

Arboricultural Impact Assessment

- in accordance with BS5837: 2012

Land adjacent to Glebe Farm

Barnsley Road

Silkstone

South Yorkshire

17th May 2019

Reference: **JC/192/190517**

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Summary of report

This report is undertaken in accordance with the requirements of BS5837: 2012. It considers the impact on trees of proposed development on land adjacent to Glebe Farm at Silkstone (South Yorkshire).

Five trees are to be removed, in addition to those that were agreed at outline planning stage. The only required pruning is very minor - to a hedge and perhaps to the low branches of a hawthorn. Excavation for a fire appliance turning arc is kept sufficiently distant from trees at the site's north-west corner, and no levels changes or other soil alterations are permitted within the Root Protection Areas of trees at the eastern boundary. New service/utility runs and connections will be located outside of Root Protection Areas. None of the retained trees should be significantly affected by the proposed development.

A Tree Protection Plan specifies fencing to ensure that retained trees and their roots are not harmed during the construction process.

Survey numbering of trees is kept consistent with the report approved at outline planning stage.

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1. Introduction

1.1 Terms of instruction

Jon Coe Tree Services Ltd were instructed by Design Space Architects (for John Wooller) to undertake a tree survey and report for land adjacent to Glebe Farm at Silkstone.

1.2 Scope of survey

The key requirements identified were to establish the condition of the trees on site, and the impact of the proposed construction works upon them, in accordance with BS5837: 2012¹ '*Trees in relation to design, demolition and construction: Recommendations*' (referred to herein as BS5837: 2012¹). This was not a detailed risk assessment survey.

The survey considered all trees that could be affected by the proposed works.

1.3 Documents supplied by client

Existing site outline and proposed layout drawings were supplied by Design Space Architects Ltd.

1.4 Items included within this report

The main report describes, in this order: the collection of data; summary of data; arboricultural impact; tree protection; arboricultural method statement and other relevant issues. It is followed by references, photographs and the appendices.

Central to the purpose of this report are Appendices H, I and J - drawings of Arboricultural Impact, Tree Protection Plan and Arboricultural Method Statement.

1.5 Qualifications and experience

The survey and report were carried out by Jon Coe, who holds a BSc (Honours) degree in Arboriculture from Myerscough College, Professional-grade membership of the Arboricultural Association, and Associate membership of the Institute of Chartered Foresters.

Jon undertakes many shorter courses as part of his commitment to professional development. These have included the following Arboricultural Association courses:

- BS5837: Tree surveying and categorisation
- BS5837: Tree assessment for planning applications
- BS5837: Managing trees on construction sites

Jon has fourteen years of continuous experience working in the arboricultural industry.

1.6 Caveats and limitations

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The survey was solely concerned with the requirements of BS5837: 2012¹. The survey was not a risk assessment survey, and it considered tree health only so far as necessary to fulfil the requirements of BS5837: 2012¹.

The survey and all observations were made from ground level only.

No soil samples were taken.

Observations were valid at the time they were made. However, trees are dynamic and growing structures that experience changes affected by time, weather and other factors.

2. Data collection

2.1 Site visit

The survey was conducted on Monday 13th May 2019. It was a dry sunny day - visibility was fine for survey purposes.

2.2 The site and tree layout

The survey area is on land adjacent to Glebe Farm at Silkstone. Site layout including trees is as shown on the Tree Constraints Plan at Appendix F. Individual tree's details are recorded in the Tree Schedule (Appendix A) and the Tree Constraints data (Appendix B). Findings are summarised in section 3.1.

2.3 Survey method

The initial survey was conducted without reference to the development proposal.

Each tree was given a tree identification number, as shown on the Tree Constraints Plan (Appendix F).

Tree locations are as defined on the plans that were supplied to us. In cases where the location of a tree was not included in the supplied topographical survey, the stem location was identified to the best ability of the arboricultural surveyor using a laser rangefinder.

The species of each tree was recorded. Common names are used in the Tree Schedule (Appendix A), with a list of botanical names supplied in Appendix C.

Where appropriate, trees were assigned to group locations if they formed cohesive arboricultural units.

Tree height was estimated in metres (m), to the nearest 0.5 m (rounded up) - or the nearest metre for trees above 10 m. At regular intervals, or for trees where precise height is likely to be important, it was recorded using the 'Measure Height' Android app; this has been checked for accuracy using a Suunto clinometer, to which it bears close comparison.

Stem diameter was measured in millimetres (mm) using a diameter tape, in accordance with the conventions detailed in Annex C of BS5837: 2012¹, which in most cases is at 1.5m above ground level.

Crown spread was recorded at the four cardinal points, to the nearest 0.5m (rounded up) - using a laser range-finder (Leica Disto D810).

Height of canopy clearance was recorded to the nearest 0.5 m. This was often an estimate, as canopy clearance is not usually consistent around the whole tree; a figure for the typical low point around the canopy was therefore estimated. Where appropriate, minor or epicormic branch growth was disregarded, in order to better portray the situation so far as clearance was concerned.

Age class was assessed according to the five possible categories listed in BS5837: 2012¹. These are young, semi-mature, early-mature, mature and over-mature.

Structural and physiological condition of trees were separately assessed and summarised using five possible categories: poor, moderate, fair, good, very good. More specific observations on condition were noted under 'Observations'.

'Observations' included details of specific structural and physiological issues, notes on past and suggested future management, and problems currently presented by the trees.

An estimate was made (in years) of the potential remaining contribution that each tree could offer, in its current situation, without a need for significant tree surgery operations.

Each tree was categorised according to the guidance given in BS5837: 2012¹ (Appendix D). Retention categories of A, B, C or U were allocated (in descending order of tree quality), with an additional sub-category of 1, 2 or 3 that defines whether the principal category was allocated for arboricultural, landscape or cultural reasons respectively.

3. Summary of data

3.1 Trees and hedges

At outline planning stage, a previous tree report indicated the expected loss of various trees – these have now been removed. Of the remaining trees, all are deciduous broadleaves with the exception of two hollies. None of the trees on site are special, though some are reasonable examples of their species. The best of the surveyed trees is a fine off-site sycamore (tree

022). Rowan, cherry and hawthorn are the most common species (3 of each). Two of the rowans are tall for the species, though one of these is structurally defective. Two Norway maples stand out due to their crimson foliage, and there are also a couple of unremarkable ash trees.

3.2 Retention categories

Retention categories have been assigned in accordance with the criteria in BS5837: 2012¹ (Appendix D).

Both Norway maples are assigned category B, as are one each of rowan, wild cherry and sycamore. The remainder of the trees on site lack the qualities required to raise them above the level of category C.

