



Harworth Group

Occupation Lane, Woodville

Arboricultural Assessment

June 2019

FPCR Environment and Design Ltd

Registered Office: Lockington Hall, Lockington, Derby DE74 2RH

Company No. 07128076. [T] 01509 672772 [F] 01509 674565 [E] mail@fpcr.co.uk [W] www.fpcr.co.uk

This report is the property of FPCR Environment and Design Ltd and is issued on the condition it is not reproduced, retained or disclosed to any unauthorised person, either wholly or in part without the written consent of FPCR Environment and Design Ltd. Ordnance Survey material is used with permission of The Controller of HMSO, Crown copyright 100018896.

Rev	Issue Status	Prepared / Date	Approved/Date
-	Draft	EKP / 14.05.19	CTT / 15.05.19
-	Revised Draft	EKP / 29.05.19	CTT / 29.05.19
A	Final	EKP&CTT / 12.06.19	CTT / 12.06.19

CONTENTS

1.0	INTRODUCTION	2
2.0	SURVEY METHODOLOGY	4
3.0	RESULTS.....	8
4.0	ARBORICULTURAL IMPACT ASSESSMENT	10
5.0	NEW TREE AND HEDGEROW PLANTING.....	11
6.0	TREE PROTECTION MEASURES	13

TABLES

Table 1: Summary of Trees by Retention Category

Table 2: Example of calculating Soil Volume for New Tree Planting

PLANS

Tree Survey Plan (8794-T-01)

Tree Retention Plan (8794-T-02-A)

APPENDICES

Appendix A: Tree Schedule

Appendix B: Protective Fencing Specifications

1.0 INTRODUCTION

- 1.1 This report has been prepared by FPCR Environment and Design Limited on behalf of Harworth Group to present the findings of an Arboricultural Assessment and survey of trees located at Occupation Lane, Woodville, Swadlincote (hereafter referred to as the site), OS Grid Ref SK 310 187.
- 1.2 The survey was carried out on 13th March 2019.
- 1.3 The tree survey and assessment of existing trees has been carried out in accordance with guidance contained within British Standard 5837:2012 '*Trees in Relation to Design, Demolition and Construction - Recommendations*' (hereafter referred to as BS5837). The guidelines set out a structured assessment methodology to assist in determining which trees would be deemed either as being suitable or unsuitable for retention.
- 1.4 The guidance also provides recommendations for considering the relationship between existing trees and how those trees may integrate into designs for development; demolition operations and future construction processes so that a harmonious and sustainable relationship between any retained trees and built structures can be achieved.
- 1.5 The purpose of the report is therefore to firstly, present the results of an assessment of the existing trees' arboricultural value, based on their current condition and quality and to secondly, provide an assessment of impact arising from the proposed development of the site.
- 1.6 This report has been produced to accompany a planning application for Harworth Group and has included an assessment of any impact to the tree cover. The survey has therefore focused on any trees present within or bordering the site that may potentially be affected by the future proposals or will pose a constraint to any proposed development.

Site description

- 1.7 The site is located in Woodville, a village which acts as a suburb for the nearby town of Swadlincote. The site is comprised of a single field parcel, which is bordered on all sides by both commercial and residential developments. The site consists of large groups of buffer planted trees, all confined to the peripheries of the site. The densest groups lie along the site's eastern boundary. The western boundary of the site is characterised by self-seeded tree cover and a water course defines the northern boundary, which has associated riparian vegetation situated along its banks.

Planning Policy

National Planning Policy Framework 2019

- 1.8 National Planning Policy is defined by the National Planning Policy Framework (NPPF). This sets out the Government's most current and up to date planning policies for England and how these should be applied. The current NPPF is dated February 2019.
- 1.9 Paragraph 11 of the NPPF states that there is a presumption in favour of sustainable development and states that for decision making, the LPA should be '*c) approving development proposals that accord with an up-to-date development plan without delay*'.

In the absence of a development plan or the development plan is out of date, the acting LPA should grant planning consent so far as the development proposals do not breach the policies and guidance outlined in the NPPF.

1.10 In relation to arboriculture, the NPPF also states that:

- 175(c) *'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 exists';*

and provides specific guidance that:

- 175(d) *'development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity'.*

1.11 Examples of what is deemed to be *'wholly exceptional'* are included within Footnote 58 and provides the examples of *'infrastructure projects (including nationally significant infrastructure projects, orders under the Transport and Works Act and hybrid bills), where the public benefit would clearly outweigh the loss or deterioration of habitat'.*

Statutory Considerations

1.12 Local authorities have a Duty under the Town and Country Planning Act to create Tree Preservation Orders (TPO) in order to protect and preserve specific trees and woodlands that bring significant amenity benefit to a particular site or location. Under a TPO it is a criminal offence to cut down, top, lop, uproot or willfully destroy a tree protected by that Order, or to cause or permit such actions, if carried out without the prior written consent of the acting LPA. Anyone found guilty of such an offence is liable and in serious cases, may result in prosecution and incur an unlimited fine.

1.13 No direct consultation with the Local Planning Authority has taken place, however, it is understood having used the online search facility on the website for the Local Planning Authority, South Derbyshire District Council that there are no Tree Preservation Orders and Conservation Areas that would apply to any trees present on, or in close proximity to the assessment site and therefore no statutory constraints would apply to the development in respect of trees. Before any tree works are undertaken confirmation of the online information should be sought from the Local Authority.

Non-Statutory Considerations

1.14 In order to compile existing baseline information on relevant arboricultural considerations information was requested from both statutory and non-statutory nature conservation organisations. The Multi Agency Geographic Information for the Countryside (MAGIC)¹ website highlighted tree cover within the site as or included within the following:

- The Priority Habitat Inventory, Deciduous Woodland
- The National Forestry Inventory

¹ <http://magic.defra.gov.uk/>

- 1.15 The Priority Habitat Inventory is a spatial dataset that describes the geographic extent and location of Natural Environment and Rural Communities Act (2006) Section 41 habitats of principal importance.²
- 1.16 The deciduous woodland inventory is a rolling programme designed to provide accurate information about the size, distribution, composition and condition of forests and woodlands.³
- 1.17 Priority habitat designation and inclusion within the National Forestry Inventory does not provide any statutory protection.

2.0 SURVEY METHODOLOGY

- 2.1 The survey of trees has been carried out in accordance with the criteria set out in Chapter 4 of BS5837. The survey has been undertaken by a suitably qualified and experienced arboriculturalist and has recorded information relating to all those trees within the site and those adjacent to the site which may be of influence to any proposals. Trees were assessed for their arboricultural quality and benefits within the context of the proposed development in a transparent, understandable and systematic way.
- 2.2 Trees have been assessed as groups or hedgerows where it has been determined appropriate. The term group has been applied where trees form cohesive arboricultural features either aerodynamically, visually or culturally including biodiversity or habitat potential for example parkland or wood pasture.
- 2.3 For the purposes of this assessment, a hedgerow is described as any boundary line of trees or shrubs less than 5m wide at the base and are managed under a regular pruning regime. A tree survey in accordance with BS5837 does not assess hedgerows against the Hedgerow Regulations 1997 or specifically from an ecological perspective, and is outside the scope of this assessment.
- 2.4 An assessment of individual trees within groups or hedgerows has been made where a clear need to differentiate between them, for example, in order to highlight significant variation between attributes including physiological or structural condition or where a potential conflict may arise.

