

Tree and Hedge Survey Report

Assessment of the Potential Impacts for an Outline Planning Application for a
Proposed Residential Development on Land off Elizabeth Crescent, Whitehaven

Report for: Messrs Bowe

August 2017

To complete the objectives stated in this report, it was necessary for OpenSpace to base our conclusions on the best information available during the period of the project and within the limits prescribed by our client in the agreement.

No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. We therefore cannot guarantee that the investigations fully identified the degree or extent of e.g. species presence or habitat management efficacy described in this report.

Document Information

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Tree and Hedge Survey Report for an Outline Planning Application for a Proposed Residential Development on Land off Elizabeth Crescent, Whitehaven

1 PROJECT BACKGROUND

This tree and hedge survey has been commissioned by Messrs Bowe for a proposed residential development on land near Elizabeth Crescent, Whitehaven. The proposal will be for 45 residential dwellings, with associated access and landscaping.

The development may potentially affect a number of trees and hedges. The site is not in a conservation area and there appears to be no TPO's on site. The tree report will assist in determining potential impacts to trees on site and future proof the proposed design layout.

2 SCOPE OF SURVEY AND METHODOLOGY

2.1 Tree survey

The tree survey aims to make a reasoned judgement as to the importance of all trees with consideration for their conservation and landscape value. The survey area (shown in the existing plan Figure 2.1 and the aerial photo in Figure 2.3) considered all trees within the site and by the site boundary that may potentially be affected by the proposed development (see Figure 2.2 for the initial proposed plan).

The inspection method was a standard Visual Tree Assessment (VTA) from ground level. The survey investigated the condition of each tree, including tree species, tree health, evidence of pathogens, tree structure, tree age (estimate), tree size and other observations on condition and use. Diane Dobson (B.Sc., M.Sc., MCIEEM) and Jonathan Rook (MEnv.Sc.) undertook the assessment, with over six years and 16 years tree survey experience respectively. Tree categorization was in accordance to guidance within **BS 5837:2012 'Trees in Relation to Construction'** where an assessment was reached on the quality of each tree.

2.2 Hedge survey

The hedge survey aims to make a reasoned judgement as to the importance of the hedges with consideration for their conservation and landscape value. The survey area (shown in Figure 2.1) considered the hedges around the boundary of the site. The hedgerow survey

methodology followed the framework set by the Hedgerow Regulations 1997, using the guidelines published by DEFRA (2002).

Some hedges may qualify as 'important hedges' under the Hedgerow Regulations (1997), requiring consent from the local authority for their removal. Species-rich hedges that do not qualify as 'important hedges' could qualify as a Section 41 Priority Habitat under the definition for hedges that have more than 80% native species. Hedges that qualify under the Hedgerow Regulations or Section 41 Priority Habitats are likely to be of conservation importance.

Hedgerows classified under the Hedgerow Regulations include those on or adjoining common land, village greens, Sites of Special Scientific Interest, National Nature Reserves, Special Protection Areas under the Bird's Directive, Special Areas of Conservation under the Habitats Directive, Local Nature Reserves or land used for agriculture, forestry or breeding or keeping horses, ponies or donkeys. Garden hedges and hedges around industrial developments are excluded from the Hedgerow Regulations 2007. For the criteria to assess hedges see Appendix Two.

These hedgerows would require consent for removal under the Hedgerow Regulations other than where the removal is part of development for which planning permission has already been granted.