3.3 Below ground constraints

The Root Protection Areas (RPAs) are the areas in which construction and activities related to the construction process should not take place, in order to protect the trees' root systems. Where such activities cannot be avoided, it may be possible to incorporate design measures that prevent the damage that may occur to the tree's health and stability through soil compaction, level changes, root severance and contamination. Sections 6 and 7 of BS5837: 2012¹ outline methods for protecting RPAs during the construction process, and for building within them where this is unavoidable.

RPAs are generically calculated as an area equivalent to a circle with a radius 12 times the stem diameter, in accordance with section 4.6.1 of BS5837: 2012¹; this also provides methods for calculating the combined stem diameter of multi-stem trees.

In accordance with BS5837: 2012¹, the RPAs listed in the Tree Constraints data (Appendix B) have been determined from the stem diameter by using Table 4 (Appendix E), whose values are themselves extracted from Table D.1 in Annex D of the standard (BS5837: 2012¹). Stem diameters are rounded up to align with those in Table 4; potentially to the trees' benefit.

Where group locations occur, a continuous RPA boundary has been shown on the Tree Constraints Plan (Appendix F). The extent of this boundary has

been determined by the tree assessor, using a balanced judgement of the various contributing factors – particularly the species composition and density of the group.

3.4 Above ground constraints

Data for crown spread is listed in the Tree Constraints Data (Appendix B). Additionally, the Tree Schedule (Appendix A) contains data on canopy clearance, and the height of the first major branch (where applicable).

4. Arboricultural Impact Assessment

4.1 Overview of the impact of proposed development on trees on this site

Five trees are to be removed. The only required pruning is very minor - to a hedge and perhaps the low branches of a hawthorn. Excavation for the fire appliance turning arc is kept sufficiently distant from trees at the site's north-west corner, and no levels changes or excavation or other soil alterations are permitted within the Root Protection Areas of trees at the eastern boundary. Levels changes are all accounted for, and all new service/utility runs and connections will be located outside of Root Protection Areas. None of the retained trees should be significantly affected by the proposed development.

4.2 Trees losses

In addition to those trees removed following outline planning approval, the following five trees are now recommended for removal once full planning permission is granted. Tree numbers are:

Tree 026 – a low quality sycamore self-set, remove to accommodate the fire appliance turning arc.

Tree 027 – a small young crab apple.

Tree 028 – a cherry with overly extended canopy that will cover garden area. Satisfactory pruning is not possible. Canopy extends much further than indicated by previous tree report.

Tree 029 – a slender cherry that will be overly exposed following removal of trees 028 and 030. Also a number of small cherry sucker stems adjacent to this.

Tree 030 – a tall rowan with severe included bark and compression fork. These are significant in this particular situation.

4.3 Tree and hedge pruning

Some pruning of hedge 031 will be required - taking it back towards the boundary by approximately 0.5 m. This is a dense but scrappy hedge that will comfortably tolerate such pruning.

It may be that some minor pruning is required to low south-east branches on hawthorn 025 – this would not be significant to the tree if carried out in accordance with the guidance in *BS 3998: 2010 Tree work – Recommendations*².

4.4 Impact on tree 023

Holly tree 023 will not be significantly affected by the required excavation for the retaining wall for fire appliance turning arc, as the line of the wall is outside of the tree's RPA. Furthermore, an existing 60+ cm high retaining wall that passes the east side of its stem means that this holly will be depending on the south-west side of its stem for rooting much more than on the side of the excavation.

4.5 Impact on tree 025

Hawthorn 025 will not be significantly affected by the required excavation for the retaining wall for the fire appliance turning arc. This is due to a small existing retaining wall on the east side of its stem, and also due to sycamore 026 to its east (to be removed) which means that this hawthorn will be depending more on the south-west side of its stem for rooting, than on the side of the excavation.

4.6 Impact on trees adjacent to eastern boundary

Trees along the eastern boundary, and the environmental buffer zone in this same area, will not be significantly affected by the development. There will be no levels changes or soil alteration within their RPAs. Temporary fencing will protect them throughout construction, and all soakaways and new service/utility runs and connections are all to be located outside of their RPAs.

4.7 Impact of levels changes

This is dealt with by items 4.4 to 4.6.

4.8 Impact of services

All new service/utility runs and connections will be located outside of RPAs. They will not impact tree roots.

4.9 New hedges

Four new hedge lines are to be planted, as follows:

- H1 (northern limit of site) = mix of *Crataegus monogyna* - Hawthorn (40%), *Corylus avellana* - Hazel (30%), *Acer campestre* - Field maple (30%)
- H2 and H3 (between new properties) = either *Fagus sylvatica* (beech) or *Carpinus betulus* (hornbeam). Both these are suitable for the shaded location where these two hedges extend beneath tree canopies.
- H4 (adjacent to roadside boundary) = mix of *Crataegus monogyna* - Hawthorn (40%), *Corylus avellana* - Hazel (30%), *Acer campestre* - Field maple (30%)

5. Tree Protection Plan

5.1 Timing and importance

The requirements of the Tree Protection Plan should be implemented in full prior to the commencement of any construction work or the delivery of any construction materials or machinery to site. All parties operating on site, and all those involved in planning construction operations, should be made aware of all of the requirements of the Tree Protection Plan.

The primary purpose of the Tree Protection Plan is to prevent the serious and often irreversible harm that can be caused to trees through the excavation, compaction or other altering of their rooting soil. Compacted soil prevents root function, which causes tree decline or death. This decline is often gradual over a period of time, such that it is often not observed by the offending party. Harmful soil compaction can be caused by vehicles, machinery, footfall, or the weight of stored materials.

Chemical spillages, bonfires and level raises are also all activities that can seriously harm tree roots.

The abundant small and fine minor roots are of great importance to trees - these and the roots in general are found much closer to the soil surface than is often assumed.

5.2 Temporary fencing for duration of construction

Fencing is to be positioned exactly as shown on the drawing at Appendix I. This should be achieved by taking scaled measurements from that drawing, and by accurately following those measurements that are provided. All indicated tree protection fencing shall consist of welded mesh panels (2 metres high) – these are to be driven into the ground to prevent ease of moving. The panels shall be joined together using at least two anti-tamper couplers, installed so their removal is only possible from inside the fence (the tree side) – these fence couplers should be spaced apart by at least 1 metre.

Fencing panels must be supported on their inner sides by stabiliser struts, with these attached to base plates that are secured with ground pins – to

ensure that the fencing line cannot be moved during construction. All-weather notices should be affixed at 7 metre intervals, with the following wording: '*Construction exclusion zone for protection of tree roots – no access permitted behind this fencing*'.