Veteran Trees

- 2.5 Veteran trees and Ancient Woodland are important components of the landscape, their importance can be for a number of reasons including that of their ecological, social, cultural and historic value. Veteran Trees and Ancient Woodlands are material considerations within the planning process and their importance is specifically recognised within the National Planning Policy Framework 2018.
- 2.6 **None of the assessed trees were considered as veteran trees in accordance with accepted methodologies and guidance.**

² Contains public sector information licensed under the Open Government Licence v3.0.

³ <https://www.forestryresearch.gov.uk/tools-and-resources/national-forest-inventory/>

- 2.7 This assessment, and the criteria for identification of attributable veteran features, was based on currently available industry guidance and resources including the Level 2 and 3 of the *Specialist Survey Methodology (SSM)* and as detailed within *Ancient and other Veteran Trees: Further Guidance on Management* (Lonsdale, D (ed.) (2013). *The Tree Council & Ancient Tree Forum*.

BS5837 Categories

- 2.8 Trees have been divided into one of four categories based on Table 1 of BS5837, 'Cascade chart for tree quality assessment'. For a tree to qualify under any given category it should fall within the scope of that category's definition (see below).
- 2.9 Category U trees are those which would be lost in the short term for reasons connected with their physiology or structural condition. They are, for this reason not considered in the planning process on arboricultural grounds. Categories A, B and C are applied to trees that should be of material considerations in the development process. Each category also having one of three further sub-categories (i, ii, iii) which are intended to reflect arboricultural, landscape and cultural or conservation values accordingly.
- 2.10 **Category (U) – (Red):** Trees which are unsuitable for retention and are 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 within this category are:
- Trees that have a serious irremediable structural defect such that their early loss is expected due to collapse and includes trees that will become unviable after removal of other category U trees.
 - Trees that are dead or are showing signs of significant, immediate or irreversible overall decline.
 - Trees that are infected with pathogens of significance to the health and/ or safety of other nearby trees or are very low quality trees suppressing adjacent trees of better quality.
 - Certain category U trees can have existing or potential conservation value which may make it desirable to preserve.
- 2.11 **Category (A) – (Green):** Trees that are considered for retention and are of high quality with an estimated remaining life expectancy of at least 40 years with potential to make a lasting contribution. Such trees may comprise:
- Sub category (i) trees that are particularly good examples of their species, especially if rare or unusual, or are essential components of groups such as formal or semi-formal arboricultural features for example the dominant and/or principal trees within an avenue.
 - Sub category (ii) trees, groups or woodlands of particular visual importance as arboricultural and / or landscape features.
 - Sub category (iii) trees, groups or woodlands of significant conservation, historical, commemorative or other value for example veteran or wood pasture.
- 2.12 **Category (B) – (Blue):** Trees that are considered for retention and are of moderate quality with an estimated remaining life expectancy of at least 20 years with potential to make a significant contribution. Such trees may comprise:

- Sub category (i) trees that might be included in category A but are downgraded because of impaired condition for example the presence of significant though remediable defects, including unsympathetic past management and storm damage.
- Sub category (ii) 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.
- Sub category (iii) trees with material conservation or other cultural value.

2.13 **Category (C) – (Grey):** Trees that are considered for retention and are of low quality with an estimated remaining life expectancy of at least 10 years or young trees with a stem diameter below 150mm. Such trees may comprise:

- Sub category (i) unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.
- Sub category (ii) trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value or trees offering low or only temporary / transient screening benefits.
- Sub category (iii) trees with no material conservation or other cultural value.

Tree Schedule

- 2.14 Appendix A presents details of any individual trees, groups and hedgerows found during the assessment including heights, diameters at breast height, crown spread (given as a radial measurement from the stem), age class, comments as to the overall condition at the time of inspection, BS5837 category of quality and suitability for retention and the root protection area.
- 2.15 The term group has been applied where trees form cohesive arboricultural features either aerodynamically, visually or culturally including biodiversity or habitat potential for example parkland or wood pasture.
- 2.16 Hedgerows are identified as a Habitat of Principle Importance (HPI) as listed within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. The tree survey conducted, in accordance with BS5837, does not assess hedgerows against the Hedgerow Regulations 1997 or specifically from an ecological perspective, and is outside the scope of this assessment.
- 2.17 For the purposes of this assessment, a hedgerow is described as any boundary line of trees or shrubs less than 5m wide at the base and are managed under a regular pruning regime. Hedgerows and substantial internal or boundary hedges (including evergreen screens) have been recorded including lateral spread, height and stem diameter(s). Where trees are present within a hedgerow that are significantly different in character from the remainder, these have been identified and recorded separately.
- 2.18 General observations particularly of structural and physiological condition for example the presence of any decay and physical defect and preliminary management recommendations have also been recorded where appropriate.

Site Plans

- 2.19 The individual positions of trees and groups have been shown on the Tree Survey Plan. The positions of trees are based on a topographical / land survey, as far as possible, supplied by the client.
- 2.20 Where topographical information has not identified the position of trees these have been plotted using a global positioning system and aerial photography to provide approximate locations. The crown spread, root protection area and shade pattern (where appropriate) are also indicated on this plan.
- 2.21 As part of this assessment, a Tree Retention Plan has been prepared to show the proposed layout in relation to the existing tree cover allowing an assessment of any potential conflicts. The plan also identifies which trees would be required to be removed or retained as part of the proposed development.

Tree Constraints and Root Protection Areas

- 2.22 Below ground constraints to future development are represented by the area surrounding the tree containing sufficient rooting volume for the specimen to have the best chance of survival in the long term which is identified as the root protection area (RPA). The RPA has been calculated in accordance with section 4.6 of BS5837 and requires suitable protection in order for the tree to be successfully incorporated into any future scheme.
- 2.23 Where applicable the shape of the Root Protection Area has been modified to consider the presence of any nearby obstacles (existing or past) which may have restricted root growth and the likely root distribution i.e. the presence of hard standing, structures and underground apparatus.
- 2.24 Where groups of trees have been assessed, the Root Protection Area has been shown based on the maximum sized tree in any one group and so may exceed the Root Protection Area required for some of the individual specimens within the group. Further detailed inspection of the individual trees forming a group may be required where development impacts upon the group.
- 2.25 Above ground constraints such as the current crown spread of the trees and an illustration of the shade pattern (where appropriate) have been considered and identified within the Tree Survey Plan and Tree Retention Plan indicates their potential area of shading influence.

