

Greenacre School, Barnsley

Arboricultural Implications Assessment

Report for Barnsley Partnership for Learning
(Laing O'Rourke)

October 2009



Ref:011/
V1 – 16/10/09

Prepared by:
Guy Morrison

Checked by:
Claire Leather

Greenengage Arboriculture & Ecology
Linfield House, 2 Bernard Lane, Green Hammerton, York YO26 8BP
T: 01423 331924 E: info@greengage-arbeco.co.uk W: www.greengage-arbeco.co.uk

CONTENTS

SUMMARY.....	1
1. INTRODUCTION.....	2
1.1 Scope and Brief	2
1.2 Site Description	2
1.3 Statutory Tree Protection	3
2. THE EXISTING TREE RESOURCE.....	5
2.1 Tree Survey Methodology.....	5
2.2 Tree Survey Results.....	6
3. IMPACT ASSESSMENT.....	7
3.1 The Development Proposal	7
3.2 Typical Development Impacts.....	7
3.3 Arboricultural Impacts	8
4. RECOMMENDATIONS.....	12
4.1 Arboricultural works.....	12
4.2 Tree Protection.....	12
4.3 Protected Species	13
4.4 Replacement planting.....	14
4.5 Further details.....	14
5. REFERENCES.....	15
APPENDIX A – ARBORICULTURAL IMPACT AND WORKS SCHEDULE	17
APPENDIX B – SPECIES LIST AND POTENTIAL TREE HEIGHT	26

SUMMARY

Greengage Arboriculture & Ecology was commissioned to carry out an arboricultural implications assessment at Greenacre School, Barnsley. The site is proposed for the construction of a new school building and associated facilities. This report assesses the direct and indirect impacts of the development proposal on the existing trees.

A pre-development tree survey of the site has been carried out previously and this survey has informed this assessment. The school contains a large number of trees. Many of these are located in groups and belts close to the boundaries, which have been densely planted with mixed native broadleaves, such as aspen, silver birch, wild cherry, alder and grey willow. There are also a number of small and medium-growing ornamental species, including silver birch, pear and *Sorbus* species, growing in mown grassland adjacent to the school and along the southern boundary. The previous survey assessed 105 individual trees and shrubs, 15 groups of trees and three hedges.

The proposed development will require the felling of nine individually assessed trees, which include nine trees of moderate quality and value (B category) and fifteen trees of low quality and value (C category) and two trees of poor condition and value (R category).

The proposed development will also require the removal of one low quality and value hedge, five low quality and value groups of trees and/or shrubs and parts of three moderate quality and value groups of trees and shrubs.

The proposed development will involve level changes within part of the root protection area of a small number of retained trees. It is considered that the impacts associated with this construction can be adequately minimised or mitigated by the adoption of appropriate construction methodologies. The production of an arboricultural method statement is recommended to detail agreed methodologies.

No significant indirect impacts on trees to be retained have been identified. The proposed layout provides sufficient space for the retention of trees without them becoming a nuisance which may lead to their felling or major tree works in the future.

There is an arboricultural impact associated with the loss of individual trees on the site, but this is low because the trees to be felled represent a small proportion of the total number of trees on the site. The landscape masterplan shows that extensive tree planting is proposed and it is considered that the development proposal will lead to a net increase in the local arboricultural resource and an enhancement of the site's amenity value.

1. INTRODUCTION

1.1 Scope and Brief

This arboricultural report was commissioned by Laing O'Rourke on behalf of Barnsley Partnership for Learning. Laing O'Rourke have been appointed by Barnsley Metropolitan Borough Council to design and construct new school buildings and facilities under Phase 2 of the Barnsley Building Schools for the Future (BSF) programme.

The report was prepared by Guy Morrison, Principal Arboriculturist and Partner of Greengage Arboriculture & Ecology. He is a Chartered Forester and Registered Consultant with the Institute of Chartered Foresters. He is also a Professional Member of the Arboricultural Association and holds the Royal Forestry Society Professional Diploma in Arboriculture.

The scope of the report was to prepare an arboricultural implications assessment report to assess the direct and indirect impacts of the development proposal on the existing trees and shrubs. The assessment is accompanied by a schedule for facilitation works to trees that are necessary in order to accommodate the proposed development, as well as remedial works necessary to improve tree condition and address tree hazards.

A pre-development tree survey of the site had been carried out previously. This *Tree Survey Report* (Greengage, 2009) should be referred to when reading this report.

Arboricultural implications assessment reports have been commissioned for the three sites that form Phase 2 of the Barnsley BSF programme. These are Springwell School, Greenacre School and land to the west of Engine Lane, near Shafton. The former two sites are existing schools proposed for improvement, while the latter site is farmland proposed for development as a new school. This report relates to the Greenacre School site.

1.2 Site Description

A full description of the site and the site location plans are provided in the tree survey report (Greengage, 2009) and this should be read alongside this report. A summary of the site description is provided below.

Greenacre School is a local authority special educational needs school. The site is located at Keresforth Hill Road, Barnsley, S70 6RJ (site centre OS grid ref. SE 331 053).

The site is approximately rectangular in shape and has an area of approximately 4.6ha. The existing school buildings and associated parking, access routes and tarmac playground all lie in the centre of the site. The north-eastern third of the site is a grass playing field and the south-western third of the site is young woodland, scrub and rough grassland. The site is accessed from the B6099 Keresforth Hill Road to the south.

The site has a variable topography. The area surrounding the existing buildings and playing fields is essentially flat. South of the buildings the site slopes down to Keresforth Hill Road and to the west of the buildings the land slopes more steeply to the site's lowest point in the south-western corner. There is 0.5-1.0m high retaining wall at the western end of the boundary with Keresworth Hill Road.

