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Arboricultural Report and Impact Assessment To BS 5837:2012

Report No:	**171208**
Client:	**Seth Whall**
Site Address:	**Land at Chapel St, Goxhill**
Survey Date:	**8th December 2017**

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[redacted]

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Introduction

Purpose of the Report

This report is required at land at Chapel St, Goxhill to provide detailed, independent, arboricultural advice on the trees present in the context of potential development.

The purpose of this report is to outline the condition of the existing vegetation on site and to define areas where development and tree protection have the potential to conflict. In addition, recommendations will be made based on the current context of the site.

Terms of Reference

Lincolnshire Tree Services Ltd has been instructed by Mr Seth Whall to survey the trees and prepare the findings in a report.

For this purpose a Trimble Juno T41/5 has been used to capture northing and easting coordinates for each tree. Whilst not as accurate as a topographical survey, this method is considered to provide a fair representation of the positions of the trees surveyed. Tree positions should, however, be considered indicative only.

Scope of the Report

This report is compiled in accordance with *BS 5837:2012 'Trees in relation to design, demolition and construction – Recommendations'* and is based on an objective assessment of the existing vegetation.

Preliminary recommendations are given with a view to the long-term management of a sustainable tree cover and to uphold the interests of health and safety.

All trees within the survey area with a stem diameter above approximately 75mm are included.

Survey Details

The survey took place on the 8th December 2017 and was conducted by Daniel Kendall of Lincolnshire Tree Services.

During this survey, all trees were inspected from ground level. Further investigation, such as climbed inspections or decay detection surveys, have not been undertaken but may be recommended where this is considered appropriate.

Measurements were obtained using clinometers, specialist tapes or electronic distometers. Where this was not possible, measurements were estimated to the best ability of the surveyor. Lincolnshire Tree Services endeavour to provide accurate information and will always take measurements unless inhibited by restricted access or other mitigating circumstances.

Site Description

Land Use

The site identified for survey is a disused greenspace. The site is surrounded on two sides by mature trees and sits with a quiet residential area.

Topography and Geology

A shallow lapsed ditch runs between the site and Chapel Lane. The bank top between the ditch and the site is slightly raised above the local ground level. Otherwise the site is level and well drained.

The site geology is superficially till over chalk bedrock. Till deposits can contain significant clay content as such due consideration must be given in relation to foundation design in close proximity to trees on this site. Failure to do so may lead to shrinkage and heave related issues.

Treescape

The trees on site are large, in significant number, and represent a major green feature in the surrounding area. There are a number of other mature and semi-mature trees interspersed thought the immediate area.

Rooting Conditions

The site itself offers good rooting conditions and is free from soil compaction, subterranean structures and hard surfacing. Rooting conditions are compromised to the east of the site by hard surfacing on Chapel Street and to the south by a neighbouring dwelling and driveway. As such the root protection areas of T1, T4, T5 T6 and T8 have been offset into the site to better represent their likely rooting patterns.

Visual Amenity Value

Three of the trees standing on Chapel Lane (T1, T4 & T5) are good specimens in a prominent position. These trees convey a moderate to high amenity value. The remaining trees on site are either less prominent or less visually appealing and as such convey a low to moderate amenity value.

Due to a lack of recent maintenance most of the trees and vegetation on site are in a state that notably detracts from their amenity value. Development of the site, if done in an appropriate manner, is likely to lead better maintenance and higher amenity value in at least the medium term.

Age Class Mix

Aside from a small number of young trees in G1 and G2 the trees surveyed were an even mix of mature and semi-mature.

Species Diversity

The trees surveyed were a mixture of mainly native and naturalised species including; Birch (*Betula spp.),* Lime (*Tilia spp*.), Sycamore (*Acer pseudoplatanus*), Laburnum (*Laburnum spp.*), Common Horse Chestnut (*Aesculus hippocastanum*).

Status of the Trees

Tree Preservation Order (TPO) and Conservation Area conditions were checked for on North Lincolnshire's online mapping service on 12th December 2017.