Considerations and Limitations of the Tree Survey

- 2.26 The survey was completed from ground level only and from within the boundary of the site. Aerial tree inspections or an assessment of the internal condition of the stem/s or branches were not undertaken at this stage as this level of survey is beyond the scope of the initial assessment.
- 2.27 The statements made in this report regarding defects in assessed trees does not take into account the effects of extreme / adverse weather conditions, changes in land use prior to the site's development as detailed within Section 4.0, unforeseen accidents or anti-social behaviors, such as vandalism, which occur since the date of the survey. As such, the assessment of tree condition given within applies to the date of survey and cannot be assumed to remain unchanged.

- 2.28 It will be necessary to review all comments and observations made within this report, in accordance with sound arboricultural practice, within two years of the date of survey (unless explicitly stated elsewhere within this report). Further review may also be necessary where site conditions change or works to trees are carried out which have not been specified in detail within this report.
- 2.29 It may be necessary during detailed design to undertake further assessment and accurate positioning of woody species within tree groups to assist structural calculations for foundation design of structures in accordance with current building regulations. Knowledge of soil type was not known at the time of this tree assessment. If a current soil survey of the site has taken place then it must be read in conjunction with the results of the tree survey.
- 2.30 The exact position of individual trees or species included as part of a tree group should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken. Further survey work would be required for calculating foundation depths in accordance with NHBC Chapter 4.2 Building near Trees.

3.0 RESULTS

- 3.1 A total of three individual trees, ten groups of trees, and two hedgerows were surveyed as part of the Arboricultural Assessment. Trees were surveyed as individual trees and groups of trees where examples are clearly present as per the description. Refer to the Tree Survey Plan and Appendix A – Tree Schedule for full details of the trees included in this assessment. The table below summarises the trees assessed.
- 3.2 Several of the trees have been discussed in more detail following the table, owing to their physical condition or arboricultural significance.

Results Summary

Table 1: Summary of Trees by Retention Category

	Individual Trees	Total	Groups of Trees	Total
Category U - Unsuitable		0	G9	1
Category A (High Quality / Value)		0		0
Category B (Moderate Quality / Value)	T1	1	G3, G4	2
Category C (Low Quality / Value)	T2, T2	2	G1, G2, G5, G6, G7, G8, G10, H1, H2	9

- 3.3 G2/G3 is classed as Priority Habitat Inventory - Deciduous Woodland (England) – ‘a *Lowland mixed deciduous woodland includes woodland growing on the full range of soil conditions... Quercus robur is generally the commoner oak (although Quercus petraea may be abundant locally) and may occur with virtually all combinations of other locally native tree species*’^[6]

⁶ <http://magic.defra.gov.uk/>

- 3.4 The tree cover across the site is largely situated in groups which are confined to the peripheries. The groups display a wide range of species including blackthorn *Prunus spinosa*, silver birch *Betula pendula*, wild cherry *Prunus avium*, ash *Fraxinus excelsior*, elder *Sambucus nigra*, hawthorn *Crataegus monogyna*, holly *Ilex aquifolium*, sycamore *Acer pseudoplatanus*, English oak *Quercus robur* and goat willow *Salix caprea*.
- 3.5 The modal age category is early mature, with occasional semi-mature and mature specimens across the site. Most of the groups were graded as retention category C as they offered low arboricultural quality to the site. It is thought this is mainly attributed to lack of management, multi-stemmed forms and the self-seeded nature of some of the groups.
- 3.6 Two groups of trees stood out due to their enhanced arboricultural quality, namely G3 and G4. Both groups stood along the eastern boundary of the site and had a varied species composition. G3 stood at a height of 10m and was semi to early mature of age, and was described as an unmanaged group of trees that were characteristic for their species. G4 stood at a height of 14m with trees being of an early-mature to mature age. It is suspected that this group was old buffer planting with only a few minor defects noted within the trees. There was however several distinct areas of fly tipping noticed around the trees.
- 3.7 One group, G9, was assessed as being retention category U meaning it is unsuitable for retention regardless of future development. This was a poor boundary group with limited future potential, consisting of mature poorly formed hawthorn, silver birch and Austrian pine *Pinus nigra* ssp. *Nigra* specimens.
- 3.8 Three individual trees were picked out of the groups due to their mature age and larger proportions than their surrounding tree cover. These consisted of two sycamore and a silver birch. T1 was assessed as a moderate quality individual with no major defects noted and its fair overall structural and physiological condition.
- 3.9 There were also two hedgerows recorded on the site. Both were mature, in fair overall condition and of low arboricultural quality. H1 consisted of ash, crack willow *Salix fragilis*, and hawthorn and was unmaintained, standing along the northern boundary of the site. H2 on the other hand was a maintained pyracantha hedgerow which bordered the sites south western boundary.

4.0 ARBORICULTURAL IMPACT ASSESSMENT

- 4.1 The following paragraphs present a summary of the tree survey and discussion of particular trees and groups recorded in the context of any proposed development in the form of an Arboricultural Impact Assessment in accordance with section 5.4 of BS5837. Any final tree retentions will need to be reconciled with the advice contained within this report.
- 4.2 The AIA has been based upon the drawing number: P16-1422_004-01 - Illustrative Masterplan R and seeks to outline the relationship between the proposals and the existing trees and hedgerows. The drawing shows the proposals for a new area of residential development, housing up to 300 new homes, areas for allocated for employment use, a local centre, public open space and a primary route (AECOM WVL-AEC-XX-XX-DR-LP-00001 Landscape Planting – REV B) through the site linking it to existing infrastructure in the area.
- 4.3 An overlay of the layout has been incorporated in the Tree Retention Plan to assist in identifying the relationship and any potential conflicts between the proposals and the existing trees and hedgerows.
- 4.4 The layout has; through positioning the built element of the proposed developed central to the field parcel and by virtue of the peripheral locations of the existing tree cover, allowed for the retention of all the existing tree cover. This tree cover shall be retained within the landscape buffer strips proposed around the extents of the site and within the green space provision of the development. These buffer strips shall enhance the quality of the existing tree cover and ensure a continued population of tree cover within both the site and the wider local environment.
- 4.5 The only tree loss required to facilitate the development is a small section of the hedgerow H1, which will be required to allow access into the site along the site's northern boundary. This should raise no objection from an arboricultural perspective as it is of low arboricultural value and quality, and only a small section is being lost, which is inevitable to facilitate access into the site.
- 4.6 Through the design lead approach, it has been possible to retain all of the higher quality tree cover across the site. Not only this, but new tree planting has been illustrated as part of the illustrative masterplan within the open space provisions and along the new link road. This new tree planting is set to significantly increase tree cover on the site as well as enhance the existing tree cover through much needed management to enhance its value, quality and future potential.
- 4.7 The lack of tree removals will also help to soften the impact of the new development from wider vantage points, as the existing tree cover along the boundaries will continue to provide screening for the site, and aid with its incorporation into the existing landscape and wider environment.

Tree Management

- 4.8 All retained trees should be subjected to sound arboricultural management as recommended within section 8.8.3 of BS5837 *Post Development Management of Existing Trees*, where there is a potential for public access in order to satisfy the landowner's duty of care. Additionally, inspections annually and following major storms should be carried out by an experienced arboriculturalist or arborist to identify any potential public safety risks and to agree remedial works as required.

