



Pegasus Group

Land off Barton Road, Barlestone

Arboricultural Assessment

May 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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Rev	Issue Status	Prepared / Date	Approved/Date
-	Draft	TCB / 25.09.19	CTT / 25.09.19
-	Final	AW / 10.12.20	TCB / 14.12.20
A	Final	TCB / 26.05.21	HR / 26.05.21

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1.0 INTRODUCTION

- 1.1 This report has been prepared by FPCR Environment and Design Limited on behalf of Pegasus Group to present the findings of an Arboricultural Assessment and survey of trees located at Barton Road, Barlestone (hereafter referred to as the site), OS Grid Ref SK 419 057.
- 1.2 The survey was carried out on Wednesday 4th September 2019.

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 a residential development with associated green infrastructure 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 was located on the western edge of the Leicestershire village of Barlestone and comprised of two arable field parcels that were bisected by hedgerows. To the west of the site ran the A447, to the north further arable land, the east was abutted by houses located on Gregory Lane and to the south was Barton Road. Tree cover on site was confined mainly to the southern boundary and it was predominantly mature in age.

2.0 PLANNING POLICY

National Planning Policy Framework 2019

- 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 February 2019.
- 2.2 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.
- 2.3 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*'.
- 2.4 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

- 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 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.
- 2.6 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, Hinckley and Bosworth Borough 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

- 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 no tree cover within the site as or included within the following:
- The Priority Habitat Inventory, Deciduous Woodland
 - The National Forestry Inventory

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, and 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.
 - For the purposes of this assessment woodland is described as a habitat where 'trees are the dominant plant form. The individual tree canopies generally overlap and interlink, often forming a more or less continuous canopy'². Woodlands, however, are not just formed of trees and generally include a great variety of other plants. These will include 'mosses, ferns and lichens, as well as small flowering herbs, grasses and shrubs'³.
- 3.3 An assessment of individual trees within groups and 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 None of the assessed trees were considered as ancient or veteran trees in accordance with accepted methodologies and guidance.

¹ <http://magic.defra.gov.uk/>

² http://www.countrysideinfo.co.uk/woodland_manage/whatis.html

³ http://www.countrysideinfo.co.uk/woodland_manage/whatis.html

BS5837 Categories

- 3.5 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).
- 3.6 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.
- 3.7 **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.
- 3.8 **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.
- 3.9 **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.

3.10 **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

- 3.11 Appendix A presents details of any individual trees, groups, hedgerows and woodlands 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.
- 3.12 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

- 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 tree's 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 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, 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.

- 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 eleven individual trees, four groups of trees and eight 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.
- 4.2 Several of the trees have been discussed in more detail following the table, owing to their physical condition or arboricultural significance.

Table 1: Summary of Trees by Retention Category

	Individual Trees	Total	Groups of Trees	Total
Category U - Unsuitable		0		0
Category A (High Quality / Value)	T1, T11	2		0
Category B (Moderate Quality / Value)	T7, T10	2	G1, H2, H5	3
Category C (Low Quality / Value)	T2, T3, T4, T5, T6, T8, T9	7	G2, G3, G4, H1, H3, H4, H6, H7, H8	9

- 4.3 Four individual trees observed on site were assessed as having high to moderate arboricultural quality (categories A and B) with the larger majority of tree cover considered to offer a lower overall quality (category C) due, in the most part, to either their outgrown nature, or as a result of comprising trees which exhibited a fair to poor physiological condition.

- 4.4 Tree stock was predominantly mature in age, with no single species being dominant species. Species were mostly native and include amongst others English oak *Quercus robur*, ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus*, hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, elder *Sambucus nigra* and English elm *Ulmus procera*. This broad range of species significantly contributed to the site's vast species diversity.
- 4.5 A large majority of the trees exhibited a fair overall condition. Broken branches, branch stubs and portions of either minor or major sized deadwood seemed to be prevalent throughout the tree cover on site, with low crown forms also being a common feature; possibly due to the peripheral positions of individual trees situated within group edges and site boundaries.
- 4.6 Two English oak trees were considered to be of high arboricultural quality at the time of assessment, with both trees being considered to either possess a remaining life expectancy and contribution to the arboricultural resource of at least 40 years or being a particularly good example of their species within the surrounding landscape. Recorded as T1 and T11, both trees were situated to the south. T1 was situated within a roadside verge whilst T11 was within a field boundary hedgerow.
- 4.7 All boundaries were defined by tree cover comprising of either managed or outgrown hedgerows. Where hedgerows had been actively managed, they appeared to be in good condition with few gaps or sparse sections. Hedgerows were predominately made up of thorny species with the occasional portion of sycamore, ash, elder and elm.
- 4.8 Tree groups were predominately formed by sections of hedgerow which had seen a lapse in management or thicket growth and sporadic self-set trees.

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 Illustrative Masterplan P19-1647 001D and seeks to outline the relationship between the proposals and the existing trees and hedgerows. The drawing shows the proposals for up to 55 residential dwellings with access, drainage and green infrastructure. 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.

