



Harworth Group

Houghton Main Colliery, Barnsley

Arboricultural Assessment

October 2021

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

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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 Houghton Main Colliery, Barnsley (hereafter referred to as the site), OS Grid Ref SE420 058.
- 1.2 The survey was carried out on 28th of July 2021.

Scope of Assessment

- 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 multiple industrial units and associated facilities 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

- 1.1 The site is located to the north-west of Little Houghton, with Middlecliff lane located on the southern boundary, Park Spring Road running adjacent to the western boundary, industrial units to the north and arable farmland to the east. The site itself is comprised of a field parcel which was defined by overgrown established scrub and vegetation. The tree material on site could be found upon the boundaries and appeared to be self-set natural colonisation.

2.0 PLANNING POLICY

National Planning Policy Framework July 2021

- 2.1 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 July 2021.

- 2.2 Paragraph 10 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.
- 2.3 In relation to arboriculture, the NPPF also states that:
- 131 *‘Trees make an important contribution to the character and quality of urban environments, and can also help mitigate and adapt to climate change. Planning policies and decisions should ensure that new streets are tree-lined⁵⁰, that opportunities are taken to incorporate trees elsewhere in developments (such as parks and community orchards), that appropriate measures are in place to secure the long-term maintenance of newly-planted trees, and that existing trees are retained wherever possible. Applicants and local planning authorities should work with highways officers and tree officers to ensure that the right trees are planted in the right places, and solutions are found that are compatible with highways standards and the needs of different users.*
 - 180(b) *‘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:
 - 180(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’.*
- 2.4 Examples of what is deemed to be ‘*wholly exceptional*’ are included within Footnote 63 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

- 2.5 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 wilfully 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.

- 2.6 The presence of any Tree Preservation Orders or Conservation Area designations that may affect the site has yet to be confirmed directly by Barnsley Metropolitan Borough Council. However, it is understood having used the online search facility on the website for the Local Planning Authority, Barnsley Metropolitan Borough Council that there is a Tree Preservation Orders present that would apply to a tree present within the assessment site and therefore statutory constraints 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

- 2.7 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
- 2.8 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
- 2.9 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
- 2.10 Priority habitat designation and inclusion within the National Forestry Inventory does not provide any statutory protection.

3.0 SURVEY METHODOLOGY

- 3.1 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 arboriculturist 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.
- 3.2 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.
 - 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.

¹ <http://magic.defra.gov.uk/>

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

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

- 3.3 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.

Ancient and Veteran Trees

- 3.4 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.
- 3.5 Veteran Trees and Ancient Woodlands are material considerations within the planning process and their importance is specifically recognised within the National Planning Policy Framework (NPPF) 2021, which defines the terms ancient or veteran tree as:

‘A tree which, because of its age, size and condition, is of exceptional biodiversity, cultural or heritage value. All ancient trees are veteran trees. Not all veteran trees are old enough to be ancient, but are old relative to other trees of the same species. Very few trees of any species reach the ancient life-stage.’⁴

- 3.6 Various published methodologies are currently available which, due to the complexity and subjectivity of the process of defining and assessing these trees, often have conflicting definitions. This assessment, and the criteria used for defining ancient/veteran trees and the identification of attributable ancient/veteran features, has been based on a range of currently published guidance and resources.

BS5837 Categories

- 3.7 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).
- 3.8 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.
- 3.9 **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.

⁴ Ministry of Housing, Communities and Local Government. (2019). *National Planning Policy Framework*. London: Ministry of Housing, Communities and Local Government.

- 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.

3.10 **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.

3.11 **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.

3.12 **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.

Site Plans

- 3.13 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. 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.
- 3.14 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

- 3.15 Below ground constraints to future development are represented by tree roots and the soil environment in which they grow which needs to be protected if the tree is to be retained. Tree rooting systems are essential for the uptake of water and nutrients, serving the storage of carbohydrates for the future growth and function of the tree, and form structural anchorage and support for the stem and crown. The perceived rooting area of the tree; referred to as the root protection area (RPA) needs to be protected if the tree is to be retained.
- 3.16 The RPA is a notional area considered to be the minimum zone that must be protected to avoid any adverse impacts on retained trees. The RPA has been calculated in accordance with Annex C, D and Section 4.6 of BS5837:2012 and requires suitable protection in order for the tree to be successfully incorporated into any future scheme. As such, the RPA of existing trees is an important material consideration when considering site constraints and planning development activities.
- 3.17 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. 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.
- 3.18 Whilst it is generally accepted that a trees roots may extend far greater distances than the notional RPA, with the distribution of the root system relating directly to the availability of suitable conditions for growth (namely oxygen, water and nutrients), with roots predominantly located in the upper 1,000 mm of the soil horizon; the RPA offers an accepted protective buffer from development.
- 3.19 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