Figure 2.1. Existing site and survey area

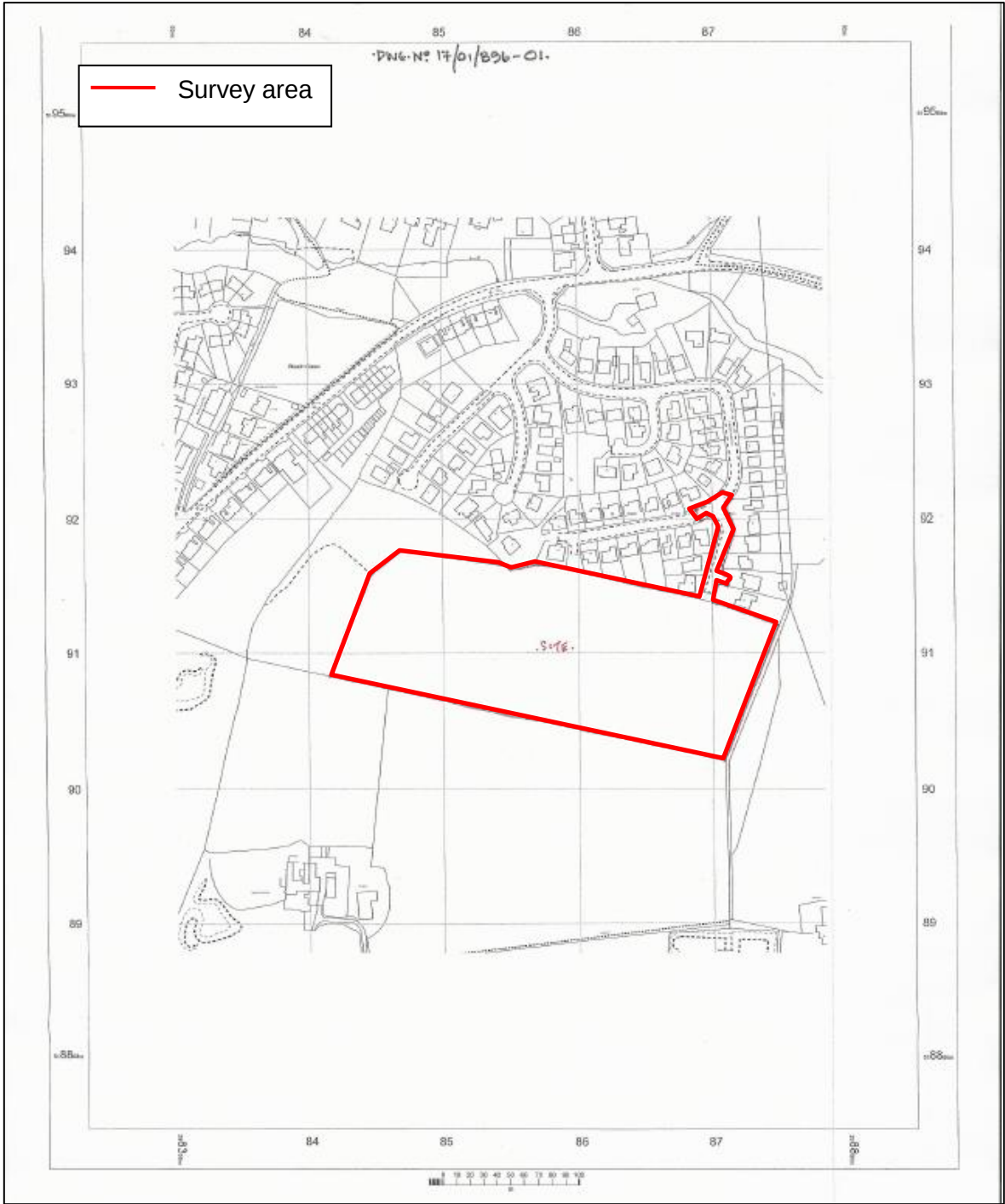


Figure 2.2. Proposed development



Figure 2.3. Aerial photo of survey area with hedges



3 RESULTS OF SURVEY

The daytime survey was undertaken on 8th February 2017 by Diane Dobson.

3.1 Tree Results

There were no trees within the proposed development site. Two trees were on/adjacent to the proposed site boundary (likely to be in third party ownership) and only had the girth measurement taken. The two trees were a Sessile Oak *Quercus petraea* in the south-eastern corner and a Sitka Spruce *Picea sitchensis* in curtilage along the northern boundaries. There was a woodland/plantation to the east of a footpath outside of the eastern boundary (See OpenSpace Preliminary Ecological Appraisal (OpenSpace, 2017) for more details). However, the trees here were small to moderate sized trees and about 5m from the site boundary.

It should be noted that only the trees over 150mm stem diameter at a height of 1.5m were fully surveyed. General tree descriptions are provided in Table 3.1 on page 6. Photos are provided on in Appendix Three.

Table 3.1. Tree Identification Data

No	Species	Diam. @1.5m (mm), at root flare for stem ii	RPA radius (m)	RPA (m ²)
1	Sessile Oak <i>Quercus petraea</i>	390	4.8	81
2	Sitka Spruce <i>Picea sitchensis</i>	370	4.5	72
The trees above were on or outside the site boundary and are likely to be in third party ownership				

3.2 Hedge Results

There were two hedges (H1 and H2) along the southern boundary of the proposed development site. The hedges had large gaps and individual mature hawthorn. These two hedges would be classed as defunct hedges. There were a number of hedges along the northern boundary. These were all within curtilage. None of the hedges would therefore be important hedges under the Hedgerow Regulations. However, some of the hedges in curtilage have over 80% native species and would therefore be Priority Habitats under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006.

