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BS 5837:2012 Arboricultural Survey

Mill Lane, Bolsover.
for:

Dragonfly Developments Limited

MAN.1788.001.AR.R.002

'Experience and expertise working in union'

enzygo.com

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BS 5837:2012 Arboricultural Survey

Project:	Mill Lane, Bolsover
For:	Dragonfly Developments Ltd
Status:	Final
Date:	April 2021
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Contents

1.0 Non-Technical Summary

1.1 Arboricultural Survey

1.1.1 The site is an area of industrial land located off Mill Lane in Bolsover. The site is surrounded by housing and there are residential properties to the north and west, playing fields to the south and Oxcroft Lane and an arable field to the east. The site includes 4No. industrial units, storage yards and parking with a small area of soft landscaping in the southwest corner.

1.1.2 A tree survey in accordance with BS 5837:2012 was carried out by Enzygo Ltd. in April 2020. 28No. individual trees and 1 No. line of conifers (021) were surveyed on the site and within 15m of the boundary. The majority of trees on site were located on the plot boundaries and were a mix of native species with a prevailing age of early mature and generally of low arboricultural merit (BS retention category C1).

1.1.3 A review of Bolsover District Council Development Plan and Tree Preservation Order (TPO) data (26th July 2017) shows that the sites are not in a Conservation Area nor are there any TPOs in the red line boundary or within 15m. No other features of note were observed in proximity to the sites.

1.2 Design Recommendations

1.2.4 The site layout design should take into account the constraints posed by the trees and should seek to retain as many trees as possible to minimise effects of the development on the amenity of the site and the local landscape as well as ecological value of the site. The retention of trees described in this report as being of high or moderate value should be prioritised. It is also recommended to retain as much of the hedgerows as possible, comply with hedgerow regulations where applicable, minimise habitat loss and to provide screening.

1.2.5 *BS 5837:2012 Trees in relation to design, demolition and construction* chapters 5.2 and 5.3 describe the constraints posed by existing trees and outline the potential conflict between proposed structures and retained trees and how these can be avoided or minimised. New structures, hard surfaces, services and construction access should be designed outside the canopy spreads and Root Protection Areas (RPA) of retained trees as far as reasonably practicable. Lowering of ground levels within the RPA of retained trees is not acceptable. Specialist solutions to manage the conflict between the proposals and retained trees are available but may have an impact on costs of the construction phase considerably. These include access facilitation pruning, no-dig construction, temporary ground protection, specialist engineering for buildings and trenchless solutions for services.

2.0 Overview

2.1 Introduction

2.1.1 Enzygo Limited [Enzygo] has been commissioned by Dragonfly Developments Ltd. to prepare an Arboricultural Survey Report in accordance with BS 5837:2012 for the site at Mill Lane in Bolsover in support of a planning application for new housing.

2.1.2 This report assists the preparation of the site layout, allowing the designer to consider the arboricultural constraints, including the retention of trees of high and moderate value and/or trees which are found to be legally protected and the protection of above and below ground parts of retained trees.

2.2 Structure of the Report

2.2.1 **Chapter 2.0** provides a brief description of the site and its location.

2.2.2 **Chapter 3.0** summarises the planning background, including relevant planning policies.

2.2.3 **Chapter 4.0** summarises the findings of the Arboricultural Survey, describing the overall species mix, age, condition and value of the trees recorded on site.

2.2.4 **Chapter 5.0** provides both general and site-specific design recommendations to assist with the development of any future site layouts which are sympathetic to the existing trees.

2.3 Site Description

2.3.1 The site is in the administrative area of Bolsover District Council (BDC) in the county of Derbyshire. It is approximately 0.8km north of Bolsover town centre and 4.5km east of the M1 Junction 29A on the edge of an industrial area and countryside. The Site is in the existing urban area.

2.3.2 The Site is approximately 11,300m^2 [1.13ha] and is broadly square shaped and industrial in character, including four industrial buildings with associated parking to the front and service/storage yards to the rear. Mill Lane runs along its northern and western boundaries with the rear of residential properties off Oxcroft Lane along its eastern edge. There are playing fields to the south of the site with an overgrown landscaped area in the southwest of the site providing access to the playing fields from Mill Lane.