- 3.20 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.
- 3.21 The statements made in this report regarding the assessed trees does not take into account the effects of extreme / adverse weather conditions, changes in land use prior to the site's development, unforeseen accidents or anti-social behaviours, 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.
- 3.22 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.
- 3.23 Hedgerows are identified as a Habitat of Principal 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.
- 3.24 It may be necessary during detailed design to undertake further assessment and accurate positioning of woody species within tree groups and hedgerows to assist structural calculations for foundation design of structures in accordance with current building regulations. 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.

4.0 RESULTS

- 4.1 A total of four individual trees, sixteen 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.

Tree Schedule

- 4.2 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.
- 4.3 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.

- 4.4 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	T4	1		0
Category A (High Quality / Value)		0		0
Category B (Moderate Quality / Value)	T1, T2	2	G4, G5, G7, G11	4
Category C (Low Quality / Value)	T3	1	G1, G2, G3, G6, G8, G9, G10, G12, G13, G14, G15, G16, H1, H2	14

- 4.5 The site itself is comprised of a field parcel which was defined by overgrown established scrub and vegetation. The tree material on site could be found upon the boundaries and appeared to be self-set natural colonisation. Further amenity buffer planting could be found along the western boundary creating a visual buffer to Park Spring Road.
- 4.6 The highest quality individual on site was T1 a mature horse chestnut *Aesculus hippocastanum* standing at 15m and stood majestically within a visual area of site. Its southern location within the southern field parcel has led to areas of compacted ground and piles of soil within the rooting area. There were minor bark wounds present upon the base of the stem alongside broken branches and branch socket cavities present. It was also noted that the in the top 1/3 of the crown the canopy appeared sparse/thinning. For arboricultural merits a category B was given to this tree.
- 4.7 T2 was another category B tree, this time a specimen of English Oak *Quercus robur*. This tree was situated within G3 and held an uneven crown dorm due to developing in close proximity of T3 a semi-mature wild cherry *Prunus avium*.
- 4.8 G5 was an avenue of mature Common Lime *Tilia x europaea* and Hybrid Black Poplar *Populus x canadensis* which stood at an average height of 17m. Due to being planted close together many showed signs of a suppressed crown form alongside other noticeable defects. As such due to their arboricultural and landscape merits they were deemed to be of moderate quality and a categorisation of B was given.
- 4.9 The largest proportion of tree material could be found in a continuous belt along the northern, eastern to southern boundaries of site and could be divided into differing groups of maturity and quality being G2, G3, G4, G6, G7, G8, G9, G10 and G16. The highest quality material was G4 and G7 being found to the east of site and consisted of hawthorn *Crataegus monogyna*, silver birch *Betula pendula*, sycamore *Acer pseudoplatanus*, wild cherry *Prunus avium* and false acacia *Robinia pseudoacacia*. The specimens within these groups were semi to early mature in stature, having fair form and vitality for their species and due to their arboricultural and landscape merits they were deemed to be of moderate to low quality.

- 4.10 T4 a U category individuals was present on the site. Due to the high risk of failure, it was deemed to be unsuitable for retention. See Tree schedule (appendix A) for more details in relation to limiting factors to future potential.

Ancient and Veteran Trees

- 4.11 None of the assessed trees were considered as ancient or veteran trees in accordance with accepted methodologies and guidance.

Statutory Constraints

- 4.12 The following table details which trees are included in the Barnsley Metropolitan Borough Council Tree Preservation Order (TPO), the of which is yet to be confirmed. The trees identified within the TPO are protected by law from felling or uprooting, pruning including ‘topping/lopping’ and wilful damage or destruction. The granting of full planning permission would override the protection afforded by the Tree Preservation Order to those trees shown as removed to facilitate the proposals within the approved plans.

Table 2: Tree Preservation Order details

Tree No. taken from FPCR	TPO reference no.
T1	2 / 20

- 4.13 Prior to any tree surgery and / or felling of protected trees it will be necessary to apply to the relevant local planning authority to gain consent for the works. For more information regarding Conservation Areas and Tree Preservation Orders it is advised that contact is made with the Local Planning Authority’s arboricultural officer, or other such relevant person.