- 4.9 All tree works undertaken should comply with British Standard 3998:2010 and should therefore be carried out by skilled tree surgeons. It would be recommended that quotations for such work be obtained from Arboricultural Association Approved Contractors as this is the recognised authority for certification of tree work contractors.
- 4.10 All vegetation and, particularly, woody vegetation proposed for clearance should be removed outside of the bird-breeding season (March - September inclusive) as all birds are protected under the Wildlife and Countryside Act, 1981 (as amended) whilst on the nest.

Where this is not possible, vegetation should be checked for the presence of nesting birds prior to removal by an experienced ecologist.

5.0 NEW TREE AND HEDGEROW PLANTING

- 5.1 As part of the development proposals an adequate quantity of structured tree planting has been demonstrated predominantly within or close to hard landscaped areas of car parking or alongside the primary access roads within the roadside verges. The purpose and function of this new tree planting should be understood from the start of any design stages so that key objectives from a landscape perspective can also be achieved.

Trees

- 5.2 The landscaping scheme should consider the use of both native tree species (for their low maintenance requirements and nature conservation value) and ornamental species (for their contribution to urban design and amenity value). Species choices should be selected on the basis of their suitability for the final site use. Furthermore, during the design process consultation should be made with the Local Planning Authority to obtain information on their tree strategy and incorporate the planting proposals with any local policies and initiatives and/or Biodiversity Action Plans (BAP).
- 5.3 In line with the NPPF all schemes should aim achieve a net gain in biodiversity value. Nationally recognised biodiversity metrics allow for the inclusion of, not limited to, newly planted scattered trees, woodlands and hedgerows as a means of compensating for loss of habitat as part of the development. Tree and shrub planting can therefore be used to contribute to this biodiversity gain.
- 5.4 To maximise biodiversity value (and contribution to net gain) native species or varieties should be specified. Such provisions can be incorporated into both the hard and soft landscaping of the scheme. It is recommended that tree and hedgerow specifications are made following consultation with guidance published by the Local Planning Authority.
- 5.5 When designing upon suitable tree species, careful consideration would need to be given to the following: ultimate height and canopy spread, form, habit, density of crown, potential shading effect, colour, water demand, soil type and maintenance requirements in relation to both the built form of the new development and existing properties.

- 5.6 Through careful species selection, the landscape scheme shall reduce the risk of trees being removed in the future on the grounds of nuisance. Nuisance can be perceived in a number of ways and vary from person to person however most commonly, within the context of trees, low overhanging branches, excessive shading, seasonal leaf fall and the misinformed perception that trees close to buildings cause damage.

Hedgerows

- 5.7 Hedgerows are identified as a Habitat of Principle Importance (HPI) as listed within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Consequently, it is important that the proposed scheme delivers a net gain in terms of linear hedgerows through new planting to compensate for any losses. Species should be native, and characteristic of the locality.
- 5.8 Recommended species for native hedgerow planting are as follows:
- *Crataegus monogyna*
 - *Prunus spinosa*
 - *Cornus sanguinea*
 - *Corylus avellana*
 - *Acer campestre*
 - *Quercus robur*
 - *Euonymus europaeus*

Rooting Environment and Soil Volumes

- 5.9 The success of any landscaping scheme relies on an adequate provision of a high-quality rooting environment within which trees can thrive and reach their full potential. Planting trees with due care and consideration can, in the long term, provide a greater return on a schemes green investment and ensure trees remain healthy and grow to mature proportions. Healthy mature trees integrate well into the built environment; increase the maturity of the landscape; help provide a natural green and leafy urban environment in which people would want to reside whilst also benefiting local wildlife.
- 5.10 The planting of trees within confined urban environments should consider the use of appropriately designed planting pits specifically engineered to promote tree health and longevity.
- 5.11 Crucially the aim will be to provide an adequate volume of quality soil for roots to suitably develop by calculating the amount of available soil volumes needed and selecting species whose mature size is compatible with the site. This is an integral component of the planning stage (Lindsey & Bassuk, 1991).
- 5.12 In a natural environment free from constraints to growth, it has been proven through research that root systems can extend up to three times the radius of the tree crown and although in an urban environment there is often insufficient space to accommodate the extent of the full potential for root growth, all efforts should be made to at least provide as much soil volume as possible. One researched method of calculating the minimum required soil volume is as follows:

Table 2: Example of calculating Soil Volume for New Tree Planting (Source: CIRIA C712 and Calculating Target Soil Volumes – Green Blue Urban)

Projected canopy area of mature tree (m) x depth 0.6m		
Calculation 1	Projected mature canopy diameter (metres)	= 3 (Diameter)
Calculation 2	Projected mature canopy area (square metres), (n x Radius ²)	= 7.1 (Area)
Calculation 3	Target soil volume (cubic metres), (Area x 0.6m)	= 4.24 (Volume)
	Target soil volume	= 4.24m ³

General Planting Recommendations

- 5.13 Wherever possible, following discussions with the developer and utility companies, common service trenches should be specified to minimise land take associated with underground service provision and facilitation access for future maintenance.
- 5.14 Tree planting should be avoided where they may obstruct overhead power lines or cables. Any underground apparatus should be ducted or otherwise protected at the time of construction to enable trees to be planted without resulting in future conflicts.

General Design Principles in Relation to Retained Trees

- 5.15 As recommended by the guidance given in section 7.7 of BS5837 services, where possible, should not encroach within the Root Protection Areas of retained trees. If below-ground services are proposed within a Root Protection Area, modifications to the alignment of the service route may need to be made in order to minimise adverse effects on root stability and overall tree health.
- 5.16 Consideration may also need to be given to the potential for tree roots of newly planted trees and hedgerows to affect or compromise the future services. As far as feasible, it would be preferable that proposed services near both the existing and any new planting should be ducted for ease of access and maintenance and grouped together to minimise any future disturbance.

6.0 TREE PROTECTION MEASURES

- 6.1 Retained trees will be adequately protected during works ensuring that the calculated root protection area for all retained trees can be appropriately protected through the erection of the requisite tree protection barriers. Measures to protect trees should follow the guidance in BS5837 and will be applied where necessary for the purpose of protecting trees within the site whilst allowing sufficient access for the implementation of the proposed layout. These have been broadly summarised below.

General Information and Recommendations

- 6.2 All trees retained on site will be protected by suitable barriers or ground protection measures around the calculated RPA, crown spread of the tree or other defined constraints of this assessment as detailed by section 6 and 7 of BS5837.

- 6.3 Barriers will be erected prior to commencement of any construction work and before demolition including erection of any temporary structures. Once installed, the area protected by fencing or other barriers will be regarded as a construction exclusion zone. Fencing and barriers will not be removed or altered without prior consultation with the Project Arboriculturalist.
- 6.4 Any trees that are not to be retained as part of the proposals should be felled prior to the erection of protective barriers. Particular attention needs to be given by site contractors to minimise damage or disturbance to retained specimens.
- 6.5 Where it has been agreed, construction access may take place within the root protection area if suitable ground protection measures are in place. This may comprise single scaffold boards over a compressible layer laid onto a geo-textile membrane for pedestrian movements. Vehicular movements over the root protection area will require the calculation of expected loading and the use of proprietary protection systems.
- 6.6 Confirmation that tree protective fencing or other barriers have been set out correctly should be gained prior to the commencement of site activity.