3.0 Planning Background

3.1 National Planning Policy Framework

3.1.1 The National Planning Policy Framework (NPPF) published by the government in July 2018 sets out the framework objectives for development in England. These are used by Local Planning Authorities (LPA) both during the preparation of their local planning policies as well as to guide them in making individual decisions for Planning Applications.

3.1.2 The NPPF sets out several objectives concerning the natural environment, including trees, woodland and hedgerows. In addition to broad objectives addressing biodiversity and the challenges posed by climate change (e.g. flood resilience, species selection) it encourages the enhancement of the natural and local environment by "*recognising […] the wider benefits from natural capital and ecosystem services including […] of trees and woodland*".

3.1.3 Paragraph 175C states "*development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exist*".

3.2 Local Planning Policy

3.2.1 Policy ENV8 Development affecting trees and hedgerows of the BDC Local Development Plan states "Planning permission will not be granted for development which fails to make allowance for important hedgerows or the canopy spread of protected trees or hedgerows or trees worthy of retention. A distance shall be left between the trunk of the tree and any new development equal to one half the mature height of the tree or 5metres, whichever is the greater.

- A greater area will be safeguarded where trees have extensive root systems or canopies, or where trees are growing on shrinkable clay soils.
- Where it is agreed that a protected tree may be felled in connection with the grant of planning permission for development a replacement tree will be required to be planted unless special circumstances dictate otherwise.
- During construction protective fencing around retained trees and hedgerows will be required to be erected."

3.2.2 For trees in Conservation Areas and those with TPOs the extract from BDC website reads; "*Tree Preservation Orders (TPOs) are used to protect selected trees and woodlands if their removal would have a significant impact on the environment and its enjoyment by the public. Priority for Tree Preservation Orders is generally given to trees which are considered under*

threat, for example where development is proposed. Trees in Conservation Areas may be protected by TPOs but where they are not, there is a duty to give us six weeks' notice in writing before carrying out any work". It should be noted that the site is not in a conservation area and a records check indicates there are no recorded TPOs within the survey boundary.

3.2.3 No green infrastructure networks have been identified within the Local Plan.

3.3 The Hedgerows Regulations 1997

3.3.1 An extract from BDC planning website highlights that "*Hedgerows represent some of the most important wildlife habitats in lowland Britain. The Regulations are intended to protect important hedges in the countryside. Anyone proposing to remove a hedge to which the Regulations apply must give the Council six weeks' notice and give the reason for seeking to remove it."*

3.3.2 As some of the hedgerows recorded in this survey are more than 20m long and located next to land used for agriculture, it needs to be investigated whether they fulfil one or more of the criteria set for "important hedgerows" in order to establish whether they are protected under the above regulations. Importance is defined by several both historical/archaeological and ecological factors listed in Schedule 1, Part II of the regulations and should be confirmed by the relevant consultants.

4.0 Arboricultural Survey

4.1 Overview

4.1.1 The arboricultural survey in accordance with BS 5837:2012 was carried out by Jon Coe (BSc [Hons] Arb. MArborA) of Jon Coe Tree Services Ltd in April 2020. At the time of the survey the trees were partially in leaf.

4.1.2 28 No. individual trees and one group of trees comprising a line of conifers were recorded during the walk-over survey. The conifers and individual trees are mainly located along the site boundaries however, there are some individual trees and large shrubs on internal industrial unit boundaries.

4.1.3 A schedule of all trees and tree groups recorded can be found in Appendix 1 – Arboricultural Survey Schedule.

4.2 Tree species

4.2.4 The majority of tree species recorded on site are of native or naturalised species, including silver birch (*Betula pendula*), hawthorn (*Crataegus monogyna*), cherry plum (*Prunus cerasifera*), common beech (*Fagus sylvatica),* and hybrid black poplar (*Populus x canadensis*).

4.3 Tree survey summary

4.3.1 The trees are generally early mature to mature and in good or fair condition. The best tree on site (BS category B- moderate value) is one tree which is located in the south-west corner of the Site, ref 029. However, the prevailing BS value is category C (low value). There are two category U Trees located in the western extent of the Site.