The site was found not to be within a conservations area.

Tree preservation order conditions were found to apply to T1 (marked as T3 Sycamore on TPO map), T4 (marked as T4 Maple on TPO map), T6 (marked as T5 Lime on TPO map), T7 (marked as T6 Birch on TPO map), T8 (marked as T7 Lime on TPO map), T9 (marked as T8 Horse Chestnut on TPO map) & T10 (marked as T9 Lime on TPO map) Prior to any works being carried out on these trees permission must be sought from the relevant local authority.

Discussion

Tree Condition & Recommended Works

During the survey the details of eleven individual trees and two groups of trees were recorded. Of the individual trees two were identified as retention category A, four as category B, two as category C and three as category U. The groups of trees were both category C.

Removals Irrespective of Development

Three trees have been marked as retention category U and should be removed by way of sound arboricultural management.

T7 is in decline with poor crown development due to suppression from T6 and T8. The loss of the tree would not create a gap in the overall tree canopy. The tree has no significant amenity value. As the tree carries TPO protection a replacement tree should be planted to mitigate its loss.

T9 has two significant strips of dead bark running from ground level up the main stem to approximately three quarters of the tree's height. The exposed ripe wood is showing early signs of decay. Despite being in good physiological condition the tree is unlikely to heal these wounds before severe structural issues arise. As the tree is growing in close proximity to T8 and T10 its loss visually will be limited. As the tree carries TPO protection a replacement tree should be planted to mitigate its loss.

T11 has had a partial root ball failure in the past leaving a severe lean. In addition, the tree has had a number of major limbs cut back to the main stem where decay is now set in. The tree has no notable amenity value.

Remedial Tree Works Irrespective of Development

No remedial works are required at the current time.

Monitoring/Further Investigations Irrespective of Development

No monitoring or further Investigations are required at the current time.

Arboricultural Implications Assessment (AIA)

Proposed Development

The proposal is to build a single detached dwelling towards the north-western corner of the site. The development will include a small area of parking and a driveway accessing the site from Chapel Street. A plan of the proposed development can be found in the appendices.

Tree Removals for Development

In order to allow access to the site the category C trees T2 and T3 will need to be removed. Although there will be some loss of screening the effect will be limited due to the close proximity of larger and better quality trees. Due to their size and close proximity to other trees the loss of amenity value will be limited.

In order to create space within the site the removal of the category C groups of G1 and G2 will also be necessary. G1 does provide some screening between the site and Chapel Street however the vegetation within the group is totally unmanaged and makes for an untidy feature on the street. Its removal will better highlight the higher quality trees of T1, T4 and T5 thus improving the green feature as a whole. To maintain a screening between the site and Chapel Street a hedge should be planted along the frontage. The group G2 is largely concealed from the general public. The impact of its loss will be negligible.

Remedial Tree Works and Pruning for Development

To improve light penetration into the site T5, T6, T8 and T10 will need to be crown lifted to a height of 5-6m. This will have little or no effect on the condition of the trees. There will be no loss of screening as the lower stems of the trees are obscured from view to the south by a high fence. In addition, the trees should be crown cleaned to remove dead, dying, diseased and contacting branches.

T1 and T4 are both ivy clad. The ivy should be removed to improved the trees appearance and reduce shading. The trees should be crown cleaned to remove dead, dying, diseased and contacting branches. In addition, T1 has recently been crown reduced to the north with the works not carried out to BS3998. These works should be corrected where possible.

The details of all recommendations can be found in Appendix 1.

Monitoring/Further Investigations to Accommodate Proposed Development

No monitoring or further investigations are required to facilitate the development.

