Tree Survey and Arboricultural Impact Assessment

BS 5837:2012

At

Corner View, Windley Lane, Turnditch, DE56 2LN



Produced for:

Mr. Benjamin Smith

Produced by:

Marcus McCormick Tech Cert. (Arbor.A), RFS Cert Arb.
Professional Tree Inspection (PTI)

Survey date:

15th April 2021 **REVISED 08/08/22**

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1. Introduction

1.1 This report was commissioned by property owner Mr. Benjamin Smith of Corner View, Windley Lane, Turnditch, DE56 2LN. This property contains a garden area and a woodland section containing mature broadleaf trees with a high percentage of Common Ash (*Fraxinus excelsior).* The trees are covered by a Tree Preservation Order overseen by Derbyshire County Council. The intention of the owner is to renovate the existing property and connect the existing workshop to the main building. There are also plans to erect a garage building to the south west of the property. The intention is to keep largely within the existing footprint of the main building. The proposed garage area is clear of trees but will be proximal to the woodland edge. I have been instructed by the owner of the property to undertake a survey of the trees on site in relation to building proposals.

1.2 This report will detail the impact the proposals will have on affected trees and provide a plan to ensure that retained tree are protected prior to and during any building work and to eliminate or minimise detrimental impacts caused by the construction.

1.3 This report references a tree safety survey undertaken by Mac Tree Services Ltd in December 2021. If access is needed to this survey, please contact Marcus McCormick by emailing mactreeservicesltd@gmail.com

1.4 This survey has been revised on 02.08.22 to clarify queries raised by Mr. Rod Whiteman, Countryside Officer (Trees) for Derbyshire County Council. Editing has been undertaken to the Tree Constraints Plan and comment added to the Arboricultural Method Statement.

2. General Information

2.1 This report was commissioned by Mr. Benjamin Smith with the brief to carry out a survey of the trees located at Corner View, Windley Lane, Turnditch, DE56 2LN. Instructions to carry out the survey were received via email correspondence with Mr. Benjamin Smith, with the go ahead for the survey given on 10th December 2021. The survey was undertaken on 15th April 2021. The survey is in accordance with BS 5837: 2012 "A guide for trees in relation to construction".

2.2 The proposed development is as follows:

- Renovate and widen the existing building, connecting the workshop to the main house.
- Build garage building and create driveway to the south west of the main building.

2.2 This survey was carried out by Marcus McCormick. Marcus McCormick is an arborist based in Belper, Derbyshire and holds an Arboricultural Association Technicians Certificate from Myerscough College, the RFS certificate in Arboriculture from Broomfield College and has the Lantra Professional Tree Inspector (PTI) certificate. He has over 20 years experience in the industry in both Bristol and Derbyshire.

2.3 Marcus McCormick holds professional indemnity which is limited to £1 million. Should you require more information on this matter, please contact Marcus McCormick by emailing mactreeservicesltd@gmail.com

2.4 This report was produced with continual reference to The British Standards Institute publication BS 5837:2013 "Trees in relation to design, demolition and construction – Recommendations".

3. Tree Survey Details and Data Interpretation

Methodology

3.1. Data was collected in accordance with the requirements of BS 5837:2012. All observations were carried out from ground level. Measurements of stem diameter were taken using a diameter tape with tree heights being estimated.

3.2 The trees were surveyed and assessed with impartiality and without influence by the proposed development.

3.3 No internal investigation of the subject trees was undertaken and no soil samples were removed. The trees were not tagged as they are easily identifiable.

3.4 The British Standard 5837 sets out to assist those concerned with trees in relation to construction. It does not set out to put arguments for or against development, or for the retention or removal of trees. It does set out how to decide upon trees for retention, means of protecting those trees during development and on means of incorporating trees into the developed landscape.

3.5 In carrying out the assessment, consideration has been given to the following points:

- The health, vigour and condition of each tree.
- Any structural defects and safe life expectancy.
- The size and form of each tree.
- The rare, unusual or component part of a group or formal feature.
- Significant historical, commemorative, conservation or other value i.e. veteran tree, wood pasture.
- The impact the tree(s) have on their landscape.

3.6 The inspection of the trees was undertaken from the ground only using binoculars and a sounding mallet where required. In some cases, access or debris/plant growth may have hindered inspections.

3.7 Trees have been numbered and presented on the maps as was deemed best suited to future interpretation.

3.8 Tree species have been listed in the report by both common and botanical name where appropriate.

3.9 The height of the trees has been estimated in metres. The stem diameter has been measured in millimetres using a diameter tape. This information being used to calculate the Root Protection Area. When gathering information for groups of trees, the largest stem diameter will usually be taken and used to calculate root protection areas.

3.10 The root protection area is calculated by taking the circumference of the stem at 1.5 metres and multiplying this by 12 for single stemmed trees and 10 for trees with multiple stems. This number is then divided by 1000 and multiplied by 3.142.

3.11 The branch spread data was collected and was taken from the four primary points of the compass, North, South, East and West and was measured in metres from the stem to the outer crown. The data was taken on trees where it was deemed relevant for the report.