6. Arboricultural Method Statement

6.1 Scheduling

The various components of this method statement are arranged sequentially, in the order in which they should be carried out.

6.2 Tree removals and pruning

Details of all tree surgery operations required or recommended to facilitate the proposed construction works are given at sections 4.2 and 4.3.

All tree work should be carried out in accordance with the various guidance in *BS 3998: 2010 Tree work – Recommendations*².

6.3 Implementation of Tree Protection Plan

The requirements of the Tree Protection Plan should be implemented in full prior to the commencement of any construction work (see Section 5).

6.4 Excavation for fire appliance turning arc

Excavation close to trees 023 and 025 will be needed in order to achieve the level required for the turning arc for fire appliances. The drawing at Appendix J makes clear exactly where there is to be no excavation or soil alteration. The required drop in level (to accommodate the north end of the fire appliance turning arc) will therefore need to be achieved using a retaining wall built up to the edge of the specified '*no excavation*' area – but not within it.

6.5 Rear gardens – levels changes

The rear gardens of the three proposed properties will extend into the Root Protection Areas (RPAs) of trees along the eastern site boundary. Within these RPAs it is essential that levels changes or other soil alteration do not occur. This same area is also designated as species-rich environmental buffer zone.

The drawing at Appendix J therefore makes clear exactly where there is to be no excavation, level raising or soil compaction. A step down in level will be required from the garden areas nearest to the houses, to the indicated area of RPAs and environmental buffer zone. This step down may be achieved by battering down or by using a retaining wall - but all works associated with that step down must be achieved outside of the indicated area.

6.6 Services and utilities

All new services and utility runs and their connections must be located outside of the Root Protection Areas of retained trees – as is shown on the proposed layout.

6.7 Severing or exposing tree roots

As tree roots can extend well beyond the generic Root Protection Area defined in BS5837: 2012¹, it is likely that some minor roots will be encountered during excavations. If it is necessary to sever any of these individual minor roots (less than 25 mm diameter), this can be done using secateurs or a sharp handsaw. If small-diameter roots occur in clumps, or if roots exceed 25 mm diameter, they should only be severed after consultation with an appropriately qualified arboriculturist.

Any roots that are exposed should be immediately covered to prevent drying out, and to protect them from sudden temperature changes. This is especially important during the colder months, when frost damage of roots is a significant risk.

6.8 New hedging

Four new hedges are to be planted, of species specified at section 4.9. New hedging should be planted in staggered double rows, with clearance of 0.3 m between the two rows, and with spacings of five hedging whips per metre along each row. Regular watering and removal of weed competition is important in the first few years, and the need or not for protection of the planted whips should be assessed – with regard to browsing wildlife in particular.

7. Other observations

7.1 Legal status of trees on site

The status of trees on site - with regard to Tree Preservation Orders and Conservation Areas - has not been independently checked. The relevant legislation to these matters is contained within the Town and Country Planning Act 1990 ³ and The Town and Country Planning (Tree Preservation) (England) Regulations 2012 ⁴.

This report has not considered the requirements of the Forestry Act 1967 ⁵: felling licences may still be required in the earlier stages of the planning process, depending on the volume of timber involved.

7.2 Wildlife considerations and law

The requirements the following legislation should also be considered in the planning of any arboricultural operations.

- Wildlife and Countryside Act 1981 ⁶
- Countryside and Rights of Way Act 2000 ⁷
- The Conservation of Habitats and Species Regulations 2010 ⁸
- The Conservation of Habitats and Species (Amendment) Regulations 2011 ⁹

One combined effect of the above legislation is that tree work operations must be planned to avoid disturbance to nesting, breeding or roosting birds, or to bats and their roosts. The nests of wild birds are protected

whilst in use, and all 18 bat species found in the UK are afforded European Protected Species status.

Reference List

1. British Standards Institution (2012) *BS 5837: 2012 Trees in relation to design, demolition and construction – Recommendations*. London, BSI Standards Ltd.
2. British Standards Institution (2010) *BS 3998: 2010 Tree work – Recommendations*. London, BSI Standards Ltd.
3. *Town and Country Planning Act 1990*. London, HMSO.
4. *The Town and Country Planning (Tree Preservation) (England) Regulations 2012*. London, HMSO.
5. *Forestry Act 1967*. London, HMSO.
6. *Wildlife and Countryside Act 1981*. London, HMSO.
7. *Countryside and Rights of Way Act 2000*. London, HMSO.
8. *The Conservation of Habitats and Species Regulations 2010*. London, HMSO.
9. *The Conservation of Habitats and Species (Amendment) Regulations 2011*. London, HMSO.

Photographs



Photo 1. Looking north into site from the roadside, towards Glebe Farm house at the centre.



Photo 2. Showing trees 25 and 26 in the left-hand clump, and trees 22 to 24 to the right (with further trees beyond). The nose of the fire appliance arc will end up in the gap between these two groups (yellow arrow). Tree 026 is to be removed (red arrow).



Photo 3. Showing the retaining wall on east side of the stems of trees 023 (left), 024, and 022 (right). The land behind this wall, on which the trees are growing, is raised by 500 to 600 mm.



Photo 4. Showing the westwards canopy extent of tree 028 – not apparent from previous survey. This tree is best removed, as are two adjacent trees – for reasons described in Tree Schedule (trees 029 and 030).



Photo 5. Showing trees 028 to 030 that are to be removed, along with various saplings (sucker growth) in the same row. Only those trees within yellow circle are to be removed – screening from the track remains on the right of picture.

Appendices

Appendix A: Tree Schedule (excluding Root Protection Areas and crown spread)

Table 1 (overleaf) contains data for all trees, excluding Root Protection Areas and crown spread details – which are found in Appendix B.