5.0 ARBORICULTURAL IMPACT ASSESSMENT

- 5.1 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.
- 5.2 The AIA has been based upon the Site Layout by HTC Architects and seeks to outline the relationship between the proposals and the existing trees and hedgerows. The drawing shows the proposals for multiple industrial units and associated facilities. 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.
- 5.3 The proposed layout of the development scheme has been ‘constraint led’ in order to keep the arboricultural impacts to a minimum and has considered the value of the existing tree material.
- 5.4 Due to the nature of the tree material upon site and the proposed development, no matter how sympathetically designed the unavoidable removal of tree material will be needed to facilitate the development. The majority of this tree removal is either low quality or unsuitable for retention.

- 5.5 The full removal of three individuals, four groups and one hedgerow will be needed to facilitate the development. Of this total one individual being T2 was deemed to be of moderate arboricultural value. Regrettably due to their central location within site no matter what modifications are made this individual will always need to be removed, it is worth noting that the accompanying new planting scheme will compensate for the loss of tree material alongside creating advantageous growing conditions to quickly replenish and improve the canopy cover initially lost. The remaining two individuals, four groups and one hedgerow needing to be removed are of low or unsuitable quality as such should not be seen as a significant loss or constraint upon development.
- 5.6 Part removal of G3, G5, G10, G12 and G14 will be needed to enable construction of the new access road, industrial units and car park facilities. The selective removal of G3, G5, G10, G12 and G14 which is needed to facilitate the proposal is not believed to affect the overall value of the tree stock upon site and a reasonable measured new planting scheme upon the site will be mitigated against and should not be seen as a constraint upon the development as their loss would not impact the overall quality of tree stock upon site.
- 5.7 The proposed development avoids the root protection areas (RPA) of the majority of the retained trees on site, however very minor conflicts are found between T1 where the new car park layout passes through the RPA. The presence of any significant rooting material on the periphery of the RPA is likely to be insignificant and inconsequential, however it would be advised that when these areas are constructed, that there is a qualified arboriculturist present to oversee the excavation and construction within the RPA.
- 5.8 It would be recommended that the detailed specific uplifting, supervision and protection during construction/demolition are set out within a site specific Arboricultural Method Statement to ensure that best practice is followed, and all the necessary protection measures are in place.
- 5.9 Although there would be the loss of a number of trees to facilitate the proposals, a large proportion of the tree can be retained and incorporated into the sites landscaping scheme. These established trees will aid in softening the built element of the proposals.

Tree Management

- 5.10 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 arboriculturist or arborist to identify any potential public safety risks and to agree remedial works as required.
- 5.11 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.

- 5.12 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.

General Design Principles in Relation to Retained Trees

- 5.13 Ground investigation through the use of pneumatic excavation, such as an Air Spade and digging of trial pits, may be required should there be areas where it is not possible to modify the layout to avoid conflict with retained trees. Ground investigations would aim to determine the actual location of the physical roots without causing them damage in the process. Such an assessment would enable consideration of the practicality and suitability of certain 'tree friendly' construction methods and would better inform decision making for a design.
- 5.14 Further assessment of the impact to actual roots found during the ground investigations can then be made and solutions reached thus, greatly reducing any potential future impacts on retained trees whilst allowing the development to proceed and minimising risks to future tree health. Ultimately the aim would be to reduce conflicts between trees and buildings, and achieve successful tree retention.
- 5.15 The routing of below ground services should also be considered with regard to the retained trees. 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 NEW TREE AND HEDGEROW PLANTING

Trees

- 6.1 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).

- 6.2 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.
- 6.3 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.
- 6.4 When deciding 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.
- 6.5 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

- 6.6 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.
- 6.7 Recommended species for native hedgerow planting are as follows:
- *Crataegus monogyna*
 - *Prunus spinosa*
 - *Cornus sanguinea*
 - *Corylus avellana*
 - *Acer campestre*
 - *Euonymus europaeus*

Rooting Environment and Soil Volumes

- 6.8 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.

- 6.9 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. 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).
- 6.10 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 3: 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

- 6.11 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.
- 6.12 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.

7.0 TREE PROTECTION MEASURES

- 7.1 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

- 7.2 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.

- 7.3 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 Arboriculturist.
- 7.4 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.
- 7.5 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.
- 7.6 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

- 7.7 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.
- 7.8 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.
- 7.9 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.
- 7.10 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

- 7.11 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.
- 7.12 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.