3.12 The height of crown clearance has been measured in metres and represents at what point branches grow from the stem.

3.13 An assessment of the trees age classification has been made in terms of its maturity within the sites landscape. These are:

- Y = Young tree.
- YM = Young mature trees less than a 1/3 of their expected life.
- M = Mature trees that are between 1/3 and 2/3 of their lifespan.
- OM = Over mature trees that are more than 2/3 of their expected life span.
- V = Veteran tree.

3.14 An assessment of a trees physiological condition has been defined as Good, Fair, Poor or Dead:

- G = Good: Fully functioning biological system showing average vitality i.e. normal bud growth, leaf size, crown density, and wound closure.
- F = Fair: Fully functioning biological condition showing below average vitality i.e. reduced bud growth, smaller leaf size, lower crown density and reduced wound closure.
- P = Poor: A biological system with limited functionality showing significantly below average vitality i.e. limited bud growth, small chlorotic leaves, low crown density and limited wound closure.
- D = Dead: Tree in an irreversible state of decline or dead.

3.15 An assessment of a trees structural condition has been defined as Good, Fair, Poor or Dead:

- G = Good: No significant structural defects.
- F = Fair: Structural defects which could be alleviated through remedial tree surgery or management practices.
- P = Poor: Structural defects which cannot be alleviated through tree surgery or management practices.
- D = Dead.

3.16 The preliminary management recommendations give advice on future management of the trees surveyed, based on the observations made.

3.17 The estimated remaining contribution is an estimation in years of the remaining useful life expectancy of the tree.

3.18 Data Sheet and Survey Details

Below is the data sheet showing the information collected at Corner View, Windley Lane, Turnditch, DE56 2LN

Tree reference number	Species	Height (m)	Root Protection Area (RPA) (m2) Linear metres from stem (m)	Stem diameter at 1.5 m (mm)	Crown height (m)	Branch spread (m)	Age class	Physiological condition	Structural condition	Comments & Recommendations (Recommended action)	Estimated useful remaining contribution (years)	Category grading (see cascade chart, section 3.19)
1 (0001)	Ornamental Cherry *Prunus ssp.*	6	**10.5m²** **3.3m**	280	2	**N 3** **S 3** **E 3** **W 3**	M	F	F	Small garden tree. Can be safely retained. No work recommended at present.	<20	C1+2
2 (0002)	Ornamental Cherry *Prunus ssp.*	3	**3.7m²** **1.2m**	100	1.8	**N 1** **S 1** **E 1** **W 1**	Ym	F	F	Small garden tree. Can be safely retained. No work recommended at present.	<10	C1+2
3 (0003)	Apple ssp. *Malus domestica*	4	**8.2m²** **2.6m**	220	1.8	**N 1** **S -** **E 2** **W 1**	M	F	F	Small garden tree. Can be safely retained. No work recommended at present.	>20	C1+2
4 (0026)	Common Ash *Fraxinus excelsior*	13	**13.5m²** **2.6m**	360	5	**N 3** **S 3** **E 3** **W 3**	M	F	F	Mature tree close to the western edge of the proposed build.	<20?	C1+2

Tree reference number	Species	Height (m)	Root Protection Area (RPA) (m2) Linear metres from stem (m)	Stem diameter at 1.5 m (mm)	Crown height (m)	Branch spread (m)	Age class	Physiological condition	Structural condition	Comments & Recommendations (Recommended action)	Estimated useful remaining contribution (years)	Category grading (see cascade chart, section 3.19)
										Likely to be affected by Ash Dieback *(Hymenoscyphus fraxineus)* and should be closely monitored. No work recommended at present.		
5 (0029)	Common Ash *Fraxinus excelsior*	15	**18.4m²** **5.8m**	490	8	**N 4** **S 4** **E 4** **W 4**	M	F	F	Mature tree close to the western edge of the proposed build. Likely to be affected by Ash Dieback *(Hymenoscyphus fraxineus)* and should be closely monitored. Reduce overhanging branches from eastern crown by 3m.	<20?	C1+2
6 (0030)	Common Ash *Fraxinus excelsior*	15	**15m²** **4.8m**	400	9	**N 3** **S 3** **E 3** **W 3**	M	F	F	Mature tree close to the western edge of the proposed build.	<20?	C1+2

Tree reference number	Species	Height (m)	Root Protection Area (RPA) (m2) Linear metres from stem (m)	Stem diameter at 1.5 m (mm)	Crown height (m)	Branch spread (m)	Age class	Physiological condition	Structural condition	Comments & Recommendations (Recommended action)	Estimated useful remaining contribution (years)	Category grading (see cascade chart, section 3.19)
										Likely to be affected by Ash Dieback *(Hymenoscyphus fraxineus)* and should be closely monitored. Reduce overhanging branches from eastern crown by 3m.		
7 (0031)	Common Ash *Fraxinus excelsior*	15	**15m²** **4.8m**	400	8	**N 2** **S 3** **E 2** **W 2**	M	F	F	Mature tree close to the western edge of the proposed build. Likely to be affected by Ash Dieback *(Hymenoscyphus fraxineus)* and should be closely monitored. No work recommended at present.	<20?	C1+2
8 (0034)	Common Sycamore *Acer psedoplatanus*	14	**21.8m²** **6.9m**	580	3.5	**N 4** **S 2** **E 2** **W 4**	M	F	G	Mature spreading crown to the north of the proposed build.	>30	B1+2

