



BS 5837:2012 Tree Survey and Arboricultural Impact Assessment

The Clifden Arms

Clifden Rd, Worminghall, Aylesbury HP18 9JR

Report Reference: 301221/RP/CA

Tree Constraints Plan Reference: AA.TCP.01

Surveyor and Author: Rebecca Peace, HND. Am Horticulture
LANTRA Accredited Professional Tree Inspector
Registered QTRA User
Professional Member of the Consulting Arborists Society (CAS)

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Client:	Robert Porter- Smith
Report Ref No:	301221/RP/CA
Site details:	Side garden of The Clifden Arms, Clifden Rd, Worminghall, Aylesbury HP18 9JR
Date of Site Inspection:	30th of December 2021
Proposal:	Construction of a single storey Events building near to public house
Report Author and Surveyor:	Rebecca Peace, HND. Am Horticulture LANTRA Accredited Professional Tree Inspector, Registered QTRA User Professional Member of the Consulting Arborists Society (CAS)

1.0 Instruction and the Purpose of the Survey and Report

- 1.1 This report provides an Arboricultural Impact Assessment (AIA) and Tree Constraints Plan in preparation for a new construction of a single storey events building adjacent to the Clifton Arms Public House.
- 1.2 This report is principally to support any planning applications to show that all legislation, building placement responsibilities and tree protection regulations are fully understood and will be implemented before and during construction of the new structure.
- 1.3 The initial Tree Survey, Arboricultural Impact Assessment (AIA) and Tree Constraints Plan are compliant with BS5837:2012 (Trees in relation to design, demolition and construction – Recommendations) as requested by Robert Porter- Smith
- 1.4 The survey extent is the land shown as marked on plan AA.TC.01 as shown in the appendices. The tree survey is based on an overall site location survey and the GPS positions recorded at the time of survey.

2.0 The Scope of the Survey Report - Methodology & Limitations

- 2.1 The tree survey process consisted of a ground-based visual inspection only, and is applied only to the area proposed for development. Soil type was not assessed.
- 2.2 This report is valid for three years from the date of site inspection. The condition of trees can change following severe meteorological conditions, the effects of diseases and pests, and other abiotic factors.
- 2.3 Two trees have been surveyed. All areas of the site are accessible. All parts of tree above ground could be seen and a detailed inspection made.
- 2.4 No definite details relating to the location or the installation of services either existing or as part of the new development have been supplied. Therefore, this report can only deal with this issue in a preliminary manner. The positioning of services should be approved by a suitably qualified surveyor.
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3.0 Site Location and Development Description

- 3.1 The land where the proposed construction is planned is an area in the garden to the west of The Clifden Arms Public House. There is one medium sized Yew and a smaller crab apple within the garden both trees being the subject of this report. The garden is well maintained and contains predominantly lawn, a children's play area and seating. There is already a marquee in approximately the same areas but laying to the east rather south. .
- 3.2 The proposed development will include the construction of a single storey events building in an area of lawn near to a wooden shed like structure already in place.

4.0 Nature and categorisation of Tree Stock.

- 4.1 The site requires consideration from an arboricultural perspective due to the presence of two trees on the site; due to location or crown and or RPA extents, both trees are within impacting distance of the potential construction area but the RPA is out of the building structure. The table of results in **Appendix 1**

provides details of the condition of the tree and their suitability for retention according to BS 5837:2012. Where the tree is of particular interest merit or require reference due to their condition, these will be discussed below.

