CAPITA

BS5837:2012 *Trees in relation to design, demolition and construction*

Belle Vue College, Cockerham Lane, Barnsley S75 1AT

14th November 2014



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1. Introduction

1.1 BRIEF

1.1.1 This report has been commissioned by Rebekah Pittard of Capita, 17 New Preston Road, Blackburn, BB2 1AU. We have been instructed to provide a report for the following site: Barnsley College, Belle Vue Campus, Cockerham Lane, Barnsley S75 1AT.

1.1.2 The report is required to address the following points of reference:

- To carry out a tree survey of the working areas on site and prepare a report and schedule classifying trees according to their suitability for retention.
- Carry out an Arboricultural Impact Assessment (AIA).
- Provide a Tree Protection Plan (TPP) detailing Root Protection Areas.
- Provide an Arboricultural Method Statement.

1.2 SCOPE OF THE REPORT

1.2.1 The tree positions included on the plans in the Appendices have not been plotted as part of a topographical land survey. These stem locations have been positioned without the use of electronic measuring equipment, using local landmarks as a reference and a tolerance of +/- 1m has been given to allow for measurement inaccuracies.

1.2.2 The trees on the site were surveyed from ground level using the Visual Tree Assessment methodology (*Ref. Body Language of Trees by C. Mattheck)*. None of the trees were climbed as part of this survey.

1.2.3 This report details the trees (on the site) that will have an influence on the development. Trees under 75mm in diameter have not been included in this survey (in accordance with BS 5837:2012 section 4.2.4 b). The surveyed trees are listed in the schedule in section 9 of this report.

1.2.4 No invasive decay testing equipment was used as part of this survey.

1.3 RELEVANT BACKGROUND INFORMATION

1.3.1 It has not been confirmed if there is a Tree Preservation Order (TPO) in effect on the trees on site or if the site is within a Conservation Area.

1.4 QUALIFICATIONS

1.4.1 I have based this report on my site observations and the information provided and I have come to the conclusions in the light of my experience. My qualifications include a Foundation Degree in Arboriculture. In addition I have experience in the utilities arboriculture industry, am a professional member of the Arboricultural Association and maintain an active continuing professional development programme. A detailed list of my Qualifications has been included in Section 7.

2. Data Collection

2.1 SITE VISIT

2.1.1 A site visit was carried out by the Author on Monday the 2nd of June 2014. The weather was fine with occasional cloud cover and no discernible breeze or rainfall, visibility was good. Access to all parts of the site was possible.

2.2 SITE DESCRIPTION

2.2.1 The surveyed area is Belle Vue Campus in Barnsley, located East of Cockerham Lane. It is located approximately 3/4 of a mile North of Barnsley town centre.

2.2.2 Cockerham Lane and Huddersfield Road form the boundary to the West of the site with railway lines to the South.

2.2.3 To the East of the site are the Honeywell Campus buildings. The properties in the immediate area are mainly residential.

2.3 DATA COLLECTION AND SCHEDULE

2.3.1 The data collected was recorded on pre-printed data collection sheets. The detailed results can be found in the tabulated survey schedule in Section 9. The recorded data categories have been summarised in the list below:

- tree location, measured from known datum points, and plotted on the site plan
- tree number is prefixed by a 'T' for individual trees ('G' for groups of trees and 'H' for hedges)
- tree species
- tree height
- trunk diameter, measured at 1.5m from the surrounding ground level and at the base for multi-stemmed trees
- tree crown spread in the four cardinal directions
- height from existing ground level of the first prominent branch and the direction of growth
- height of the lowest part of the crown above existing ground level
- relative vigour and vitality of the tree
- tree age classification
- the considered amenity value of the tree
- comments on notable conditions, problems, or peculiarities to do with the tree
- tree retention category in accordance with BS5837:2012 section 4.5

2.3.2 The information was manually recorded using the data sheets described.

3. Arboricultural Appraisal

3.1 BS 5837 Retention Categories

3.1.1 BS 5837 recommends that trees be evaluated and categorised according to their 'Retention Value'. These values are detailed in the Tree Data Survey Schedule and the pre-development values are summarized below. 16 individual trees and 1 hedgerow have been recorded by the surveyor as having the potential to be affected by the proposed development.

3.1.2 The tree stock on site is predominantly mature with some recent additional planting around the main building and the playing field edge. The trees mainly were found to be in good condition and it appears that the trees have been well maintained in the past. A full schedule of the tree stock can be found in Section 9.