The school contains a large number of trees. These are predominantly small and medium-growing ornamental species growing singly or in small clusters in mown grassland, and mixed native broadleaves planted in groups and belts adjacent to the site's boundaries.

Ornamental species include silver birch, *Sorbus* species, pear and purple crab apple. These are predominantly middle-age and early-mature trees which have been planted adjacent to school buildings, access roads and car-parking areas, plus along the southern boundary.

Dense groups of mixed native broadleaves have been planted at the south-western and western end of the site. These are predominantly young and middle-age trees. The predominant species are aspen, silver birch, wild cherry and alder along with scattered oak, beech and ash and several older early-mature Norway maple and sycamore trees.

Along the eastern boundary and eastern half of the northern boundary are dense belts of planted young and middle-age trees. These are dominated by grey willow and goat willow with scattered silver birch, rowan, oak and field maple. Within the belt on the eastern boundary is a dense group of middle-age smooth-leaved elm trees.

Despite the restricted access to the school grounds there is a relatively high public visibility of many of the trees on the site. These are visible from surrounding public viewpoints, particularly Keresforth Hill Road and Broadway. There is also partially obstructed visibility of the site from the footpath running along the northern boundary. There are additional views of trees on the site from houses on Keresforth Hill Road and Bramley Carr.

1.3 Statutory Tree Protection

The Local Planning Authority (LPA) has confirmed previously (e-mails dated 27/04/09 and 28/04/09) that there are no trees on the site protected by Tree

Preservation Orders (TPOs), although several trees adjoining the site are protected. Barnsley MBC TPO 1/1976 protects two mature horse chestnut trees (no.s 39-40) which lie beyond the south-western boundary but slightly overhang the site. The LPA have confirmed that the site is not located in a Conservation Area.

TPOs place various restrictions on the felling, pruning or damaging of trees, subject to various exemptions (DETR, 2000; DCLG, 2008). Permission is required from the LPA to fell or prune trees covered by the TPO, or to carry out any other operations that may damage the trees. There are a number of exemptions, such as the *felling of dead, dying and dangerous trees*, but it is recommended that the LPA is consulted on all planned works to agree on whether a formal application for permission is required.

Tree felling on non-residential land is also controlled by the need to obtain a Felling Licence from the Forestry Commission before felling more than 2m² of timber (or 5m² if timber is not sold) per three month period, subject to various exemptions (FC, 2005).

2. THE EXISTING TREE RESOURCE

2.1 Tree Survey Methodology

A tree survey was carried out on the site in accordance with BS5837:2005 'Trees in relation to construction – Recommendations' (BSi, 2005). The tree survey report (Greengage, 2009) should be referred to for the survey methodology.

The trees' overall quality and value for retention was assessed in accordance with BS5837:2005 Table 1. This was dependent on the trees' physiological and structural condition, safe useful life expectancy and arboricultural, landscape, cultural and ecological value. Arboricultural and landscape value takes account of the trees' amenity value, which was determined by tree size, prominence, visibility, appropriateness, attractiveness and screening value. Trees were assigned to the following quality and value categories:

Quality and value	Characteristics
Category A	Those of high quality and value: in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested).
Category B	Those of moderate quality and value: in such a condition as to make a significant contribution (a minimum of 20 years is suggested).
Category C	Those of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested), or young trees with a stem diameter below 150mm.
Category R	Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed for reasons of sound arboricultural management.

The root protection area (RPA) radius and area for each tree was calculated in accordance with BS5837:2005. The RPA is an area of ground that provides sufficient soil rooting volume to ensure the survival of the tree. Where there are no likely impediments to rooting, a circular RPA is shown on the Tree Constraints Plan. Where restrictions on rooting are present, a non-circular shape with an identical area has been plotted to reflect the likely response of the roots to the soil rooting environment.

2.2 Tree Survey Results

The full survey results are shown in the *Tree Survey Report* (Greengage, 2009) and accompanying *Tree Constraints Plan* (Greengage drawing no. 011-03-1-4). An extract of the survey information is provided in the arboricultural impact and works schedule (Appendix A).

The survey assessed 105 individual trees and shrubs, 15 groups of trees (6,740m² total on-site area) and three hedges (175m length).

Two trees of high quality and value (A category) were identified during the survey. These are the two horse chestnut trees (no.s 39 and 40 on the tree survey) located beyond the south-western boundary. Both trees are protected by TPOs.

Forty six individually surveyed trees were assigned to the moderate quality and value category (B category). These include some of the middle-age and early mature silver birch, pear and assorted *Sorbus* species located adjacent to the existing school and adjacent to the southern boundary. Trees in this category also include several early-mature Norway maple and sycamore trees growing in the tree belts on the south and south-western boundaries, as well as some of the large aspen and silver birch trees within these groups that were surveyed individually.

Thirty nine individually surveyed trees were assigned to the low quality and value category (C category). These include younger and smaller trees that are easily replaced, those with significant structural defects and wounding (which nevertheless have a safe useful life expectancy of more than ten years) and trees of poor form, such as multi-stemmed trees or those with strongly leaning stems and very irregular crowns.

Six trees are in a poor condition and require felling because of their condition, irrespective of any development proposal (R category).

Of the 15 groups of trees surveyed, eight were assigned to the moderate quality and value category (B category). These are all groups and belts of young and middle-age mixed broad-leaved trees that have an important role in screening the site. All other groups of trees and shrubs were identified as the low quality and value category (C category). The majority of groups in this category are beds of low and medium-growing mixed ornamental shrubs.