Implications for Retained Trees

The Protective Barrier

In order to ensure the effective protection of retained trees during development, a protective barrier will be installed, in accordance with BS5837: 2012 and may comprise of protective fencing and/or ground protection. This will be the first job on site following the tree removal and pruning works. The fencing and ground protection should be positioned to protect the entire Root Protection Area (RPA) of the retained trees. The position of protective fencing and ground protection is detailed on the Tree Protection Plan. The specifications for the construction of a protective barrier can be found in the Appendices.

Routes for pedestrian and site traffic should ideally be located outside, and diverted away from, the RPAs of the retained trees. Where this is not possible, temporary protective surfaces (ground protection) must be laid over the exposed RPAs which will distribute the weight of site vehicles, machinery or pedestrians whilst allowing moisture to reach the tree rooting area beneath. Such surfaces should be constructed in accordance with BS5837: 2012.

Access/Construction of Hard Surfacing

As almost the entire proposed driveway and parking areas falls within the RPAs of retained trees thorough consideration for ground protection during and post construction must be given. Failure to do so is likely to cause physiological stress to the trees which may lead to compromised conditions and/or early loss.

To allow access into RPAs during construction temporary ground protection must be laid. The position of this surfacing is highlighted as the 'Ground Protection Area' on the Tree Protection Plan. This surfacing must be installed using a no dig 'roll-out' technique and must be able to adequately distribute the weight of site traffic.

To provide adequate ground protection post construction the driveway must be able to distribute the weight of normal domestic traffic. This surfacing too must be installed using a no dig 'roll-out' technique. In addition, as the driveway is likely to cover more than 20% of the currently unsurfaced RPA of T1 and T4 the finished surface must be permeable in nature.

In order to provide access to the site from Chapel Lane an entranceway will need to be installed between T1 and T4. The majority of this new surfacing can be installed above the existing ground level using a no-dig, 'roll-out' technique. There is a small area of raised ground to the west of the boundary ditch that will need to be brought down to allow for a manageable gradient. The area in question is highlighted as 'Change in Ground Level' on the Tree Protection Plan. The area itself will make up no more than 6% of the currently unsurfaced RPA of either tree. This work may have a slight physiological effect on T1 and/or T4. Due to the tree's size and vigour any effects should be short lived and they should fully recover in the medium term.

To minimise any ill effects of the change in ground level the excavations should be kept to an absolute minimum. The works must be carried out using compressed air soil displacement and hand digging with the appropriate root protection and pruning protocols used.

Demolition

No demolition is required to facilitate the development.

Construction/ Foundation Design

Almost all the foundations of the proposed new dwelling sit outside the RPAs of retained trees. However slight incursions into the RPAs of T1, T8 and T10 will be necessary to accommodate the proposed dwelling. The extent of these incursions can be seen on the Development Proposal Plan in the Appendices. As these incursions are minor the use of traditional foundations with strip footing has been specified. Any adverse effects on these trees is highly unlikely and if issues did arise they would likely be both minor and short lived.

Utilities

All utilities will be brought onto site in a single trench positioned down the centre of the propose driveway. The position of the trench is highlighted in pink on the Development Proposal Plan in the Appendices. To minimise root damage the trench should be created using a combination of compressed air soil displacement and hand digging. Any roots encountered should be either removed or protected in an appropriate manner. Failure to do so may lead to compromised condition and/or early loss of retained trees.

Landscaping

The replanting of the removed trees that are covered by TPOs (T7 & T9) will require some consideration so as not to cause undue shading within the site. The trees should be replanted with those of an appropriate mature size and where possible not along the southern boundary of the site.

Any proposed fence lines may be constructed within the RPA if necessary, providing that appropriate considerations are made to the protection of the tree. This is providing that no continual trenching is undertaken (e.g. for small walls onto which panel fencing is installed). Excavation must be kept to a minimum and therefore only fence designs requiring intermittent posts will be acceptable within the RPA of retained trees.

Any patios, garden paths or other hard surfaces within RPAs which may not be shown on the plans provided may be constructed using no-dig techniques, providing that they do not cover more than 20% of the RPA and are implemented in accordance with BS5837: 2012. If there is any concern of damaging retained trees, further advice should be sought from a qualified Arboriculturalist.