Tree reference number	Species	Height (m)	Root Protection Area (RPA) (m2) Linear metres from stem (m)	Stem diameter at 1.5 m (mm)	Crown height (m)	Branch spread (m)	Age class	Physiological condition	Structural condition	Comments & Recommendations (Recommended action)	Estimated useful remaining contribution (years)	Category grading (see cascade chart, section 3.19)
										Can be safely retained. No work recommended at present.		
9 (0036)	European Lime *Tilia x europaea*	18	**19.9m²** **6.3m**	530	2	**N 4** **S 3** **E 4** **W 3**	M	F	F	Mature, upright, narrow form located next to the main road. Can be safely retained. No work recommended at present.	>30	C1+2
10 (0035)	Common Ash *Fraxinus excelsior*	20	**25m²** **8m**	670	9	**N 4** **S 4** **E 4** **W 4**	M	p	F	Large, mature tree showing advanced symptoms of Ash Dieback *(Hymenoscyphus fraxineus).* The proposed build will not enter the root protection area but the tree should be removed for safety reasons due to high target risk.	<10	U

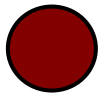
Tree reference number	Species	Height (m)	Root Protection Area (RPA) (m2) Linear metres from stem (m)	Stem diameter at 1.5 m (mm)	Crown height (m)	Branch spread (m)	Age class	Physiological condition	Structural condition	Comments & Recommendations (Recommended action)	Estimated useful remaining contribution (years)	Category grading (see cascade chart, section 3.19)
										Fell.		
11 (0037)	Common Ash *Fraxinus excelsior*	19	**21.8m²** **6.9m**	580	9	**N 4** **S 4** **E 4** **W 4**	M	P	F	Large, mature tree showing advanced symptoms of Ash Dieback *(Hymenoscyphus fraxineus).* The proposed build will not enter the root protection area, but the tree should be removed for safety reasons due to high target risk. Fell.	<10	U
12 (0039)	Common Beech *Fagus sylvatica*	13	**32m²** **10m**	860	4	**N 5** **S 5** **E 5** **W 5**	M	P	G	Mature, spreading tree with a high amenity value. Can be safely retained. Showing drought symptoms since original survey. No work recommended at present.	>20	B1+2

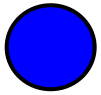
Tree reference number	Species	Height (m)	Root Protection Area (RPA) (m2) Linear metres from stem (m)	Stem diameter at 1.5 m (mm)	Crown height (m)	Branch spread (m)	Age class	Physiological condition	Structural condition	Comments & Recommendations (Recommended action)	Estimated useful remaining contribution (years)	Category grading (see cascade chart, section 3.19)
H1	Common Hawthorn, Snowberry, Ivy	1	-	-	-	**N -** **S -** **E 1** **W 1**	M	F	F	Boundary hedge line. Can be safely retained. No work recommended at present.	>20	C2
	Groups below are located within the proposed garage area.									**Groups and trees below are located within the proposed garage area.**		
G1	Common Ash, Wild Cherry. Sycamore, Elm	<15	**11.3m²** **3.6m**	300 (average)	2	**N -** **S -** **E 1** **W 1**	Ym	F	F	Group of broadleaf trees next to the minor road. Can be safely retained. No work recommended at present.	>20	B1+2
G2	Leyland Cypress, Common Ash, Sycamore	<15	**11.3m²** **3.6m**	300 (largest)	GL	**N -** **S -** **E 1** **W 1**	Ym	F	F	Group of Leyland Cypress next to wooden outbuilding.	<20	C1+2

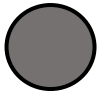
Tree reference number	Species	Height (m)	Root Protection Area (RPA) (m2) Linear metres from stem (m)	Stem diameter at 1.5 m (mm)	Crown height (m)	Branch spread (m)	Age class	Physiological condition	Structural condition	Comments & Recommendations (Recommended action)	Estimated useful remaining contribution (years)	Category grading (see cascade chart, section 3.19)
										Three broadleaf trees are behind this line. Remove line of Leyland Cypress.		