Table 2: Summary of Impact on Tree Stock

	Trees to be Retained	Total	Trees to be Removed in full or part	Total
Category U - Unsuitable		0		0
Category A (High Quality / Value)	T1, T11	2		0
Category B (Moderate Quality / Value)	T7, T10, G1, H2, H5	5		0
Category C (Low Quality / Value)	T2, T3, T4, T5, T6, T8, T9 G2, G4, H1, H4, H6, H7, H8	14	G3, H3, H5	3

- 5.3 To facilitate the proposed development as per the above plan no significant tree loss will be required. The proposed built element of the development is to be positioned within each field parcel which is devoid of tree cover and the existing trees which are situated around these field boundaries will be retained seeing their integration as part of the new development and reinforced as landscape buffer strips and green corridors with new planting.
- 5.4 The main access point is to be positioned to the south and will be forged off Barton Road. To facilitate the point of access the removal of tree cover from G3 and H5 will be required. The full extent of any losses will be determined by the required visibility splays associated with this point of access. The tree cover to be removed consists of outgrown sycamore forming G3 along with hedgerow material and its loss is not considered to be detrimental.
- 5.5 As part of the proposed access an external footpath will be provided along Barton Road. This footpath has been constraint lead in its design to reduce any potential impacts to the high-quality trees along the frontage. Where the footpath is adjacent to T11, localised narrowing will be implemented.
- 5.6 To facilitate the internal road network, private driveways and residential units, a small section of H3 will have to be removed. Once again, these losses are not considered to be detrimental and in low proportions in comparison to that being retained.
- 5.7 Residential parcels are proposed to the north of both T1 and T11, trees of high quality situated along the southern boundary and will need to be carefully integrated within the development. The property shown to the west of T11 avoids the RPA of this tree and has been provided an adequate offset and should reduce the common problems such as pressure to prune crowns or even remove the trees in question.
- 5.8 Whilst the design of the layout has been led by tree constraints, due to the desire to retain trees of a high quality along with achieving the current housing density the fronting of properties creates a potential issue with encroachment upon root protection areas through the construction of private driveways. The proposed layout shows a conflict between a private driveway and the RPA of T1.

- 5.9 The extent of this encroachment is considered to be minimal and will need to be carefully designed at the detailed design stage. The area should be constructed using 'No dig' construction, more information on this method of construction is provide in paragraphs 5.10 – 5.13. The use of no dig construction will allow the successful retention of these trees along with any other surrounding tree cover which could potentially be impacted upon by the proposals.
- 5.10 In conclusion, although the proposals would necessitate the loss of a small amount of tree cover, there will be extensive landscaping of the new open space; associated gardens and green spaces with new tree planting therefore in terms of arboriculture, this would serve to improve and increase tree cover in the local area along with enhancing the landscapes visual amenity.

No Dig Construction

- 5.11 As stated within the above paragraph's partial areas of proposed driveway and footpaths are located within the RPA of certain trees which are to be retained. Conventional methods used in the construction of these areas involve soil excavation to allow sufficient depth for installation of a compacted sub-base material. This method of construction can potentially cause detrimental impact to adjacent trees through root severance and soil compaction should the accumulation of loads bear down on the soil.
- 5.12 Soil compaction compresses the soil closing up the pores especially in the upper levels and so reduces the infiltration of water and oxygen available to roots which prevents them growing through the soil. This will impede air movement into and out of the soil around the roots and consequently reduce the availability of oxygen to the roots. The effect on the tree is usually progressive shoot and branch dieback until a new balance has been reached between reduced capacity of the damaged root system to absorb water and the demands of the leaves although the damage usually results in the loss of or dead hazardous branches. If damage is progressive or so severe that such a balance cannot be achieved the tree will ultimately die. No dig construction methods reduce the risk of root severance and spread the loading on the soil significantly increasing a trees chance of survival. Retained trees will therefore continue to grow and flourish, either achieving their full maturity and potential or continue to contribute to the surrounding landscape.
- 5.13 The specification for undertaking construction of permanent porous hard surfacing using 'no-dig' techniques, suitable for use when requiring a light vehicle access and pathway beneath the crown spread and within the root protection area of a mature tree is therefore recommended. The recommended specification is shown in Appendix C, which demonstrates a permeable surface supported by a Cellular Confinement System above a Geo-Textile Membrane. Implementation of a porous no-dig construction would also reduce the need to provide drainage within the RPA of a retained tree; however, soil analysis would be required to determine the porosity of the ground to ensure sufficient infiltration could be achieved. By undertaking such a construction method, the retained trees will be sufficiently protected, and the proposed access drives successfully integrated alongside the existing trees.
- 5.14 A method statement approach will be best to ensure works are not going to significantly impact on retained trees and that the correct tree protection measures are provided to safeguard the trees from damage.

Tree Management

- 5.15 The layout of the development is currently reserved for subsequent approval. In the course of a reserved matters application pursuant to layout, a review of the relationship between the layout and the retained trees should be undertaken by a qualified arboriculturist to assess the existing tree cover and prepare a schedule of tree works.
- 5.16 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.
- 5.17 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.
- 5.18 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.

6.0 NEW TREE AND HEDGEROW PLANTING

- 6.1 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

- 6.2 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).
- 6.3 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.