- 7.13 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.
- 7.14 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.
- 7.15 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.
- 7.16 Notice boards, telephone cables or other services should not be attached to any part of a retained tree.
- 7.17 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

- 7.18 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.
- 7.19 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

- 7.20 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 arboriculturist.
- 7.21 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.
- 7.22 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.



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.

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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

-	18.08.21	First Issue	AZS
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- masterplanning
 - environmental assessment
 - landscape design
 - urban design
 - ecology
 - architecture
 - arboriculture
- FPCR Environment and Design Ltd
Lockington Hall
Lockington
Derby DE74 2RH
- t: 01509 672772
e: mail@fpcr.co.uk
w: www.fpcr.co.uk

client
Harworth Group Plc

project
**Houghton Main Colliery
Barnsley**

drawing title
TREE SURVEY PLAN

scale
1:1250 @ A3

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AZS / HR

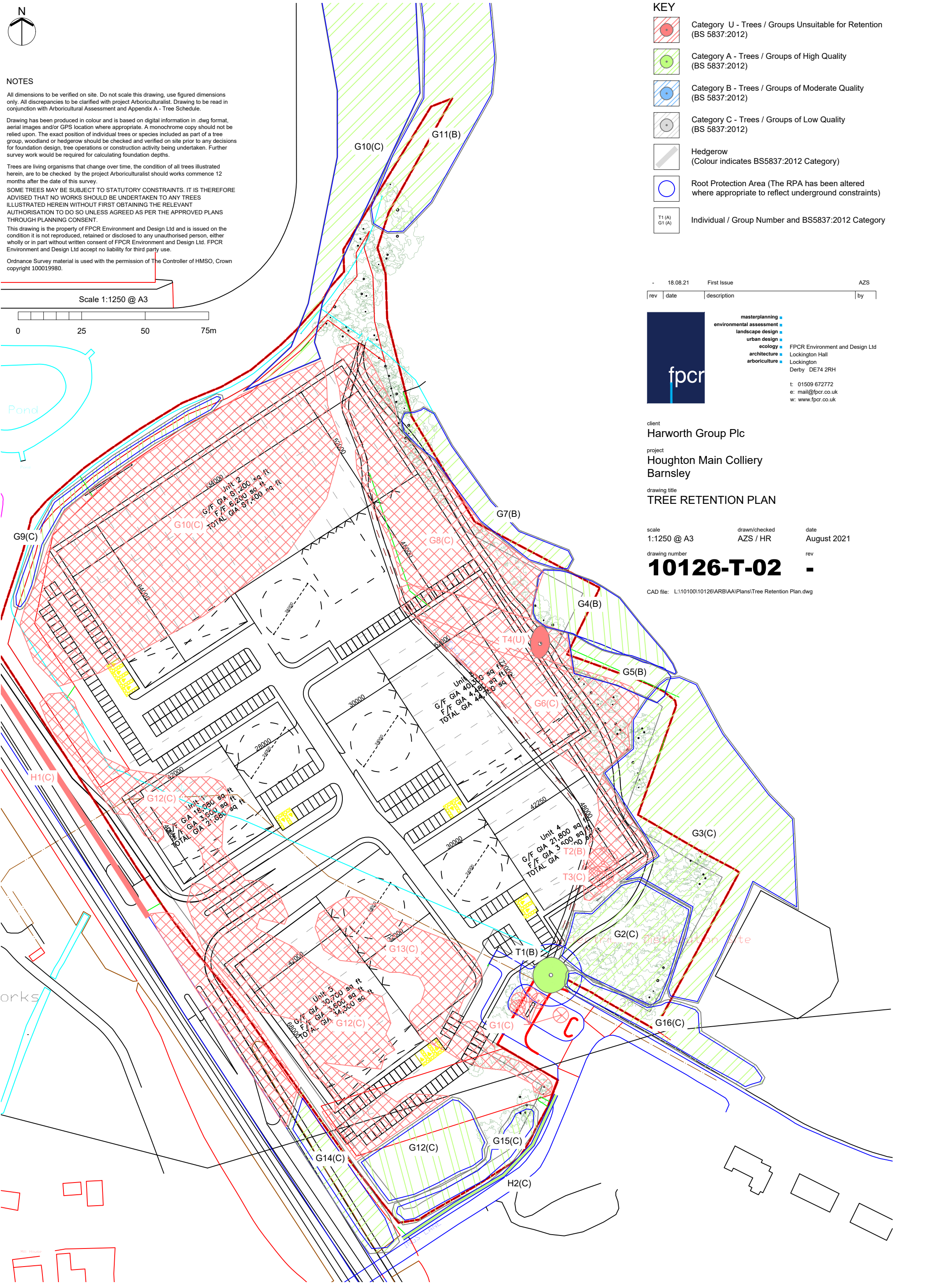
date
August 2021

drawing number
10126-T-01

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-

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NOTES

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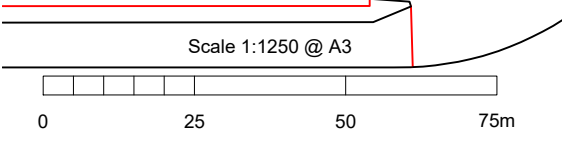
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KEY