4.3.1 On the Site a line of confers ref 021, forms part of the eastern boundary. Individual trees are present on the site and are considered to be typically of limited value (especially large shrubs rather than trees).

4.4 Root Protection Areas (RPA)

4.4.2 The Root Protection Areas for each Category B to C tree and tree group has been calculated based on measured stem diameters. Both the radius and the area of each RPA are listed in Appendix 1 – Arboricultural Survey Schedule and shown on the plan included in Appendix 2 – Tree Survey and Constraints Plan.

4.5 Tree Preservation Orders and Conservation Areas

4.5.1 A review of Bolsover District Council Tree preservation order data set (26th July 2017) has confirmed that none of the trees included in this survey is protected by a Tree Preservation Order.

https://data.gov.uk/dataset/d2dc2e81-59fa-496b-8c94-8ab10ed20efa/tree-preservation-orders

4.5.2 The site is not in a Conservation Area.

4.6 Non-statutory Designations

4.6.1 There are no non-statutory designations present on the site.

5.0 Design Recommendations

5.1 General recommendations

5.1.1 Design decisions should be based on the recommendations in chapters 5.2 and 5.3 of *BS 5837:2012 Trees in relation to design, demolition and construction* which describe the constraints posed by existing trees and outline the potential conflict between proposed structures and retained trees and how these can be avoided or minimised.

5.2 Maximise tree retention

5.2.1 It is recommended that the site layout design accommodates the safe retention of any trees which have been assigned the retention categories A, B and C as far as practicable to retain the ecological value and the mature character of the site and to minimise the potential visual impact the development may have on the surrounding landscape. The retention of legally protected trees should be a priority.

5.2.2 The trees most desirable for retention are listed below:

Table 1 –Trees recommended for retention

Ref No.	BS cat.	Species	Reason for desirable retention
026, 027, 029	2no. C1 and 1No B1	Betula pendula - Silver birch	Would add a mature character to the Site boundary

5.3 Minimise residual effect of trees on development

5.3.1 In addition to the desired retention of existing trees as described in 5.2 above, it is advised to consider the impacts any retained trees would have on the development, including excessive shading of sensitive building elevations and open spaces and the increased requirement for routine tree management near built structures (i.e. regular crown reduction near buildings).

5.4 Minimise residual effect of development on retained trees

Proposed buildings, structures and hard surfacing

5.4.1 The site layout design should allow generous distances between vertical structures and tree canopies and allow for the expected future expansion of crowns.

5.4.2 The location of new structures and hard surfacing within the canopy spread of existing trees and tree groups should be considered carefully. Excessive management of these trees to facilitate any such elements may cause an imbalance of stem/crown ratio, unbalanced crowns or unnatural shape of specific tree species. The future requirement for continuous tree management to limit any conflicts should remain minimal.

5.4.3 Where built structures and hard landscape elements are proposed within the Root Protection Areas of existing trees, specialist methodologies may have to be adopted to manage the conflict. These solutions may have an impact on costs of the construction phase and it may be desirable to keep this to a minimum by developing a layout which is sensitive to the existing trees. Any vertical elements such as fences should be proposed at such a distance from tree stems as to allow for the future increase of the stem diameter and root buttresses.

Earthworks

5.4.4 Underground services and any proposed design elements requiring foundations (e.g. boundary treatments, street furniture, hard surfaces) should be placed outside of Root Protection Areas where possible.

5.4.5 Excavations for underground services may have an impact where they are proposed within the RPA of retained trees. Proposed above ground services may further conflict with parts of tree canopies.

5.4.6 The reduction of ground levels within the Root Protection Areas of retained trees are not acceptable. Where this cannot be avoided, the removal of the tree may have to be considered.

Construction operations

5.4.7 Demolition and construction operations near retained trees are likely to cause accidental damage of tree trunks and low hanging branches. Where possible, the design should allow for reasonable distances between new structures and above ground parts of retained trees, including sufficient clear working areas around those structures.

5.4.8 Vehicle and plant movement during demolition and construction may further cause ground compaction which could lead to irreversible damage of tree roots and the rooting environment within the RPA of retained trees. The construction phase plans should ensure that site access routes, site compounds and internal routes are proposed outside the Root Protection Areas (RPA) of retained trees.