4 ASSESSMENT AND RECOMMENDATIONS

4.1 Tree Assessment

Assessment

There two trees (over 150mm in girth) growing on the boundary around the proposed development site. The proposed development may impact on trees on the boundary around the site. The proposed development site is not in a conservation area and there are no TPO's registered on site (pers. corr. Sue Kennett, Planning Technician, Development Control, Copeland Borough Council).

Removal of trees due to poor health or quality

No trees are proposed for removal due to poor health.

Removal of trees due to development

No trees are proposed for removal due to the proposed development.

The overall tree resource and local biodiversity would be enhanced by planting native tree species, with some native shrubs.

Retained trees

The proposed development may impact on the RPA of retained Trees (See Figure in Appendix Four for the RPA of the trees). The proposed construction footprint is outwith the RPA of Tree 1 and 2 although there are two existing utilities pipes within the RPA of Tree 1. However, there may be a risk of soil compaction from construction machinery.

Where issues arise for root compaction wooden working boards to be used to protect the tree roots and Geogrid (or equivalent i.e. Geoweb) to be used where machinery has to operate within RPAs. Appropriate tree fence protection to be installed before construction to restrict access to the RPAs.

Any landscaping proposals within the RPA must considered potential damage to roots.

4.2 Tree Protection Measures

To reduce and manage the potential impacts on all retained trees the following measures must be considered.

1. Construction of buildings and access to be directed away from trees.
2. No tree roots greater than 25mm to be cut.
3. Limited pruning of retained trees to be approved by the Tree Officer.
4. All materials for construction and machinery stored outside all RPA.
5. No construction vehicles to access near all retained trees.
6. Protective fencing put in place for trees that may be affected by the proposed new build as indicated above.
7. Where issues arise for root compaction wooden working boards should be used to protect the tree roots.

General Precautions

The following schedule sets provides general measures for all retained trees on site. These will be carried out before commencement of other site operations including erection of protective fencing. These are:

- All works will be carried out in accordance with the British Standard Institution (2010). BS3998:2010 Recommendations for Tree Work – recommendations. BSI, London.
- The specification for protective fencing will conform to British Standard Institution (2012). BS5837:2012 Trees in relation to Construction – recommendations. BSI, London.
- All protective measures signed off by arboricultural consultant.
- No vehicles will be allowed to enter areas to be protected by fencing.
- No materials that are likely to have an adverse effect on tree health such as oil, bitumen or cement will be stored or discharged within 10 metres of the trunk of a retained tree.

Follow other general measures as below:

- **Do not** store materials, plant or equipment within RPA.
- **Do not** move plant or vehicles within the RPA.
- **Do not** lean materials against, or chain plant to, the trunk.
- **Do not** cut roots over 25mm in diameter, unless advice has been sought from the local authority tree officer.
- **Do not** repeatedly move / use heavy mechanical plant except on hard standing/ access road zone.

- **Do not** store spoil or building material, including chemicals and fuels, within this zone.
- **Do not** light fires under any tree canopy or within 20 metres of any tree to be retained.
- **Do not** empty cement washing or other chemical within the RPA.
- **Do** contact the local authority tree officer or owner of the tree if excavation within RPA by machinery is unavoidable or not been agreed prior to works.
- **Do** protect any exposed roots uncovered within RPA with dry sacking.
- **Do** backfill with a suitable inert granular and top soil material mix as soon as possible on completion of works.
- **Do** notify the local authority tree officer or the tree's owner of any damage.

4.3 Tree Recommendations

There is an opportunity to enhance the site by planting native trees (or wildlife friendly ornamental species) in appropriate locations across the site. The trees should be located on an agreed Landscape Plan.

Planting recommendations

The following native species could be considered. These species are appropriate for the location and all are native species (Ash has currently not been recommended due to the restrictions in place due to Ash Dieback). Planting native trees and shrubs will enhance the site for biodiversity.