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- 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)
- T1 (A)
G1 (A) Individual / Group Number and BS5837:2012 Category

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

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

client
Harworth Group Plc

project
**Houghton Main Colliery
Barnsley**

drawing title
TREE RETENTION PLAN

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AZS / HR

date
August 2021

drawing number
10126-T-02

rev
-

CAD file: L:\10100\10126\ARB\AA\Plans\Tree Retention Plan.dwg

Appendix A - Tree Schedule

Measurements	Age Classes	Quality Assessment of BS Category	ULE (relates to BS Category)
Height - Measured using a digital laser clinometer (m)	YNG: Establishing, typically with good vigour and fast growth rates and strong apical dominance; c. less than 1/3 life expectancy	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.	<10 years
Stem Dia. - Diameter measured (mm) in accordance with Annex C of the BS5837	SM: Semi-mature trees less than 1/3 life expectancy	Category A - Trees of high quality with an estimated remaining life expectancy of at least 40 years.	40+ years
Crown Radius - Measured using a digital laser clinometer radially from the main stem (m)	EM: Established, typically vigorous and increasing in apical height and lateral spread; 1/3 - 2/3 life expectancy. Offers landscape significance	Category B - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.	20-40 years
Abbreviations est - Estimated stem diameter avg - Average stem diameter for multiple stems upto - Maximum stem diameter of a group	M: Fully established over 2/3 life expectancy, generally good vigour and achieving full height potential with crown still spreading	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.	10-20 years
	OM: Fully mature, at the extremes of expected life expectancy, vigour decreasing, declining or moribund	Sub-categories: (i) - Mainly arboricultural value (ii) - Mainly landscape value (iii) - Mainly cultural or conservation value	
	V: biological, cultural or aesthetic value comprising niche saproxylic habitat. Individuals of large proportions (stem girth) in comparison to trees of the same species/surviving beyond the typical age range for their species.	The BS category particular consideration has been given to the following: • 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	

Structural Condition	Physiological Condition
Good - No significant structural defects	Good - No significant health problems
Fair - Structural defects that can be remediated	Fair - Symptoms of ill-health that can be remediated
Poor - Significant defects beyond remediation, present a risk of failure in the foreseeable future	Poor - Significant ill-health. Unlikely the tree will recover in the long term
Dead - Dead tree with structural integrity of tree severely compromised	Advanced Decline / Dead - Advanced state of decline and unlikely to recover or Dead

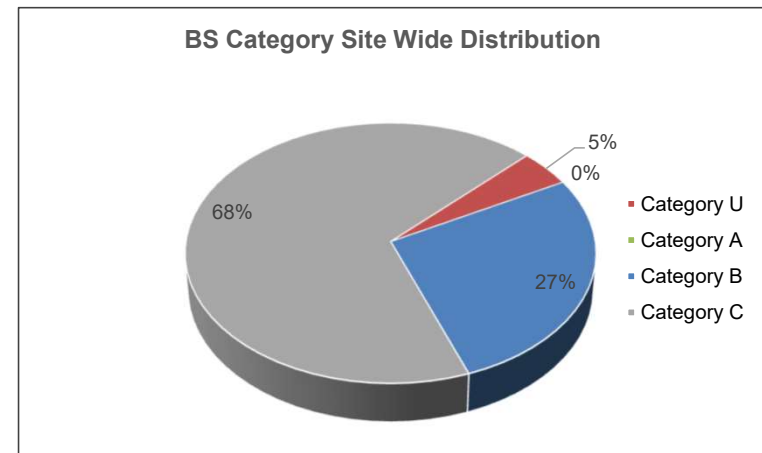
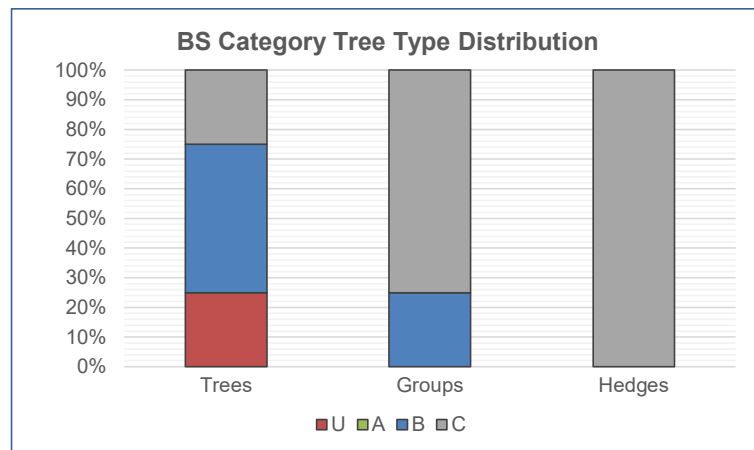
Root Protection Area (RPA)
• The RPA Radius column provides the extent of an equivalent circle from the centre of the stem (m). • The RPA is calculated using the formulae described in paragraph 4.6.1 of British Standard 5837: 2012 and is indicative of the rooting area required for a tree to be successfully 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.