- 4.2 BS5837:2012** requires a tree survey to identify **four** categories of trees; trees that are **(A)** highly desirable to retain and of high quality with an estimated remaining life expectancy of at least 40 years. **(B)** moderate quality trees with an estimated remaining life expectancy of at least 20 years and **(C)** trees which may or may not be suitable for retention and are of low quality with an estimated remaining life expectancy of at least ten years, or are below 150mm in stem diameter, or are unremarkable specimens of limited merit or such an impaired condition as to not qualify in the higher 'A' and 'B' categories. Trees marked **(U)** (Unsuitable for retention) should be removed due to their condition and/or life expectancy. The system assesses not only tree health and condition, but other factors such as their long-term impact on adjacent structures and good arboricultural management.
- 4.3** The site contains one medium mature specimen yew (**T1**) which is a valuable asset to the landscape. The tree has been maintained to a high standard in the past and has had previous crown reductions through out time, the last being possibly within the last few years. The tree in question has been categorised 'A'. No works have been recommended to support the development, such as crown reduction or crown raising as any more works will be detrimental to the tree in the long run. There is a seat around this tree which can be maintained throughout construction and finalisation.
- 4.4** **T2** is a smaller crab apple tree which has been categorised "B". The tree is not of good quality structurally but is an important landscape and ecological asset. Historical pruning has caused decay to some of the limbs and this will be hard to remedy as more works will be detrimental to the tree. No works have been recommended for either tree.

5.0 Root Protection Areas (RPAs)

- 5.1 BS5837:2012** makes recommendations for the provision of areas around any retained trees where their roots should be protected, known as Root Protection Areas, or RPAs, expressed in metres. For any tree, BS5837: 2012 prescribes this area according to a formula using stem diameter measurements of the trees in question. The RPAs for the trees are listed in radius (**m**) from the stem of the tree within the survey data table attached to this report.
- 5.2** The RPA for the tree recorded by the tree survey have been calculated in accordance with the guidance in *Chapter 4.6* of BS5837:2012. For single stem trees, the RPA is equivalent to a circle with radius of 12 times the stem diameter. For trees with between two to five stems, the combined stem diameter is calculated by finding the square root of the sum of the squared stem diameters. For trees with more than five stems, the combined stem diameter is calculated by finding the square root of the sum of the mean stem diameter squared multiplied by the number of stems. Where appropriate, the shapes of the RPAs have been amended to reflect actual site conditions or where tree has been pruned.
- 5.3** The RPA's of the trees that could affect the building proposals have been recorded onto the Tree Data Report in **Appendix 1**. This report will explain any amendments or root protection methods which will need to be put into place where any development could be within the RPA.

6.0 Arboricultural Impact Assessment (AIA)

- 6.1 The **Arboricultural Impact Assessment (AIA)** utilises the information from the survey, Tree Constraints Plan No. AA.TCP.01, design layout and applied judgement to evaluate the effect on the tree of the proposed development and where necessary recommend suitable mitigation.
- 6.2 There is only two trees (**T1 and T2**) in consideration for this report. **T1** is a medium sized yew on the south east side of the construction near to the pub. It is categorised as 'A' due to its historical and landscape value and also for the condition it is in. It has been historically reduced and will benefit the landscape for an extensive future. It is recommended for all stages of construction and demolition that temporary and permanent ground protection is used for this tree. At the present time there is a bench around the tree and lawn laid on the area throughout the RPA of this tree.
- 6.3 **T2** is a smaller crab apple tree which although categorised as 'B' does have a few historical damage aspects but is contributing a great deal to the local ecology and landscape. **This tree can be protected by ground protection and fencing.**
- 6.4 The alignment of proposed building does not reach to the Root Protection Area of **T1 or T2**. In view of this, and as assessed in accordance with BS5837:2012, no specialist foundation designs or construction techniques will be required to prevent damage to tree roots. **Important:** Please note that, however, the tree is in open ground and the roots will be in this area. With this in mind, specialist foundations may still be required for this reason, including mitigating the influencing distance of tree roots, subject to expert advice from a structural engineer.
- 6.5 The RPA however does fall into the area of construction but because of the position of the trees, root protection measures will be needed to protect while construction is in progress.