Condition categories, in ascending order of quality:

poor – moderate – fair – good - very good

Tree Number	Species (common name)	Height (m)	Canopy clearance (m)	Life stage	Observations, and suggestions for management	Remaining contribution (years)	BS retention category	Condition (physiological : structural)
001	Ash	16	6	Mature	Off site. Twin-stemmed and overhanging access track. Limited view of tree available.	10+ Years	C1	Fair : Fair
014	Hawthorn	9	0	Early mature	Multi-stemmed. Growing out of adjacent track's retaining wall.	20+ Years	C1	Good : Good
015	Rowan	15	2	Mature	Sizeable for a rowan. Included bark, though not severe enough to be a concern.	20+ Years	B1	Good : Fair
016	Hawthorn & Rowan	12	0	Semi mature	Hawthorn and rowan growing together with entwined stems and shared crown structure.	20+ Years	C1	Good : Good
017	Maple, Norway	15	2	Early mature	Twin-stemmed above main fork at 1 m height.	20+ Years	B1	Good : Fair
018	Maple, Norway	16	2	Early mature	No significant issues observed.	20+ Years	B1	Good : Good
019	Ash	18	2	Early mature	No significant issues observed.	20+ Years	C1	Good : Good
020	Mixed group	14	0	Early mature	Slender cherries, sycamores and elders adjacent to the boundary with track.	10+ Years	C1	Good : Fair
021	Cherry, Wild	16	2	Early mature	No significant issues observed.	20+ Years	B1	Good : Good
022	Sycamore	18	2	mature	A good mature tree, twin-stemmed above 3 m height and with a well-formed crown. Growing within fence line, and inspected from one side only.	40+ Years	B1	Good : Good

Tree Number	Species (common name)	Height (m)	Canopy clearance (m)	Life stage	Observations, and suggestions for management	Remaining contribution (years)	BS retention category	Condition (physiological : structural)
023	Holly	16	2	Mature	On fenceline, ownership unclear. This and trees 23 and 24 are growing on retained land that is 60+ cm higher than site, with an existing small retaining wall in front. SEE PHOTO	20+ Years	C1	Good : Fair
024	Holly	16	2.5	Mature	On fenceline, ownership unclear.	20+ Years	C1	Fair : Fair
025	Hawthorn, Common	10	0.5	Mature	Could not properly access - estimated dimensions. No significant issues observed. A little bit of low retaining wall in front (east side of stem).	20+ Years	C1	Fair : Fair
026	Sycamore	13	1	Semi Mature	Low quality self-set.	40+ Years	C1	Good : Fair
027	Apple, Crab	6	1	Young	Young small tree, not significant.	40+ Years	C1	Good : Good
028	Cherry	12	2	Mature	Canopy extends much further west than indicated by previous survey (will touch proposed dwelling, covering much of garden). Cannot be pruned satisfactorily for clearance without destroying the tree's amenity. <u>REMOVE THIS TREE.</u>	20+ Years	C1	Fair : Fair
029	Cherry, Wild	16	5	Early Mature	Slender growth due to competing neighbouring trees. Will be overly exposed following removal of trees 28 and 30. <u>REMOVE THIS TREE.</u>	20+ Years	C1	Fair : Moderate

Tree Number	Species (common name)	Height (m)	Canopy clearance (m)	Life stage	Observations, and suggestions for management	Remaining contribution (years)	BS retention category	Condition (physiological : structural)
030	Rowan	16	2.5	Mature	Co-dominant stems with compression fork and severe bark inclusion at main fork at 2.5 m height. Not suitable for retention within falling distance of development. <u>REMOVE THIS TREE.</u> Also - within 1.5 m of the stems of trees 28 to 30, a further dozen minor cherry stems and saplings are <u>to be removed</u> at the same time (they'll be very unsatisfactory once trees 28 to 30 are gone). All are sucker growth from trees 28 to 30. These are up to 150 mm diameter, though mostly 50 to 80 mm. SEE PHOTO.	20+ Years	C1	Good : Moderate
031	Elder, holly, honeysuckle	1.5	0	Semi mature	Rough hedge extending out from boundary. Not special, will tolerate extensive pruning if required.	20+ Years	C1	Fair : Moderate

Appendix B: Tree Constraints Data: Root Protection Areas (RPAs) and crown spread

Table 2 (overleaf) contains data for Root Protection Areas and crown spread for all trees – all other tree data is found in in Appendix A.

Tree Number	No. of stems	Diameter (mm) single stem	Diameter (mm) - 2 to 5 stems					Mean stem diameter (mm)	Calculated stem diameter (mm)	Radius of nominal circle (m)(from BS5837: 2012 ¹ Annex D)	RPA Area (m ²) (from BS5837: 2012 ¹ Annex D)	Crown spread (m)			
			stem 1	stem 2	stem 3	stem 4	stem 5	> 5 stems				north	south	east	west
001	2		500	500						8.7	238	7	7	7	7
014	2		300	250						4.8	72	3.5	4.5	3.5	4.5
015	1	460								5.7	102	5	5.5	3	5.5
016	3		250	180	150					4.2	55	3	2.5	2	4
017	1	470								5.7	102	3.5	3.5	4	6
018	1	310								3.9	48	3	4	4	5.5
019	1	370								4.5	64	5	6	4	7.5
020	Group location - see Tree Constraints Plan for RPA and canopy extents														
021	1	490								6	113	7	3.5	3.5	9
022	1	850								10.2	327	9	9	9	9
023	3		350	300	250					6.3	124	1	3	4	3
024	1	350								4.2	55	2	2	2	2
025	1	350								4.2	55	4	4	4	4
026	1	200								2.4	18	4	4.5	4.5	1.5
027	1	50								0.9	3	1	1	1	1
028	1	320								3.9	48	3.5	5	2.5	7.5
029	1	210								2.7	23	2	3	2	5
030	1	370								4.5	64	4	4	4	4
031	Group location - see Tree Constraints Plan for RPA and canopy extents														

Appendix C: Key to botanical names

Ash	- <i>Fraxinus excelsior</i>
Cherry	- <i>Prunus</i> spp.
Common hawthorn	- <i>Crataegus monogyna</i>
Crab apple	- <i>Malus</i> spp.
Holly	- <i>Ilex aquifolium</i>
Norway maple	- <i>Acer platanooides</i>
Rowan	- <i>Sorbus aucuparia</i>
Sycamore	- <i>Acer pseudoplatanus</i>
Wild cherry	- <i>Prunus avium</i>

Appendix D: Tree retention categories

Trees are assessed for retention categories in the order in which those categories appear in the table below – with all trees initially assessed against the criteria for category 'U', followed sequentially by categories 'A', 'B' and 'C'.

Table 3 (overleaf) is based on Table 1 of BS5837: 2012 ¹; some but not all of the text is necessarily reproduced verbatim.

Table 3.

