Replacement Tree Planting

(as recommended in the Arboricultural Impact Assessment & Construction Method Statement – Feb 2016)

Planting area

The new development will provide an area to the side of the hotel, adjacent to St Johns Road, for tree planting. The proposed area is 18m x 2.5-3.0m (increasing to 3.0-3.5m width if the proposed hedging area is included and 4.0-4.5m if the soil under the pavement is taken into consideration). Soil volume and rooting area considerations will be based on the dedicated area of 18 x 2.5-3.0m only.

Given that a significant part of this area will be excavated as part of the development, scope exists to ensure that eventual soil conditions are favourable in terms of:

- non compaction
- drainage
- ideal pH value (6.5-7.0) – via reduction of alkalinity (the existing soil has been assessed as 7.3 in this area)
- suitable moisture content (either by manual grey-watering or drip irrigation systems if necessary)
- sufficient root aeration via permeable tubes (which can additionally facilitate water & fertiliser delivery)

Landscape ambitions

Planting trees that:

- are naturally narrow in form rather than columnar or fastigiate variants
- are suited in eventual mature height and crown to site constraints, which include proximity to the new building and provision of sufficient light to habitable (bed)rooms , thus ensuring their longevity, without the need for future pollarding, etc
- are proven to reliably perform in UK growing conditions (eg AGM recognition)
- collectively provide year round interest
- provide recognised benefits for wildlife such as early spring pollen and nectar
- are semi-mature (as defined by BS 3936-1), in order to provide greater immediate amenity
- reduce the over-reliance on particular species in a population as recommended by BS 8545:2014 (Annex C.3 Existing tree population of the landscape into which young trees are planted)

Eventual mature height and crown spread are the key factors. The gap between the proposed north elevation and the site boundary on St Johns Road is 6m appx. Assuming new rootball planting is at the midpoint of the 2.5m width (leaving a spacing of 0.65m either side), the gap between the tree trunks and the north elevation will reduce to 4.15m once the trees reach 50cm girth.

South Derbyshire County Council will only consider pruning trees that are blocking daylight when the separation between the tree trunk and the window of the nearest habitable room (bedroom) is:

- less than 6m for trees with a height of over 12m, or
- less than half the height of the tree for smaller trees

Assuming 4.15m separation, a mature tree ht of 8.3m would be deemed acceptable – rising to 10m (given the lightly leaved canopies). Furthermore, it is felt that first tree can be to be taller (up to 15m) as it would be planted at the NE corner of the building, and only marginally encroach on the first set of windows on the north elevation (these windows are 2m from the start of the elevation). Regarding crown spread, 4-6m is considered appropriate, based on four suitably spaced trees.

Such height and crown restrictions rule out many species (see following RHS Guidance regarding size - Trees and shrubs: native to the UK).

Royal Horticultural Society
Sharing the best in Gardening

Trees and shrubs: native to the UK

With so many trees and shrubs for gardeners to choose from, it can be useful to know which ones are native to the UK. These range from obscure rarities to familiar favourites.

Quick facts

Recommended native trees for gardens;

Acer campestre (field maple)
Betula pendula (silver birch)
Corylus avellana (hazel)
Ilex aquifolium (holly)
Sorbus aucuparia (rowan)

Introduction

It is widely accepted that ‘native’ trees and shrubs are those species that have occurred naturally in the UK since the last Ice Age. The more recent introductions that have established themselves in the wild are referred to as ‘naturalised’ or ‘archeophytes’.

Not all British native trees and shrubs have the ornamental properties required for garden use. Others may grow too large to be considered appropriate for the average-sized garden – take English oak (*Quercus robur*) or common aspen (*Populus tremula*), for example, both of which can reach over 20m (70ft).

However, native trees and shrubs have a place in UK gardens and some are familiar favourites either as full blown trees or clipped plants; e.g. box (*Buxus sempervirens*), English yew (*Taxus baccata*), holly (*Ilex aquifolium*), hornbeam (*Carpinus betulus*), beech (*Fagus sylvatica*), Scots pine (*Pinus sylvestris*) and silver birch (*Betula pendula*).

Others are particularly useful in larger gardens, especially those backing onto British countryside where obviously exotic trees would look out of place. While some lend themselves to coppicing – hazel (*Corylus avellana*) and many willow species (*Salix*) – or are important species in mixed native hedging; hawthorn (*Crataegus monogyna*), blackthorn *(Prunus spinosa*) and elder (*Sambucus nigra*).

Practical considerations

This list is a guide for gardeners. If planting outside of gardens for conservation use, seek professional advice regarding choice of species and provenance.

Suitable plants

This list comprises trees and shrubs native to the Britain and Ireland. It excludes natural hybrids and non-native species that have naturalised (see section below).