No ground level changes are to be undertaken within the RPA of retained trees, unless otherwise stated or agreed with the appointed Arboricultural consultant or the LPA. The requirement to raise/lower ground levels within RPAs should be communicated to these parties at the earliest practical convenience.

Arboricultural Method Statement – Areas for Consideration

Operations that may need to be addressed by way of an Arboricultural Method Statement include;

- The installation of temporary ground protection in the Ground Protection Area as highlighted on the Tree Protection Plan
- Subterranean installation of utilities
- Installation of the proposed driveway
- Excavation of the area of raised ground adjacent to the site entrance as highlighted on the Tree Protection Plan

Appendix 1: Survey Schedule

Tree ID	Species	Maturity	Height (m)	Stem Diameter (mm)		RPA Radius (m)	Crown Spread (m)				Structural Condition			Category	Life Expectancy	Physiological Condition	Comments	Recommendations
				1	2		N	E	S	W	Crown	Stem	Basal					
T1	Sycamore	Mature	18	1000		12.0	5.5	8	5	8.5	Fair	Good	Good	A1	>40 yrs	Good	Heavily ivy clad. Recently crow spread reduction to NW not to BS. Two codominant stems with seemingly good union between.	Development Recommendation: Crown clean removing dead, dying, diseased and contacting branches. Remove ivy.
T2	Sycamore	Semi-mature	17	450		5.4	3.5	7	2.5	8	Poor	Good	Good	C2	20 to 40 yrs	Fair	Heavily ivy clad, suppressed by neighbouring sycamores.	Development Recommendation: Fell and remove stump.
T3	Laburnum	Semi-mature	5	100	140	2.1	3	3	4	3.5	Fair	Poor	Good	C2	10 to 20 yrs	Fair	Numerous decay points in crown.	Development Recommendation: Fell and remove stump.
T4	Sycamore	Mature	20	960		11.5	8	11	8.5	8.5	Good	Good	Good	A2	>40 yrs	Good		Development Recommendation: Crown clean removing dead, dying, diseased and contacting branches. Remove ivy.
T5	Sycamore	Semi-mature	18	640		7.7	5	9	8	6	Fair	Fair	Good	B1	20 to 40 yrs	Good	Notable cavity in main stem to SW at 5.5m. Minor deadwood.	Development Recommendation: Crow lift to 5-6m and crown clean removing dead, dying, diseased and contacting branches.

T6	Lime	Semi-mature	18	540		6.5	4.5	5	3.5	4	Fair	Fair	Good	B2	20 to 40 yrs	Fair	Ivy clad. Twin stemmed union adequate. Epicormic growth at base.	Development Recommendation: Crow lift to 5-6m, remove epicormic growth from lower stem and crown clean removing dead, dying, diseased and contacting branches.
T7	Birch	Semi-mature	17.5	370		4.4	3	2	1	2	Poor	Fair	Good	U	<10 yrs	Poor	In decline. Ivy clad. C rec remove.	Current Recommendation: Fell and replant.
T8#	Lime	Mature	20	700		8.4	7	5.5	6.5	5	Fair	Good	Good	B2	20 to 40 yrs	Good	Dense epicormic growth at base. Significant deadwood in western crown. Suppressed by T9.	Development Recommendation: Crow lift to 5-6m, remove epicormic growth from lower stem and crown clean removing dead, dying, diseased and contacting branches.
T9	Horse Chestnut	Mature	19	680		8.2	6	4	6.5	4	Good	Poor	Fair	U	<10 yrs	Good	Significant dead bark strips with signs of decay running from ground level to 12m. Torn out branch at 2.5m to east. Cavity present.	Current Recommendation: Fell and replant.
T10#	Lime	Mature	20	750		9.0	6	4	4.5	4	Fair	Good	Good	B2	>40 yrs	Good	Dense epicormic growth at base. Minor deadwood in western crown.	Development Recommendation: Crow lift to 5-6m, remove epicormic growth from lower stem and crown clean removing dead, dying, diseased and contacting branches.
T11	Laburnum	Mature	5.5	240		2.9	6	4	0	0	Fair	Poor	Poor	U	<10 yrs	Poor	Partial root plate failure in past. Stem leaning 50 degrees to north. Major wounds on stem following limb removals.	Current Recommendation: Fell and remove stump.