- 6.4 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.
- 6.5 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.
- 6.6 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

- 6.7 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.
- 6.8 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

- 6.9 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.
- 6.10 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. 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).

- 6.11 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), ($n \times \text{Radius}^2$)	= 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

- 6.12 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.
- 6.13 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

- 6.14 In a subsequent Reserved Matters application following the final layout of the scheme, assessment of the distance of proposed development in relation to the calculated root protection area of retained trees should be made which will inform the final layout.
- 6.15 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.
- 6.16 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.

- 6.17 The use of “no-dig” construction methods should be considered prior to decisions being made as to the removal of each tree concerned, where conflicts between trees identified for retention and the layout arise. Such methods of construction and the use of industry led specialist engineering solutions i.e., three dimensional “load bearing” cellular confinement systems can be used particularly in the case of carriageways, footways and driveways in order to avoid unnecessary losses of trees.
- 6.18 The routing of below ground services should also be considered with regard to the retained trees as part of a subsequent reserved matters application pursuant to layout. 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.
- 6.19 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.

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

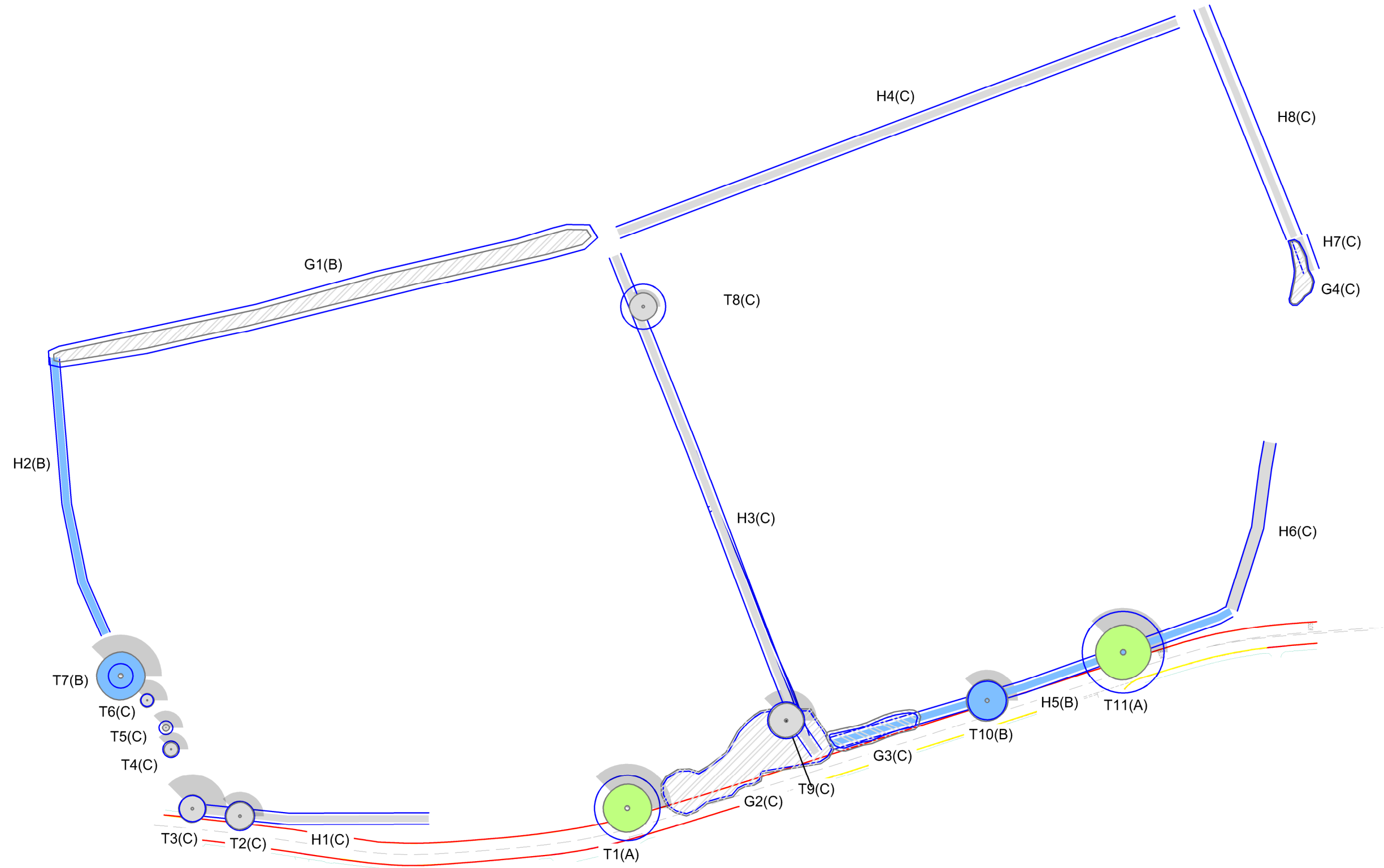
- 7.11 Once the areas around trees have been protected by the barriers, any works on the remaining site area may be commenced providing activities do not impinge on protected areas.
- 7.12 All weather notices should be attached to the protective fencing to indicate that construction activities are not 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.