3.1.3 Ivy was found across many trees on the site and it is recommended that this be removed to permit future inspections. T5 was found to be touching the building and this should be crown raised to clear the roof and prevent damage.



T5 touching the roof of Belle Vue

3.1.4 T40 was found to have 3 cavities, all on the main structural limbs. There is potential for these cavities to be bat roost sites. The cavity represent a structural compromise in the limbs of the trees however they also represent an ecological benefit. As a compromise, the end weight of the branches should be reduced to relieve stress on the limbs and reduce the risk to site users from failure whilst retaining the cavities.



Cavity on T40 (potential for bat roost)

3.1.5 T33 was found to be having a detrimental effect on the boundary wall, there is potential for further damage in the mid to long-term and the removal of this tree is recommended. G35 are small self-seeded trees growing through the fence and the removal of these trees is recommended to abate any nuisance.

4. Arboricultural Impact Assessment

4.1.1 The impact assessment is based upon the design proposal supplied which is shown in Appendix B; if the finalised proposal is radically different from that previously supplied the impact assessment will need to be reviewed.

4.1.2 After studying the proposed layout for 17 detached houses with a service road entering the site from Cockerham Lane and a mini pitch sports ground the arboricultural impacts are detailed below.

4.1.3 An existing building close to T1 (Cat C) and G45 (Cat B) will be demolished for the development with careful de-construction techniques employed harm to these trees will be within acceptable limits.

4.1.4 The construction of the access road requires the removal of T6, T7, T8 (Cat C) and G39 (Cat B). The loss of the individual trees will not have a significant impact on visual amenity and replacement planting will offset this loss in the short to medium term.

4.1.5 The loss of G39 (Cat B) a band of mixed tree species which transects the site will have greater impact on visual amenity. However this is limited to views within the site as topography and infrastructure restricts the view to this feature from outside the site. Mitigating tree planting around the development will offset this loss in the longer term.

4.1.6 For the construction of plots 9 & 10 T46 and T47 (Cat C) will be removed the loss of these two trees. The safe useful life expectancy is estimated at 10 to 20 years and therefore replacement planting would offset this loss in the medium term.

4.1.7 Trees retained close to the proposed properties Plot 1, 4, 5, 15 and 17 includes T1 (Cat C), T9 (Cat C), T40 (Cat C) and G41 (Cat B). Development is located outside the root protection zone and as such maintained protective fencing will ensure tree health. There may be a risk of over shading from of gardens and properties leading to requests for pruning or removal. Therefore the landscape planting scheme should take account of this and provide succession planting near to these trees. If in 10 or 20 years time the trees have out grown their location established trees are all ready present.

4.1.8 The construction of the mini pitch does not impact on existing trees.

5. Conclusions

5.1 There are 37 individual trees, 12 groups and 2 hedgerows recorded on site. Individual trees (T); 1 Category U tree, 4 Category B trees and 32 Category C trees.

5.2 Groups (G); 1 Category U group, 3 Category B groups and 8 Category C groups. Hedges (H); 1 Category C and 1 Category B hedge.

5.2.1 T6, T7, T8, T46, T47 (Cat C) and G39 (Cat B) will be removed for this development. The loss of these trees will have an impact in the immediate area of the site. These trees are screened by the topography and other infrastructure like the railway line and buildings.

5.2.2 Works recommended for all trees should be carried out regardless of whether the proposed development goes ahead or not in the interests of good arboricultural management.

5.2.3 Temporary protective fencing should be erected around the retained trees as shown on the Tree Protection Plan (TPP) in Appendix C.

5.2.4 Any future development scheme should offer mitigation planting to offset the trees proposed for removal which should be included in a landscaping scheme; this may be conditioned by the LPA.



Signed by David Holmes on behalf of Capita Symonds

6. Recommendations

6.1 MANAGEMENT WORKS RECOMMENDATIONS

6.1.1 The following works are recommended to minimise the risk to the users of the site and to maintain the trees in good Arboricultural management. These works should be carried out regardless of whether the development goes ahead or not.