G1	A Group							3		3				C2	20 to 40 yrs		Group containing remains of lapsed Hawthorn hedge, cat C Holly and yew up to 5m, and other shrubs including Elder, Laurel and Black Thorn. Group is a notable but untidy green feature providing screening between the site and chapel lane.	Development Recommendation: Fell, remove stumps and reinstate hedge on frontage.
G2	A Group						3	8	3	6				C2	10 to 20 yrs		Group containing cat C holly trees up to 6m, a number of young saplings and shrubs. Provides very limited screening to south as no windows overlook and a 5ft boundary fence is present.	Development Recommendation: Fell and remove stumps.

Appendix 2: Glossary of Terms & Tree Descriptions

Tabular Headings

Tree ID: Unique reference number (tree tag number is when available)

Tree Type: Common name of tree

Height: Total height in meters either measure with a distometer or estimated

Maturity: Approximate age class of tree categorised to; Young (Y), Semi-mature (SM), Mature trees (M), Over mature trees (OM)

Physiological Condition: Health of tree taking into account vigour, presence of disease, and dieback. Categorised to; Good (G), Fair (F), Poor (P), Dead (D)

Next Survey: Timescale within which trees should be re-inspected. Frequency indicates the potential level risk posed by the trees. Categorised to; 6 months, 18 months, 36 months, 60 months

Comments: Explanation of significant defects present

Recommendations: Remedial work advised

Work Time Scale: Timescale within which tree work should be completed. Duration indicates level of work priority. Categorised to; 1 month (Urgent Priority), 3 months (High Priority), 1 year (Medium Priority), 3 years (Low Priority)

Retention Categories

Trees Unsuitable for Retention	
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. 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, or very low quality trees suppressing adjacent trees of better quality. *NOTE Category U trees can have existing or potential conservation value, which it might be desirable to preserve; see [BS5837: 2012]* ***4.5.7***

Tree to be Considered for retention	1 For Arboricultural Reasons	2 For Landscaping Qualities	3 For Cultural Values, Including Conservation
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years.	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue).	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features.	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture).

Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years.	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation.	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality.	Trees with material conservation or other cultural value.
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm.	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits.	Trees with no material conservation or other cultural value.

General Terms

Access facilitation pruning. One off tree pruning operation, the nature and effects of which are without significant adverse impact on tree physiology or amenity value, which is directly necessary to provide access for operations on site

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

Arboricultural Method Statement. Methodology for the implementation of any aspect of development that is within the root protection area, or has the potential to result in loss of or damage to a tree to be retained

Arboriculturist. Person who has, through relevant education, training and experience, gained expertise in the field of trees in relation to construction**Architecture.** In a tree, a term describing the pattern of branching of the
crown or root system

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

Basidiomycotina (Basidiomycetes). One of the major taxonomic groups of fungi; their spores are borne on microscopic peg-like strucres (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

Compartmentalisation. 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

Competent person. A person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached.

Compression fork. An acute angled fork that is mechanically optimised for the growth pressure that two or more adjacent stems exert on each other

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 condition 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. Site based operations with the potential to affect existing trees

Construction exclusion zone. Area based on the Root Protection Area from which access is prohibited for the duration of the project

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

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

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

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

Engineer-designed hard surfacing. Hard surfacing constructed within the 'Root protection area' of a tree, which will be designed by a structural or geotechnical; engineer in collaboration with an arboriculturist as set out in clause 7.4 of British Standard BS5837:2012. The purpose being to minimise the effects of the construction on the health of the tree.