Process	Actions and Mitigation
Initial first installation of tree protection fencing before any works.	Initial tree protection fencing must be installed before machinery or building materials are moved onto the site. <i>Please see - Tree Constraints Plan No. AA.TL.01</i> Any space within the red circle.
Installation of ground protection	Where it is not possible to erect fencing, ground protection must be used. Examples are given in appendix 5. This will be needed to protect T1 and T2 nearer to the development.
Commencement of building works and access.	<ul style="list-style-type: none"> The development is on the edge of the RPA but as stipulated in BS5837:2012 there can be an offset of 20% within the RPA. Note: Mitigation in the design of paths and access and underground utilities can be maximised to the 20% in the RPA. Any proposed additional surfacing within the RPA of the tree will require a 'No Dig' construction method in accordance with BS5837; 2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'. Excavation should be limited to the manual removal of existing turf only Any changes in placing of the structure in the design falling into the RPA could possibly be built on either a pile foundation or a raft foundation, if the structure is of a modular construction screw foundations can be used. This will have to be discussed with the architect as no information on foundations is available.

Continuous Installation of ground protection Landscaping and final processes.

Once all works are completed within the RPA, protection of the ground must still be evident while the project is ongoing.

New soft landscaping within the root protection areas of the retained trees can occur as the final phase of development. The final specification for soft landscaping is to be confirmed but may include re- turfing. Shrub planting and larger vegetation planting is **not** recommended within the root protection area. All stages will be kept within the British Standard guidelines.

7.0 Method Statement - Order of Arboricultural Works with Tree Protection Measures

7.1 General requirements: The arboricultural method statement and Tree Protection Plan shall remain on site for the duration of the construction and landscaping works and will be available to site operatives at all times. All operatives at the site shall be briefed about tree related factors as part of their site induction.

7.2 Any variation from the methodology described in this method statement shall be discussed with the supervising arboriculturalist or informed site manager and agreed with the local authority arboricultural officer.

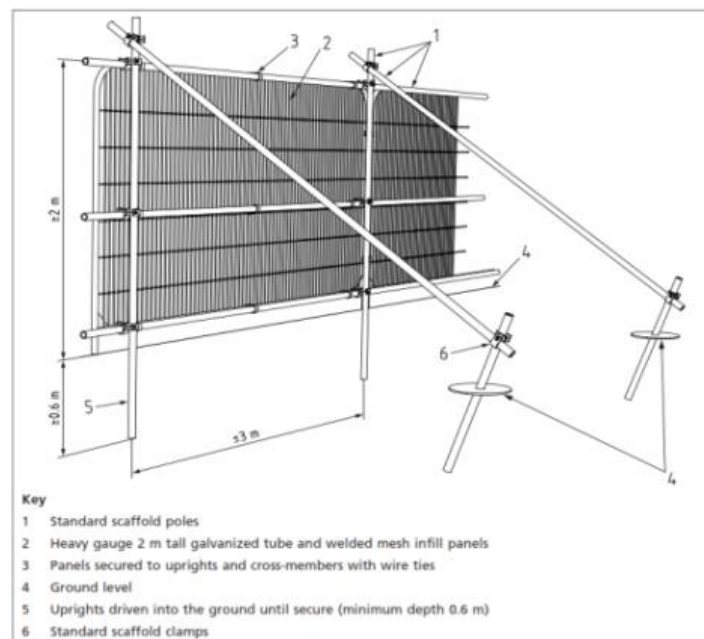
7.3 There are no trees works recommended in the initial stages of the development.

7.4 Temporary Fencing Protection Before and During Development: Tree protection fencing is recommended to be erected to form a barrier to the north side of the RPA (*Please see Tree Protection Plan in appendices*)

Where fencing is implemented, this must be done prior to any works commencing, or any materials or plant associated with development are brought onto the site. The area enclosed by the fencing is to be designated as a construction exclusion zone, within which there is to be no storage of materials or transit of machinery which could cause ground compaction. Compaction is a killer of trees.

7.5 The general measurements for the fencing is indicated on the tree data form in **appendix 1** and the RPA in the Tree Constraints Plan in **appendix 2**. For this project RPA is not indicative of the position of the fence line. It is recognised that occasionally with any project there will be a need for further alterations to the layout and general logistics of construction, hence further adjustments to the protection fencing can be expected during the planning process.