Native tree species suggested:

Silver Birch (*Betula pendula*)

Wild Cherry (*Prunus avium*)

Rowan (*Sorbus aucuparia*)

Sessile Oak (*Quercus petraea*)

English Oak (*Quercus robur*)

Small tree/ shrub species suggested:

Hawthorn (*Crataegus monogyna*)

Hazel (*Corylus avellana*)

Holly (*Ilex aquifolium*)

Elder *Sambucus nigra*

Bird Cherry (*Prunus padus*)

Guelder Rose (*Viburnum opulus*)

Dog Rose (*Rosa canina* agg.)

Use of native ground flora could be planted using plug plants or selected seed sowing. The species should be chosen following a site visit in the spring to identify what species are present.

4.4 Hedge Assessment and Recommendations

Assessment

None of the hedges would be an important hedge in terms of the Hedgerow Regulations.

The hedges at the proposed entrance to the site, although in curtilage, have over 80% native species and would therefore be a Priority Habitat (under Hedgerows) under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006. These hedges would be of moderate conservation value. It is likely that about 15m of hedgerow would require removal for the proposed access into the site. The removal of 15m of hedge would be of low to moderate impact.

Some of the other hedges within curtilage have over 80% native species and would therefore be a Priority Habitat (under Hedgerows) under Section 41 of the NERC Act 2006. None of these hedges are proposed for removal.

All the hedges may offer some breeding bird potential and provide a wildlife corridor from the proposed development site.

Hedge removal can be mitigated by planting new native species-rich hedges around the proposed development. It is also recommended that enhancement of the scheme is undertaken by planting additional new native trees and shrubs on site.

No building footprint or large construction machinery should enter within 3m of the retained hedges. If during the project construction machinery must incur in to the 3m zone, this report recommends large wooden boards are placed around the area to reduce compaction. If necessary appropriate fence protection should be installed before construction to restrict access to the root systems.

Mitigation and planting recommendations

For any hedge sections proposed for removal, the mitigation proposals should undertake new native species-rich hedge planting using native tree and shrub species. The hedge planting can include planting up of the gaps in the defunct hedges along the southern boundary. This will mitigate for the loss of the hedge and provide some enhancement planting to increase biodiversity, which will benefit breeding birds and invertebrates. All planting should be undertaken during the winter months as all the plants recommend would be bare rootstock.

The hedge mitigation proposals would be as follows:

1. All hedge removal on site should be undertaken outside the bird-breeding season or if hedges are removed within the bird breeding season (March - September) a detailed bird nest survey must be undertaken before works commence.
2. A buffer of 3m establish from the centre of all retained hedges to protect from a building footprint or construction traffic.

Suggested native species to be planted:

Hawthorn *Crataegus monogyna*

Hazel *Corylus avellana*

Holly *Ilex aquifolium*

Elder *Sambucus nigra*

Wild Cherry *Prunus avium*

Rowan *Sorbus aucuparia*

Guelder Rose *Viburnum opulus*

Dog-rose *Rosa canina* agg.

Honeysuckle *Lonicera periclymenum*

Use of native ground flora could be planted using plug plants or selected seed sowing.

5 SUMMARY

As all the trees were outside the proposed development site boundary and in third-party ownership no trees are proposed for removal. There may be an impact on the RPA of retained trees. It is important to ensure that any construction should follow **British Standard 5837:2012 trees in relation to construction** to avoid any damage to the retained trees.

There is an opportunity to enhance the site for biodiversity by planting native trees and shrubs. The tree resource on site could be enhanced by planting a mix of native tree species.

None of the hedges would be an important hedge in terms of the Hedgerow Regulations. Some of the hedges in curtilage along the northern boundary would be a Priority Habitat under hedgerows under S41 of the NERC (2006) Act, including sections at the proposed access point from Elizabeth Crescent.

About 15m of hedge will require removal for the proposed access into the site from Elizabeth Crescent. The loss of 15m of hedge can be mitigated by new native species planting. The proposed planting scheme should increase hedge/tree resource on site by the planting of a new native shrubs and trees, which will increase biodiversity.

The impact would be reduced if removal of sections of hedgerow is undertaken in the winter and mitigation measures are undertaken. The development should consider the hedge root system and a buffer zone should be applied.

There is an opportunity to enhance local biodiversity on site by increasing bat foraging habitat, bird-breeding features and improved habitat quality. The landscape design should consider native species and connectivity to other areas.