Tree Protection Barriers

- 6.7 Tree protection fencing should be fit for the purpose of excluding any type of construction activity and suitable for the degree and proximity of works to retained trees. Barriers must be maintained to ensure that they remain rigid and complete for the duration of construction activities on site.
- 6.8 In most situations, fencing should comprise typical construction fencing panels attached to scaffold poles driven vertically into the ground. For particular areas where construction activity is anticipated to be of a more intense nature, supporting struts, acting as a brace should be added and fixed into position through the application of metal pins driven into the ground to offer additional resistance against impacts.
- 6.9 Where site circumstances and the risk to retained trees do not necessitate the default level of protection an alternative will be specified appropriate to the level / nature of anticipated construction activity. The recommended methods of fencing specifications for this site have been illustrated in Appendix B.
- 6.10 It may be appropriate on some sites to use temporary site offices, hoardings and lower level barrier protection as components of the tree protection barriers. Details of the specific protection barriers for the site can be provided should the application be approved, as part of a site specific Arboricultural Method Statement for a Reserved Matters application and in accordance with the guidance contained within BS5837.

Protection outside the exclusion zone

- 6.11 Once the areas around trees have been protected by the barriers, any works on the remaining site area may be commenced providing activities do not impinge on protected areas.
- 6.12 All weather notices should be attached to the protective fencing to indicate that construction activities are not permitted within the fenced area. The area within the protective barriers will then remain a construction exclusion zone throughout the duration of the construction phase of the proposed development. Protection fencing signs can be provided upon request.

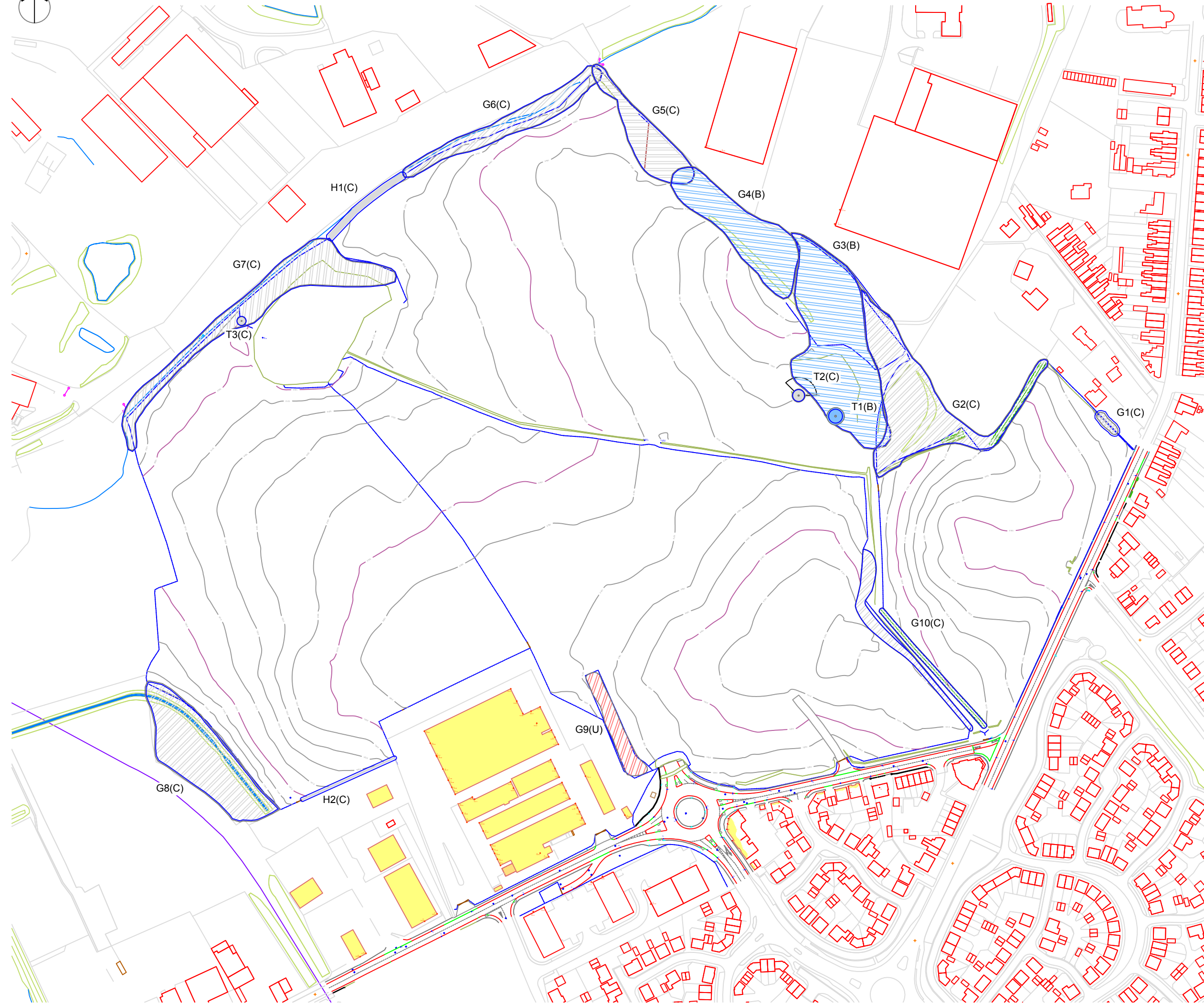
- 6.13 Wide or tall loads etc should not come into contact with retained trees. Banksman should supervise transit of vehicles where they are in close proximity to retained trees.
- 6.14 Oil, bitumen, cement or other material that is potentially injurious to trees should not be stacked or discharged within 10m of a tree stem. No concrete should be mixed within 10m of a tree. Allowance should be made for the slope of ground to prevent materials running towards the tree.
- 6.15 No fires will be lit where flames are anticipated to extend to within 5m of tree foliage, branches or trunk, taking into consideration wind direction and size of fire.
- 6.16 Notice boards, telephone cables or other services should not be attached to any part of a retained tree.
- 6.17 Any trees which need to be felled adjacent to or are present within a continuous canopy of retained trees, must be removed with due care (it may be necessary to remove such trees in sections).

Protection of Trees Close to the Site

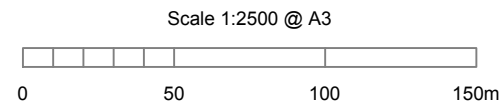
- 6.18 A number of trees were located on the boundaries of the site and therefore the root protection area and crown spread of these trees will need to be protected in the same way as all the retained trees within the site. All trees located outside the boundaries of the assessment site yet within close proximity to works should be adequately protected during the course of the development by barriers or ground protection around the calculated root protection area.
- 6.19 Any trees which are to be retained and whose Root Protection Areas may be affected by the development should be monitored, during and after construction, to identify any alterations in quality with time and to assess and undertake any remedial works required as a result.