Of the three hedges which were surveyed, two are Leyland cypress hedges that have been identified as being of low quality and value (C category). The other hedge is the mature hedgerow located beyond the northern boundary which been assigned to the moderate quality and value category (B category).

3. IMPACT ASSESSMENT

3.1 The Development Proposal

The layout of the development proposal and proposed levels are shown on the project *Sketch Landscape Masterplan* (AWP drawing no. BP4L_GRE_AWP_DR_94_BW_LL_01 Rev.P14) and this arboricultural impact assessment was based on this proposal and associated plans.

It is proposed to develop the site by improving the school facilities. The main older school building will be demolished although the more recently constructed hall to the west of this position will be retained. A new school building is *proposed for construction to the south of the present school building*. The new building would be accessed by the existing vehicle and pedestrian entrance from Keresforth Hill Road. Car-parking is proposed to the north of the new building and in the south-eastern corner of the site.

New play and sports facilities are proposed for construction to the north of the *proposed school building, including hard courts and a cycle skills area*. The grass sports pitch will be retained at the eastern end of the site and the woodland and scrub at the western end will remain largely undeveloped, although it is proposed to create a habitat trail in one area of woodland.

It is proposed that there will be some re-levelling of the site in order to accommodate the construction of the new building, but this will be relatively limited as the site has been previously levelled.

It is proposed that new water, gas, electricity and telecommunication services will enter the site from Keresforth Hill Road to the south and south-east, although the proposed route this are currently indicative only. It is proposed that excess surface water drainage and foul-water will connect to the existing sewer network at the site access on Keresforth Hill Road.

3.2 Typical Development Impacts

Impacts by trees can be divided into direct and indirect impacts. Direct impacts refer to the removal of trees to facilitate the development and physical damage caused to retained trees during construction works. Indirect impacts refer to future pressures on the trees arising from their location in relation to the proposed use of the site.

Damage can be caused to trees in various ways during construction works. Direct damage to the roots is commonly encountered and is caused by excavation, for example to construct foundations or hardstandings or to install services. Roots are generally most frequent in the upper 600mm of soil, with many encountered

at far shallower depth, and significant root damage can be caused by site soil stripping.

Damage to the soil may be as equally damaging to trees as direct root damage. Compaction is a commonly encountered problem and causes long-lasting damage to the soil. The anaerobic conditions which are often caused by compaction are unsuitable for most plant rooting and may cause tree decline. Compaction soil damage by vehicle movement is most common on, but not restricted to, high clay-content and poorly drained soils. Damage to tree rooting conditions is also caused during hard-standing construction where impermeable construction prevents the infiltration of water and oxygen to the roots.

Direct damage to trees by construction at close distance can be minimised or even eliminated by the adoption of special construction methodologies. These include non-dig permeable hardstanding construction, pile and beam foundation design and non-trenched service installation. All these methodologies require careful design and supervision if they are to be used to minimise impact on trees.

Other common causes of tree damage on construction sites are accidental bark damage or branch breakage by vehicles and plant, fire damage, herbicide damage and soil pollution by cement-based products, diesel, hydraulic oil and other chemicals.

Trees may face indirect impacts where their retention in relation to the development causes a significant nuisance to future users of the site. This may lead to future pressure to fell the trees or prune them heavily in a way that destroys their form and much of their value. Another significant indirect impact is where indirect space has been allowed for the future crown-spread of the tree and BS5837 advises that trees should not be retained on the basis that their crown spread can be controlled by periodic pruning unless this is a desired management outcome. It is also important to allow space for trees to grow and develop without causing significant nuisances such as severe loss of light to adjacent property.

3.3 Arboricultural Impacts

The arboricultural impact of the development proposal was determined by overlaying the *Tree Constraints Plan*, proposed *Sketch Landscape Masterplan* and the existing *Topographical Plan* (Malcolm Hughes Land Surveyors drawing no. 9985/1&2), all in CAD. The *Site Sections*, *Drainage Strategy* and *Service Connection* plans were analysed to identify potential conflicts.

Potential direct impacts were identified where construction is proposed within or close to the RPA of existing trees. The existing and proposed levels were also analysed to identify where level changes in or close to the RPA of existing trees could have an impact.

Potential indirect impacts were identified where construction or activity is proposed within or close to the crown-spread of the trees or within the area of potential shade, which on the *Tree Constraints Plan* is shown as a segment from north-west to east, with radius equivalent to current tree height (in accordance with BS5837:2005). Very few of the trees on the site are mature trees that have grown to their maximum height and account was taken of potential future growth to the potential maximum heights given for each species in Appendix B.

Direct impacts

The proposed development will require the removal of 26 individually assessed trees which lie on the line of the proposed construction works:

- no. 2 - Silver birch (C cat.)
- no. 6 - Hybrid service tree (B cat.)
- no. 7 - Swedish whitebeam (B cat.)
- no. 9 - Sycamore (R cat.)
- no. 10 - Silver birch (C cat.)
- no. 11 - Pear (B cat.)
- no. 12 - Silver birch (C cat.)
- no. 13 - Silver birch (B cat.)
- no. 14 - Silver birch (B cat.)
- no. 15 - Silver birch (C cat.)
- no. 16 - Silver birch (R cat.)
- no. 22 - Norway maple (C cat.)
- no. 24 - Silver birch (C cat.)
- no. 25 - Silver birch (C cat.)
- no. 26 - Silver birch (C cat.)
- no. 80 - Japanese cherry (C cat.)
- no. 86 - Leyland cypress (C cat.)
- no. 87 - Leyland cypress (C cat.)
- no. 94 - Purple crab apple (C cat.)
- no. 95 - Swedish whitebeam (C cat.)
- no. 96 - Hybrid service tree (B cat.)
- no. 114 - Silver birch (B cat.)
- no. 120 - Pear (B cat.)
- no. 121 - Pear (B cat.)
- no. 122 - Horse chestnut (C cat.)
- no. 123 - Manna ash (C cat.)