6 REFERENCES/BIBLIOGRAPHY

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7 APPENDIX ONE: KEY TO TREE SCHEDULE

Tree ID No:	Relates to individual trees identified within the Tree Survey Plan.					
Species:	Common name (<i>Latin name</i>).					
Height:	Estimated height expressed in metres to the nearest half metre.					
Stem diameter:	Diameter of main trunk or stems of a multi-stemmed tree taken at 1.5m above ground level where this is measurable (where the stem diameter is affixed by a “*” this measurement has taken above the root flare for multi-stemmed trees where the stems cannot be measured). Measurement expressed in millimetres to the nearest 10mm.					
Branch Spread:	(N, S, E, W radius) Estimated crown radius expressed in metres to the nearest half metre. Where a trees crown is heavily asymmetrical, the crown radius for each cardinal compass point is given.					
Age Class	Y	Young - Less than one third of natural life expectancy				
	SM	Semi-mature - One thirds of natural life expectancy				
	EM	Early mature - Two thirds of natural life expectancy				
	M	Mature - More than two thirds of natural life expectancy				
	OM	Over mature				
No. of stems:	M = multi-stemmed					
Physiological Condition:	G = Good	F=Fair	P=Poor	D=Dead		
Structural Condition:	G = Good	F=Fair	P=Poor			
Estimated remaining						
Contribution:	Expressed in years (<10, 10+, 20+, 40+)					
Abbreviations:	#: Estimated	Ave: Average	A.G.L:	Above	ground	level

Cascade chart for tree quality assessment, with the colour identification added (from BS5837:2012)

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
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 <i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i>			See Table 2 Dark Red
	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)	See Table 2 Light green
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 necessary to merit the category A designation	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	See Table 2 Mid blue
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	See Table 2 Grey

BRITISH STANDARD

BS 5837:2012

Root Protection Area: This is the minimum Root Protection Area (RPA) recommended within the British Standards 5837: 2012 'Trees in relation to construction'. The RPA is an area (m²) equivalent to a circle with a specified radius. This is the minimum area in m², which should be left undisturbed.

Calculating the Root Protection Area (RPA), BS5837: 2012 Trees in relation to construction - Recommendations Number of stems	Calculation
Single stem tree	See Table D.1
Tree with more than one stem arising below 1.5m above ground level	RPA(m ²) = a) For trees with two to five stems, the combined stem diameter should be calculated as follows: $\sqrt{(\text{stem diameter } 1)^2 + (\text{stem diameter } 2)^2 \dots + (\text{stem diameter } 5)^2}$ b) For trees with more than five stems, the combined stem diameter should be calculated as follows: $\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$
NOTE The 12 x multiplier is based upon NJUG and published works by Metheny and Clark.	

Notes:

Whilst 'C' category trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150mm should be considered for relocation or replacement through mitigation.

The calculated RPA should be capped to 707m², e.g. which is equivalent to a circle with a radius of 15m.

The RPA, for each tree (as determined in Table D.1 for single stemmed trees and equivalent resultant combined stem diameter for multi-stemmed trees – note for multi-stemmed trees where the stems are not measurable OpenSpace use the previous method of measuring the stem above the root flare (RPA(m²) = ((Basal diameter(measured immediately above root flare)(mm) x 10) / 1000) x 3.142)), should be plotted on the TCP taking full account of the following factors, as assessed by an arboriculturalist, which may change its shape but not its area whilst still providing adequate protection for the root system:

- a) The likely tolerance of the tree to root disturbance, based on factors such as species, age and condition and presence of other trees.

b) The morphology and disposition of the roots, when known to be influenced by past or existing site conditions (e.g. presence of roads, structures and underground services).

c) The soil type and structure.

d) Topography and drainage.

e) Where any significant part of a tree's crown overhangs the provisional position of tree protection barriers, these parts may sustain damage during the construction period. In such cases, it may be necessary to increase the extent of tree protection barriers to contain and thereby protect the spread of the crown. Protection may also be achieved by access facilitation pruning. An arboriculturalist should assess the need for such measures, including the precise extent of pruning.