Tree / Group No	Recommended works	Work Priority
T2	Crown Raise - 3m above building	4
T3	Crown Raise - 4m above sub-station	4
G4	Sever ivy	5
T5	Reduce from building / Sever ivy	3
T9	Sever ivy / Monitor	5
T10	Sever ivy	5
T11	Monitor	5
T14	Monitor	5
T21	Monitor	5
T27	Monitor	5
T28	Monitor	5
T33	Fell	4
G35	Fell	4
T40	Reduce branch end weight / Monitor	4
T43	Monitor	5
G45	Sever ivy	5
T50	Crown Thin 20% / CC	4
T51	Formatively Prune	5

6.1.2 Works priority reflects the level of risk posed by the tree and is included to inform the client of which trees require works as a priority. Priority 1 trees present a high risk to site users, priority 5 tree present a low risk.

6.1.3 Taking into account the likely level of use of the site, it is strongly recommended that the trees on the site are monitored on a regular basis, especially after stormy weather, for signs of crown, trunk, and root damage.

6.1.4 All tree work should be carried out to BS3998:2010 *Recommendations for tree work.*

6.1.5 Tree maintenance can be a hazardous profession, so it is important that all operatives have the necessary and relevant training, health and safety and insurance certification

7. Bibliography & Qualifications

7.1 BIBLIOGRAPHY

B.S.5837:2012 *Trees in relation to design, demolition and construction – Recommendations*. BSI Publications.

B.S.3998:2010 *Recommendations for tree work*. BSI Publications

QUALIFICATIONS

Tree Related Qualifications:

- Professional Member of the Arboricultural Association (M.Arbor.A)

  Professional membership from 2008.

- Foundation Degree in Arboriculture (FdSc Arb)

  This is considered to be a competent level of knowledge and education for Arboricultural consultants. Studied at Myerscough College, University of Lancashire, Bilsborrow. Three year full-time course - *Graduated 2008*.

Other Professional Qualifications

- Quantified Tree Risk Assessment

  Training and Licensing - *November 2008* (updated September 2010 and October 2012 and November 2013)

- A Practitioners Guide to Visual Tree Analysis

  Training and Licensing - *March 2009* (updated October 2012)

8. Tree Data Schedule

EXPLANATORY NOTES FOR TREE DATA SCHEDULE

- The tree locations have not been plotted as part of a land survey/topographical survey. These stem locations have been positioned without the use of electronic measuring equipment. The accuracy given for the tree stem locations is ±1m.
- The tree species is given in the common name
- The tree height is measured using geometrical similar triangles methodology, and is given an accuracy of ± 2m.
- The trunk diameter is measured at 1.5m from the surrounding ground level. The accuracy is given as ± 50mm.
- The tree crown spread is measured at the four cardinal directions. The accuracy for the measurement is given as ± 1m
- The height of the first significant branch is given an accuracy of ± 0.5m
- The height of the lowest branch in the crown is given an accuracy of ± 500mm
- The Maturity is defined as follows;

  Y- Young; establishing trees, should be fast growing, primarily in height than spread but only having a limited impact upon the landscape.

  EM- Early Mature; established young trees should be fast growing, primarily in height than spread but having some impact upon the landscape.

  M- Mature; well established trees still developing with some vigour but now have filled out, increasing in crown spread. In middle or half of useful life expectancies

  OM- Over Mature; fully mature with declining vitality and likely to have features that could be regarded as potential faults, such as large ponderous branches and old wounds. Likely also to have high visual amenity value

  V- Veteran tree which can survive for many years, with health growth continuing although the tree may be of low vitality. Crown size is usually reducing through natural branch loss or tree management. Sites of decay are normally present which may represent a hazard to public or property. These trees have high conservation or historic or amenity value.

- **The physiological condition**: is an assessment of relative vitality of the tree are indicated by Dead; Poor; Fair; and Good. Dead or Moribund growth / dead; Poor = low vigour and declining growth, many dead twigs and branches within the outer crown; Fair = normal growth and twig extension; Good = very good growth extension, normally found in young and young mature specimens.

- **The structural condition:** Is an assessment of the condition of the structural form of the tree which includes the branching system and stem and buttresses. Good; no obvious structural defects; basically a sound tree. Fair; minor or potential incipient defects that may require remedial tree work to reduce the risks to public safety. Poor; defects that are likely to result in actual failure in the medium to long term, not foreseeable in the short term. OD Obvious defects; the tree has already suffered significant level of structural failure and is at risk of collapse in whole or part in the short term.

COMMENTS: Notes the condition, problems, or peculiarities to do with the tree.
LIFE EXPECTANCY: An estimate of the length of time in years that a tree might be expected to continue to make a useful contribution to the locality at an acceptable level of risk (based on an assumption of continued maintenance). <10 = Less than 10 years; 10-20 = 10 to 20 years; 20-40 = 20 to 40 years; 40+ = more than 40 years.