Appendix Summary

	Individual Trees	Totals	Tree Groups and Hedgerows	Totals
Category U	T4	1		0
Category A		0		0
Category B	T1, T2	2	G4, G5, G7, G11	4
Category C	T3	1	G1, G2, G3, G6, G8, G9, G10, G12, G13, G14, G15, G16, H1, H2	14
	Total	4	Total	18

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

BS Category Site Wide Distribution shows the proportion of trees assessed in each category across the whole site which allows an interpretation of the site's overall quality.



Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
INDIVIDUAL TREES										
T1	Horse Chestnut Aesculus hippocastanum	15	1020	7	M	F	Barbed Wire attached to stem/s Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Compacted ground at the base Minor dead wood evident in the crown (<75mm) Multi leadered form Sparse / thinning crown	471	12.2	B (i)
T2	English Oak Quercus robur	10	410	N - 6 S - 2 E - 6 W - 6	EM	F	Branch stubs evident Dense undergrowth at the base Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form Suppressed crown form	76	4.9	B (ii)
T3	Wild Cherry Prunus avium	10	280 170	N - 1 S - 5 E - 6 W - 3	SM	F	Bark wounds noted Branch stubs evident Dense undergrowth at the base Minor dead wood evident in the crown (<75mm) Suppressed crown form	49	3.9	C (i)
T4	Hybrid Black Poplar Populus x canadensis	17	est 510	N - 7 S - 5 E - 2 W - 2	M	P	Specimen in extensive decline Large wound present at 1m to 2m on main stem on northern side Fire damage present on main stem at wound location	N/A	N/A	U

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
GROUPS OF TREES										
G1	Hawthorn Crataegus monogyna Rowan Sorbus aucuparia	6	avg 180	3	SM	P	Characteristic for species Pruning wounds noted	15	2.2	C (i)
G2	Goat Willow Salix caprea Hawthorn Crataegus monogyna Silver Birch Betula pendula	10	avg 100	2	Yng / SM	F	Characteristic for species Etiolated form Planted group	5	1.2	C (i)
G3	Ash Fraxinus excelsior Field Maple Acer campestre Hawthorn Crataegus monogyna Horse Chestnut Aesculus hippocastanum Norway Maple Acer platanoides Wild Cherry Prunus avium Apple Malus domestica Hazel Corylus avellana Pear Pyrus communis Dogwood Cornus sanguinea	12	avg 200	3	SM	F	Branch stubs evident Broken branches evident Dead trees noted Dense undergrowth at the base Etiolated form Failed trees Selfset group	18	2.4	C (i)