3.19 Cascade Chart – showing the criteria for the assessment of the category grading

BS5837:2012 Table 1 – Cascade chart for tree quality assessment

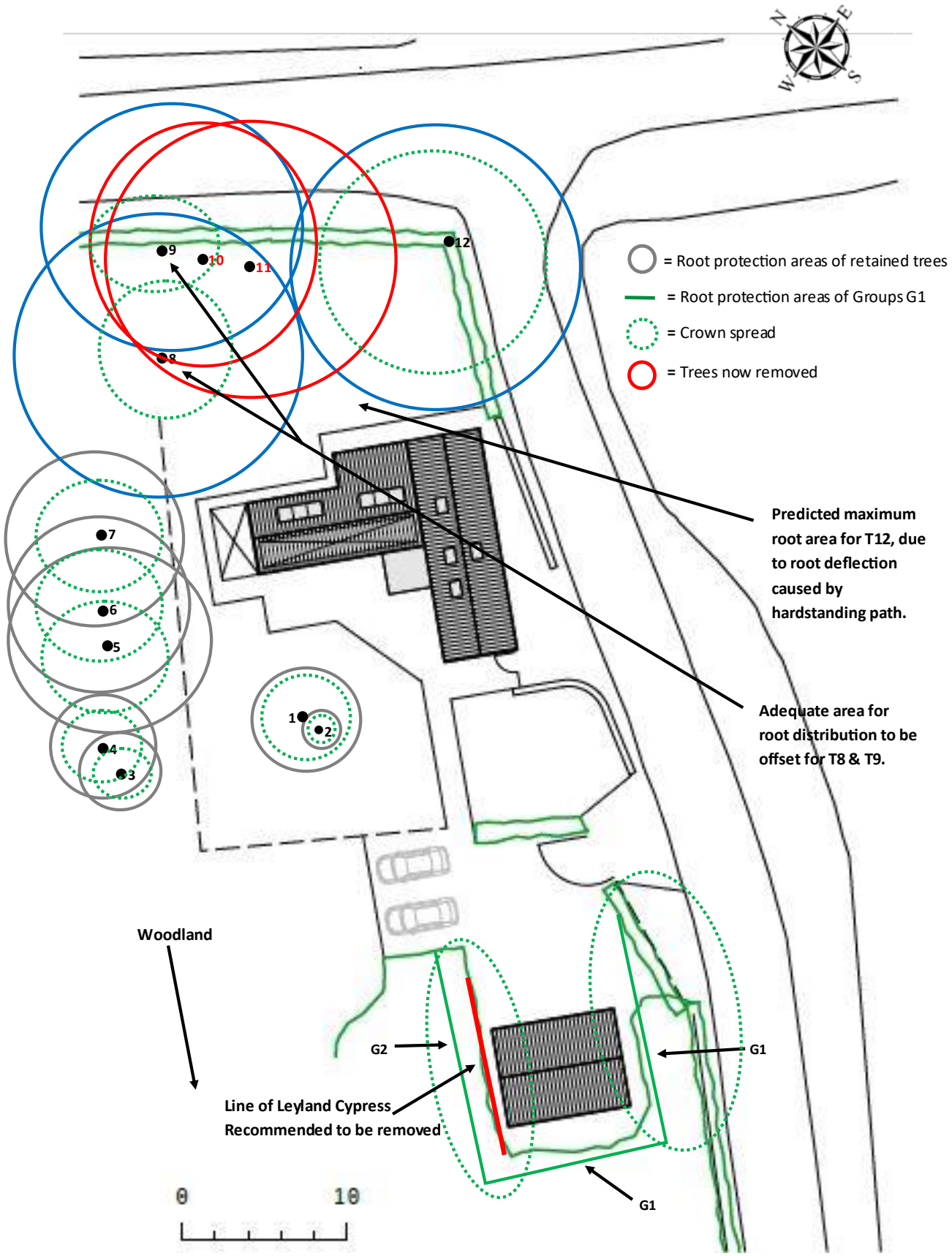
Category and definition	Criteria (including subcategories where appropriate)	Identification on plan
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, 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 (e.g. where, for whatever reason, 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 *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see [BS5837:2012]* ***4.5.7.***	

	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
Trees to be considered for retention				
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality	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	Trees with material conservation or other cultural value	