Appendix 1 – Arboricultural Survey Schedule

Information recorded and symbols used

Ref - Sequential tree reference as per Tree Survey Plan

Species - Common name (*Scientific name*)

Ht (m) - Estimated tree height in metres

Stem dia (cm) - Stem diameter measured in accordance with BS5837:2012 Annex C

Canopy Spread - Estimated branch spread (in metres) at four cardinal points

Clear crown - Height of the lowest branch(es) including cardinal point(s) where applicable

Life stage -
- YNG - Young
- SM - Semi-mature
- EM - Early mature
- M - Mature
- OM - Over-mature (including veteran trees)

RULE - Remaining useful life expectancy estimated in years

Cond. - Overall condition -
- G - Good
- F - Fair
- P - Poor

Notes - Including observations and notes on:

Defects and other structural and physiological abnormalities, nesting birds, bat roost potential, notes on surrounding land incl. soil compaction, Tree Preservation Orders and Conservation Area, notes on limited access/inspection, off site location and preliminary management recommendations (in *italics*)

BS Cat. - retention category and sub-category in accordance with BS5837:2012

A - High Quality	1 - Mainly arboricultural value
B - Moderate Quality	2 - Mainly landscape value
C - Low Quality	3 - Mainly cultural value
U - Unsuitable for retention	

RPA (m) - Radius of Root Protection Area calculated in metres

(Radius of RPA= 12x stem diameter)

- This will usually be capped at 15m for trees with a stem diameter larger than 1.25m.

RPA (m^2) - Area of Root Protection Area (relevant if RPA is not circular due to pre-existing site conditions, incl. water courses, retaining structures and building foundations).

- This will usually be capped at 707m^2 for trees with a stem diameter larger than 1.25m.

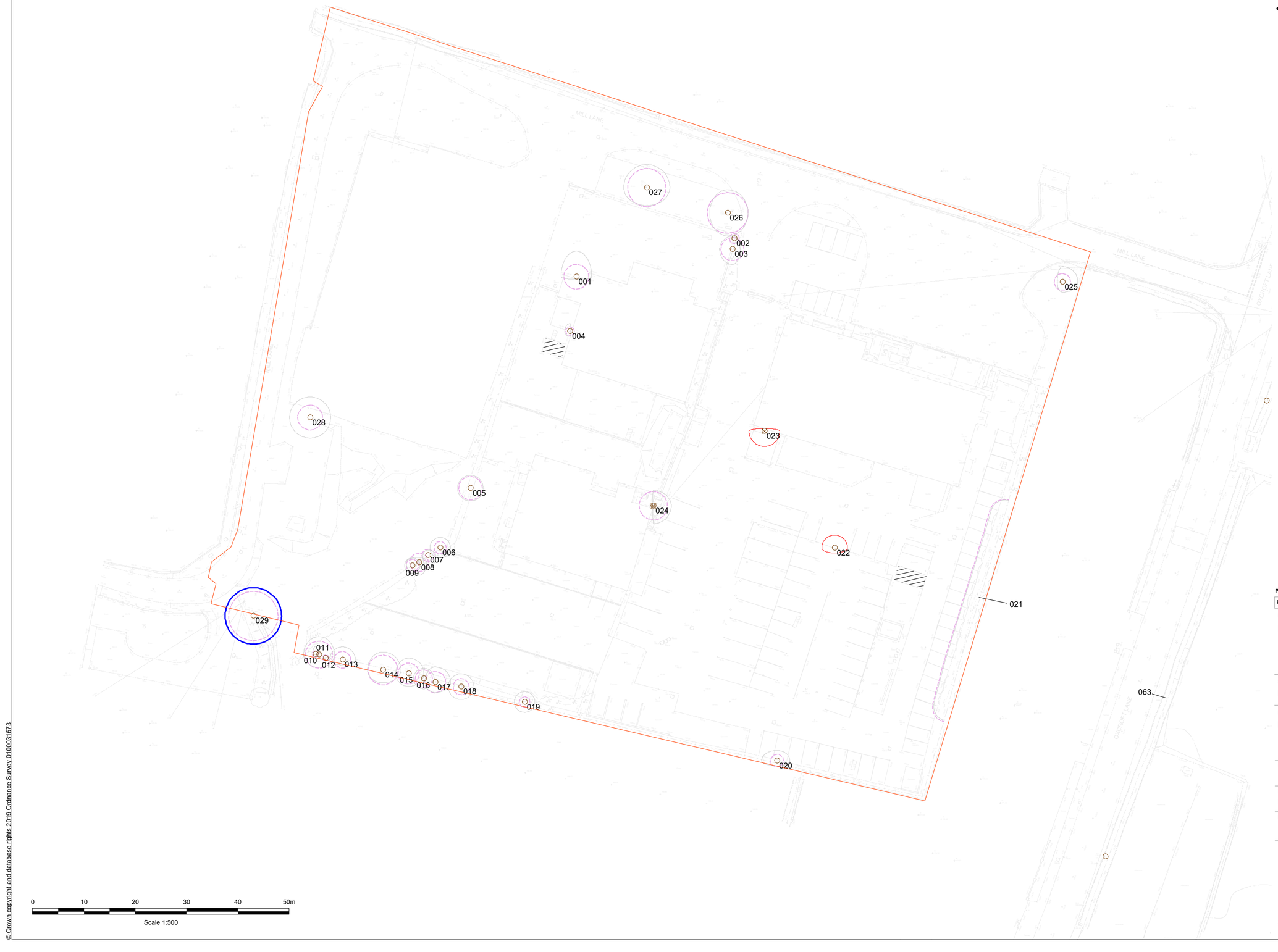
~ - estimated, used to indicate measurements which cannot be taken due to access restrictions (in particular stem diameters)