Trees that are not suitable for retention			
<p>Category U</p> <p>Trees whose condition means that their retention as living trees beyond 10 years is unrealistic in the context of the current land use</p>	<p>Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (where, for example, the loss of companion shelter cannot be mitigated by pruning). Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline. Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality.</p> <p>In some circumstances, category U trees may have conservation value which it might be desirable to preserve, despite tree condition.</p>		
Trees whose retention should be prioritised			
	1.	2.	3.
	Predominantly arboricultural merit	Predominantly landscape merit	Predominantly cultural merit (includes conservation value)
<p>Category A</p> <p>High quality trees, currently with life expectancy of at least 40 years</p>	<p>Trees that are particularly good examples of their species, especially rare or unusual species. Also trees that are essential components of groups or formal or semi - formal arboricultural features (such as an avenue's dominant or principal trees).</p>	<p>Trees, groups or woodlands that have particular visual importance as arboricultural and/or landscape features</p>	<p>Trees, groups or woodlands that have significant conservation, historical, commemorative or other value (such as veteran trees or wood - pasture)</p>

Trees whose retention should be considered (with Category B assuming the greater priority in retention decisions)			
	1. Predominantly arboricultural merit	2. Predominantly landscape merit	3. Predominantly cultural merit (includes conservation value)
Category B Moderate quality trees, currently with life expectancy of at least 20 years	Trees that are excluded from category A due to impaired condition (such as the presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention beyond 40 years. Also trees that simply lack the special quality necessary to merit the category A designation.	Trees present in numbers, often those growing as groups or woodlands, such that their collective rating is higher than that which they might attract as individuals. Also trees occurring as collectives but situated so as to make little visual contribution to the wider locality.	Trees that have material conservation or other cultural value.
Category C Low quality trees, currently with life expectancy of at least 10 years. Also young trees of stem diameter <150mm.	Trees that are unremarkable or of very limited merit, or that have such impaired condition that they do not qualify in higher categories.	Trees growing as groups or woodlands, but without this conferring on them significantly greater collective landscape value. Also trees offering low or only temporary/transient landscape benefits.	Trees lacking any material conservation or other cultural value.

Appendix E: Calculating Root Protection Areas

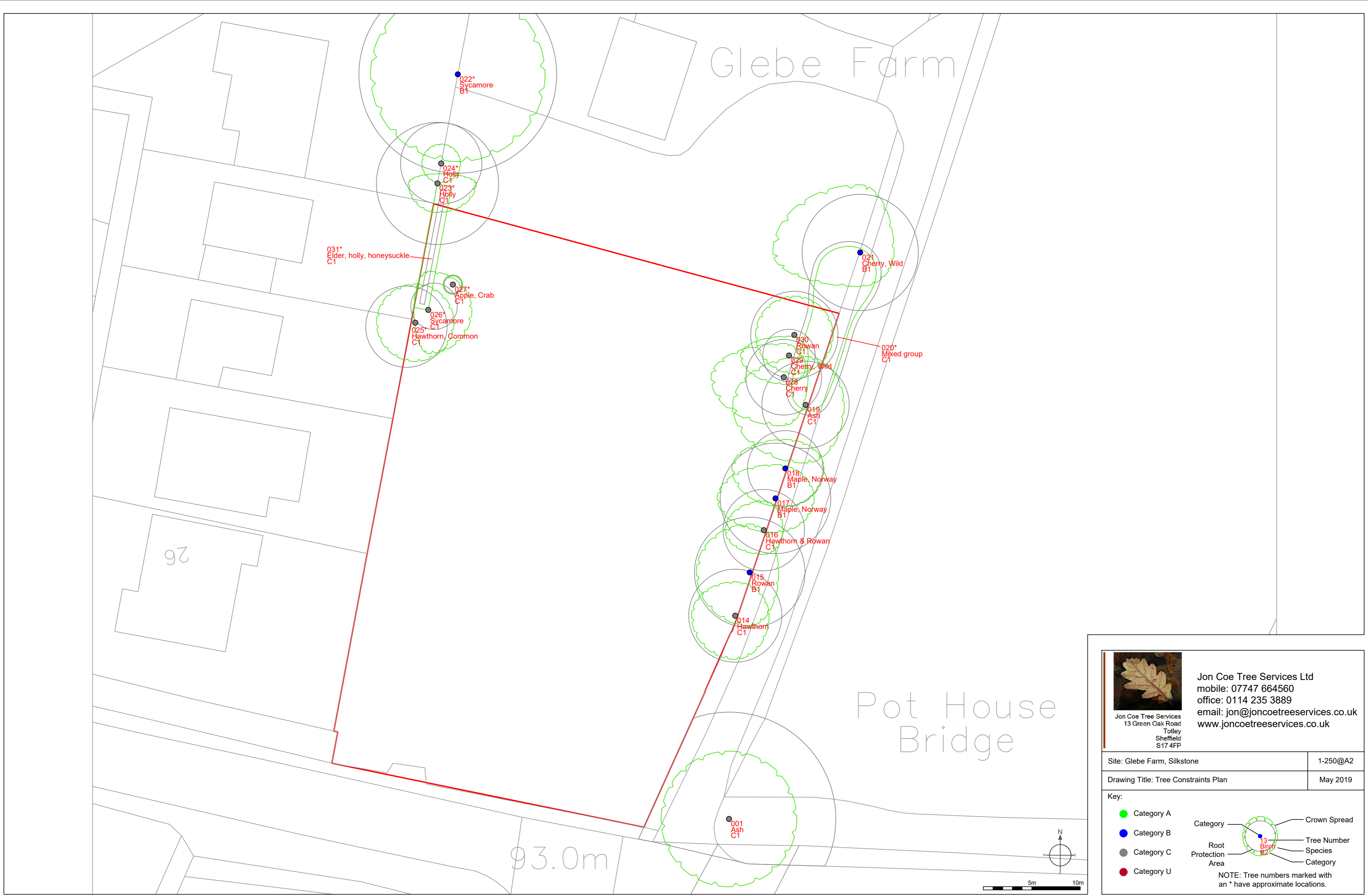
Table 4. This table was used to establish Root Protection Areas (RPAs) in accordance with section 4.6.1 of BS5837: 2012¹, and Annex D of the same standard (from which this table's values are drawn). 'Stem diameter' refers to either the measured diameter of single stem trees, or the calculated combined stem diameter of multi-stem trees (BS5837: 2012¹, 4.6.1).

Stem diameter (mm)	Radius of a uniformly circular RPA (m)	RPA – area (m ²)	Stem diameter (mm)	Radius of a uniformly circular RPA (m)	RPA – area (m ²)
75	0.9	3	675	8.1	206
100	1.2	5	700	8.4	222
125	1.5	7	725	8.7	238
150	1.8	10	750	9.0	255
175	2.1	14	775	9.3	272
200	2.4	18	800	9.6	290
225	2.7	23	825	9.9	308
250	3.0	28	850	10.2	327
275	3.3	34	875	10.5	346
300	3.6	41	900	10.8	366
325	3.9	48	925	11.1	387
350	4.2	55	950	11.4	408
375	4.5	64	975	11.7	430
400	4.8	72	1000	12.0	452
425	5.1	81	1025	12.3	475
450	5.4	92	1050	12.6	499
475	5.7	102	1075	12.9	519
500	6.0	113	1100	13.2	547
525	6.3	124	1125	13.5	573
550	6.6	137	1150	13.8	598
575	6.9	150	1175	14.1	625
600	7.2	163	1200	14.4	652
625	7.5	177	1225	14.7	679
650	7.8	191	1250+	15.0	707

Appendix F: Tree Constraints Plan

The Tree Constraints Plan (overleaf) indicates the locations, retention categories, Root Protection Areas and crown spreads of all relevant trees. Tree locations are as defined on the plans that were supplied to Jon Coe Tree Services Ltd (see section 1.3).