T1 (A)
G1 (A)



Scale 1:1250 @ A3



0 25 50 75m

-	18.09.19	First Issue	AW
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t: 01509 672772
f: 01509 674565
e: mail@fpcr.co.uk
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KEY

Tree/Group to be Retained

Tree/Group to be removed to facilitate the proposals

Hedgerow Proposed to be Retained and Incorporated into the New Development

Hedgerow Proposed to be Removed to Facilitate the Development upon Approval of the Application

Root Protection Area
(Shown for retained trees only)

Individual / Group Number and BS Category

Indicative Shade Pattern (in accordance with BS5837:2012 where appropriate)

Scale 1:1250 @ A3

0

25

50

75m

NOTES

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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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A	10.12.2020	Updated Layout	AW
B	26.05.2021	Updated Layout	AW

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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

Pegasus Group

project

Barton Road Barlestone

drawing title

TREE RETENTION PLAN

scale

1:1250 @ A3

drawn/checked

AW/TCB

date

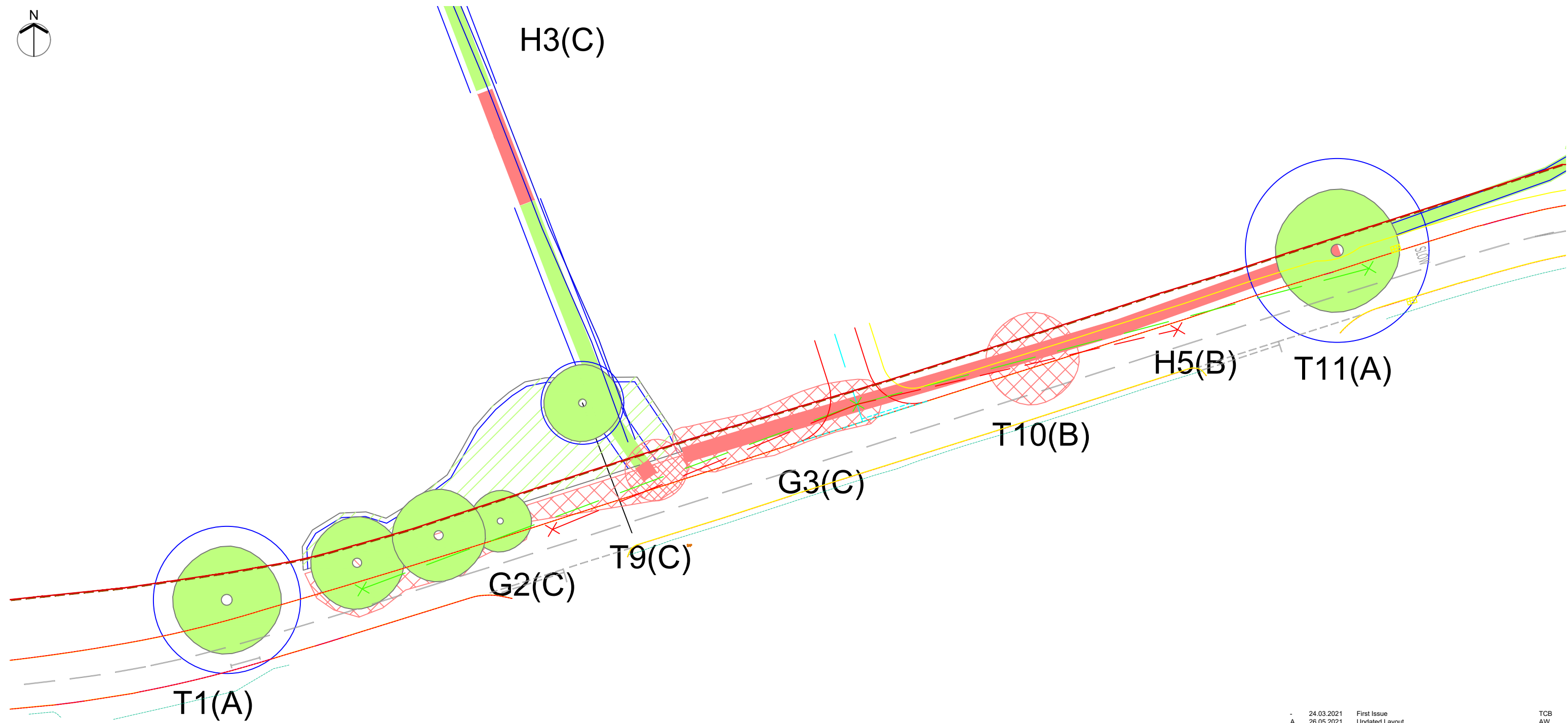
May 2021

drawing number

9171-T-02

rev

B



KEY

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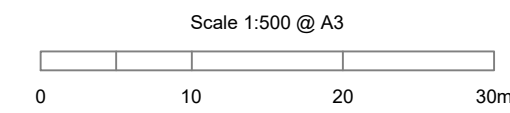
Tree/Group to be removed to facilitate the proposals

Hedgerow Proposed to be Retained and Incorporated into the New Development

Hedgerow Proposed to be Removed to Facilitate the Development upon Approval of the Application