The proposed development will require the removal of one hedge and five entire groups of trees and/or shrubs and parts of another three groups of trees and shrubs which lie on the line of the proposed construction works or site re-grading:

- no. H1 - Leyland cypress (C cat.)
- no. G8 - Cherry laurel 'Otto Luyken' (C cat.)

no. G97 - Mixed broadleaves (B cat.) (part)
no. G23 - Ornamental shrubs (C cat.)
no. G79 - Mixed broadleaves (B cat.) (part)
no. G88 - Shrub (unknown) (C cat.)
no. G17 - Ornamental shrubs (C cat.)
no. G18 - Ornamental shrubs (C cat.)
no. G19 - Mixed broadleaves (B cat.) (part)

The felling of three trees is also proposed because they are in poor condition and require felling irrespective of any development. These trees are:

no. 91 - Rowan (R cat.)
no. 93 - Purple crab apple (R cat.)
no. 115 - Silver birch (R cat.)

Felling of trees is also recommended as part of the silvicultural thinning of plots numbered G19, G37, G71, G79, G97, G98 and G99 on the tree survey. All these plots have been densely planted and removal of some stems will allow the balanced and stable growth of the remaining trees, as well as promoting the growth of slower-growing trees, such as oak and beech, over faster-growing 'pioneer species', such as willows, aspen and birch.

The development proposal will involve re-grading which will change the ground levels within the RPA of tree no.s 4, 5 and 20 on the tree survey. In all these cases it is considered that the impact of the proposed works can be adequately minimised or mitigated by the adoption of appropriate construction methodologies such as supervision to ensure that non-essential re-grading does not take place within the trees' RPA. It is recommended that an arboricultural method statement is produced to detail the methodologies and procedures that are developed and agreed to afford the protection to these trees (see section 4.5)

All other proposed construction work will take place beyond the RPA of individual trees to be retained and at least 1.0m beyond the canopy spread of groups of trees and shrubs to be retained. It is therefore possible to adequately protect all retained trees from impacts associated with the construction works. There should be no significant impact on the health of the retained trees, subject to their satisfactory protection in line with the recommendations of this report.

Indirect impacts

No significant indirect impacts on trees to be retained have been identified. The proposed layout provides sufficient space for the retention of trees without them becoming a nuisance that prompts their felling or major tree works in the future.

The belt of trees on the south-west of the proposed school building are all relatively young trees that can be expected to grow from their current height of approximately 1-6m to a maximum height which is likely to exceed 18m as the

trees mature. This will undoubtedly create shading to the main school building located to the north-east, but this is not considered to be significant. It should be noted that this group of trees has been planted relatively densely and will benefit from the proposed thinning of the plot.

Impact summary

There is an arboricultural impact associated with the loss of individual trees on the site, but this is low because trees to be felled represent a small proportion of the total number of trees on the site. All the moderate quality trees to be felled are small-growing species or relatively young examples of larger-growing species *and most do not have significant public amenity value. All other trees to be felled are of low or poor quality and value.*

The *Sketch Landscape Masterplan* shows extensive areas of tree planting are proposed, particularly on the site boundaries and at the main entrance to the site. It is considered that the development-proposal will lead to a net increase in the arboricultural resource of the immediate area and an increases in the site's tree-related amenity value.

4. RECOMMENDATIONS

4.1 Arboricultural works

The arboricultural impact and works schedule (Appendix A) contains recommendations for arboricultural works that are necessary to facilitate the development.

Trees to be removed to facilitate the development or because of their condition are shown on the *Sketch Landscape Masterplan* and the *Tree Protection Plan*.

No urgent works are proposed and all the preliminary work recommendations could be postponed for up to 12 months until a development proposal receives planning permission and development commences.

All works should be carried out by experienced arboricultural contractors and should comply with BS3998:1989 '*British Standard Recommendations for Tree Work*'.

Because of the time that has lapsed since the original confirmation (see section 1.3), it is recommended that the presence or absence of TPOs is re-confirmed before any felling or arboricultural works are carried out. If it is proposed to fell trees to facilitate development before full planning permission is gained then the need to obtain a Felling Licence (see section 1.3) should be discussed with the Forestry Commission.

There is an exemption from the above statutory controls on tree felling and pruning for works strictly necessary to implement development that has received full planning permission. It is recommended that no tree felling is carried out until full planning permission has been gained and that trees to be felled are strictly limited to those shown on the *Tree Protection Plan* and listed in this report.

4.2 Tree Protection

It is recommended that all trees and hedgerows on site are protected in accordance with the *Tree Protection Plan*.

Trees to be retained on the site should be protected by protective fencing. This should be erected before any work commences on site, including demolition and preliminary earthworks, and it should remain until all construction has finished.

This fencing should be constructed from 2.4m high Herris-type weld-mesh panels securely attached to a robust timber framework. The framework shall comprise a vertical and horizontal framework posts, well-braced against impact. Vertical posts will be placed at a maximum spacing of 3.0m and driven at least 600mm

into the ground. The *Tree Protection Plan* shows the location and detailing of the proposed fencing.