Protection for Aerial Parts of Retained Trees

- 6.20 Where it is deemed necessary to operate wide or tall plant within close proximity to trees it is best advised that appropriate, but limited tree surgery, be carried out beforehand to remove any obstructive branches as any such equipment would have potential to cause damage to parts of the crown material, i.e. low branches and limbs, of retained trees within the protective barriers. This is termed as 'access facilitation pruning' within BS5837. Any such pruning should be undertaken in accordance with a specification prepared by an arboriculturalist.
- 6.21 A pre-commencement site meeting with contractors who are responsible for operating machinery is advised to firstly highlight the potential for damage occurring to tree crowns and to ensure that extra care is applied when manoeuvring machinery during such operations within close proximity to retained trees to avoid any contact.
- 6.22 In the event of having caused any branch or limb damage to retained trees it is strongly recommended that suitable tree surgery be carried out, in accordance with British Standard 3998:2010 and in agreement with the Local Planning Authority prior to correcting the damage, upon completion of development.



- KEY**
- Category U - Trees / Groups Unsuitable for Retention (BS 5837:2012)
 - Category A - Trees / Groups of High Quality (BS 5837:2012)
 - Category B - Trees / Groups of Moderate Quality (BS 5837:2012)
 - Category C - Trees / Groups of Low Quality (BS 5837:2012)
 - Hedgerow (Colour indicates BS5837:2012 Category)
 - Root Protection Area (The RPA has been altered where appropriate to reflect underground constraints)
 - Individual / Group Number and BS5837:2012 Category
 - Indicative Shade Pattern (in accordance with BS5837:2012 where appropriate)



NOTES

All dimensions to be verified on site. Do not scale this drawing, use figured dimensions only. All discrepancies to be clarified with project Arboriculturalist. Drawing to be read in conjunction with Arboricultural Assessment and Appendix A - Tree Schedule.

Drawing has been produced in colour and is based on digital information in .dwg format, aerial images and/or GPS location where appropriate. A monochrome copy should not be relied upon. The exact position of individual trees or species included as part of a tree group, woodland or hedgerow should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken. Further survey work would be required for calculating foundation depths.

Trees are living organisms that change over time, the condition of all trees illustrated herein, are to be checked by the project Arboriculturalist should works commence 12 months after the date of this survey.

SOME TREES MAY BE SUBJECT TO STATUTORY CONSTRAINTS. IT IS THEREFORE ADVISED THAT NO WORKS SHOULD BE UNDERTAKEN TO ANY TREES ILLUSTRATED HEREIN WITHOUT FIRST OBTAINING THE RELEVANT AUTHORISATION TO DO SO UNLESS AGREED AS PER THE APPROVED PLANS THROUGH PLANNING CONSENT.

This drawing is the property of FPCR Environment and Design Ltd and is issued on the condition it is not reproduced, retained or disclosed to any unauthorised person, either wholly or in part without written consent of FPCR Environment and Design Ltd. FPCR Environment and Design Ltd accept no liability for third party use.

Ordnance Survey material is used with the permission of The Controller of HMSO, Crown copyright 100018896.

-	14.03.19	First Issue	AW
rev	date	description	by

- masterplanning
- environmental assessment
- landscape design
- urban design
- ecology
- architecture
- arboriculture

FPCR Environment and Design Ltd
Lockington Hall
Lockington
Derby DE74 2RH

t: 01509 672772
f: 01509 674565
e: mail@fpcr.co.uk
w: www.fpcr.co.uk

client
Harworth Group

project
**Occupation Lane
Woodville**

drawing title
TREE SURVEY PLAN

scale 1:1250 @ A3	drawn/checked AW	date March 2019
drawing number 8794-T-01		rev -

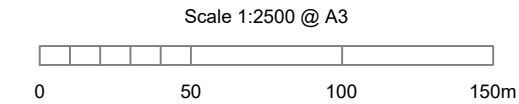


KEY

Tree/Group to be Retained

Tree/Group to be removed to facilitate the proposals

T1 (A)
G1 (A)

Individual / Group Number and BS5837:2012 Category

NOTES

All dimensions to be verified on site. Do not scale this drawing, use figured dimensions only. All discrepancies to be clarified with project Arboriculturalist. Drawing to be read in conjunction with Arboricultural Assessment and Appendix A - Tree Schedule.

Drawing has been produced in colour and is based on digital information in .dwg format, aerial images and/or GPS location where appropriate. A monochrome copy should not be relied upon. The exact position of individual trees or species included as part of a tree group, woodland or hedgerow should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken. Further survey work would be required for calculating foundation depths.

Trees are living organisms that change over time, the condition of all trees illustrated herein, are to be checked by the project Arboriculturalist should works commence 12 months after the date of this survey.

SOME TREES MAY BE SUBJECT TO STATUTORY CONSTRAINTS. IT IS THEREFORE ADVISED THAT NO WORKS SHOULD BE UNDERTAKEN TO ANY TREES ILLUSTRATED HEREIN WITHOUT FIRST OBTAINING THE RELEVANT AUTHORISATION TO DO SO UNLESS AGREED AS PER THE APPROVED PLANS THROUGH PLANNING CONSENT.

This drawing is the property of FPCR Environment and Design Ltd and is issued on the condition it is not reproduced, retained or disclosed to any unauthorised person, either wholly or in part without written consent of FPCR Environment and Design Ltd. FPCR Environment and Design Ltd accept no liability for third party use.

Ordnance Survey material is used with the permission of The Controller of HMSO, Crown copyright 100018896.

-	13.05.19	First Issue	EKP
A	12.06.19	P16-1422_004A-01 - Illustrative Masterplan R Inserted	CTT
rev	date	description	by