Root Protection Area
(Shown for retained trees only)

Individual / Group Number and BS Category



NOTES

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A	26.05.2021	Updated Layout	AW
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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
Pegasus Group

project
Barton Road
Barlestone

drawing title
TREE RETENTION PLAN
DETAILED ACCESS DRAWING

scale
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drawn/checked
TCB/HR

date
May 2021

drawing number
9171-T-03

rev
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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

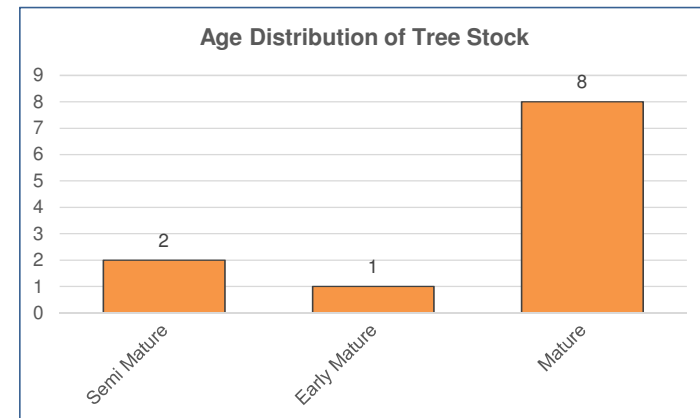
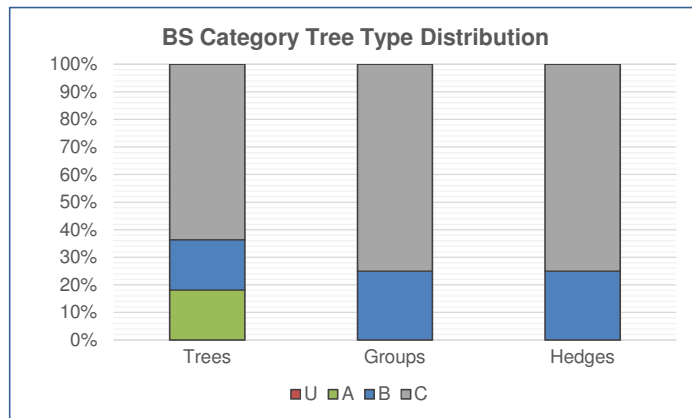
Root Protection Area (RPA)
• The RPA Radius column provides the extent of an equivalent circle from the centre of the stem (m). • The RPA is calculated using the formulae described in paragraph 4.6.1 of British Standard 5837: 2012 and is indicative of the rooting area required for a tree to be successfully 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		0		0
Category A	T1, T11	2		0
Category B	T7, T10	2	G1, H2, H5	3
Category C	T2, T3, T4, T5, T6, T8, T9	7	G2, G3, G4, H1, H3, H4, H6, H7, H8	9
	Total	11	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	English Oak Quercus robur	13	800	7	M	G	Epicormic growth evident within the crown Established ivy cover Minor dead wood evident in the crown (<75mm) Situating offsite	290	9.6	A (i)
T2	Sycamore Acer pseudoplatanus	7	est 180 180 180 180	4	M	F	Base obscured Established ivy cover Low crown form Minor dead wood evident in the crown (<75mm) Multi stemmed from base Rhytisma acerinum Tar spot of sycamore	59	4.3	C (i)
T3	Ash Fraxinus excelsior	10	est 160 160 160 160	4	M	P	Base obscured Dense undergrowth at the base Established ivy cover Minor dead wood evident in the crown (<75mm) Multi stemmed from base	46	3.8	C (i)
T4	Holly Ilex aquifolium	5	est 200	2	M	F	Base obscured Crossing and rubbing branches Dense undergrowth at the base Low crown form	18	2.4	C (i)
T5	Contorted Willow Salix matsudana Tortuosa	5	170	1	SM	F	Base obscured Crossing and rubbing branches Low crown form	13	2.0	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T6	Contorted Willow Salix matsudana Tortuosa	6	est 150	2	SM	F	Base obscured Crossing and rubbing branches Low crown form Situating offsite	10	1.8	C (i)
T7	Cider Gum Eucalyptus gunni	12	est 300	7	EM	F	Base obscured Crossing and rubbing branches Low crown form Situating offsite	41	3.6	B (i)
T8	Crack Willow Salix fragilis	5	est 300 350 300	4	M	P	Branch stubs evident Broken branches evident Crossing and rubbing branches Epicormic growth evident within the crown Lapsed Pollard Minor dead wood evident in the crown (<75mm) Main stem has split	137	6.6	C (i)
T9	Ash Fraxinus excelsior	9	est 450	5	M	P	Base obscured Branch stubs evident Dieback of the crown observed Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Sparse / thinning crown Situating on edge of pond	92	5.4	C (i)
T10	English Oak Quercus robur	9	470	6	M	F	Base obscured Branch stubs evident Epicormic growth evident within the crown Minor dead wood evident in the crown (<75mm)	100	5.6	B (i)