RETENTION CATEGORY: Trees are classed as category U, A, B or C, based on criteria given in BS5837:2012; summary definitions as follow (see BS5837 for further details). Categories A, B and C are further characterised by the use of sub-categories: (1) refers to qualities of the tree of an arboricultural nature, (2) indicates qualities concerned primarily with their situation within the landscape and (3) refers to other values such as those of a cultural, historic or ecological nature. Examples of these qualities for each of the three categories are given below, although these are indicative only.

U UNSUITABLE TREES (●): Defective, poor or negligible specimens, not worthy of retention within a developed site. Trees whose existing value would be lost within 10 years, or which should be removed on grounds of sound Arboricultural management (e.g. trees that will be left unstable by other essential works; poor quality that are trees suppressing better specimens.*)*

A HIGH RETENTION VALUE (●): Important or valuable trees or groups of trees that are likely to make a substantial contribution to the locality for 40 years or more.
Notably fine specimens; rare or unusual specimens; essential component trees within groups, semi-formal or formal plantings (e.g. dominant trees within an avenue etc.)
Trees, groups or woodlands of particular screening benefit in relation to views into and out of the site; those of notable visual importance (including avenues & other features that may be assessed collectively as groups)
Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees)

B MODERATE VALUE (●): Trees or groups of some importance and likely to make a significant contribution for in excess of 20 years.

Fair quality but not notably fine; good specimens showing some impairment (e.g. remediable defects, minor storm damage or poor past management.)

Numbers of trees, groups or woodlands forming distinct landscape features that are of higher collective value than they would warrant as individuals (e.g. non category A trees within avenues). Also trees internal to the site that are of little visual impact within the wider locality.

Trees, groups or woodlands with clearly identifiable conservation or other cultural benefits.

C MINOR VALUE (●): Trees or groups of rather low quality, but capable of retention for at least approx. 10 years, e.g. until new planting is established. Also small, young trees (below 15cm diameter) whose loss would be easily mitigated by new planting, or which would be capable of transplanting.

Retainable (for the present), but not trees that represent a significant constraint

Secondary specimens within groups or woodlands whose loss would not greatly diminish their landscape value; trees providing only minor or short term screening benefit

Trees with very limited conservation or other cultural benefit.

ROOT PROTECTION AREA (RPA): This is the area in square metres formed by a circle of radius (the Protection Radius) twelve times the effective stem diameter of the tree. For multi-stemmed trees, trees with two to five stems are calculated by measuring each stem at 1.5m, squaring these dimensions and adding them together to give a compound measurement. Trees with more than five stems are calculated by measuring each stem at 1.5m, a mean average is taken from these dimensions which is squared and then multiplied by the number of stems. The RPA represents the minimum area of soil that the tree requires to support a healthy and effective root-system and is the basis whereby the layout of the Construction Exclusion Zone (CEZ) is determined. This should encompass an area equal to the RPA but its form may be adapted in the light of Arboricultural considerations and pre-existing physical constraints. The CEZ should be protected by sturdy temporary fencing (see BS5837:2012) throughout the entire process of site preparation and construction.

9. Tabulated Tree Data Schedule

Tree / Group No.	Species	Height	Dia @ 1.5m	Crown Spread				First Branch Height/Direction	Crown Clearance	Age Class	Physiological Condition	Structural Condition	Management Recommendations	Remaining Contribution	Retention Category
				N	E	S	W								
H1	Privet (*Ligustrum spp.*)	3	≤ 100	5	5	5	5	0:N	0	Early Mature	Good	Good - maintained hedge	No works required	20-40	B2
T2	Sycamore (*Acer pseudoplatanus*)	14	640	6	6	6	6	4:N	2	Mature	Fair	Fair - ivy cover / moderate vigour	Crown Raise - 3m above building	10-20	C1
T3	Sycamore	15	450	6	3	4	6	2:N	2	Early Mature	Good	Fair - bifurcates @ 3m / low clearance over sub-station	Crown Raise - 4m above sub-station	10-20	C1
G4	Holly *(Ilex aquifolium*)	10	≤ 400	3	3	4	3	0:N	0	Mature	Good	Fair - ivy cover / minor stem damage	Sever ivy	10-20	C2
T5	Lime *(Tilia spp.*)	20	800	8	7	7	6	5:N	1	Mature	Good	Good - ivy cover / touching building	Reduce from building / Sever ivy	20-40	B1
T6	Birch (*Betula spp.)*	12	240	3	3	3	4	2:N	1	Early Mature	Good	Fair - thin crown	No works required	10-20	C1
T7	Damson (*Prunus spp.*)	6	280	3	3	2	2.5	0:N	1	Mature	Good	Fair - co-dominant	No works required	10-20	C1
T8	Damson	5	200	1	2	2	3	0:N	1	Mature	Good	Fair - co-dominant	No works required	10-20	C1
T9	Sycamore	18	430	7	7	7	7	0:N	2.5	Mature	Good	Fair - co-dominant / cavity - ivy cover	Sever ivy / Monitor	10-20	C1
T10	Holly	11	380	3	3	3	3	0:N	0	Mature	Good	Fair - ivy cover	Sever ivy	10-20	C1