masterplanning

environmental assessment

landscape design

urban design

ecology

architecture

arboriculture

FPCR Environment and Design Ltd
Lockington Hall
Lockington
Derby DE74 2RH

t: 01509 672772
f: 01509 674565
e: mail@fpcr.co.uk
w: www.fpcr.co.uk

client
Harworth Group

project
**Occupation Lane
Woodville**

drawing title
TREE RETENTION PLAN

scale
1:1250 @ A3

drawn/checked
EKP

drawing number
8794-T-02

date
June 2019

rev
A

Appendix A - Tree Schedule

Measurements	Age Class	Overall Condition	Root Protection Area (RPA)
Height - Measured using a digital laser clinometer (m)	YNG: Young trees up to ten years of age	G - Good: Trees with only a few minor defects and in good overall health needing little, if any attention	• The RPA Radius column provides the extent of an equivalent circle from the centre of the stem (m). • The RPA is calculated using the formulae described in paragraph 4.6.1 of British Standard 5837: 2012 and is indicative of the rooting area required for a tree to be successfully retained. Tree roots extend beyond the calculated RPA in many cases and where possible a greater distance should be protected. • Where veteran trees have been identified the RPA has been calculated in accordance with Natural England guidance i.e. 15x the stem diameter, uncapped
Stem Dia. - Diameter measured (mm) in accordance with Annex C of the BS5837	SM: Semi-mature trees less than 1/3 life expectancy	F - Fair: Trees with minor rectifiable defects or in the early stages of stress from which it may recover	
Crown Radius - Measured using a digital laser clinometer radially from the main stem (m)	EM: Early mature trees 1/3 – 2/3 life expectancy	P - Poor: Trees with major structural and/or physiological defects such that it is unlikely the tree will recover in the long term	
Abbreviations est - Estimated stem diameter avg - Average stem diameter for multiple stems upto - Maximum stem diameter of a group	M: Mature trees over 2/3 life expectancy	D - Dead: This could also apply to trees in an advanced state of decline and unlikely to recover	
	OM: Over mature declining or moribund trees of low vigour	The BS category particular consideration has been given to the following • The health, vigour and condition of each tree • The presence of any structural defects in each tree/group and its future life expectancy • The size and form of each tree/group and its suitability within the context of a proposed development • The location of each tree relative to existing site features e.g. its screening value or landscape features • Age class and life expectancy	
	V: Veteran tree possessing certain attributes relating to veteran trees		

Structural Condition
The following is an example of considerations when inspecting structural condition: - The presence of fungal fruiting bodies around the base of the tree or on the stem, as they could possibly indicate the presence of possible internal decay - Soil cracks and any heaving of the soil around the base - Any abrupt bends in branches and limbs resulting from past pruning - Tight or weak 'V' shaped forks and co-dominant stems - Hazard beam formations and other such biomechanical related defects (as described by Claus Mattheck, Body Language of Trees HMSO Research for Amenity Trees No. 4 1994) - Cavities as a result of limb losses or past pruning - Broken branches or storm damage - Damage to roots - Basal, stem or branch / limb cavities - Crown die back or abnormal foliage size and colour

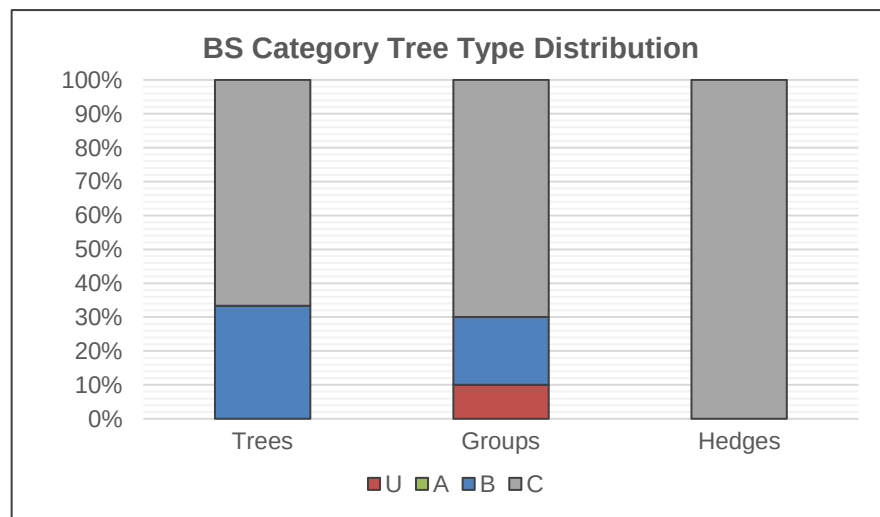
Quality Assessment of BS Category
Category U - Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.
Category A - Trees of high quality with an estimated remaining life expectancy of at least 40 years.
Category B - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.
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 150mm.
Sub-categories: (i) - Mainly arboricultural value (ii) - Mainly landscape value (iii) - Mainly cultural or conservation value

Appendix Summary

	Individual Trees	Totals	Tree Groups and Hedgerows	Totals
Category U		0	G9	1
Category A		0		0
Category B	T1	1	G3, G4	2
Category C	T2, T3	2	G1, G2, G5, G6, G7, G8, G10, H1, H2	9
Total		3	Total	12

BS Category Tree Type Distribution displays the proportion of trees assessed in each type to enable a better understanding of the category distribution.

Age Distribution of Tree Stock shows the number of trees in each age category across the tree stock allowing assessment of their longevity to be made.



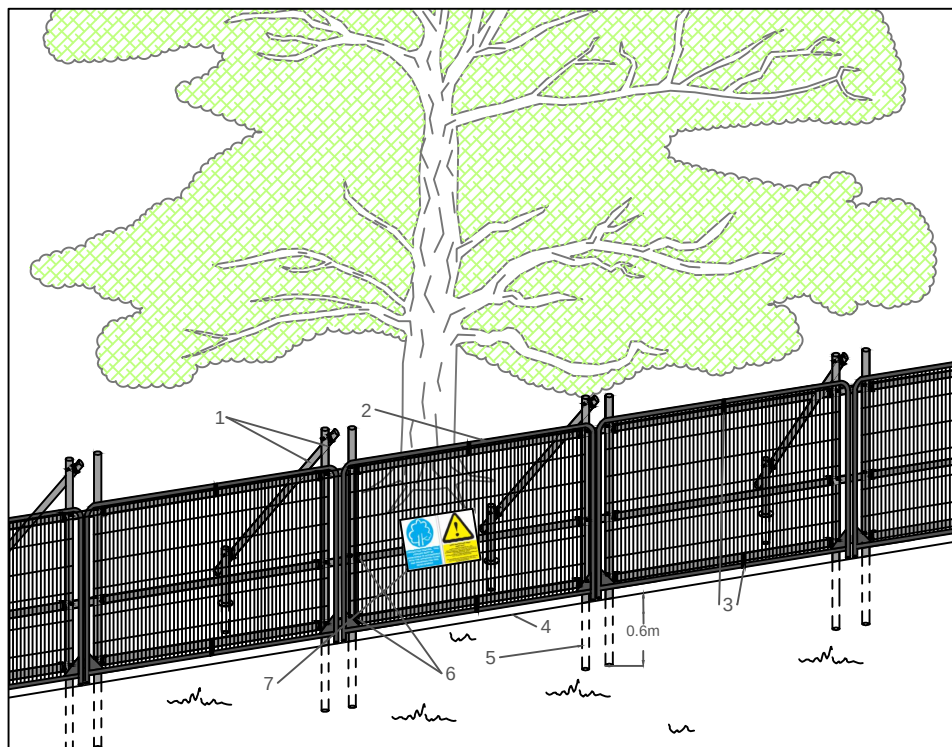
Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
INDIVIDUAL TREES										
T1	Sycamore Acer pseudoplatanus	11.5	est 400	6	M	F	Branch stubs evident Broken branches evident Minor dead wood evident in the crown (<75mm) No major defects were noted	72	4.8	B (i)
T2	Sycamore Acer pseudoplatanus	12.5	est 340	4.5	M	F	Bark wounds noted Branch stubs evident Broken branches evident Limited future potential Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) No major defects were noted	52	4.1	C (i)
T3	Silver Birch Betula pendula	10	210 160	3	M	F	Barbed Wire attached to stem/s Branch socket cavities observed Branch stubs evident Broken branches evident Limited future potential	32	3.2	C (i)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
GROUPS OF TREES										
G1	Blackthorn Prunus spinosa Silver Birch Betula pendula Wild Cherry Prunus avium	9	190 190	2	EM	F	Low crown form Multi stemmed from base Garden boundary group. Ownership uncertain	33	3.2	C (ii)
G2	Ash Fraxinus excelsior Elder Sambucus nigra Hawthorn Crataegus monogyna Sycamore Acer pseudoplatanus Holly Ilex aquifolium	7	avg 120	2	EM	F	Limited future potential Outgrown hedgerow Situated offsite	7	1.4	C (ii)
G3	Goat Willow Salix caprea Hawthorn Crataegus monogyna Silver Birch Betula pendula Sycamore Acer pseudoplatanus	10	avg 110	2	SM / EM	F	Characteristic for species Etiolated form Situated offsite Unmanaged group of trees	5	1.3	B (ii)
G4	Ash Fraxinus excelsior Blackthorn Prunus spinosa English Oak Quercus robur Goat Willow Salix caprea Hawthorn Crataegus monogyna Sycamore Acer pseudoplatanus	14	avg 370	5	EM / M	F	Bark wounds noted Maintained hedgerow Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Fly tipping around trees Possibly old buffer planting	62	4.4	B (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G5	Blackthorn Prunus spinosa Crack Willow Salix fragilis Silver Birch Betula pendula Sycamore Acer pseudoplatanus Alder Alnus glutinosa Lombardy Poplar Populus nigra 'Italica'	14	Over ivy 120	2	SM	F	Ownership undetermined Scrubby boundary group that mainly consists of blackthorn	7	1.4	C (ii)
G6	Ash Fraxinus excelsior Goat Willow Salix caprea Hawthorn Crataegus monogyna Leyland Cypress Cupressocyparis leylandii	10	upto 120 100 140	2	EM	F	Multi stemmed from base Situated along watercourse Riparian trees	20	2.5	C (ii)
G7	Blackthorn Prunus spinosa Crack Willow Salix fragilis Goat Willow Salix caprea Hawthorn Crataegus monogyna Silver Birch Betula pendula	11	upto 130 120 120	2	SM	F	Dead trees noted Interlocking crowns Ownership undetermined Situated along watercourse	21	2.6	C (ii)
G8	Hawthorn Crataegus monogyna Silver Birch Betula pendula	7	avg 100	2	M	F	Limited future potential Situated offsite Sporadic self-seeded group of trees	5	1.2	C (ii)