The area contained by the protective fencing will be referred to as the construction exclusion zone. This zone should protect the RPA and ensure that trees to be retained and their essential rooting zone is not damaged during the works. Within the construction exclusion zone, all damaging operation should be excluded. In particular, the following activities should be prohibited within the zone:

- changes in levels;
- excavation;
- storage of materials
- movement or parking of plant and vehicles;
- siting of site cabins or other temporary buildings;
- mixing of materials and chemicals; and
- disposal of liquids.

In addition to the above no fires should be lit within 20m of the crown of any retained trees.

Utility services and drainage should be planned and routed so they do not pass through the RPA of trees to be retained. Where this is unavoidable, the impact should be assessed and measures taken to reduce the impact. Measures and procedures to be utilised should comply with BS5837:2005 and '*NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*' (NJUG, 2007) and should be detailed in an arboricultural method statement.

4.3 Protected Species

Trees on the site may be used for nesting by birds during the spring and summer. Nesting birds and their nests are legally protected and wherever possible the felling or pruning trees should be avoided between 1 March to 30 August to avoid an impact on nesting birds. Where it is necessary to carry out the work during this period then advice should be sought from a suitably qualified Ecologist.

Trees may be used by bats for roosting, and both bats and their roosts are legally protected. Bat roosts within trees are usually associated with features such as cavities, cracks, loose bark and dense ivy.

It is understood that ecology surveys will be commissioned at a later date and it is recommended that the Ecologist considers the bat roosting potential of all trees proposed for felling or pruning, in advance of this work taking place.

4.4 Replacement planting

The *Sketch Landscape Masterplan* shows extensive tree planting on the site, which will mitigate the proposed tree loss and lead to an enhancement of the site's amenity value.

The detailed landscape proposals have not yet been developed, but it is recommended that the proposed tree planting incorporates the use of a significant proportion of large-growing trees such as appropriate species of oak, ash, lime, maple and beech wherever space and design objectives allow. Such trees generally provide greater public amenity value.

It is recommended that native broadleaved species predominate in the tree planting scheme as they generally have higher biodiversity value. However limited planting with conifers, such as pine and larch, may also be appropriate to provide visual interest and smaller-growing broadleaved ornamental trees may also be appropriate, especially within more formally landscaped areas close to the proposed school building. Planting of fruit trees on vigorous large-growing root-stocks will also be appropriate, particularly in the vicinity of the horticultural area to the west of the proposed school building.

4.5 Further details

The arboricultural impact and works schedule (Appendix A) recommends the development and adoption of an arboricultural method statement where construction works are proposed within the RPA of trees to be retained (see section 3.3). This method statement should relate in particular to the proposed re-grading works and should detail procedures and methods which are developed and agreed to protect trees and their rooting environment during the construction and demolition works.

5. REFERENCES

Reports, books and standards

BSi. 1989. *BS 3998:1989 British Standard Recommendations for Tree Work*. British Standards Institute.

BSi. 2005. *BS5837:2005. Trees in Relation to Construction – Recommendations*. British Standards Institute.

DETR. 2000. *Tree Preservation Orders: a Guide to the Law and Good Practice*. Department of the Environment, Transport and the Regions.

DCLG. 2008. *Tree Preservation Orders: a Guide to the Law and Good Practice. Addendum – September 2008*. Department of Communities and Local Government.

FC. 2005. *Tree Felling – Getting Permission*. Forestry Commission leaflet.

Greengage. 2009. *Greenacres School, Barnsley – Tree Survey Report*. Greengage Arboriculture & Ecology. Report for Barnsley Partnership for Learning (Laing O'Rourke).

More, D. and White, J. 2003. *Cassell's Trees of Britain and Northern Europe*. Cassell, London.

NHBC. 2006. *Chapter 4.2. Building Near Trees*. National House Building Council.

NJUG. 2007. *Volume 4 - NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*. Issue 2. National Joint Utilities Group. www.njug.org.uk

Plans and drawings

Barnsley Building Schools for the Future Phase 2 – Greenacre School – Tree Constraints Plan. Greengage Arboriculture & Ecology drawing no. 011-03-1-4

Barnsley BSF – Greenacre SEN School - Topographical Survey Plan. Anthony Walker and Partners drawing no. BP4L_GRE_AWP_DR_94_BW_LL_03

Barnsley BSF - Greenacre SEN School – Sketch Landscape Masterplan. Anthony Walker and Partners drawing no. BP4L_GRE_AWP_DR_94_BW_LL_01 Rev.P14

Barnsley BSF – Greenacre SEN School – Tree Protection Drawing. Anthony Walker and Partners drawing no. BP4L_GRE_AWP_DR_94_BW_LL_04 Rev.P02

Barnsley BSF – Greenacres SEN School – Site Sections. Anthony Walker and Partners drawing no. BP4L_GRE_AWP_DR_94_BW_LL_05 Rev.P02

Greenacre Service Connections. No drawing no.