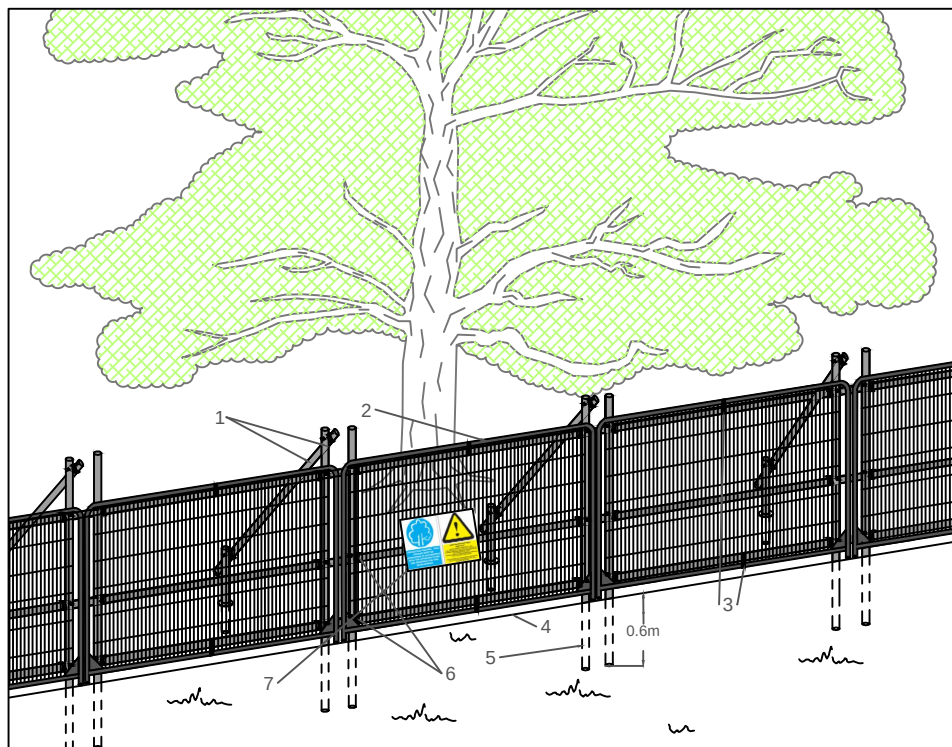
Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G4	Ash Fraxinus excelsior English Oak Quercus robur Field Maple Acer campestre Hawthorn Crataegus monogyna Horse Chestnut Aesculus hippocastanum Norway Maple Acer platanoides Wild Cherry Prunus avium False Acacia Robinia pseudoacacia Hazel Corylus avellana Dogwood Cornus sanguinea	12	avg 300	4	SM	F	Branch stubs evident Broken branches evident Dead trees noted Dense undergrowth at the base Etiolated form Failed trees Planted group	41	3.6	B (ii)
G5	Common Lime Tilia x europaea Hybrid Black Poplar Populus x canadensis	17	avg 500	N - 6 S - 6 E - 3 W - 3	M	F	Bark wounds noted Branch stubs evident Broken branches evident Characteristic for species Crossing and rubbing branches Included bark union Interlocking crowns Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Suppressed crown form Avenue of trees with alternate species planted Approx 32	113	6.0	B (i)
G6	Goat Willow Salix caprea Silver Birch Betula pendula	6	upto 65	1	Yng	F	Characteristic for species	2	0.8	C (i)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G7	Hawthorn Crataegus monogyna Silver Birch Betula pendula Sycamore Acer pseudoplatanus Wild Cherry Prunus avium False Acacia Robinia pseudoacacia	16	avg 250	3.5	EM	F	Characteristic for species Dense undergrowth at the base Included bark union Interlocking crowns Minor dead wood evident in the crown (<75mm) Understorey of hawthorn birch and cherry	28	3.0	B (ii)
G8	English Oak Quercus robur Goat Willow Salix caprea Hawthorn Crataegus monogyna Silver Birch Betula pendula Wild Cherry Prunus avium Alder Alnus glutinosa Pear Pyrus communis Scots Pine Pinus sylvestris	8	avg 120	2	Yng / SM	F	Branch stubs evident Broken branches evident Characteristic for species Dead trees noted Dense undergrowth at the base Minor dead wood evident in the crown (<75mm)	7	1.4	C (i)
G9	Crack Willow Salix fragilis Goat Willow Salix caprea Silver Birch Betula pendula Swedish Whitebeam Sorbus intermedia	9	avg 110 130	3	SM	F	Etiolated form Interlocking crowns Avenue of predominantly goat willow lining brook	13	2.0	C (i)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G10	English Oak Quercus robur Goat Willow Salix caprea Silver Birch Betula pendula Alder Alnus glutinosa Hazel Corylus avellana Scots Pine Pinus sylvestris	9	upto 150	2	Yng / SM	F	Characteristic for species Dense undergrowth at the base Planted group	10	1.8	C (i)
G11	Hawthorn Crataegus monogyna Norway Maple Acer platanoides Silver Birch Betula pendula Wild Cherry Prunus avium	14	avg 200	3	SM	F	Characteristic for species Dense undergrowth at the base Minor dead wood evident in the crown (<75mm) Multi leadered form Ownership undetermined	18	2.4	B (ii)
G12	Goat Willow Salix caprea Silver Birch Betula pendula	6	avg 80	2	Yng	F	Characteristic for species Dense undergrowth at the base Selfset natural colonisation	3	1.0	C (ii)
G13	Goat Willow Salix caprea Silver Birch Betula pendula Wild Cherry Prunus avium Alder Alnus glutinosa Purple Plum Prunus cerasifera Pissardii Scots Pine Pinus sylvestris	9	avg 140	3	SM	F	Characteristic for species Compacted ground at the base Dense undergrowth at the base Selfset natural colonisation	9	1.7	C (i)