7.6 Temporary Ground Protection Before and During Development: Temporary Ground Protection - Where it is not practical to protect the RPA by use of fencing barriers, an important factor in this project, BS5837:2012 allows for the fencing to be set back and the soil shielded by ground protection. A range of methods



can be used including retaining existing hard surfaces or structures that already protect the soil, installing new materials, or a combination of both. Whatever the choice of method, the end result must be that the underlying soil (rooting environment) remains undisturbed and retains the capacity to support existing and new roots within the RPA. ***Please see Appendix 5 for internet links to ground protection examples.***

7.7 In particular relation to this tree on site, it is recommended that the following precautions are also adhered to so as to minimise the potential for damage to the trees:

Ensure wide or tall loads or plant with booms, jibs and counterweights can operate without coming into contact with the tree canopy. Any transit or traverse of plant in close proximity to the tree should be conducted under the supervision of a banksman to ensure that adequate clearance from the tree is maintained at all times.

b) Material which will contaminate the soil, e.g. concrete mixings, diesel oil and vehicle washings, should not be discharged in the ground in the rear garden at all. Cement mixers and toxic materials should not be permitted close to the tree.

c) It is essential that allowance be made for the slope of the ground so that damaging materials such as concrete washings or mortar or diesel oil cannot run towards the tree if accidental tipping should occur.

d) Notice boards, light cables or other services should not be attached to any part of the tree.

British Standards Institute - British Standard for trees in relation to construction (BS 5837:2012).

It would be prudent for any person involved with the development to familiarise themselves with relevant sections from British Standard for trees in relation to construction (BS 5837:2012).

7.8 Access to the site during Works Activities: In every case, the routing of pedestrian access to areas under development must be as far away from the retained tree as possible to ensure that no clashes between the trees and the movement of heavy materials will occur.

7.9 The areas protected by fencing or ground protection shall be referred to as the construction exclusion zones. The following actions shall be prohibited within the exclusion zones:

- Regular pedestrian access unless on suitable ground protection.
- Storage of construction materials.
- Storage or handling of harmful chemicals.
- Any change in ground level.

7.10 Storage and handling of harmful chemicals: Provision needs to be made to avoid the storage and handling of harmful chemicals in proximity to the tree. Harmful chemicals include fuels, oils, builder's sand (which has a high salt content) and cement. Cement mixing shall only occur where there is no potential for cement washings to leech into a root protection area. Provision shall also be made to prevent fuelling or the handling of cement from occurring in areas proposed for further planting.

- 7.11 Services:** When details of the routing of services become available, prior to commencement of construction works, they shall be reviewed by the project arboriculturalist. The arboriculturalist shall then confirm to the local authority arboricultural officer either that no works will be carried out within root protection areas, or provide details of the methodology required to ensure the works are carried out in accordance with NJUG10 'Guidelines for the planning, installation and maintenance of utilities in proximity to trees' and BS5837: 2012.
- 7.12 Soft landscaping within root protection areas:** New soft landscaping within the root protection areas of retained trees shall occur as the final phase of development. The final specification for soft landscaping is to be confirmed but may include re- turfing but no additional tree/shrub planting within root protection areas.
- 7.13** Where new turf is to be laid within the root protection areas of the retained tree, topsoil will likely need to be imported. The existing soil may be lightly tilled by hand but use of rotavators will be **prohibited**. A maximum increase of 50mm of topsoil may be introduced to avoid suffocating root growth. Care must be taken to prevent soil being piled against tree buttresses or buttress roots. When soil or other materials are transported across a root protection area, scaffold board pathways must be used to prevent compaction of the rooting medium. It should be noted that even light pedestrian use could compact the soil, particularly in wet conditions.
- 7.14** In addition to the above, a system and programme of onsite monitoring by the appointed arboricultural consultant or an informed site manager should be agreed with the Local Authority Arboricultural Officer, if it is deemed necessary. The form and frequency of site monitoring should be agreed at the pre-commencement meeting.
- 7.15** If significant root growth is disturbed during construction activities that are not within the scope of this report, the work shall cease until the project arboriculturalist has been consulted. Roots greater than 25mm in diameter or dense/matted fibrous roots shall be considered significant root growth. It should be remembered that whilst root protection areas are part of industry best practice, tree root growth is influenced by a number of factors and may not conform to expected ideals.
- 7.16** If at any time during the construction process, damage is inadvertently caused to the tree, the project arboriculturalist shall be notified to assess the likely implications and to prescribe potential remedial measures to be implemented. Damage can be in the form of chemical or fuel spillage, mechanical damage to either the above ground parts of the tree or the roots, fire or any other unforeseen circumstance.