Greenacre SEN – Drainage Strategy. BDP drawing no. BP4L_SPR_BDP_DR_93_BW_LL_001 Rev.P02

APPENDIX A – ARBORICULTURAL IMPACT AND WORKS SCHEDULE

Appendix A. Arboricultural Impact and Works Schedule

No.	Species	Age class	Category grade	RPA radius (m)	RPA area (m ²)	Impact	Facilitative arboricultural works
H1	Leyland cypress	MA	C ₂₃	CS	CS	Hedge forms boundary of care-takers house, to be removed.	Remove hedge for landscaping reasons.
2	Silver birch	EM	C ₁₃	2.90	26	Tree located in area proposed for re-grading with an increase in levels.	Fell tree to facilitate development.
3	Silver birch	EM	C ₁₃	2.76	24	None	No action
4	Silver birch	EM	C ₁₃	3.84	46	Part of RPA located in area proposed for re-grading with a proposed decrease in levels. Recommend arboricultural method statement to consider retention of existing levels within RPA.	No action
5	Silver birch	EM	B ₁	3.84	46	Part of RPA located in area proposed for re-grading with a proposed decrease in levels. Recommend arboricultural method statement to consider retention of existing levels within RPA.	No action
6	Hybrid service tree	EM	B ₁	4.08	52	Tree stem located on edge of proposed cycle tarmac path	Fell tree to facilitate development.
7	Swedish whitebeam	EM	B ₁	3.72	43	Tree located within area of proposed school building.	Fell tree to facilitate development.
G8	Cherry laurel 'Otto Luyken'	M	C ₂₃	CS	CS	Shrub located within area of proposed school building.	Remove shrub to facilitate development.

No.	Species	Age class	Category grade	RPA radius (m)	RPA area (m ²)	Impact	Facilitative arboricultural works
9	Sycamore	Y	R	1.80	10	Tree stem located within area of proposed tarmac pedestrian access immediately adjacent to proposed school building.	Fell tree to facilitate development.
10	Silver birch	EM	C ₁₃	2.64	22	Tree located within area of proposed school building.	Fell tree to facilitate development.
11	Pear	EM	B ₁	3.24	33	Tree located within area of proposed school building.	Fell tree to facilitate development.
12	Silver birch	MA	C ₁₃	2.04	13	Tree located within area of proposed school building.	Fell tree to facilitate development.
13	Silver birch	EM	B ₁	3.36	35	Tree located within area of proposed school building.	Fell tree to facilitate development.
14	Silver birch	EM	B ₁	2.40	18	Tree located within area of proposed school building.	Fell tree to facilitate development.
15	Silver birch	MA	C ₁₃	2.04	13	Tree located within area of proposed school building.	Fell tree to facilitate development.
16	Silver birch	MA	R	1.20	5	Tree located within area of proposed school building.	Fell tree of poor condition to facilitate development.
G17	Ornamental shrubs	EM	C ₂₃	CS	CS	Ornamental shrub bed located within area of proposed school building.	Remove shrubs to facilitate development.
G18	Ornamental shrubs	EM	C ₂₃	CS	CS	Ornamental shrub bed located within area of proposed school building.	Remove shrubs to facilitate development.
G19	Mixed broadleaves	MA	B ₂	CS	CS	Eastern end of plot located within area of proposed school building and associated re-grading and pedestrian tarmac access.	Remove trees and shrubs in part of group (as shown on <i>Tree Protection Plan</i>) to facilitate development. Thin retained plot by 33%. Select oak and beech for retention and promotion.

No.	Species	Age class	Category grade	RPA radius (m)	RPA area (m ²)	Impact	Facilitative arboricultural works
20	Norway maple	EM	B ₁	4.56	65	Small part of RPA located in area to be re-graded with a proposed change in levels. Recommend method statement to consider retention of existing levels within RPA.	No action
21	Norway maple	MA	B ₁	3.60	41	None	No action
22	Norway maple	MA	C ₁₃	2.88	26	Tree located in area to be re-graded, with a proposed change in levels.	Fell tree to facilitate development.
G23	Ornamental shrubs	MA	C ₂₃	CS	CS	Ornamental shrub bed located in proposed life skills garden.	Remove shrubs for landscaping reasons.
24	Silver birch	Y	C ₂₃	0.60	1	Tree located in proposed life skills garden.	Fell tree for landscaping reasons
25	Silver birch	Y	C ₂₃	0.96	3	Tree located in proposed life skills garden.	Fell tree for landscaping reasons
26	Silver birch	Y	C ₂₃	0.60	1	Tree located in proposed life skills garden.	Fell tree for landscaping reasons
G27	Ornamental shrubs	EM	C ₂₃	CS	CS	None	No action
H28	Leyland cypress	Y	C ₂₃	CS	CS	None	Continue to trim annually
29	Silver birch	Y	C ₂₃	1.20	5	None	Prune tree to reduce crown-spread 0.5m beyond kerb-line
30	Silver birch	Y	C ₂₃	0.96	3	None	No action
31	Silver birch	Y	C ₂₃	1.20	5	None	Prune tree to reduce crown-spread 0.5m beyond kerb-line
32	Silver birch	Y	C ₂₃	1.32	5	None	No action
33	Silver birch	Y	C ₂₃	0.96	3	None	No action
G34	Silver birch & white dogwood	Y/MA	C ₂₃	CS	CS	None	No action