Tree / Group No.	Species	Height	Dia @ 1.5m	Crown Spread				First Branch Height/Direction	Crown Clearance	Age Class	Physiological Condition	Structural Condition	Management Recommendations	Remaining Contribution	Retention Category
				N	E	S	W								
T11	Mulberry (*Morus spp.*)	8	600	4	3	5	3	2:N	1	Mature	Good	Poor - cankers to stem / decay to main stem / deadwood	Monitor	10-20	C1
G12	Holly	8	≤ 200	3	3	3	3	0:N	1	Early Mature	Good	Fair - multi-stemmed / basal damage	No works required	10-20	C2
T13	Birch	12	450	4	3	5	3	2:W	3.5	Mature	Good	Fair - asymmetric crown / suppressed by T14	No works required	10-20	C1
T14	Horse Chestnut (*Aesculus hippocastanum*)	15	710	3	3	3	3	3:S	0.5	Mature	Good	Fair - canker to main stem & scaffold limbs / radial cracks to limbs	Monitor	10-20	C1
T15	Whitebeam (*Sorbus aria*)	14	650 e	3	6	4	5	0:N	0	Mature	Good	Fair - multi-stemmed / dense epicormic	No works required	10-20	C1
T16	Oak (*Quercus robur*)	17	600	7	6	6	5	4:N	1	Mature	Good	Good - previously side-pruned	No works required	20-40	B1
T17	Beech (*Fagus sylvatica*)	18	900	9	5	8	7	3:N	1	Mature	Good	Fair - leaning stem / asymmetric crown	No works required	10-20	C1
T18	Oak	16	720	10	8	8	5	3:N	2	Mature	Good	Good - bifurcates @ 3m	No works required	20-40	B1
T19	Whitebeam	12	460	8	6	4	5	3:N	2	Mature	Good	Fair - leaning stem / asymmetric crown / included unions / suppressed by T18	No works required	10-20	C1
T20	Lime	14	450 e	6	5	5	4	4:W	0	Mature	Good	Good - poor access	No works required	20-40	B1
T21	Ash (weeping) (*Fraxinus excelsior 'Pendula'*)	6	600	3	4	7	3	3:W	0	Mature	Good	Fair - storm damage / partially attached limbs / poor pruning	Monitor	10-20	C1