8.0 Legal Constraints

- 8.1** Trees subject to statutory controls: The Local Authority is **Aylesbury Vale Aea which is a part of Buckingham Council** . There are no constraints due to Tree Preservation Orders or Conservation Areas. [Click here](#) for interactive mapping on council website. **Checked 3/01/22**

8.2 Statutory wildlife obligations: The Wildlife and Countryside Act 1981 as amended by the Countryside and The Habitat Regulations 2012 provide statutory protection to birds, bats and other species that inhabit trees. All tree work operations are covered by these provisions and advice from an ecologist should be obtained before undertaking any works that might constitute an offence.

9.0 Summary

- 9.1** A development of an events building is proposed for an area adjacent to The Clifden Arms Public House, Clifden Rd, Worminghall, Aylesbury HP18 9JR. The proposal is a one story structure on an open space in the garden.
- 9.2** This report presents the results of a tree survey for the site in accordance with BS 5837:2012 (Trees in relation to design, demolition and construction – Recommendations) and a basic Tree Constraints Plan accompanies the report, reference **AA.TCP.01**
- 9.3** **The initial design has placed the proposed construction outside of any RPA. But tree protection during construction is paramount. Any placement of utilities must be either outside of the RPA or within 20%**
- 9.4** Subject to proactive tree protection measures in conjunction with the active and on-going consultation of an arboriculturalist, the tree on site can be adequately protected during the project and hence not be damaged during construction processes.
- 9.5** **T1**, a Yew is an important landscape feature and every effort must be put into place to protect the tree from any damage during development. It is acknowledged that the tree protection arrangements are likely to require on-going monitoring and adjustment.
- 9.6** Recommendations are based on observations at the time of survey. Trees are dynamic living organisms whose structure is constantly changing. Following site development, regular inspections (*every 24 to 36 months*) of the tree should be undertaken by a qualified Arboricultural Consultant.

Appendices

Appendix 1 Tree Inspection/Survey Results

Table 1. SURVEY KEY: Abbreviations and categories used in the survey are as follows:

Tree Type and No	T = Tree, G = Group, S = Shrub, H= Hedge . Number of tree and corresponding number on plan.
Species.	Common name and scientific in name in <i>italics</i> .
Height (Ht.).	Estimated height in metres
Stem diameter. (Dia.).	Diameter measured in millimetres at 1.5m above ground level. MS:=Multiple stems
Crown spread	Measured from centre to average branch spread in metres. Four points measured North, East, South and West.
Age Class.	Young (Y). Semi Mature (SM). Early Mature (EM). Mature (M). Over Mature (OM). Veteran (V).
Condition: Physiological and Structural.	Good. (G) Fair. (F) Poor. (P) Dead. In addition, specific diseases, defects or faults are described.
Recommendations	Recommendations for tree work where observed as necessary, including further investigations of suspected defects which may require more detailed assessment. If blank no works are recommended.
Cat: Category Grading (BS5837) with estimated remaining contribution in years	U or A, B, C (See table below). Less than 10 years. <10. 10-20 years. 20 -40 years. More than 40 years. 40> <i>SULE = Safe Useful Life Expectancy</i>
Root Protection Area. (RPA).	The root protection in metres as radial distance as measured from the centre of the tree stem. Where an * is present the R.P.A. cannot be achieved due to ground constraints, or it is located outside the site.