In cases where the location of a tree was not included in the supplied topographical survey, the tree number is suffixed with an *. In such cases, the stem location has been identified to the best ability of the arboricultural surveyor, using a laser rangefinder.



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Site: Glebe Farm, Silkstone 1-250@A2

Drawing Title: Tree Constraints Plan May 2019

Key:

- Category A
- Category B
- Category C
- Category U

Category

Root Protection Area

Crown Spread

Tree Number

Species

Category

NOTE: Tree numbers marked with an * have approximate locations.

Appendix G: Proposed development plan

The proposed layout overleaf, on which this report's findings are based, was supplied by Design Space Architects Ltd.

Appendix H: Arboricultural impact assessment – drawing

The drawing overleaf illustrates the proposed layout in relation to trees, as referred to in the Arboricultural Impact Assessment (section 4).

Some pruning of hedge 031 will be required - taking it back towards the boundary by approximately 0.5 m. This is a dense but scrappy hedge that will comfortably tolerate such pruning.

Holly tree 023 will not be significantly affected by the required excavation for retaining wall, as the line of the wall is outside of the tree's RPA. Furthermore, an existing 60+ cm high retaining wall that passes the east side of its stem means that this holly will be depending more on the south-west side of its stem for rooting than on the side of the excavation.

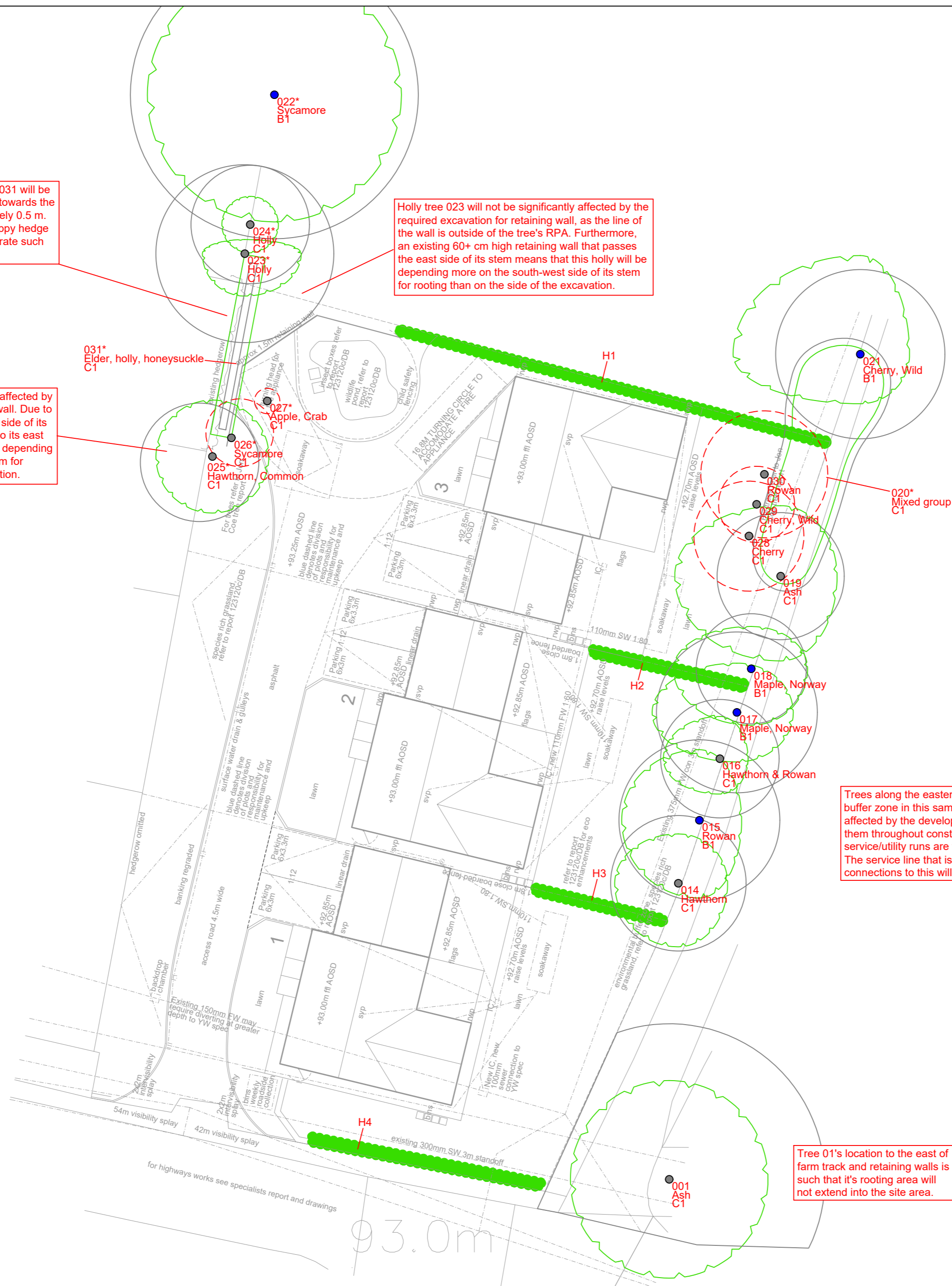
Hawthorn 025 will not be significantly affected by the required excavation for retaining wall. Due to a small existing retaining wall on east side of its stem, and also due to sycamore 026 to its east (to be removed), this hawthorn will be depending more on the south-west side of its stem for rooting than on the side of the excavation.


