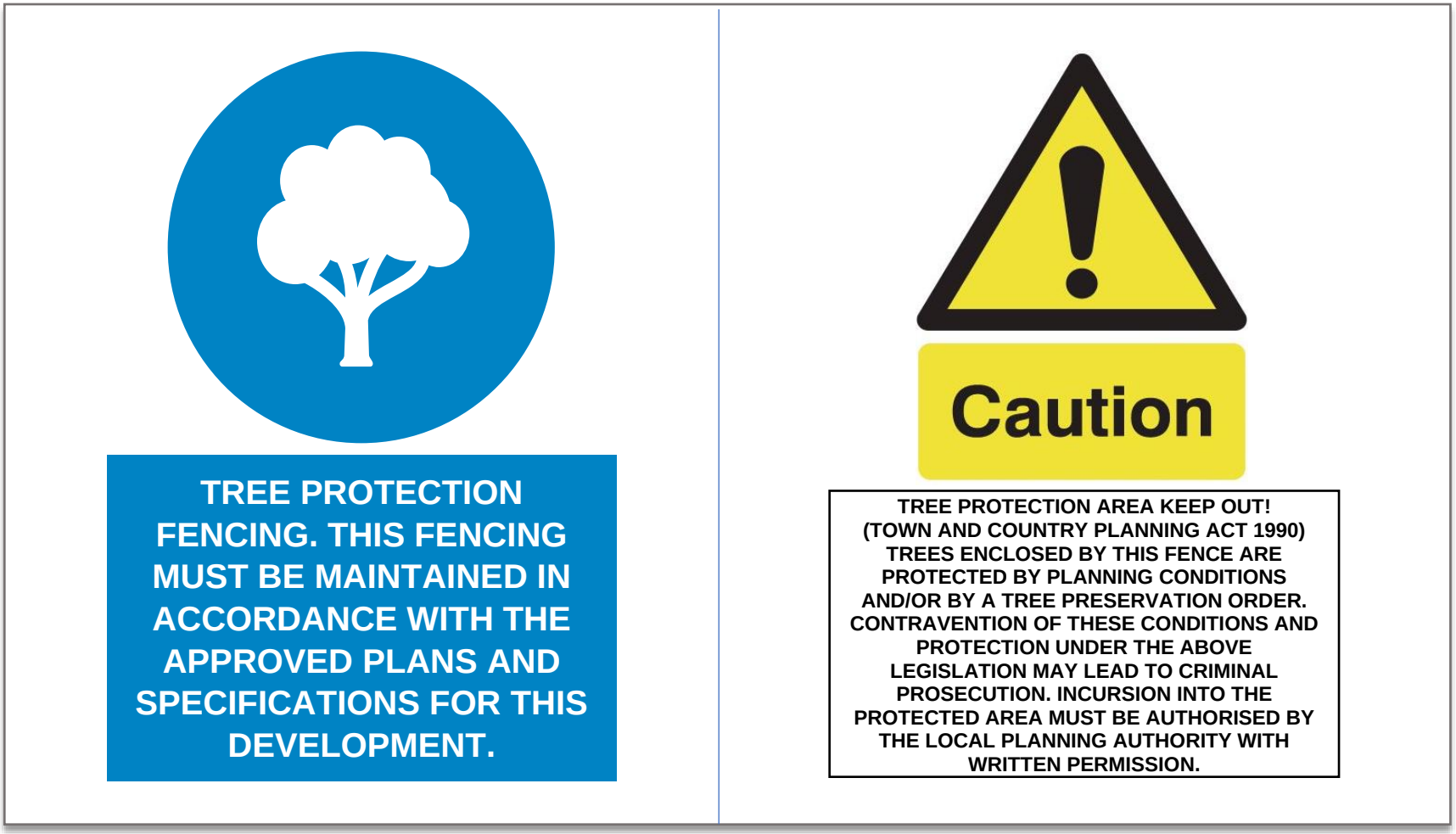
a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

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

APPENDIX F: TREE PROTECTION SIGN



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'