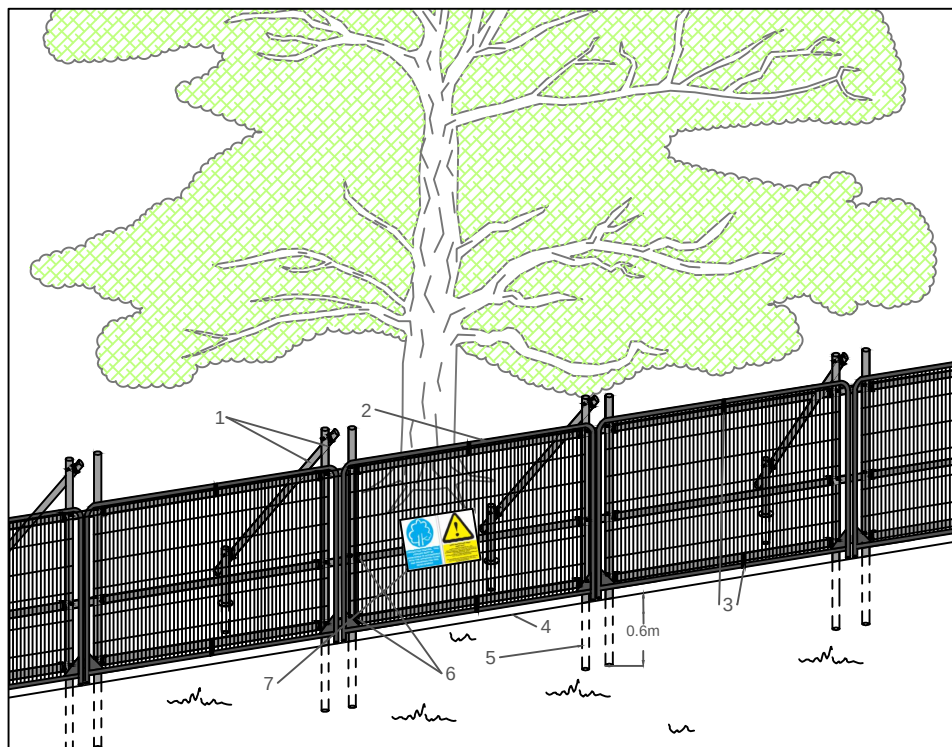
Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T11	English Oak Quercus robur	13	est 1000	8	M	F	Basal suckers present Branch stubs evident Epicormic growth evident within the crown Established ivy cover Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm)	452	12.0	A (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 Elder Sambucus nigra Hawthorn Crataegus monogyna Crab Apple Malus sylvestris English Elm Ulmus procera Holly Ilex aquifolium	5	est 120 120 120	1	M	F	Crossing and rubbing branches Interlocking crowns Low crown form Old laid forms Outgrown hedgerow Overhead cables	20	2.5	B (ii)
G2	Ash Fraxinus excelsior Blackthorn Prunus spinosa Hawthorn Crataegus monogyna English Elm Ulmus procera	8	avg 200	3	SM / EM	F	Base obscured Branch stubs evident Crossing and rubbing branches Dense undergrowth at the base Interlocking crowns Low crown form Trees around pond	18	2.4	C (ii)
G3	Sycamore Acer pseudoplatanus	9	est 100 100 100	3	EM	F	Base obscured Crossing and rubbing branches Established ivy cover Interlocking crowns Low crown form Multi stemmed from base Rhytisma acerinum Tar spot of sycamore	14	2.1	C (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G4	Hawthorn Crataegus monogyna English Elm Ulmus procera	6	est 200	2	EM	F	Base obscured Crossing and rubbing branches Dense undergrowth at the base Interlocking crowns Low crown form Rhytisma acerinum Tar spot of sycamore	18	2.4	C (ii)