Table 2. SURVEY KEY: British Standards Categories and Criteria

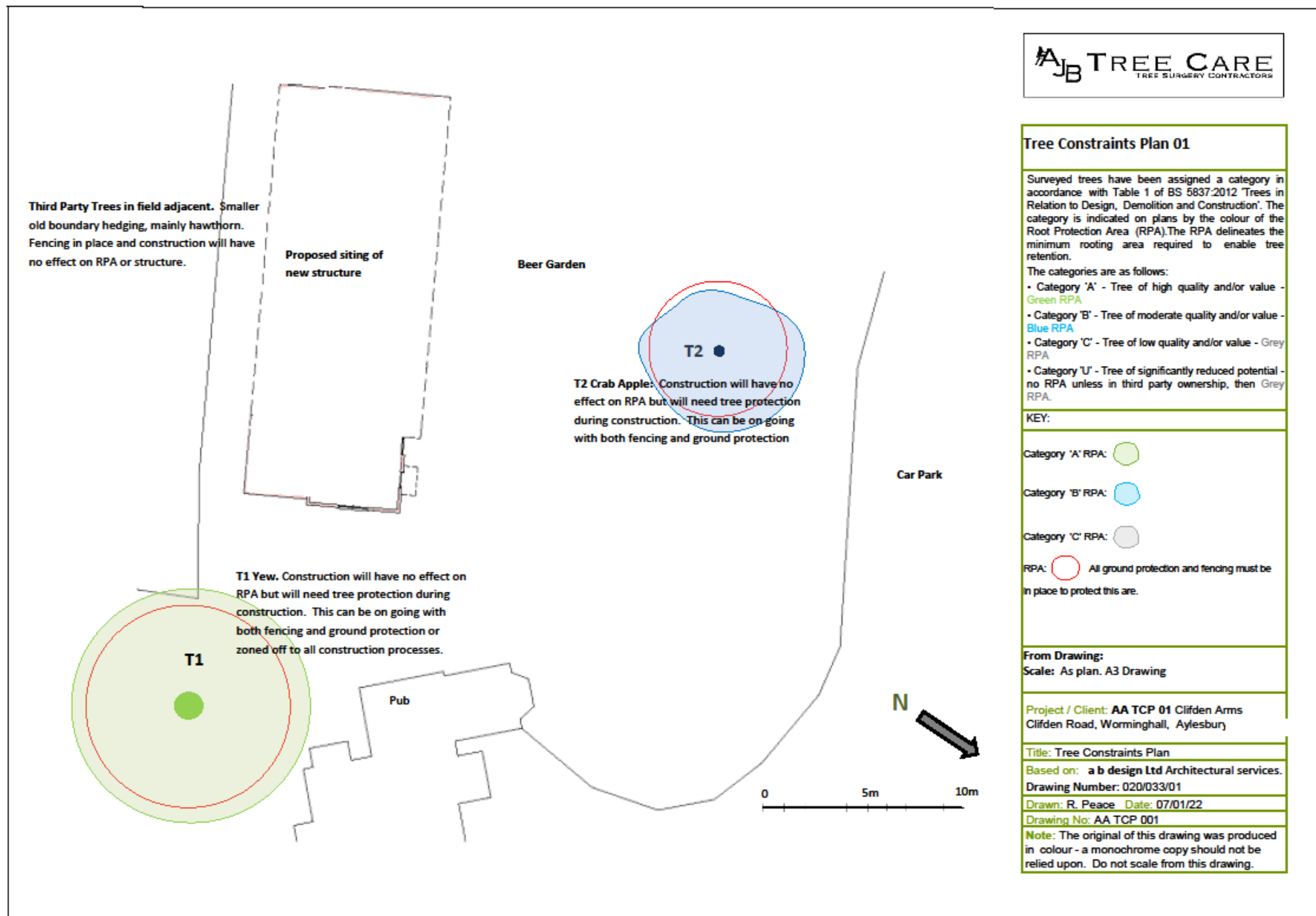
Category & definition	Criteria (including subcategories where appropriate)		
Category U Trees in such a condition that they cannot realistically be retained as living trees in the context of current land use for <10 yrs.	<ul style="list-style-type: none"> Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees Trees that are dead or showing signs of significant, immediate and irreversible decline Trees infected with significant pathogens affecting health or safety, or very low-quality trees suppressing trees of better quality NOTE: these trees can have existing or potential conservation value making retention desirable		
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values incl conservation
Category A Trees of high quality with an estimated remaining life expectancy of >40 yrs	Particularly good examples of their species, especially if rare or unusual. Those that are essential components of groups or formal or semi-formal arboricultural features	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
Category B Trees of moderate quality with an estimated remaining life expectancy of >20 yrs.	Trees that might be included in category A but are downgraded because of impaired condition such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit category A designation.	Trees present in numbers, usually growing as groups or woodlands such that they attract a higher collective rating that they might as individuals. Trees occurring as collectives but situated so as to make little visual contribution to the area.	Trees with material conservation or other cultural value
Category C Trees of low quality with an estimated remaining life expectancy of >10 years, or young trees with a stem diameter <150mm	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 landscape benefits.	Trees with no material conservation or other cultural value.