Tree / Group No.	Species	Height	Dia @ 1.5m	Crown Spread				First Branch Height/Direction	Crown Clearance	Age Class	Physiological Condition	Structural Condition	Management Recommendations	Remaining Contribution	Retention Category
				N	E	S	W								
H22	Holly	3	≤ 150	0.5	0.5	0.5	0.5	0:N	0	Young	Good	Fair - sporadic hedge occurring from stump re-gen	No works required	10-20	C2
T23	Holly	6	300	2.5	2.5	2.5	2.5	1:E	1	Early Mature	Good	Fair - bifurcates @ 2m	No works required	10-20	C1
T24	Norway Maple (*Acer platanoides*)	18	700	8	7	8	5	2:N	3	Mature	Good	Fair - bifurcates @ 3m / canker to scaffold limb	No works required	10-20	C1
T25	Holly	8	380	5	3	3	3	3:N	1.5	Mature	Good	Fair - bifurcates @ 2.5m / minor stem damage	No works required	10-20	C1
T26	Holly	10	350	3	3	3	2	2:N	1.5	Mature	Good	Fair - bifurcates @ 2m / minor stem damage	No works required	10-20	C1
T27	Ash (*Fraxinus excelsior*)	18	900	8	7	8	8	6:N	5	Mature	Fair	Fair - reduced in past (with associated decay at pruning wounds) / exposed & damaged roots / deadwood / low vigour	Monitor	10-20	C1
T28	Sycamore	11	380	3	4	5	4	3:N	0	Early Mature	Poor	Poor - squirrel damage / previous failures & associated decay / dieback	Monitor	10-20	C1
G29	Holly & shrubs	6	≤ 150	2	2	2	2	0:N	0	Early Mature	Good	Fair - mixed group growing as understorey (largely self-seeded)	No works required	10-20	C2
T30	Ash	10	310	3	3	2	2	2:N	2	Young	Good	Fair - included union @ 1m / self-seeded close to wall / asymmetric crown	No works required	10-20	C1
T31	Alder (*Alnus spp.)*	12	360	3	3	3	3	2.5:N	1.5	Early Mature	Good	Good - self-seeded close to wall	No works required	10-20	C1
G32	Goat Willow *(Salix caprea)*/ Sycamore	9	≤ 140	2	2	2	2	0:N	0	Young	Good	Fair - self-seeded / multi-stemmed	No works required	10-20	C2

Tree / Group No.	Species	Height	Dia @ 1.5m	Crown Spread				First Branch Height/Direction	Crown Clearance	Age Class	Physiological Condition	Structural Condition	Management Recommendations	Remaining Contribution	Retention Category
				N	E	S	W								
T33	Sycamore	15	450 e	7	5	5	6	0:N	1	Early Mature	Good	Fair - bifurcates @ 2m / sub-dominant limb / ivy cover / damage to wall / overhanging railway embankment	Fell	<10	U
G34	Goat Willow	6	≤ 200	3	3	3	3	0:N	1	Young	Good	Fair - self-seeded / multi-stemmed	No works required	10-20	C2
G35	Sycamore	6	≤ 100	1.5	1.5	1.5	1.5	0:N	1	Young	Good	Poor - self-seeded next to fence	Fell	<10	U
T36	Alder	8	120	2	2	2	2	1:N	1	Young	Good	Fair - stake in-situ	No works required	10-20	C1
T37	Alder	8	110	2	2	2	2	1:N	1	Young	Good	Fair - stake in-situ	No works required	10-20	C1
T38	Rowan (*Sorbus aucuparia*)	8	80	2	2	2	2	1:N	1	Young	Good	Fair - multi-stemmed / minor crossing branches	No works required	10-20	C1
G39	Cedar (*Cedrus spp.*)/ Cherry (*Prunus spp.*) / Hawthorn (*Crataegus spp.*)/ Holly / Lime / Plane (*Platanus x hispanica*) / Robinia (*Robinia pesudoacacia*)/ Sycamore	18	≤ 750	5	5	6	6	0:N	0	Mature	Good	Good - defines boundary between sites	No works required	10-20	B2

Tree / Group No.	Species	Height	Dia @ 1.5m	Crown Spread				First Branch Height/Direction	Crown Clearance	Age Class	Physiological Condition	Structural Condition	Management Recommendations	Remaining Contribution	Retention Category
				N	E	S	W								
T40	Ash	16	720	6	10	7	5	4:W	3	Mature	Good	Fair - cavities noted on 3 scaffold limbs in upper crown - POTENTIAL BAT ROOST	Reduce branch end weight / Monitor	10-20	C1
G41	Plane	18	≤ 730	9	12	12	8	0:N	3	Mature	Good	Good - previously thinned	No works required	20-40	B2
G42	Hawthorn / Sycamore	18	≤ 450	3	5	5	5	0:N	4	Mature	Good	Good - asymmetric crowns	No works required	20-40	B2
T43	Sycamore	18	540	5	8	8	4	2.5:N	4	Mature	Good	Fair - co-dominant stems / included unions	Monitor	10-20	C1
T44	Mulberry	8	160	2	3	3	3	1:N	1	Early Mature	Good	Fair - minor torn-out limb (removed) / exposed & damaged roots	No works required	10-20	C1
G45	Horse Chestnut / Laburnum / Lime / Sycamore	20	≤ 700	5	4	5	4	0:N	0	Mature	Good	Fair - canker to Horse Chestnut (progressively worse running West to East) / ivy cover / close to fence	Sever ivy	20-40	B2
T46	Aspen (*Populus tremula*)	20	780	10	8	10	8	4:W	3	Mature	Fair	Fair - minor storm damage / asymmetric crown	No works required	10-20	C1
T47	Aspen	20	900	6	10	12	8	3:N	2	Mature	Fair	Fair - asymmetric crowns	No works required	10-20	C1
G48	Ash / Lime / Norway Maple / Sycamore	12	≤ 350	3	5	4	3	0:N	2	Early Mature	Good	Good - previously pruned / minor crossing branches	No works required	10-20	C2