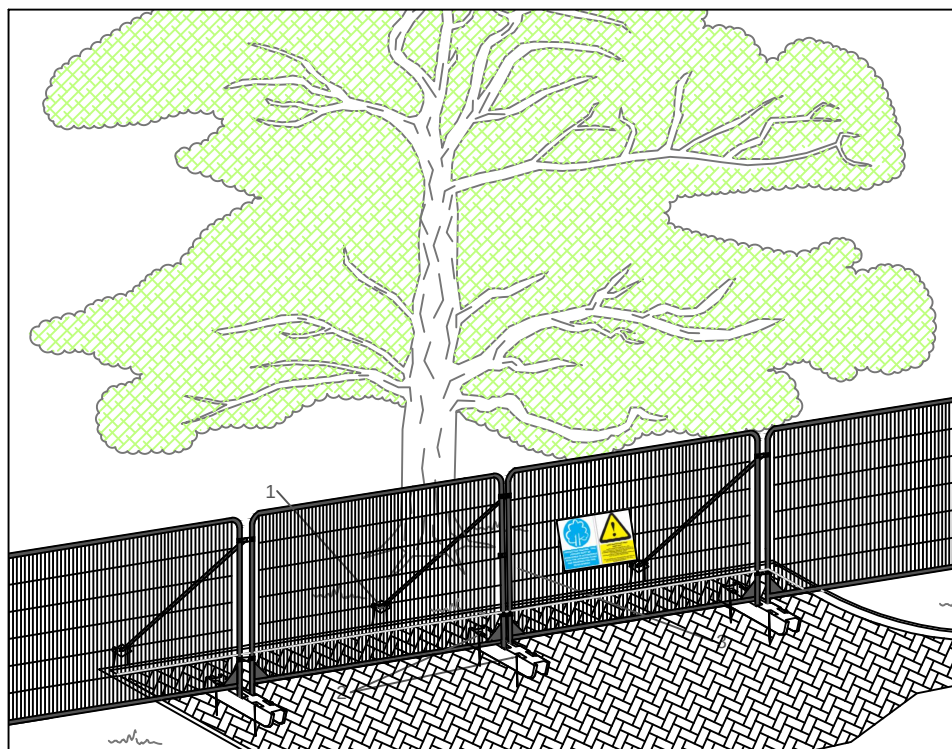
Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
HEDGEROWS										
H1	Blackthorn Prunus spinosa Elder Sambucus nigra Hawthorn Crataegus monogyna Sycamore Acer pseudoplatanus	2	80 80 80	1	EM	F	Crossing and rubbing branches Low crown form Maintained hedgerow	9	1.7	C (ii)
H2	Elder Sambucus nigra Hawthorn Crataegus monogyna	3	est 80 80	1	EM	F	Crossing and rubbing branches Dense undergrowth at the base Outgrown hedgerow	6	1.4	B (ii)
H3	Ash Fraxinus excelsior Blackthorn Prunus spinosa Elder Sambucus nigra Hawthorn Crataegus monogyna Holly Ilex aquifolium	3	est 6x 60	1	EM	F	Crossing and rubbing branches Low crown form Maintained hedgerow Outgrown in places	10	1.8	C (ii)
H4	Elder Sambucus nigra Hawthorn Crataegus monogyna	2	est 6x 60	1	EM	F	Crossing and rubbing branches Interlocking crowns Low crown form Maintained hedgerow Overhead cables	10	1.8	C (ii)

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
H5	Blackthorn Prunus spinosa English Oak Quercus robur Hawthorn Crataegus monogyna Sycamore Acer pseudoplatanus English Elm Ulmus procera	3	est 6x 60	1	EM	F	Base obscured Crossing and rubbing branches Low crown form Maintained hedgerow	10	1.8	B (ii)
H6	Hawthorn Crataegus monogyna English Elm Ulmus procera Holly Ilex aquifolium	3	est 6x 60	2	EM	F	Base obscured Crossing and rubbing branches Dense undergrowth at the base Interlocking crowns Low crown form Outgrown hedgerow	10	1.8	C (ii)
H7	Leyland Cypress Cupressocyparis leylandii	3	est 200	1	EM	F	Maintained hedgerow Situated offsite	18	2.4	C (i)
H8	Elder Sambucus nigra Hawthorn Crataegus monogyna	3	est 6x 80	1	EM	F	Base obscured Crossing and rubbing branches Interlocking crowns Low crown form Outgrown hedgerow	17	2.4	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

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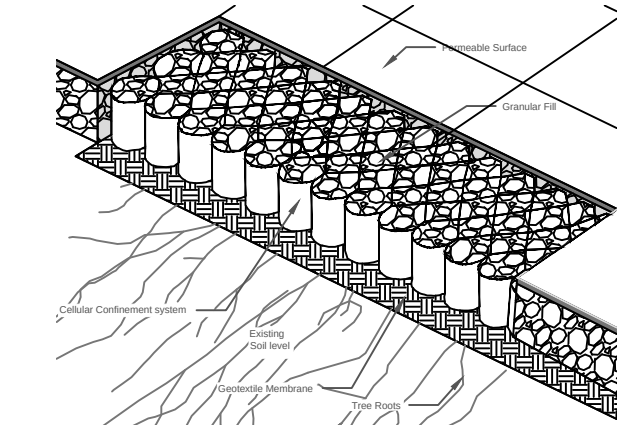
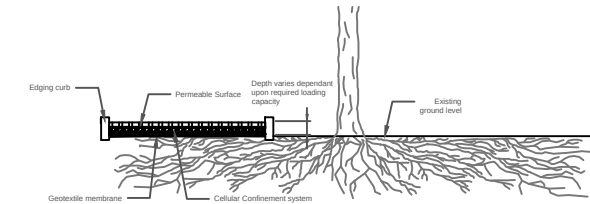
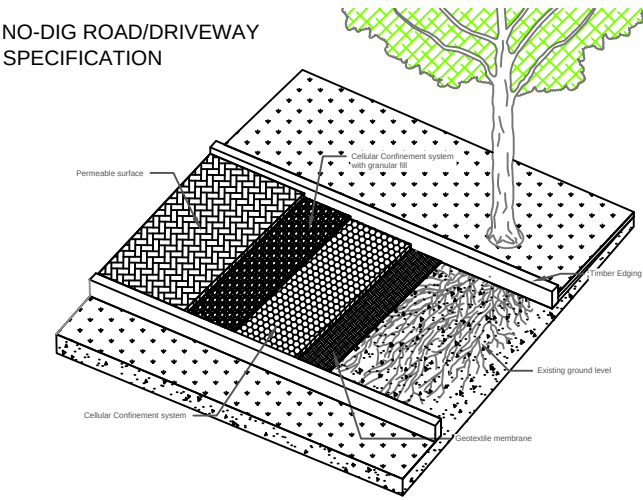
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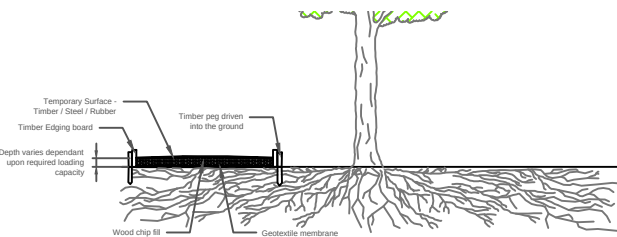
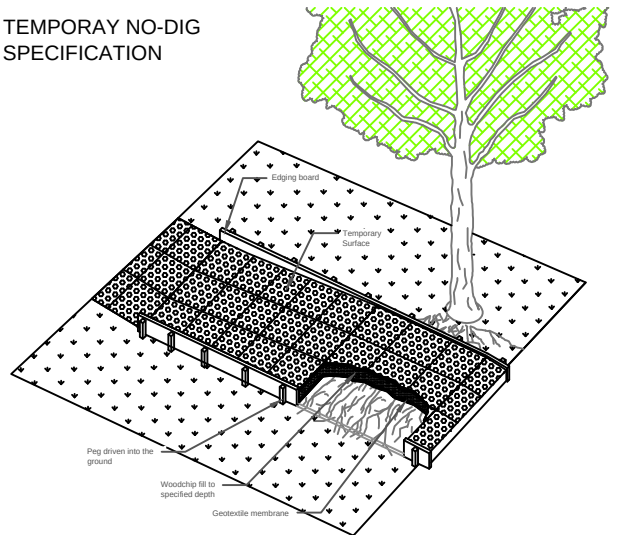
APPENDIX B PROTECTIVE FENCING SPECIFICATIONS