Appendix 1 Tree Data including Root Protection Area

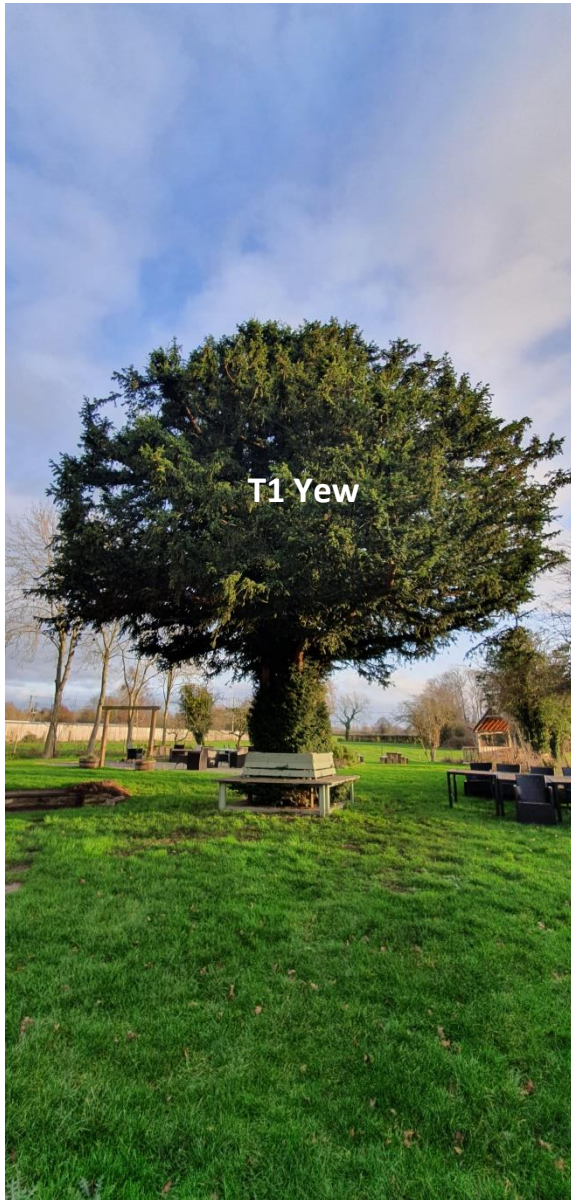
Tree No.	Latin Name	Common Name	Height (m)	DBH (cm)	RPA Calculation	CS NORTH	CS EAST	CS SOUTH	CS WEST	Height of ground clearance	Age Class	Physiological Condition	Structural Condition	Category Grading	Notes	Photo
T1	<i>Taxus baccata</i>	Yew	12m	86cm	10.3 m	6m	6m	6m	6m	2m	Mature	Good, Fair	Good	A 40>	Well maintained tree with bench underneath	Photo
T2	<i>Malus sylvestris</i>	Crab apple	6m	29cm	3.4 m	3m	3m	4m	3m	1.5m	Mature	Fair, Poor	Fair but poor in some limbs	B (20 -40 years)	Decay with some stems. Bad historical pruning. Slight lean to North East.	Photo