Ref	Species	Ht (m)	Stem dia (cm)	Canopy spread (m)				Clear crown	Life stage	RULE	Cond.	Notes (*Including preliminary management recommendations*)	BS Cat.	RPA (m)	RPA (m^2)
				N	E	S	W								
001	Goat willow (*Salix caprea*)	8	20	5	0.5	3	3	0	EM	10+	G	Low quality self-set, growing out of wall base.	C1	2.4	18
002	Silver Birch (*Betula Pendula)*	6	8	0.5	0.5	0.5	0.5	2	SM	20+	F	Very small self-set.	C1	1.2	5
003	Elder (*Sambucus nigra*)	5		2.5	3	1.5	2.5	0	EM	10+	G	Low quality self-set, growing out of wall.	C1	2.4	18
004	Common Ash (*Fraxinus excelsior)*	6	7	1.5	1	0	1	1	SM	10+	F	Low quality self-set, growing out of wall base. Likely to succumb to Ash Dieback disease in next few years.	C1	0.9	3
005	Elder (*Sambucus nigra*)	7	19	2.5	2.5	2.5	2.5	0	EM	10+	M	Self-set elder.	C1	2.4	18
006	Common Ash (*Fraxinus excelsior)*	7	10	2	2	2	2	1	SM	10+	F	Self-set, growing out of fenceline. Likely to succumb to Ash Dieback disease in next few years.	C1	1.2	5
007	Norway Maple (*Acer platanoides*)	8	10	1	2.5	1.5	1	1	EM	10+	G	Very low quality self-set, growing through fenceline - which is weakening both tree and fence.	C1	1.2	5
008	Sycamore (*Acer pseudoplatinus*)	9	15	1	2.5	1.5	2.5	1.5	EM	10+	G	Very low quality self-set growing through fenceline - which will weaken both the tree and the fence.	C1	1.8	10
009	Plum (*Prunus domestica*)	7	10	1.5	1.5	1.5	1.5	1	EM	10+	F	Low quality self-set growing out of fenceline.	C1	1.2	5
010	Silver Birch (*Betula Pendula)*	4	5	1.5	0	0.5	0.5	0.5	Y	10+	M	Very small young self-set.	C1	90	3
011	Japanese Cherry (*Prunus serrulata*)	9	22	3.5	2.5	3	3	0.5	M	20+	G	No significant issues observed.	C1	2.7	23
012	Common Ash (*Fraxinus excelsior)*	4	5	0	0.5	1	0	0.5	Y	10+	M	Very small self-set, likely to succumb to Ash Dieback disease in the next few years.	C1	90	3
013	Redcurrant (*Ribes rubrum*)	4		2.5	1	2.5	2.5	0	EM	20+	G	Large shrub	C1	1.8	10