No.	Species	Age class	Category grade	RPA radius (m)	RPA area (m ²)	Impact	Facilitative arboricultural works
35	Norway maple	EM	B ₁	4.08	52	None	No action
36	Norway maple	EM	B ₁	3.96	49	None	No action
G37	Mixed broadleaves	MA	B ₂	CS	CS	None	Thin plot by 33%. Select oak and beech for retention and promotion.
G38	Ash & sycamore	EM	B ₂	CS	CS	None	Remove poor multi-stemmed ash with canker and multi-stemmed sycamore adjacent to utilities cabinet. Remove 3 additional stems to thin densely-growing group.
39	Horse chestnut	M	A ₁	9.60	290	None	No action
40	Horse chestnut	M	A ₁	9.60	290	None	No action
41	Silver birch	EM	C ₂₃	3.36	35	None	No action
42	Osier	EM	C ₂₃	3.00	28	None	No action
43	Aspen	M	C ₂₃	3.12	31	None	No action
44	Osier	EM	C ₂₃	3.00	28	None	No action
45	Aspen	EM	B ₂	2.40	18	None	No action
46	Aspen	MA	C ₂₃	1.32	5	None	No action
47	Aspen	MA	C ₂₃	1.56	8	None	No action
48	Aspen	MA	C ₂₃	1.56	8	None	No action
49	Aspen	MA	B ₂	1.92	12	None	No action
50	Aspen	MA	B ₂	2.04	13	None	No action
51	Aspen	MA	B ₂	2.28	16	None	No action
52	Aspen	MA	B ₂	2.28	16	None	No action
53	Aspen	MA	B ₂	1.92	12	None	No action
54	Aspen	MA	C ₂₃	1.08	4	None	No action
55	Aspen	MA	B ₂	1.92	12	None	No action
56	Aspen	MA	B ₂	1.92	12	None	No action
57	Aspen	MA	C ₂₃	1.44	7	None	No action
58	Aspen	MA	C ₂₃	1.56	8	None	No action
59	Aspen	MA	B ₂	1.80	10	None	No action
60	Aspen	MA	B ₂	1.92	12	None	No action

No.	Species	Age class	Category grade	RPA radius (m)	RPA area (m ²)	Impact	Facilitative arboricultural works
61	Silver birch	MA	C ₂₃	1.20	5	None	No action
62	Silver birch	MA	C ₂₃	1.44	7	None	No action
63	Silver birch	MA	C ₂₃	1.32	5	None	No action
64	Silver birch	MA	C ₂₃	1.20	5	None	No action
65	Silver birch	MA	C ₂₃	1.32	5	None	No action
66	Norway maple	EM	B ₁	3.96	49	None	No action
67	Sycamore	EM	B ₁	3.48	38	None	No action
68	Aspen	MA	B ₂	2.64	22	None	No action
69	Aspen	MA	B ₂	2.28	16	None	No action
70	Aspen	MA	C ₂₃	2.76	24	None	No action
G71	Mixed broadleaves	MA	B ₂	CS	CS	None	Thin plot by 33%. Select ash for retention and promotion.
72	Aspen	MA	C ₂₃	2.40	18	None	No action
73	Aspen	MA	B ₂	2.04	13	None	No action
74	Wild cherry	MA	C ₂₃	1.20	5	None	No action
75	Sycamore	MA	B ₁	3.00	28	None	No action
76	Aspen	MA	B ₂	1.80	10	None	No action
77	Aspen	MA	B ₂	1.92	12	None	No action
78	Aspen	MA	C ₂₃	1.56	8	None	No action
G79	Mixed broadleaves	MA	B ₂	CS	CS	Plot to be partially cleared to create habitat trail.	Remove trees and shrubs in part of group (as shown on Tree Protection Plan) to facilitate development. Thin remaining plot by 33%. Select oak and ash for retention and promotion.
80	Japanese cherry	Y	C ₁₃	0.72	2	Tree located in proposed car-parking bay.	Fell tree to facilitate development.
H81	Hawthorn, elder and sycamore	M	B ₂	3.00	28	None	No action
82	Swedish whitebeam	EM	B ₁	3.72	43	None	No action
83	Swedish whitebeam	EM	C ₁₃	3.36	35	None	No action

No.	Species	Age class	Category grade	RPA radius (m)	RPA area (m ²)	Impact	Facilitative arboricultural works
84	Stump	NA	R			Stump located in proposed hard games court.	Remove stump
85	Stump	NA	R			Stump located in proposed hard games court.	Remove stump
86	Leyland cypress	MA	C ₁₃	3.12	31	Tree located in proposed hard games court.	Fell tree to facilitate development.
87	Leyland cypress	MA	C ₁₃	2.16	15	Tree located in proposed hard games court.	Fell tree to facilitate development.
G88	Shrub (unknown)	MA	C ₂₃	CS	CS	Shrub located in proposed hard games court.	Remove shrub to facilitate development.
89	Stump	NA	R			Stump located in proposed hard games court.	Remove stump
90	Small-leaved lime	MA	C ₁₃	2.88	26	None	No action
91	Rowan	EM	R	1.92	12	None	Fell tree in poor condition
92	Common lime	MA	B ₁	4.68	69	Proposed pedestrian tarmac path to be constructed in RPA, but beyond existing concrete path. Minimal impact envisaged. Recommend that appropriate construction methodology is agreed and included in arboricultural method statement.	No action
93	Purple crab apple	MA	R	1.20	5	None	Fell tree in poor condition
94	Purple crab apple	MA	C ₁₃	1.56	8	Tree located in proposed pedestrian tarmac path.	Fell tree to facilitate development.
95	Swedish whitebeam	MA	C ₁₃	3.72	43	Tree located in proposed car-parking bay.	Fell tree to facilitate development.
96	Hybrid service tree	EM	B ₁	3.24	33	Tree located in proposed vehicular tarmac area	Fell tree to facilitate development.