Four new hedge lines are to be planted. New hedging should be planted in staggered double rows, with clearance of 0.3 m between the two rows, and with spacings of five hedging whips per metre along each row. Hedging species to be as follows:

- H1 = mix of *Crateagus monogyna* - Hawthorn (40%), *Corylus avellana* - Hazel (30%), *Acer campestre* - Field maple (30%)
- H2 = either *Fagus sylvatica* (beech) or *Carpinus betulus* (hornbeam). Both these are suitable for the shaded location where hedge extends beneath tree canopies.
- H3 = either *Fagus sylvatica* (beech) or *Carpinus betulus* (hornbeam). Both these are suitable for the shaded location where hedge extends beneath tree canopies.
- H4 = mix of *Crateagus monogyna* - Hawthorn (40%), *Corylus avellana* - Hazel (30%), *Acer campestre* - Field maple (30%)

Trees along the eastern boundary, and the environmental buffer zone in this same area, will not be significantly affected by the development. Temporary fencing will protect them throughout construction, and all soakaways and new service/utility runs are to be located outside of their RPAs. The service line that is shown is an existing foul water run - connections to this will be made outside of all RPAs.

Tree 01's location to the east of farm track and retaining walls is such that its rooting area will not extend into the site area.





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Site: Glebe Farm, Silkstone 1-250@A2
 Drawing Title: Arboricultural Impact Assessment May 2019

Key:

- Category A
- Category B
- Category C
- Category U

Category — Crown Spread
 Tree Number
 Species
 Category

Root Protection Area

NOTE: Tree numbers marked with an * have approximate locations.

● Proposed hedge planting ○ Trees to be removed

Appendix I: Tree protection plan - drawing

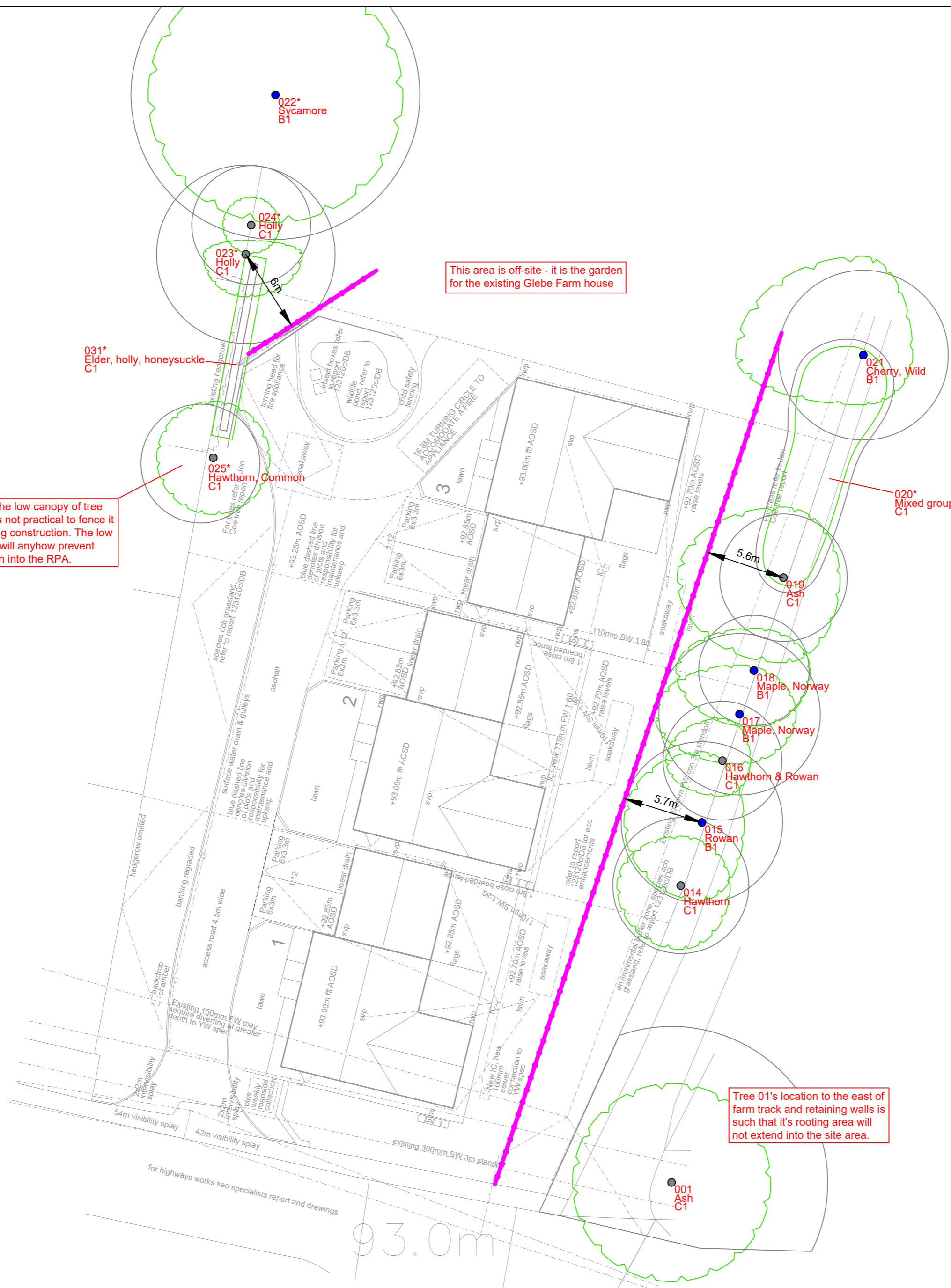
The drawing overleaf illustrates the layout referred to in the Tree Protection Plan (section 5). Neither this drawing nor section 5 stands alone; it is essential that both are referred to together.

The primary purpose of the Tree Protection Plan is to prevent the serious and often irreversible harm that can be caused to trees through the excavation, compaction or other altering of their rooting soil. Compacted soil prevents root function, which causes tree decline or death. This decline is often gradual over a period of time, such that it is often not observed by the offending party. Harmful soil compaction can be caused by vehicles, machinery, footfall, or the weight of stored materials. Chemical spillages, bonfires and level raises are also all activities that can seriously harm tree roots. The abundant small and fine minor roots are of great importance to trees - these and the roots in general are found much closer to the soil surface than is often assumed.

Due to the low canopy of tree 025, it is not practical to fence it off during construction. The low canopy will anyhow prevent incursion into the RPA.

This area is off-site - it is the garden for the existing Glebe Farm house

Tree 01's location to the east of farm track and retaining walls is such that it's rooting area will not extend into the site area.



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Site: Glebe Farm, Silkstone	1-250@A2
Drawing Title: Tree Protection Plan	May 2019

Key:

- Category A (Green circle)
- Category B (Blue circle)
- Category C (Grey circle)
- Category U (Red circle)

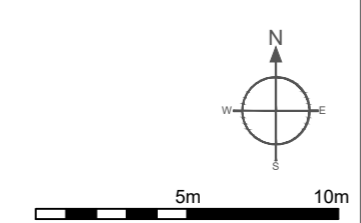
NOTE: Tree numbers marked with an * have approximate locations.