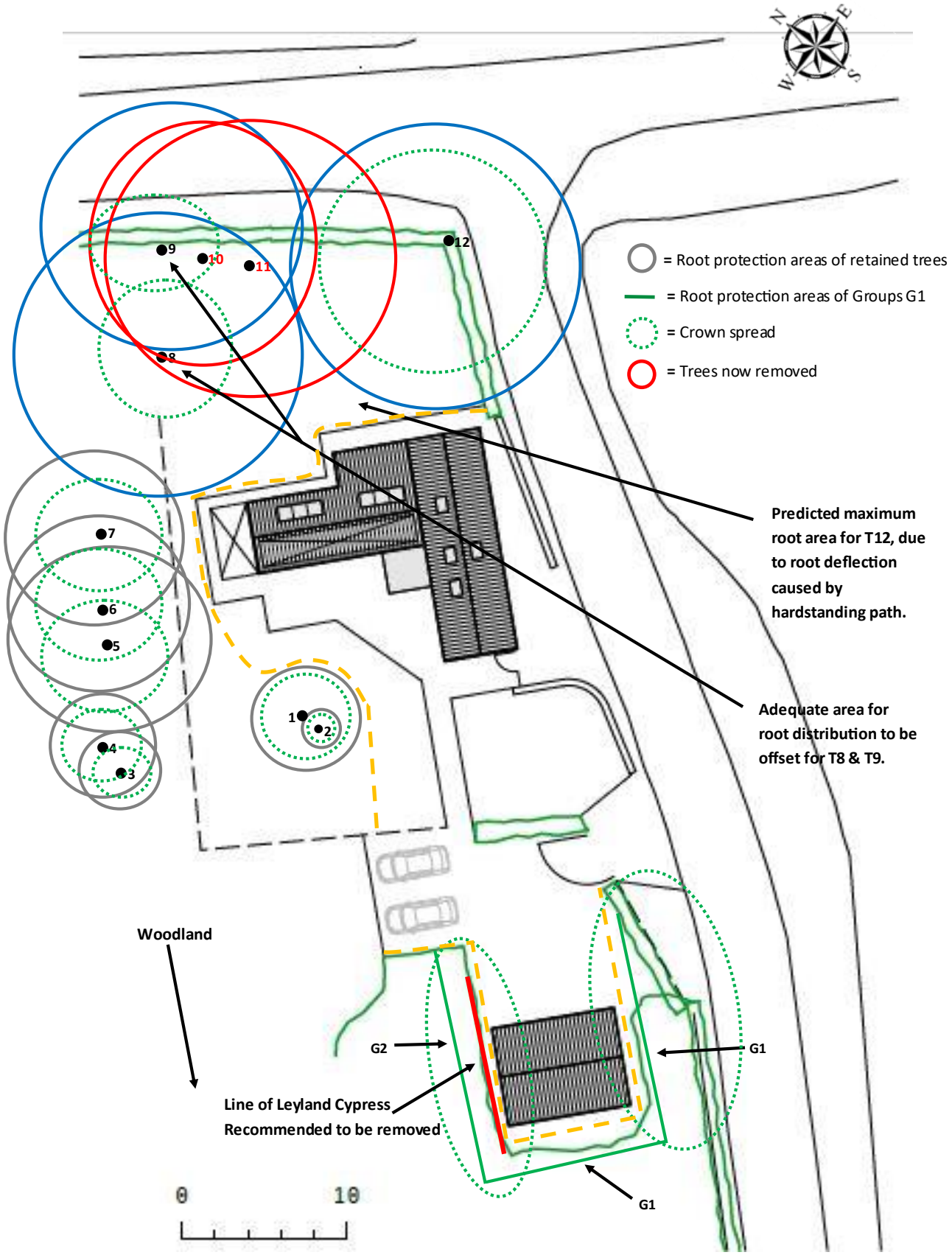
	necessary to merit the category A designation			
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	

4. Tree Constraints Plan

Plan 1: Shows the position of the trees in relation to the proposed building work: **Corner View, Windley Lane, Turnditch, DE56 2LN**



Plan 2: Shows the placement of tree protection barriers and potential positions for site storage: **Corner View, Windley Lane, Turnditch, DE56 2LN**



5. Arboricultural Implications Assessment

Location.

Corner View, Windley Lane, Turnditch, DE56 2LN

Proposals

- Renovate and widen the existing building; connecting the workshop to the main house.
- Erect garage structure and create driveway to the south west of the main building.

Photograph 1:

Shows an overhead view of the property



Overview

Corner View is a residential property with a garden and a woodland area covering an estimated two acres in total. The whole property is covered by a Tree Preservation Order (TPO) overseen by Derbyshire County Council. The current property is in a run-down state and the intention of the owner is renovate the property and join the main building to the adjacent workshop/outbuilding located to the west. There is also a proposal to build a garage structure on a cleared area that is accessed via a wooden gate from Windley Lane.

The woodland and garden area are comprised of predominantly broadleaf species with a high proportion being Common Ash (*Fraxinus excelsior).* The proposal for the main building renovation will not encroach root protection areas (RPA's) of any nearby trees and they can be satisfactorily protected during construction. The proposals for the garage structure may entail working near to a line of Leyland Cypress. The value of retaining these trees or altering foundation structure

to accommodate them has been evaluated as being low. This is due to their low amenity and arboricultural status within the area.

Unfortunately, due to the high composition of Common Ash trees growing in the property, many trees will be lost to Ash Dieback *(Hymenoscyphus fraxineus).* A tree survey focusing on tree condition and health and safety was undertaken late 2021 and identified the presence of Ash Dieback. Two trees (10 and 11) included in this survey, due to their proximity to the property, already have permission from the local authority to be removed. Foreseeably, this could also be the case with trees 4, 5 6 and 7 at a point in the future. A replanting scheme is already in place with the local authority as part of consent for the other granted remedial tree works.

Comment and Recommendations

The photographs below show the two areas for the building work. The photograph to the left (2) shows the main building with the workshop visible to its left. This building is to be renovated, slightly widened to the north and south and connected to the workshop/outbuilding to create one property. The proposals generally stick to the original foundations and hard standing area and will not require working within the root protection areas (RPA's) of any retained trees.

Photographs 2 and 3:

Shows the building to be renovated and the proposed garage area.