Tree / Group No.	Species	Height	Dia @ 1.5m	Crown Spread				First Branch Height/Direction	Crown Clearance	Age Class	Physiological Condition	Structural Condition	Management Recommendations	Remaining Contribution	Retention Category
				N	E	S	W								
G49	Hornbeam (*Carpinus betula*) / Lime / Rowan	12	≤ 330	3	4	4	4	0:N	2	Early Mature	Good	Good - suppressed rowan / minor crossing branches	No works required	10-20	C2
T50	Cherry	10	520	6	6	5	6	2:N	2	Mature	Good	Good - exposed & damaged roots / minor crossing branches	20% Crown Thin Crown Clean	10-20	C1
T51	Rowan	8	230	3	4	3	3	2:N	2	Mature	Good	Good - minor crossing branches	Form. Prune	10-20	C1

Appendix A - Development within the root protection zone

A.1 **Development within the root protection area**

A.1.1 The zone of influence for the rooting area of a tree has been determined using the calculation outlined in Table 2, of section 4.6 of BS5837:2012 Trees in relation to construction – Recommendations. This calculation utilises the diameter of the trunk, at a height of 1.5m from the surrounding ground level; and calculates the Root Protection Area (RPA) by multiplying the diameter by a value of 12; the result is then used to calculate the total area (m²) of the RPA.

A.1.2 The table below shows the RPA for the trees on the site; these have been illustrated on the Tree Protection Plan (TPP) in Appendix C.

A.1.3 **Individual trees**

Tree Identification Number	Tree Diameter @1.5m (in mm)	RPA Radius (m)	RPA (m²)
H1	≤ 100	1.2	N/A
T2	640	7.8	191
T3	450	5.4	92
G4	≤ 400	4.8	N/A
T5	800	9.6	290
T6	240	2.7	23
T7	280	3.6	41
T8	200	2.4	18
T9	430	5.4	92
T10	380	4.8	72
T11	600	7.2	163
G12	≤ 200	2.4	N/A
T13	450	5.4	92
T14	710	8.4	222
T15	650 e	7.8	191
T16	600	7.2	163
T17	900	10.8	366
T18	720	8.4	222
T19	460	5.7	102

Tree Identification Number	Tree Diameter @1.5m (in mm)	RPA Radius (m)	RPA (m^2)
T20	450 e	5.4	92
T21	600	7.2	163
H22	≤ 150	1.8	N/A
T23	300	3.6	41
T24	700	8.4	222
T25	380	4.8	72
T26	350	4.2	55
T27	900	10.8	366
T28	380	4.8	72
G29	≤ 150	1.8	N/A
T30	310	3.6	41
T31	360	4.5	64
G32	≤ 140	1.5	N/A
T33	450 e	5.4	92
G34	≤ 200	2.4	N/A
G35	≤ 100	1.2	N/A
T36	120	1.2	5
T37	110	1.2	5
T38	80	0.9	3
G39	≤ 750	9	N/A
T40	720	8.4	222
G41	≤ 730	8.7	N/A
G42	≤ 450	5.4	N/A
T43	540	6.3	124
T44	160	1.8	10
G45	≤ 700	8.4	N/A
T46	780	9.6	290
T47	900	10.8	366
G48	≤ 350	5.4	N/A
G49	≤ 330	3.9	N/A
T50	520	6.9	113
T51	230	2.7	23

A.1.4 These values indicate the soil around the base of the tree to be retained undisturbed. Radius measurements should be taken from the main stem of each tree in the group. This area should be protected with vertical barriers and considered sacrosanct. Signs should be erected on the fencing to indicate that the area is a Construction Exclusion Zone (CEZ).

A.2 Barriers, ground protection and construction within the RPA

A.2.1 Section 7.4 of BS5837:2012 outlines the design of vehicular access in proximity to trees. Any design within this area should be constructed with a no-dig design, to avoid root loss or damage due to excavation.