Tree Protection Fencing BS5837:2012 (Pink line)

Drawing to be used in colour and at scale.

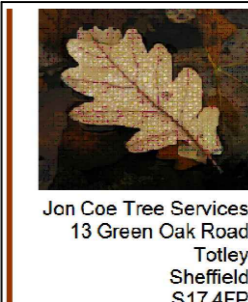
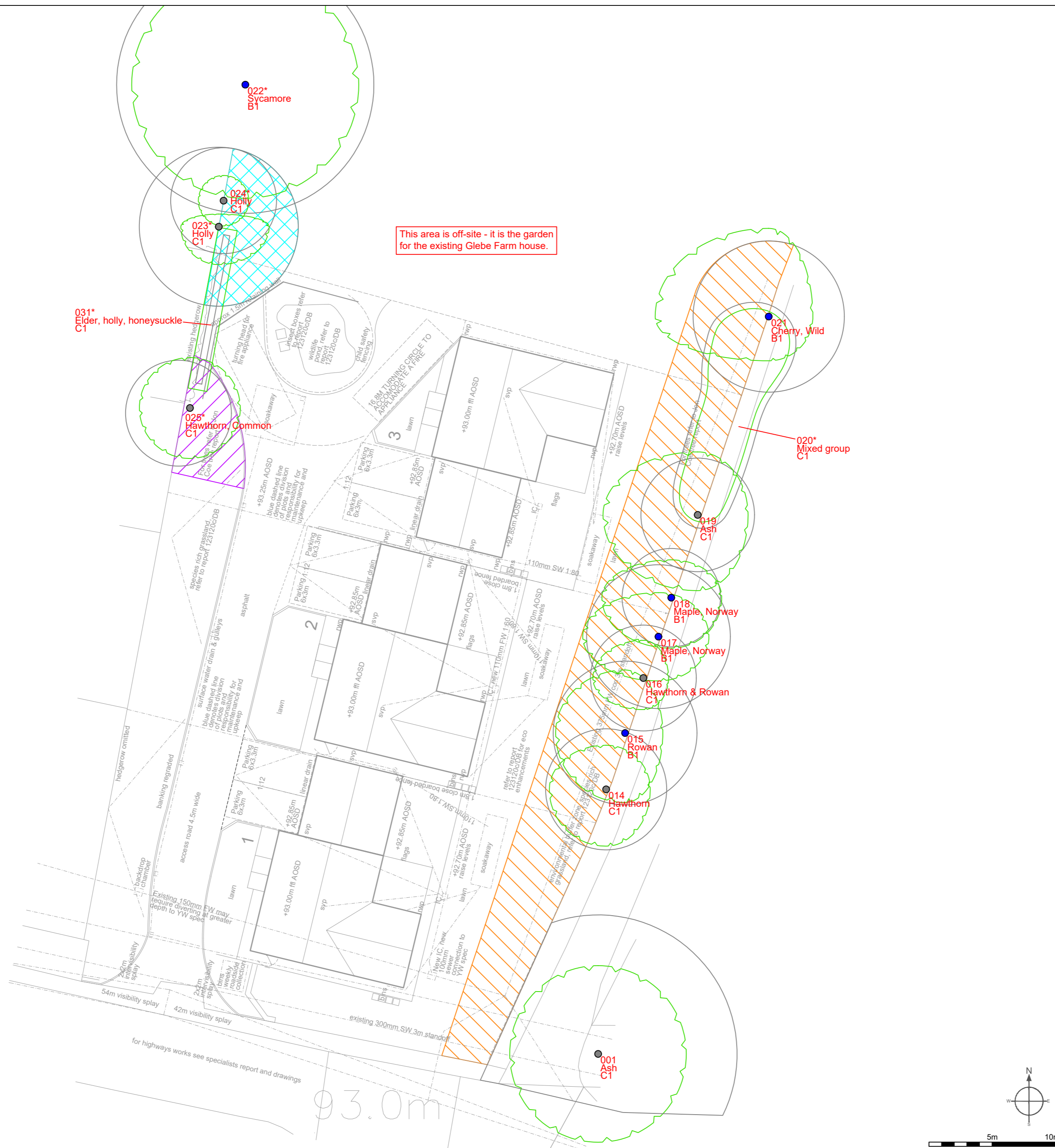
All the indicated requirements of this Tree Protection Plan must be implemented in full prior to the commencement of any construction work or the delivery of any construction materials or machinery to site. All parties operating on site or involved in planning the works must be made aware of all of the requirements of the Tree Protection Plan by the contractor with overall responsibility for the site.

Fencing to be positioned exactly as shown on this plan. This should be achieved by taking scaled measurements from this drawing, and by accurately following those measurements that are provided. All indicated tree protection fencing shall meet the following specification:
 "Welded mesh panels (2 metres high) - these to be driven into the ground to prevent ease of moving. The panels shall be joined together using at least two anti-tamper couplers, installed so their removal is only possible from inside the fence (the tree side) - these fence couplers should be spaced apart by at least 1 metre.
 Fencing panels must be supported on their inner sides by stabiliser struts, with these attached to base plates that are secured with ground pins - to ensure that the fencing line cannot be moved during construction.
 All-weather notices should be affixed at 7 metre intervals, with the following wording: 'Construction exclusion zone for protection of tree roots - no access permitted behind this fencing'.



Appendix J: Arboricultural Method Statement - drawing

The drawing overleaf illustrates a number of the measures described in the Arboricultural Method Statement (section 6). Neither this drawing nor section 6 stands alone; it is essential that both are referred to together.



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Site: Glebe Farm, Silkstone	1-250@A2
Drawing Title: Arboricultural Method Statement	May 2019

Key:

- Category A
- Category B
- Category C
- Category U

NOTE: Tree numbers marked with an * have approximate locations.

- Within this indicated area there is to be no excavation, level raising or soil compaction. A step down in level will be required from the garden areas nearest to the houses, to the indicated shaded area. This step down may be achieved by battering down or by using a retaining wall - but all works associated with that step down must be achieved outside of the indicated shaded area. These measures are to protect tree roots (found shallow to surface) and the species rich environmental buffer zone.
- Within this indicated area there is to be no excavation. The required drop in level (to the fire appliance turning arc) is to be achieved using a retaining wall built up to the eastern edge of the indicated shaded area - but not within it.
- Within this indicated area there is to be no excavation or soil compaction. The required drop in level (to the fire appliance turning arc) is to be achieved using a retaining wall built up to the south-eastern edge of the indicated shaded area - but not within it.

Drawing to be used in colour and at scale, and with reference also to Section 6 of the tree report within which this drawing is included.