Ref	Species	Ht (m)	Stem dia (cm)	Canopy spread (m)				Clear crown	Life stage	RULE	Cond.	Notes (*Including preliminary management recommendations*)	BS Cat.	RPA (m)	RPA (m^2)
				N	E	S	W								
014	Japanese Cherry (*Prunus serrulata*)	8	24	3.5	2.5	3.5	3	0.5	EM	10+	M	Structurally flawed - very tight low main union, with severe bark inclusion.	C1	3	28
015	Japanese Cherry (*Prunus serrulata*)	8	17	3	2.5	3	2.5	0.5	EM	20+	F	No significant issues observed	C1	2.1	14
016	Elder (*Sambucus nigra*)	6		2	2	2	2	0	SM	30+	F	Multi-stemmed clump.	C1	1.8	10
017	Japanese Cherry (*Prunus serrulata*)	7	17	3	2	3	2	0.5	EM	30+	F	No significant issues observed.	C1	2.1	14
018	Japanese Cherry (*Prunus serrulata*)	8	13	2.5	2.5	2.5	2.5	0.5	EM	30+	F	Various large bark wounds on stem.	C1	1.8	10
019	Japanese Cherry (*Prunus serrulata*)	7	8.6	2	2	2	2	0	SM	40+	F	Twin-stemmed, with major bark wounding on smaller stem.	C1	1.2	5
020	Goat Willow (*Salix caprea*)	9	10.3	2	1	2.5	3	1	SM	20+	F	Very low quality self-set, two adjacent stems.	C1	1.5	7
021	Lawson Cypress (*Chamaecyparis lawsoniana*)	9	Group arranged in a line/hedgerow					0		20+	F	Boundary row of Lawson cypress.	C2	RPA and crown outline extend into site by 3 m from fenceline	
022	Elder (*Sambucus nigra*)	6	17.3	2.5	1	2.5	2.5	0.5	EM	<10	M	Extremely low quality, in state of structural collapse.	U	2.1	14
023	Elder (*Sambucus nigra*)	9	25	0.5	3	3	3	2	OM	Dead	D	Dead tree, in gap between buildings.	U	3	28
024	Elder (*Sambucus nigra*)	10	23	3	3.5	3.5	0	0.5	EM	10+	G	Growing out of gap between building and metal staircase. Low quality self-set.	C1	3	28
025	Crab Apple (*Malus Sylvestris*)	7	13.5	3	2	3	1	2	M	10+	F	No significant issues observed	C1	1.8	10
026	Silver Birch (*Betula Pendula)*	12	33	4.5	4.5	4	3.5	2	M	10+	G	Has previously lost central leading stem - structurally flawed.	C1	4.2	55
027	Silver Birch (*Betula Pendula)*	12	31	4.5	3.5	4.5	4.5	2.5	EM	30+	F	No significant issues observed	C1	3.9	48

Ref	Species	Ht (m)	Stem dia (cm)	Canopy spread (m)				Clear crown	Life stage	RULE	Cond.	Notes (*Including preliminary management recommendations*)	BS Cat.	RPA (m)	RPA (m^2)
				N	E	S	W								
028	Salix caprea (Goat Willow)	8	20	4	4	4	4	0	EM	20+	G	No significant issues observed	C1	2.4	18
029	Silver Birch (*Betula Pendula)*	16	40	5.5	5.5	5.5	5.5	1.5	M	20+	G	Well-structured, attractive and prominent.	B1	4.8	72

Appendix 2 – Tree Survey and Constraints Plan



NOTES

- Do not scale from this drawing
- All dimensions are in meters unless stated otherwise
- This drawing is to be read in conjunction with all relevant drawings and documents associated with this project.
- All surveyed information including levels and layout is provided by others
- All existing and proposed dimensions, levels and locations to be checked and verified by the main contractor on site prior to the commencement of the works and any anomalies reported to the engineer.