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 there is a well-defined central main stem, bearing branches which are limited in their length, diameter and secondary branching (cf. decurrent)

Fastigiate. Having upright, often clustered branches

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

Field layer. Herbs, ferns, grasses and sedges

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

Ground layer. Mosses, ivy, lichens and fungi

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. The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

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

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, usually to a point just outside that of the previous cutting. 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 BS5837 (2012) Trees in Relation to design, demolition and construction

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

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 deadwood. Unless otherwise specified, this refers to the removal of all accessible dead, dying and diseased branchwood and broken snags

Included bark (ingrown bark). Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

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

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 endloading

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

Microdrill. 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)

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

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

Service. Any above- or below-ground structure or apparatus required for utility provision e.g. drainage, gas supplies, ground source heat pumps, CCTV and satellite communications

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

Silviculture. The practice of controlling the establishment, growth, composition, health, and quality of forests to meet diverse needs and values

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 microscopic and dispersed in air or water

Removal of major deadwood. The removal of, dead, dying and diseased branchwood 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

Rib. A ridge of wood that has usually developed because of locally increased mechanical loading. Often associated with internal cracking in the wood of the stem, branch or root.

Ring-barking (girdling)**.** The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Ripewood. The older central wood of those tree species in which sapwood gradually ages without being converted to heartwood

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 (RPA). Layout design tool indicating a national minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability and where the protection of the roots and soil structure is treated as a priority

Root zone. Area of soils containing absorptive roots of the tree/s described. 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

Tree Risk Assessment. An assessment and description of the risks and where appropriate the values associated with a tree or trees. The primary risk being considered is that from falling trees. Other risks, such as damage to infrastructure, interruption of service and building subsidence may also be considered

· Walkover – A general view of the tree population considered in the context of the adjacent land-use to identify trees that present significantly elevated risks

· Drive-by - A general view of the tree population from a moving vehicle and considered in the context of the adjacent land-use to identify trees that present significantly elevated risks

· Individual – the assessment of risks from a single tree considered in the context of the adjacent land-use to identify trees that present significantly elevated risks

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. Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour. The expression of carbohydrate expenditure to growth (in trees)

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. Principle above-ground structural component(s) of a tree that supports its 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

Structure. Manufactured object, such as a building, carriageway, path, wall, service run, and built or excavated earthwork

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

Tree Protection Plan. Scale drawing, informed by descriptive text where necessary, based upon the finalised proposals, showing trees for retention and illustrating the tree and landscape protection measures

Volunteer trees. Trees arising from natural colonisation rather than having been planted