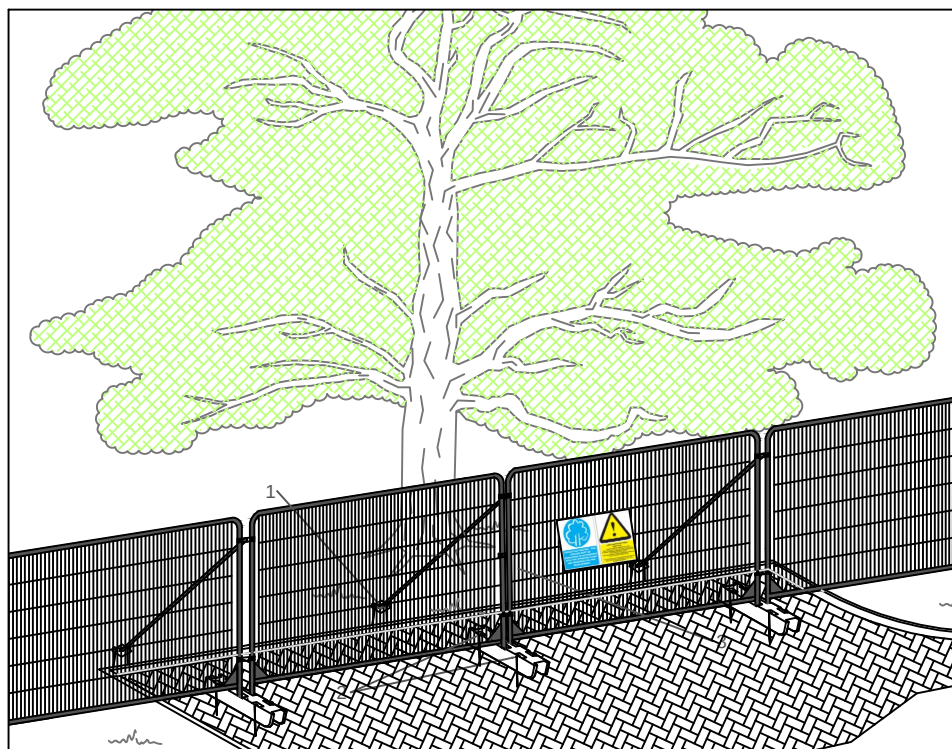
Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G14	Ash Fraxinus excelsior Blackthorn Prunus spinosa English Oak Quercus robur Goat Willow Salix caprea Silver Birch Betula pendula Wild Cherry Prunus avium Alder Alnus glutinosa Scots Pine Pinus sylvestris	9	avg 90	3	SM	F	Characteristic for species Compacted ground at the base Dense undergrowth at the base Situating offsite Highway buffer planting	4	1.1	C (i)
G15	Goat Willow Salix caprea Silver Birch Betula pendula Scots Pine Pinus sylvestris	8	avg 110	3	SM	F	Characteristic for species Compacted ground at the base Dense undergrowth at the base	5	1.3	C (i)
G16	Ash Fraxinus excelsior Blackthorn Prunus spinosa Horse Chestnut Aesculus hippocastanum Laural Prunus Laurocerasus	5	avg 90 90 110	3	SM	P	Basal suckers present Base obscured Branch stubs evident Broken branches evident Dense undergrowth at the base Flail damage evident Multi leadered form	13	2.0	C (i)

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
HEDGEROWS										
H1	Hawthorn Crataegus monogyna Hazel Corylus avellana	3	avg 70	2	SM	F	Outgrown hedgerow Buffer planting to highway	2	0.8	C (i)
H2	Hawthorn Crataegus monogyna Hazel Corylus avellana	3	est 60	1	Yng / SM	F	Outgrown hedgerow	2	0.7	C (i)



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

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 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