Notes regarding other surrounding trees: It was noted that there is an old remnant of a boundary in the hedge in the neighbouring field. This again is an important consideration but the construction will not be entering the field or the RPA of any part of the remnant trees.

Appendix 2: Tree Location and Constraints Plan with RPA. For Full Tree Constraints Plan see accompanying PDF



Appendix 3 Photographs.



Appendix 4 Glossary of Terms & Abbreviations

- **Compression fork/Co-dominant stem.** Can be a failure point at a fork between two branches or limbs, which, as they grow, press against each other, causing a build-up of stresses similar to the effect you would get if a wedge were hammered into the fork. Increased end-loading as the limbs grow can lead to the fork failing.
- **Cavity.** Hole in a tree resulting from decay or damage
- **Deadwood.** Twigs or branches in the crown of the tree which have died off. This can indicate the tree's inability to transport fluid and/or nutrients to its extremities signifying that the tree is under stress or has failing systems. It can also take place naturally when a branch affects a process known as "self-pruning". This occurs when the energy needed to sustain the live branch outweighs the energy it produces
- **Decay.** This can be minor, such as on the surface of a shallow wound, or severe, with large sections of the trees structure being decayed. It is a problem that can progress to the point where the tree collapses.
- **Epicormic growth.** This can sometimes indicate a problem within the tree's systems. Epicormic growth is produced by the tree to gain a greater ability to photosynthesize when it is in need of extra resources. Some trees, such as Lime, produce epicormic growth, particularly from the base, as part of their natural growth habit.
- **Lean.** A lean does not necessarily mean inherent instability but when a tree's stem loses structural integrity, it can become a hazard, especially if the weakness is on the side to which the tree is leaning.
- **Loosened bark.** This indicates a problem under the surface in either the wood or the inner layers of bark (cambium). Bark can fall away from decaying wood behind it, or can start to die off due to a range of reasons (bacterial infections etc). The bark can then no longer transport fluid or nutrients around the tree.
- **Mechanical Damage.** Damage caused by non-biological means i.e. vehicle impact or damage caused by animals trying to eat bark. Damage of this kind can penetrate into the structure and is more often found on the surface of the tree.
- **Reaction wood/growth.** Where weakness or decay within a tree occurs, the tree will grow material to compensate for it. It is often seen as 'cable' like structures with patches of uneven bark which indicate irregular growth patterns. Another form of reaction growth can be seen as 'bulges' on a trees structure. Large amounts of reaction growth indicate advanced decay or weakness within the tree structure.
- **Sail Area.** The area of the tree that is affected by the wind
- **Weak unions.** The unions between the stem (trunk) and structural limbs or branches sometimes develop weakly, and as the tree ages can become unstable. This can be exacerbated when the tree is affected by other problems. Also, certain tree species are prone to developing weak unions.

Appendix 5 Internet and Reading References

General

<http://www.forestry.gov.uk/safetreemanagement>

<https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals> (SSSI)

Mattheck & Breloer H. (1994). Research for Amenity Trees No.4: The Body Language of Trees, HMSO, London.

Strouts R.G. & Winter T.G. (1994). Research for Amenity Trees No.2: Diagnosis of ill health in Trees. Department of the Environment, HMSO.

Weber K., Mattheck C. (2003). Manual of Wood Decays. The Arboricultural Association

Tree Protection

<https://ecogrid.co.uk/popular-uses/tree-root-protection/>

<http://www.ground-guards.co.uk/sectors/>

<http://www.geosyn.co.uk/product/cellweb-tree-root-protection>