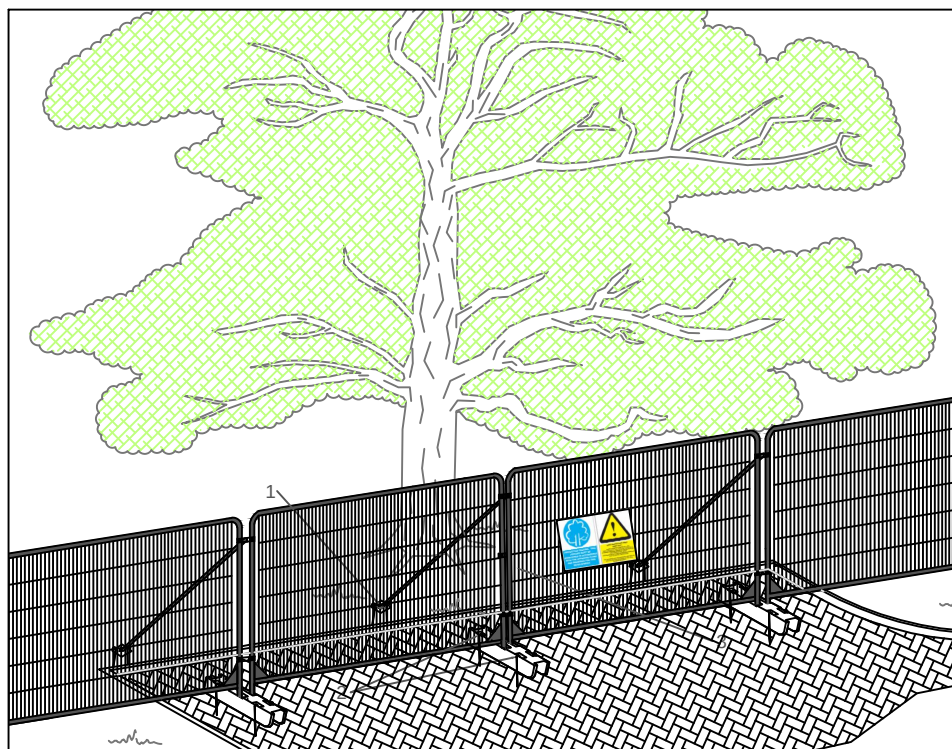
Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G9	Hawthorn Crataegus monogyna Silver Birch Betula pendula Austrian Pine Pinus nigra ssp. Nigra	6	upto 130	1.5	M	P	Limited future potential Ownership undetermined Fell and replace Poor boundary group	N/A	N/A	U
G10	Hawthorn Crataegus monogyna Blackthorn Prunus spinosa	6	upto 150	2	EM / M	G	Outgrown and unmanaged hedgerow Old hedgeline comprises larger hawthorn which comprise multi-stemmed / leadered forms	10	1.8	C (ii)

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
HEDGEROWS										
H1	Ash Fraxinus excelsior Crack Willow Salix fragilis Hawthorn Crataegus monogyna	4	avg 100	2	M	F	Un-maintained hedgerow	5	1.2	C (iii)
H2	Pyracantha	2	est 50	0.5	M	F	Maintained hedgerow	1	0.6	C (ii)



Standard specification for protective barrier

1. Standard scaffold poles
2. Heavy gauge 2m tall galvanized tube and welded mesh infill panels
3. Panels secured to scaffold frame with wire ties
4. Ground level
5. Uprights driven into the ground until secure (min depth of 0.6m)
6. Standard scaffold clamps
7. Construction Exclusion Zone signs



Above ground stabilising systems

1. Stabiliser strut with base plate secured with ground pins
2. Feet blocks secured with ground pins
3. Construction Exclusion Zone signs

NOTES

This drawing is the property of FPCR Environment and Design Ltd and is issued on the condition it is not reproduced, retained or disclosed to any unauthorised person, either wholly or in part with written consent of FPCR Environment and Design Ltd.



masterplanning ■
 environmental assessment ■
 landscape design ■
 urban design ■ FPCR Environment and Design Ltd
 ecology ■ Lockington Hall
 architecture ■ Lockington
 arboriculture ■ Derby DE74 2RH

t: 01509 672772
 f: 01509 674565
 e: mail@fpcr.co.uk
 w: www.fpcr.co.uk

drawing title

APPENDIX B PROTECTIVE FENCING SPECIFICATIONS

CAD file: S:\Arb resources\Basic Templates\Tree Protection\Appendix B - Protective Fencing A4.dwg