The photograph above to the right (3) shows the area intended for the garage building. There is a pre-existing gate and entry point from Windley Lane that is visible in the foreground. A line of Leyland Cypress can be seen to the right centre of the photograph. The garage structure will encroach the root protection areas (RPA's) of these trees however the remaining broadleaf species around the proposal can be safely protected behind construction exclusion barriers. The Leyland Cypress were presumably planted to act as a screen to a shed within the garden area. The removal of the

Leyland Cypress trees would have a negligible impact on local amenity and should not have a constraint on the building design. The broadleaf trees growing in G1 can be safely retained behind the construction exclusion barriers.

The photograph below (4) shows the crowns of Common Ash trees (T5 and T6) in proximity to the current workshop/outbuilding. It is beneficial to reduce this overhang slightly before any work commences along with close monitoring for signs and symptoms of Ash Dieback (*Hymenoscyphus fraxineus).* These trees face an uncertain safe useful lifespan.

Photograph 4.

Shows the proximity of the overhanging crowns of Common Ash. To the west (rear of building).



The photograph below (5) show two trees that are located to the north of the building. These have prior consent from Derbyshire County Council for removal due to their poor condition and likely infection with Ash Dieback. Replanting with suitable species to replace them is a pre agreed condition with the local authority.

Photograph 5.

Shows Common Ash (T10 and T11) to be removed.



The photograph below (6) shows more closely the line of Leyland Cypress growing within G2. The garage structure is to be placed to their left on the stoned area. They are modest in size at present but they have the potential to get very large and be out of keeping with the broadleaf trees surrounding them. The trees growing in G1 will be able to be retained behind the construction exclusion barriers being placed outside of their Root Protection Areas.

Photograph 6.

Shows the proposed area for the garage building.



The photograph below (7) show a Common Beech tree that has the highest landscape value of the trees in the garden area of the property. It is in a highly visible position and can be safely retained during any of the building proposals through the use of construction exclusion zones.

Photograph 7.

Shows the Common Beech (T12) that has considerable amenity value.



02.08.22 CLARIFICATION OF ROOT DISTRIBUTION FOR T8, T9 and T12.

The Tree Officer overseeing the site requested more details on the predicted root distribution of the retained trees with regards to the effects caused by the proximity of the nearby road. The Sycamore (T8) has sufficient room for a predictable root distribution to be anticipated and can be adequately protected by the current position of the construction exclusion zone. The root distribution of The Common Lime (T9) is likely to show an asymmetrical distribution away from the road towards the garden and the woodland. Again, sufficient room for a healthy root system can be seen by the current good physiological health of the tree. There is also sufficient distance from the proposed works for it to be safely retained. The Common Beech (T12) rooting area is limited by the proximity to the road and also by the existing hard standing structures around the house. No direct root impact such as lifting or cracking of the house side paths can be seen, suggesting this has limited the root spread. The buttress distribution and direction shows root growth into the garden area and also shows a large root running parallel with the road, towards the woodland. The effects of the works on this tree can be limited by excluding excavation in the garden area. This is the current position of

the construction exclusion barriers. Should any work need to be done in this area it should be undertaken by hand under supervision from an arboriculturalist.

Recommendations

1. Removal of Common Ash (T10 and T11) prior to commencement of building works for health and safety reasons. This has now been undertaken by Western Power.
2. The removal of the of Leyland Cypress trees within (G2) prior to work on the garage structure.
3. The installation of tree protection barriers to avoid physical/mechanical damage to the above ground structures of the retained trees. This is detailed in the Arboricultural Method Statement and in the position shown in Plan 2 of the Tree Constraints Plan.
4. Any excavation needed to be undertaken should be done by hand under the supervision of an arboriculturalist. This is detailed in the Arboricultural Method Statement.
5. Site materials are advised to be stored in the recommended area shown in the Tree Constraints Plan.

6. Arboricultural Method Statement and Tree Protection Plan

6.1. Retained trees are to be protected from harm during the construction phase by the erection of vertical barriers to form a physical barrier between the site and the trees. These are to be installed before any development commences. Once installed they should not be moved or altered in any way. The barriers should be made from block and mesh or Heras fencing and should be fitted with signs signaling that it is a tree retention area and must not be moved. The area within the construction zone is to be regarded as sacrosanct and fencing should not be taken down or moved at any time without consultation with an arboriculturalist. It is suggested that the barriers be erected with a similar design to the diagram below.