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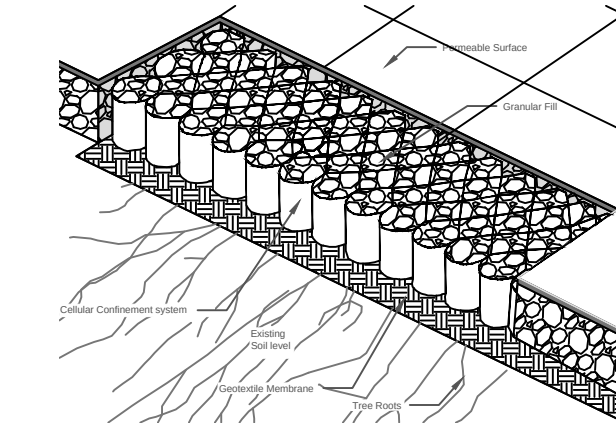
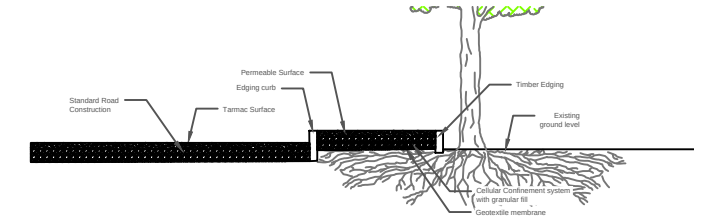
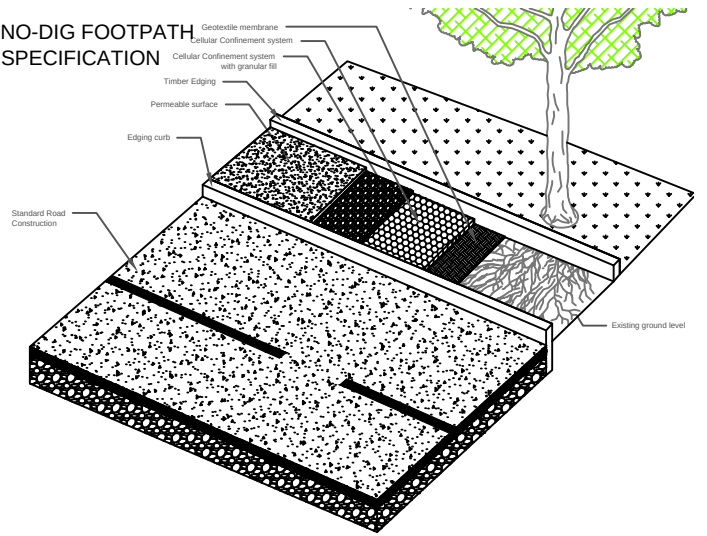
NO-DIG ROAD/DRIVEWAY SPECIFICATION



TEMPORAY NO-DIG SPECIFICATION



NO-DIG FOOTPATH SPECIFICATION



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

APPENDIX D NO DIG TECHNIQUES

CAD file: J:\7900\7989\ARB\Plans\Appendix D - No Dig Specification.dwg

NOTES

All dimensions to be verified on site. Do not scale this drawing.
 All discrepancies to be clarified with project Arboriculturalist.

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