KEY - Tree Survey and Tree Constraints Plan

Tree Categories BS 5837 (2012)

- Tree Category A
- Tree Category B
- Tree Category C
- Tree Category U

- Root Protection Area (RPA)
- Tree location (Topographic survey)
- Tree location (Estimated by Enzygo Ltd.)
- Site Boundary

Rev	Date	Description	DRA	CHK	APP
PL01	19.04.21	updated planning issue	NP	GB	GB

Project
Mill Lane Bolsover

Client
DragonFly Developments Limited

Drawing Title
Mill Lane, Bolsover
Tree Constraints Plan

Scale	Date	Status
1:500@A2	19/04/21	For Planning

Drawn	Designed	Checked	Approved
NP	NP	GB	GB

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Revision PL01

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Appendix 3 – Methodology

Introduction

This report and the methodology adopted to carry out the Arboricultural Survey is based on recommendations outlined in British Standard (BS) 5837:2012 Trees in relation to design, demolition and construction- Recommendations. This was published by BSI Standards Limited and came into effect on 30th April 2012. It supersedes BS 5837:2005 which is withdrawn.

Arboricultural Survey

A tree survey or arboricultural survey is a ground-based visual assessment of existing trees and tree groups on a site. It records the location of trees, the species, the estimated height and canopy spread, the stem diameter, and the tree's life stage, remaining useful life expectancy (RULE) and overall condition. Any distinctive features and abnormalities such as structural defects and physiological condition which may or may not have an adverse effect on the health or stability of the tree are also recorded, together with any signs of nesting birds and bat roost potential. Where ground conditions may influence the tree's growth, health and stability, such as water logging, ground compaction and severe level changes, this would also be recorded.

The site walkover includes an assessment of the overall value and quality of the trees on site by assigning a retention category to each tree and tree group. This assists stakeholders in deciding which trees should be removed or retained in the event of development occurring. There are four categories: A (high quality), B (moderate quality), C (low quality) and U (unsuitable for retention). For trees in categories A to C, these should qualify under one or more subcategories: 1 (mainly arboricultural qualities), 2 (mainly landscape qualities) and 3 (mainly cultural values).

The findings of the tree survey are recorded in an Arboricultural Survey Schedule supported by a Tree Survey and Tree Constraints Plan, both appended to the report.

The survey includes all trees which have a stem diameter of at least 75mm at 1.5m height or measured in accordance with BS 5837:2012 Annex C.

The tree survey usually records individual trees, but may also group trees of similar age, species and condition into groups. Trees may also be grouped where they form a homogeneous unit (e.g. tree belts and woodland groups) which is unlikely to be directly affected by the development. Hedgerows are also recorded where present.

The majority of trees are located as shown on the topographical survey. For those not shown on the topographical survey, a Garmin GLO GPS device with an accuracy of up to 3.0 m was used to record the location of individually described trees. The OTISS app by Intrinsica Technology further enabled the collection of data associated with each tree, such as species and stem diameters.

Following the completion of the site survey this is then uploaded into a Computer Aided Design (CAD) programme in order to produce the Tree Survey and Tree Constraints Plan, with the tree survey information converted into a corresponding Tree Survey Schedule.

The survey includes any trees outside the site boundary which may be affected by any development proposals by overhanging canopies or by Root Protection Areas which are likely to extend into the site. These trees are normally found within 15m from the site boundary.

In addition to a site walk-over survey, a desk-study is carried out which includes the calculation of Root Protection Areas (RPA) in accordance with BS 5837:2012 clause 4.6 as the minimum area of land around the stem of a tree which should be protected during construction.

In line with standing advice by the Forestry Commission and Natural England for any veteran trees on site, the Root Protection Area will be a “buffer zone around an ancient or veteran tree” which “should be at least 15 times larger than the diameter of the tree [and] 5m from the edge of the tree’s canopy if that area is larger than 15 times the tree’s diameter”.

The desk study includes liaison with the relevant local authority to establish whether any of the trees on site are protected by Tree Preservation Order (TPO) or whether Conservation Areas affect the legal status of any trees. Some local authorities provide online mapping tools on their website which identify any legal tree protection.

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