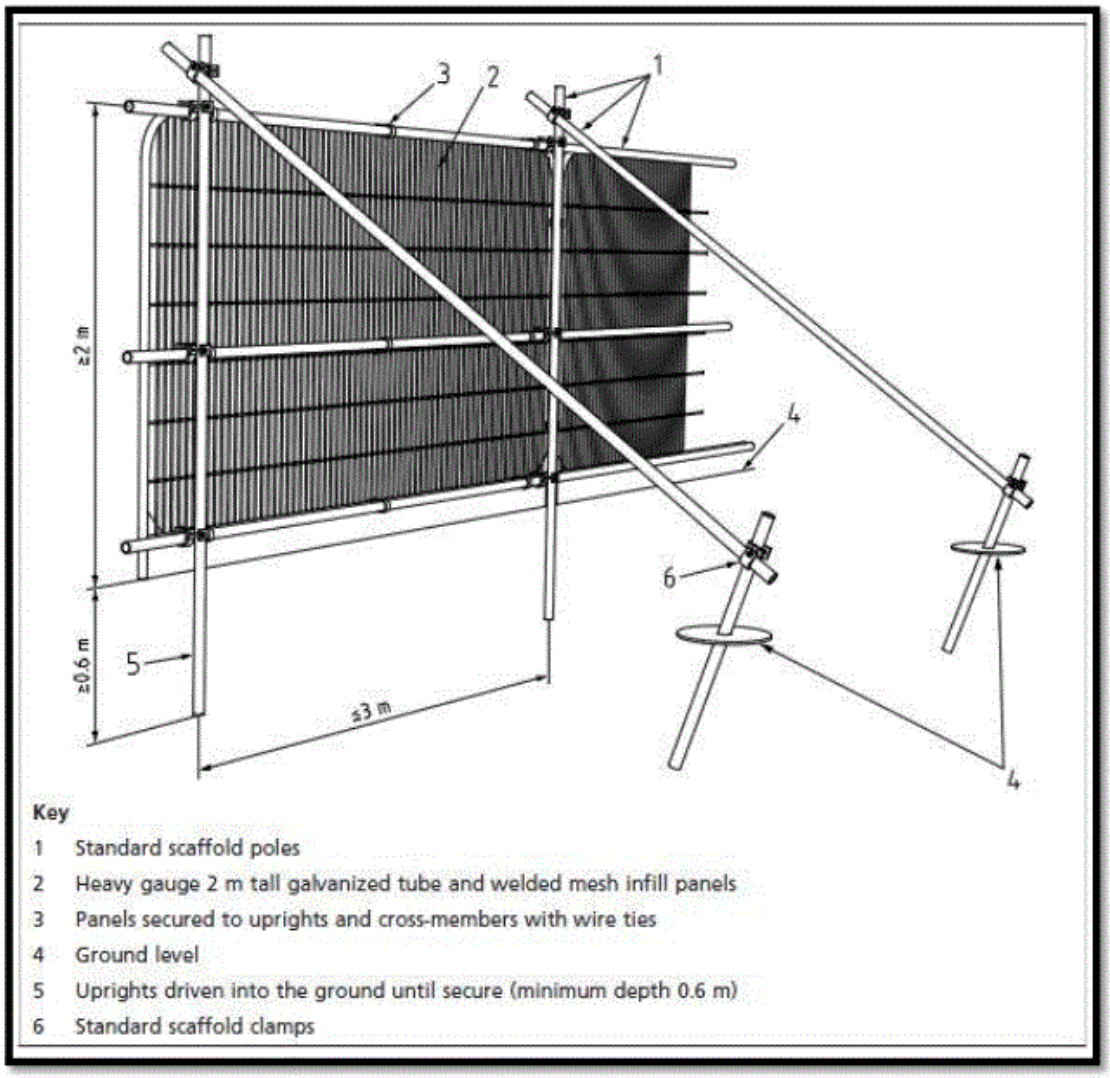


Figure 1 BS5837 (2012)

Examples of Root Protection Area exclusion signs:

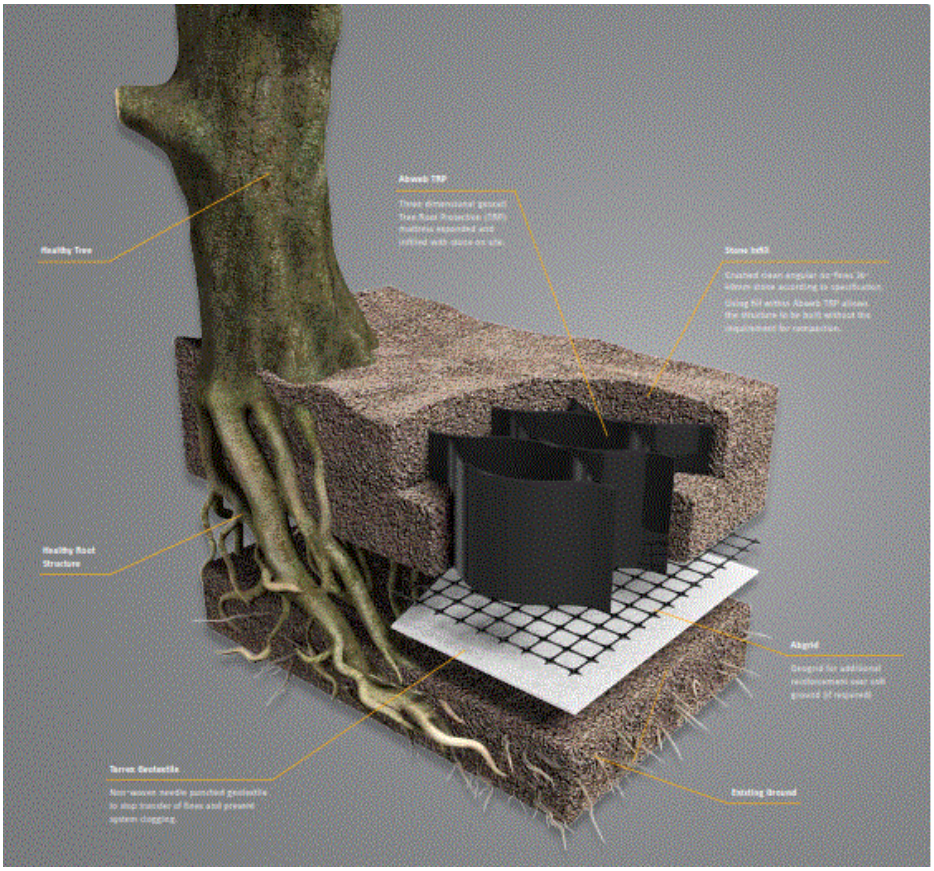


6.2. The erection of the construction exclusion zones should not require remedial pruning of the trees, however if this is not the case, work should be carried out by a qualified arborist and adhere to the British Standard 3998 “Tree work. Recommendations” 2010 and only be undertaken after consultation with the Local Planning Authority.

6.3. If the installation of a load distribution matting is necessary in is to be installed prior to any vehicular access to the site and should be located as shown in the Tree Constraints Plan. The following guidelines and techniques should be used. A double layer of suitable ground matting should be used with a 150mm section of woodchip sandwiched in between the layers to aid cushioning and distribution of loads. This will prevent soil compaction and damage to the soil structure and cause little impact to the tree roots and overall health. Below is an example of the system to be used.



6.4. A cellular confinement system should be used beneath any parking or driveway within tree Root Protection Areas (RPA's) and should be located as shown in the Tree Constraints Plan. The following guidelines and techniques should be used. To ensure that the root protection area is not disturbed a 'no dig' technique is advised in order to minimise any damage done physically or to the functionality of the root system. The ground within this root protection zone is to be laid with a cellular confinement system. This structure will dissipate downward forces horizontally (caused by vehicles or pedestrian traffic), preventing compaction and allowing air and water to pass through to the roots. This work must be undertaken by suitably qualified engineers. The diagram below outlines an example of a cellular confinement system.



6.5. **Hand digging recommendations:** Where excavations must be undertaken within the Root Protection Area of the tree, mechanical excavation is forbidden. Precautions should be undertaken to protect any exposed roots. Most tree roots are found within the top 600mm of soil and often grow outwards further than the trees height. The majority of the roots are very fine except for the structural, stabilising roots found closer to the stem. If roots are damaged the tree may suffer irreversible damage and eventually die.

- Do not excavate within the Root Protection Area with machinery. Where excavation is unavoidable, the use of hand tools or such techniques as air-spading are permitted.
- Do not cut roots over 25mm in diameter unless advice has been sought from an aboriculturalist or the local authority tree officer.
- Do not repeatedly move/use heavy mechanical plant except on hard standing.
- Do not store spoil or building materials, including chemicals and fuels within this zone.
- Prune roots which have been removed with a sharp too e.g. secateurs/ handsaw. Make a clean cut and leave as small a wound as possible.
- Any trench must be lined with an impermeable membrane prior to pouring concrete to avoid harmful contamination to the tree roots or rooting environment.
- Backfill the trench with an inert granular material and topsoil mix. Compact the backfill with care around the retained roots.
- Protect any exposed roots with dry sacking ensuring this is removed before backfilling

6.6. Vehicular movement should be kept away from the exclusion areas, with special care taken concerning plant with booms, jibs or counterweights. A banksman should be used to direct plant whenever work is taking place in close proximity to the retained trees to avoid mechanical damage occurring.

6.7. No building material is to be stored within or near to the tree retention areas. It is advised that a suitable site for storage or site office be located in the area shown in the tree constraints plan.

6.8. Care must be taken with materials which could contaminate soil, such as concrete mixing, diesel oil and vehicle washings and correct disposal of these materials should be sought. Special care should be taken to ensure that no accidental runoff of these materials accesses the root protection areas of any trees on site.

6.9. Tree works to the area should be done outside of the main bird nesting season which is generally regarded as March 1st to August 31st. If this is not possible then an ecological inspection should be undertaken by a qualified person to ensure that no wildlife is disturbed or harmed during the tree work.

7. Bibliography

BS 5837: 2012. *Trees in relation to design, demolition and construction - Recommendations*

Lonsdale, D., 1999. *Principles of Tree Hazard Assessment and Management.* London: TSO.

Matheny, N.P., Clarke, J.R., 1994. *Evaluation of Hazard Trees in Urban Areas*. ISA Publication.

Strouts, R.G., Winter, T.G., 1994. *Diagnosis of ill-health in trees.* London: TSO.