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

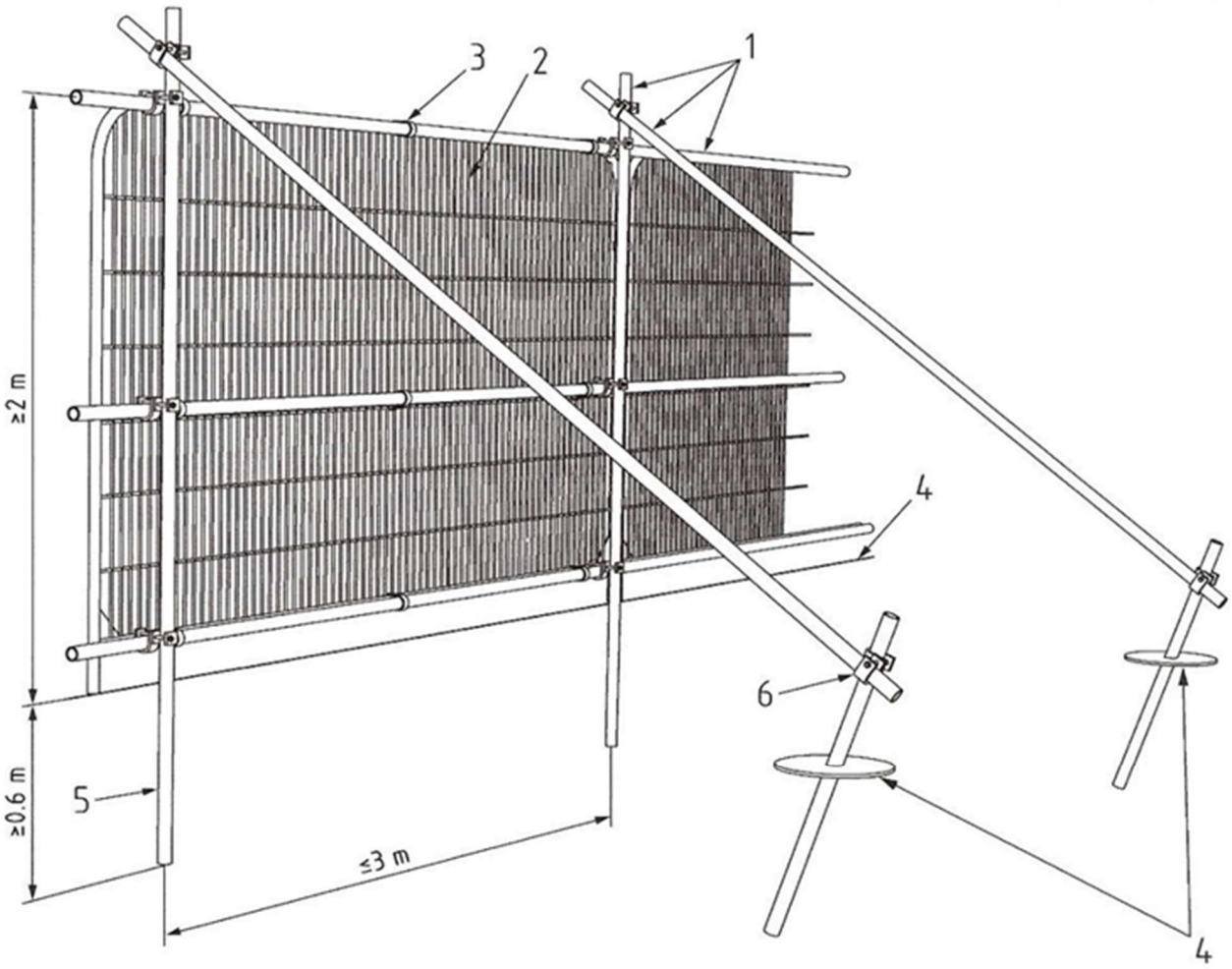
Wind pressure. The force exerted by a wind on a particular object

Windthrow. 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

Woundwood. Wood with atypical anatomical features, formed in the vicinity of a wound

Appendix 3: The Protective Barrier



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

Appendix 4: Guidelines & Limitations

All work must be to BS 3998: 2010 - 'Recommendations for tree work'.

Staff carrying out the work must be qualified, experienced contractors, and should be covered by adequate public liability insurance.