No.	Species	Age class	Category grade	RPA radius (m)	RPA area (m ²)	Impact	Facilitative arboricultural works
G97	Mixed broadleaves	MA	B ₂	CS	CS	Plot contains area to be re-graded to create car-parking.	Remove trees and shrubs in part of group (as shown on <i>Tree Protection Plan</i>) to facilitate development. Thin plot by 20%. Select and promote non-willows for retention to diversify plot.
G98	Mixed broadleaves	MA	B ₂	CS	CS	None	Thin plot by 20%. Select and promote non-willows for retention to diversify plot.
G99	Mixed broadleaves	Y	B ₂	CS	CS	None	Thin plot by 20%. Select and promote non-willows for retention to diversify plot.
100	Silver birch	EM	B ₂	2.64	22	None	No action
101	Smooth-leaved elm	MA	C ₂₃	3.68	42	None	No action
102	Smooth-leaved elm	MA	C ₂₃	2.55	20	None	No action
103	Smooth-leaved elm	MA	C ₂₃	2.12	14	None	No action
104	Smooth-leaved elm	MA	C ₂₃	1.80	10	None	No action
105	Silver birch	EM	B ₂	2.40	18	None	No action
106	Smooth-leaved elm	MA	C ₂₃	2.28	16	None	No action
107	Pear	EM	B ₁	3.12	31	None	Cut rootstock shoots at base.
108	Pear	EM	B ₁	4.20	55	None	Cut rootstock shoots at base.
109	Pear	EM	B ₁	3.36	35	None	Cut rootstock shoots at base.
110	Swedish whitebeam	EM	B ₁	3.96	49	None	No action
111	Hybrid service tree	EM	B ₁	3.24	33	None	No action
112	Swedish whitebeam	EM	B ₁	4.08	52	None	No action
113	Silver birch	EM	B ₁	3.12	31	None	No action

No.	Species	Age class	Category grade	RPA radius (m)	RPA area (m ²)	Impact	Facilitative arboricultural works
114	Silver birch	EM	B ₁	3.12	31	Tree located in proposed car-parking bay.	Fell tree to facilitate development.
115	Silver birch	MA	R	1.32	5	None	Fell tree in poor condition.
116	Silver birch	EM	B ₁	3.12	31	None	No action
117	Hybrid service tree	EM	B ₁	3.96	49	None	No action
118	Silver birch	EM	C ₁₃	2.63	22	None	No action
119	Hybrid service tree	EM	B ₁	3.72	43	None	No action
120	Pear	EM	B ₁	3.60	41	Tree located in proposed vehicular tarmac area	Fell tree to facilitate development.
121	Pear	EM	B ₁	6.36	127	Tree located in area of proposed feature paving.	Fell tree to facilitate development.
122	Horse chestnut	MA	C ₁₃	1.80	10	Tree located close to proposed school building with significant construction in RPA.	Fell tree to facilitate development.
123	Manna ash	MA	C ₁₃	2.88	26	Tree located within area of proposed school building.	Fell tree to facilitate development.

Key: Y – young MA – Middle-age EM – early mature Mat – mature CS – crown spread

APPENDIX B – SPECIES LIST AND POTENTIAL TREE HEIGHT

Appendix B. Potential ultimate height for tree and large shrub species and cultivars on the survey site

Species	Common name	Potential mature tree height (m)		
		Estimated for site*	UK (NHBC, 2006)**	UK (More & White, 2003)***
<i>Acer campestre</i>	Field maple	12		14
<i>Acer platanoides</i>	Norway maple	22	18	25
<i>Acer pseudoplatanus</i>	Sycamore	28	22	35
<i>Aesculus hippocastanum</i>	Horse chestnut	28	20	36
<i>Alnus glutinosa</i>	Alder	20	18	25
<i>Alnus incana</i>	Grey alder	18		22
<i>Betula pendula</i>	Silver birch	18	14	25
<i>Chamaecyparis lawsoniana</i>	Lawson cypress	25	18	40
<i>Cornus alba</i>	White dogwood	4		
<i>Corylus avellana</i>	Hazel	12	8	15
<i>Crataegus monogyna</i>	Hawthorn	12	10	15
<i>X Cupressocyparis leylandii</i>	Leyland cypress	25	20	40
<i>Fagus sylvatica</i>	Beech	28	20	35
<i>Fraxinus excelsior</i>	Ash	25	23	30
<i>Fraxinus ornus</i>	Manna ash	12		16
<i>Malus x purpurea</i>	Purple crab-apple	7		7
<i>Populus tremula</i>	Aspen	18		25
<i>Prunus avium</i>	Wild cherry	18	17	25
<i>Prunus laurocerasus</i>	Cherry laurel	6	8	6
<i>Prunus serrulata</i>	Japanese cherry	9	9	<12
<i>Pyrus communis</i>	Pear	12	12	≤15
<i>Quercus petraea</i>	Sessile oak	28		30
<i>Quercus robur</i>	English oak	25	20	25
<i>Rosa canina</i>	Dog rose	6		
<i>Salix caprea</i>	Goat willow	10		10
<i>Salix cinerea</i>	Grey willow	7		7
<i>Salix viminalis</i>	Osier	7		
<i>Sambucus nigra</i>	Elder	6	10	
<i>Sorbus aucuparia</i>	Rowan	12	11	15
<i>Sorbus intermedia</i>	Swedish whitebeam	12		15
<i>Sorbus x thuringiaca</i> 'Fastigiata'	Hybrid service tree	10		10
<i>Tilia cordata</i>	Small-leaved lime	22	22	25
<i>Tilia x europaea</i>	Common lime	28	22	40
<i>Ulmus minor</i>	Smooth-leaved elm	15		30
<i>Viburnum opulus</i>	Guelder rose	4		

* - Maximum height of trees and shrubs growing under similar conditions in the local area. Estimate takes account of site exposure and ground conditions.

** - Average height attained by healthy trees growing in favourable ground and environmental conditions.

** - Height generally attained by healthy open-grown trees growing in their appropriate conditions and climatic range.