PLOTTING THE RPA – TABLE D.1 (from BS5837:2012)

Table D.1 Root protection areas

Single stem diameter mm	Radius of nominal circle m	RPA m ²	Single stem diameter mm	Radius of nominal circle m	RPA m ²
75	0.90	3	675	8.10	206
100	1.20	5	700	8.40	222
125	1.50	7	725	8.70	238
150	1.80	10	750	9.00	255
175	2.10	14	775	9.30	272
200	2.40	18	800	9.60	290
225	2.70	23	825	9.90	308
250	3.00	28	850	10.20	327
275	3.30	34	875	10.50	346
300	3.60	41	900	10.80	366
325	3.90	48	925	11.10	387
350	4.20	55	950	11.40	408
375	4.50	64	975	11.70	430
400	4.80	72	1 000	12.00	452
425	5.10	81	1 025	12.30	475
450	5.40	92	1 050	12.60	499
475	5.70	102	1 075	12.90	519
500	6.00	113	1 100	13.20	547
525	6.30	124	1 125	13.50	573
550	6.60	137	1 150	13.80	598
575	6.90	150	1 175	14.10	625
600	7.20	163	1 200	14.40	652
625	7.50	177	1 225	14.70	679
650	7.80	191	1 250+	15.00	707

NOTE These figures are derived from the calculations described in 4.6.

8 APPENDIX TWO: HEDGE ASSESSMENT CRITERIA

Definitions used are as those given in the Hedgerow Regulations (1997). The following criteria are used to assess the importance of a hedge:

A. The hedgerow contains protected flora and/or fauna.

B. The hedgerow includes:

- At least 7 woody species; or
- At least 6 woody species and has 3 associated features; or
- At least 6 woody species including Black Poplar, a Large-leaved lime, a Small-leaved Lime or a Wild Service Tree; or
- At least five woody species and has at least four associated features.

C. The hedgerow is

- Adjacent to a road, bridleway, footpath, road used as a public footpath or a byway open to all traffic and
- Includes at least four woody species and has at least two associated features.

Associated features recorded are as follows:

- A bank or wall for at least half the length of the hedgerow.
- A ditch for at least half the length of the hedgerow.
- Gaps over no more than 10% of the length of the hedgerow.
- At least one standard tree per 50m of hedgerow.
- At least three woodland species in the ground flora as defined in Schedule 2 of the Regulations within 1m from the outermost edges of the hedgerow.
- Connections scoring four or more points, where connection a hedgerow counts as one, and connection to a woodland, in which the majority of the trees are broad-leaved, or a pond counts as two.
- A parallel hedge within 15m of the hedgerow.

Regional Variations: The number of woody species required is reduced by one for hedgerows situated wholly or partly in a number of counties, of which Cumbria is one.

9 APPENDIX THREE: PHOTOS

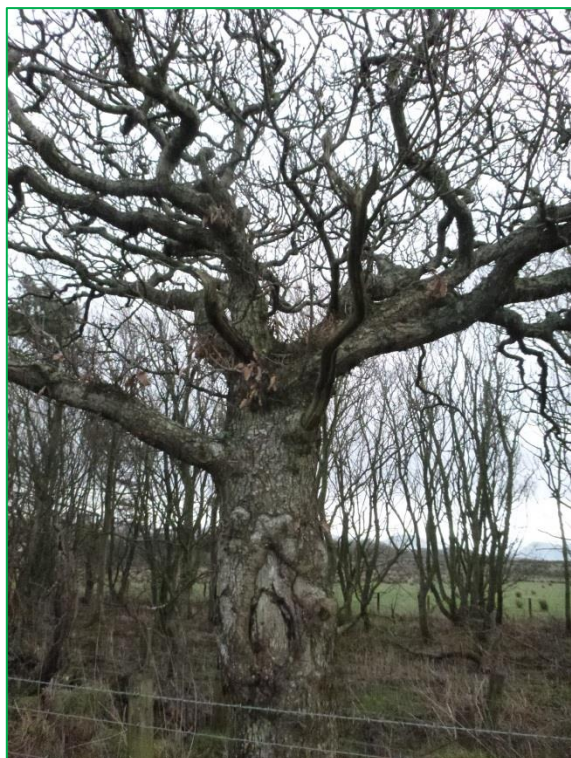


Photo 1. Tree 1



Photo 2. Tree 2



Photo 3. Woodland to the east of a footpath along the eastern boundary



Photo 4 and 5. Defunct hedges along the southern boundary



Photo 6. Hedge at proposed entrance to site

Photo 7. Hedges at proposed entrance to
site from Elizabeth Crescent



Photo 8. Hedge in curtilage along
northern boundary

10 APPENDIX FOUR: TREE RPA