A.2.2 The surfacing should ideally incorporate a 3D cellular confinement system, which is capable of evenly distributing the weight of traffic regularly accessing the site. The site specific requirements will require the involvement of a structural engineer and an Arboriculturist in order to ensure it is fit for purpose. The driveway hard surfacing should have a permeable, gas-porous finish.

Appendix B – Proposal

Proposed development



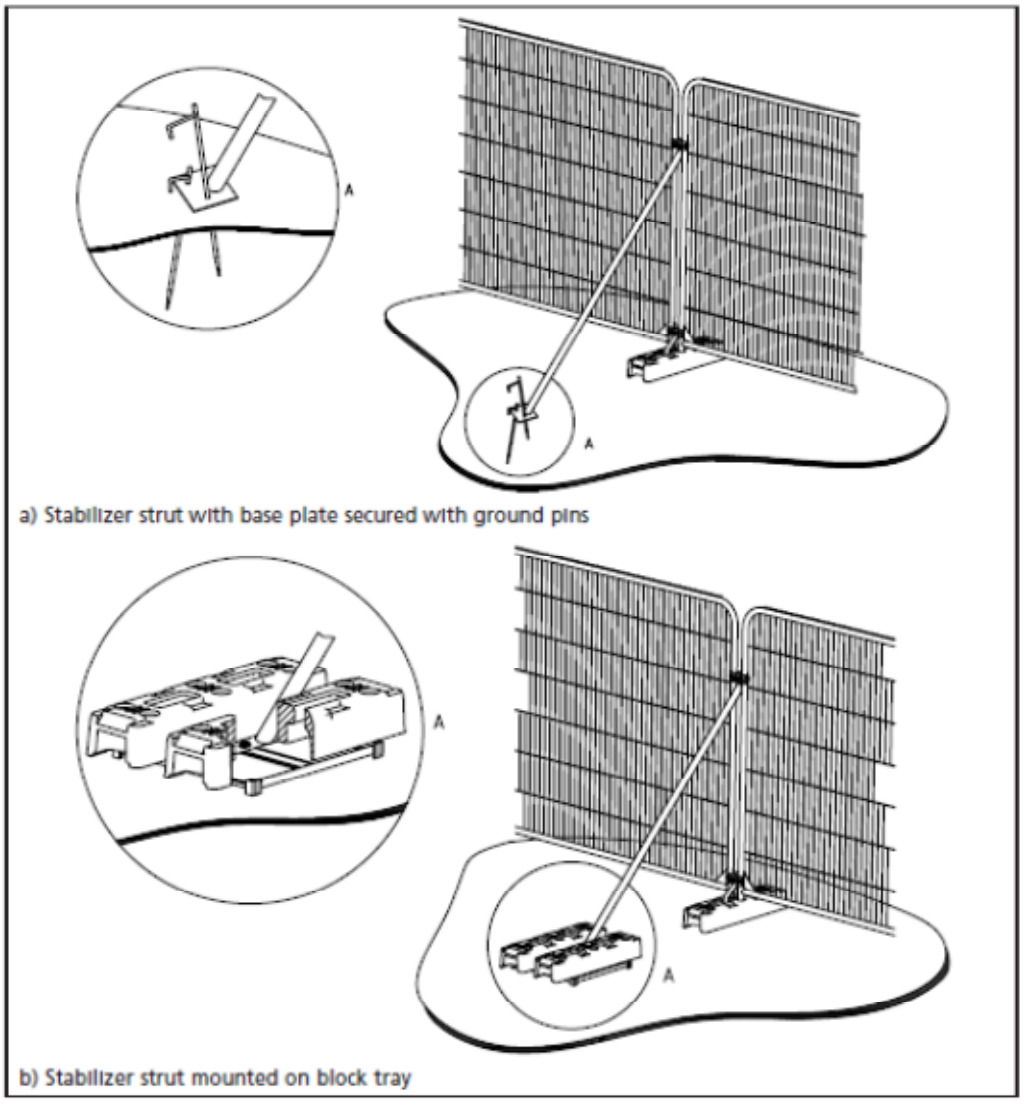
Appendix C - Tree Protection Plan

Drawing number :- “BELLE_VUE_TPP_O1_REV1”

(*see attached sheet*)

Appendix D –Temporary fencing

Figure 3 **Examples of above-ground stabilizing systems**



Temporary fencing using above ground stabilisation

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