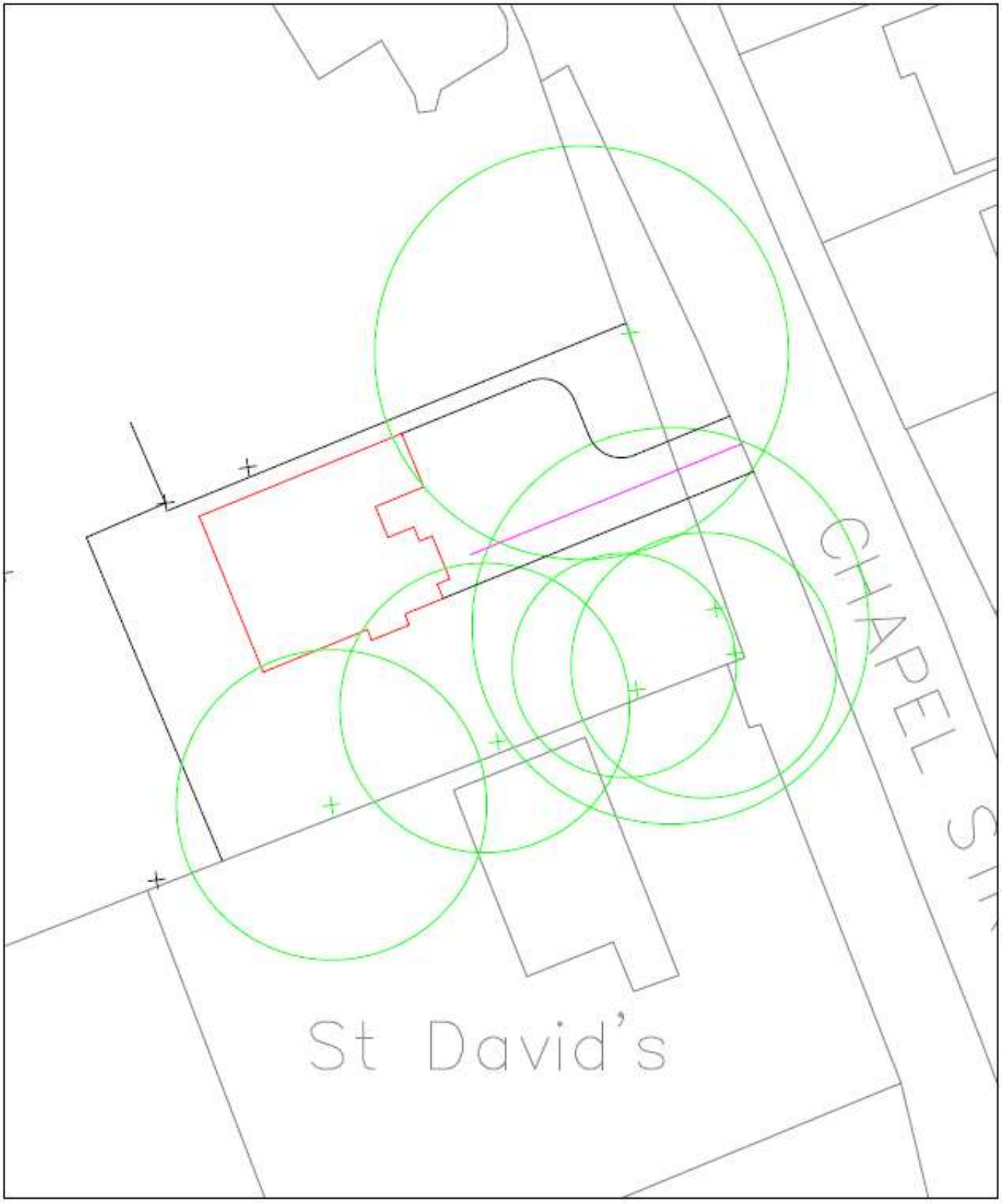
This report is based upon a visual inspection. The consultant shall not be responsible for events which happen after this time due to factors which were not apparent at the time, and the acceptance of this report constitutes an agreement with the guidelines and the terms listed in this report.

Any defects seen by a contractor or the employer that were not apparent to the consultant must be brought to the consultant's attention immediately.

No liability can be accepted by the consultant in respect of the trees unless the recommendations of this report are carried out as outlined and within the stated timescales.

It is advisable to have trees inspected by an arboricultural consultant regularly. In this instance it is recommended that these inspections are made as per the recommended re-inspection timings in this report. Furthermore it is recommended that trees be re-inspected following certain events. These include; severe weather events, significant changes to site usage, changes that affect wind loading on the trees (e.g. Removal of neighbouring trees, erection/demolition of buildings).

Appendix 5: Development Proposal Plan with RPAs



PROPOSED NEW DWELLING - CHAPEL ST, GOXHILL
SITE LOCATION PLAN 1 / 200 NOV 2017