Large Trees 25m (80ft) or over at maturity

Alnus glutinosa (alder): 25m, good on wet soils
Betula pendula AGM (silver birch): 25m, attractive white bark
Carpinus betulus AGM (hornbeam): 25m, good for hedging
Fagus sylvatica AGM (beech): 25m, good for hedging and chalky soils
Fraxinus excelsior AGM (ash): 30m, prefers alkaline soils, seeds freely
Ilex aquifolium AGM (holly): 25m, evergreen, attractive berries on female forms
Pinus sylvestris AGM (Scots pine) (native in Scotland only): 30m, evergreen, good specimen tree
Populus nigra subsp. *betulifolia* AGM (native black poplar): 35m, pollution-tolerant
Quercus petraea AGM (sessile oak): 30m, good specimen tree, lime-tolerant
Quercus robur AGM (English oak): 35m, good specimen tree, lime-tolerant
Salix alba (white willow): 25m, very fast-growing
Salix fragilis (crack willow): 25m, coarse tree for damp areas
Tilia cordata AGM (small-leaved lime): 25m, prefers chalky soil
Tilia platyphyllos (large-leaved lime): 30m, prefers chalky soil
Ulmus glabra (wych elm):35m, susceptible to Dutch elm disease
Ulmus minor (small-leaved elm): 30m, susceptible to Dutch elm disease, not readily available
Ulmus plotii (Plot's elm): 30m, susceptible to Dutch elm disease, not readily available
Ulmus procera (English elm): 40m, susceptible to Dutch elm disease

Medium Trees between 10-20m (25-70ft) at maturity

Betula pubescens (downy birch): 20m, tolerates poor or wet, acid soil
Crataegus monogyna (hawthorn): 10m, good as hedging, attractive berries
Populus tremula AGM (aspen): 20m, tolerant of most soils
Prunus avium AGM (wild cherry): 20m, attractive flowers and fruits
Prunus padus (bird cherry): 15m, autumn colour, fragrant flowers
*Salix ca*prea (goat willow): 10m, yellow catkins on male trees
Salix pentandra (bay willow): 10m, showy catkins on male trees
Salix triandra (almond willow): 10m, long catkins on male trees
Sorbus aria (whitebeam): 20m, attractive berries, good on chalk
Sorbus aucuparia (rowan): 15m, attractive berries and autumn foliage
Sorbus bristoliensis: 10m, woolly leaf undersides, orange fruits
Sorbus devoniensis: 15m, medium-sized brown berries
Sorbus domestica (service tree): 20m, pollution-tolerant, best on acid soils
Sorbus subcuneata: 10m, large, brown berries, not readily available
Sorbus torminalis (wild service tree): 20m, attractive autumn colour
Taxus baccata AGM (yew): 15m, evergreen, pollution- and wind-tolerant

Replacement planting

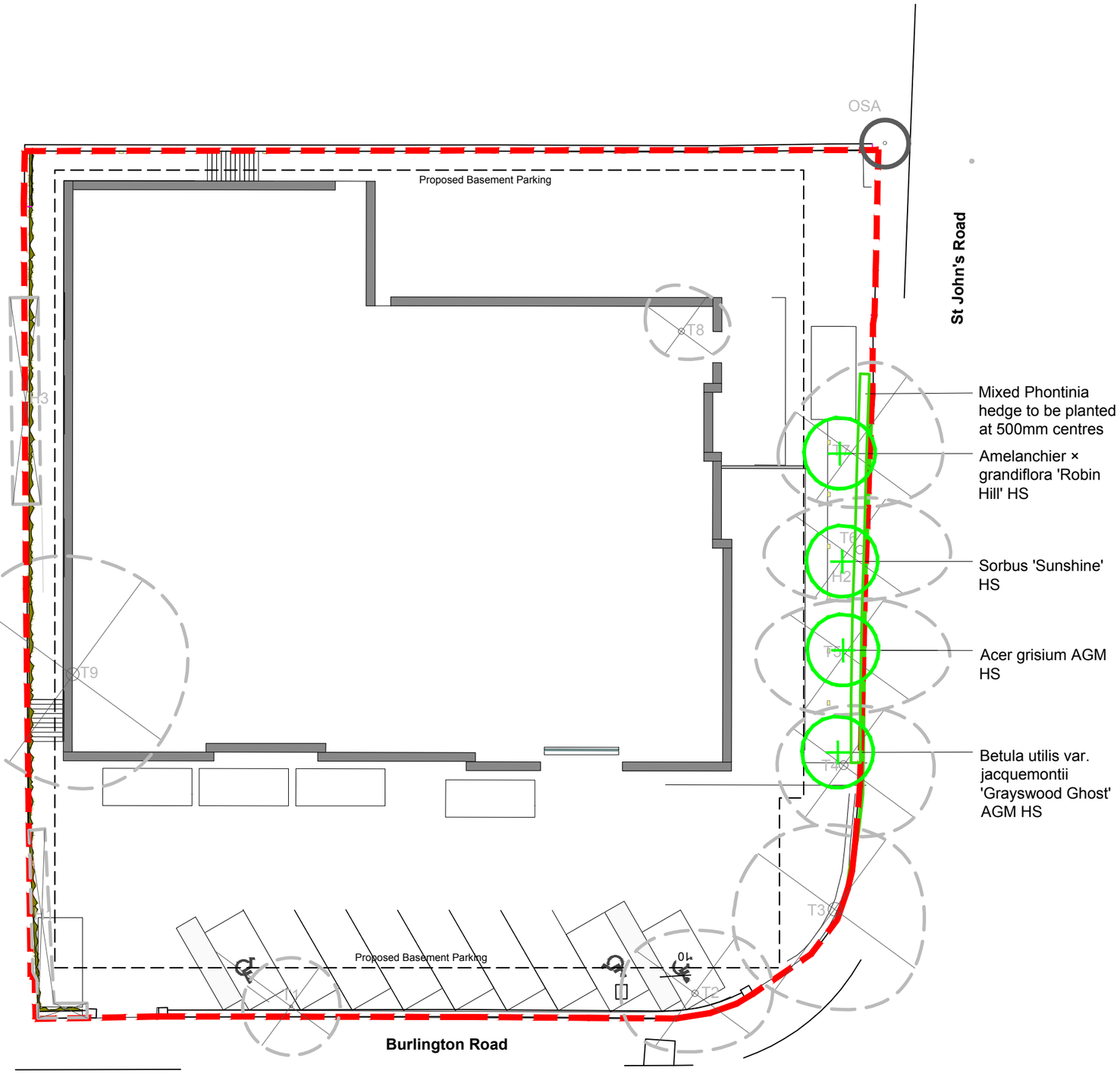
The following pages comprise:

- replacement tree planting drawing (as included in the Arboricultural Impact Assessment) – page 5
- details and benefits of the replacement planting – page 6
- rooting area considerations – page 7

Species selection: supplementary notes

Sorbus ‘Sunshine’ has been preferred to *Sorbus* ‘Joseph Rock’ based on the advice contained in Hillier’s Designer Guide who recommend ‘Sunshine’ given Joseph Rock’s susceptibility to fireblight. Additionally, its berry production is more prolific.

Photinia davidiana, Photinia 'Redstart' and *Photinia davidiana* var. *undulata* 'Fructu Luteo' have been chosen instead of *Photinia* × *fraseri* 'Red Robin' AGM as they are less prone to leaf thinning.



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0 5 10 15 20 25

KEY

Proposed Heavy Standard Tree

Site Boundary

OUTLINE SPECIFICATION:

GENERAL
All works to be in accordance all relevant British Standards and the Landscape Consultant's planting plans and specification (to be issued) and in compliance with the National Landscape Specification (NBS) 1998, latest revision.

SETTING OUT
All dimensions and levels should be checked and adjusted on site. Contractor responsible for care around all services. Do not scale from this drawing.

SITE PREPARATION
Building rubble in excess of 50mm dimension to be removed, compaction ripped 150mm deep or broken out by JCB back-actor leaving surface rough. Ensure free drainage.

TOPSOIL
General purpose Grade topsoil BS:3882 medium loam, not more than slightly stoney, pH 5.7-7.5.
Depth 450mm all planting areas. 150mm to all other areas.
1 litre sample of topsoil should be sent to Weddles office for pH testing and approval.

TREE PIT
Heavy Standard 1200mmØ x 750mm depth

PREPARATORY HERBICIDE
Weed allowed to grow and treated with up to three applications glyphosate prior to cultivation or planting during the fallow period.

PLANTS
General
Plant material in accordance with the HTA's National Plant Specification 1997. All plants container grown, well formed and free from disease. Plant handling to CPSE Plant Handling Code.

Quality as supplied by:
Johnsons of Whixley Ltd, York YO26 8AQ. Tel: 01423 330234.
Or other nursery listed in the Horticultural Trades Association Nursery Certification Scheme.

Planting
Plant November to March.
Planting areas cultivated 150 mm deep and stone picked of material greater than 50mm. Plant material pit planted 300 x 300 x 200 minimum. Approved planting compost incorporated into the soil during planting.

Backfill mix	Enmag	P4	Compost
Shrubs	35g	5g	10 litres
Heavy Standard	75g	50g	75 litres

Backfill mix (30%) incorporated into topsoil (70%) during planting.

TREE STAKING
Heavy Standard -Short Double Staking
Preserved softwood 100mm min diameter. Driven vertically 450mm into base of pit on either side. Cross bar - timber, as stake.Secured with rubber J Tom's 37.5mm wide standard nylon reinforced rubberbelt ref L2 ties including rubber spacer pads ref L1.

MULCH
Total cover coarse bark mulch to shrub areas, Melcourt Bark Nuggets 75mm deep.

AFTERCARE
24 months aftercare by planting contractor. Including grass cutting, weed, pest and disease control, pruning and watering.

Weed control by residual herbicide to a weed free condition around plants. Spot treat with glyphosate and hand weed as nesessary.

Watering 10 litres per plant in periods of drought.

DEFECTS LIABILITY
Twenty-four months on plant material and grass. Replacements in November in year of loss.

ONGOING MAINTENANCE
Continue to maintain for five years from completion of planting by hand weeding and spot treatment of glyphosate herbicide to any weed in planted areas until plants close canopies. Replace failures for 5 years.

Based on Topographic Survey drawing no. 6983-A1 rec'd 16/07/2012

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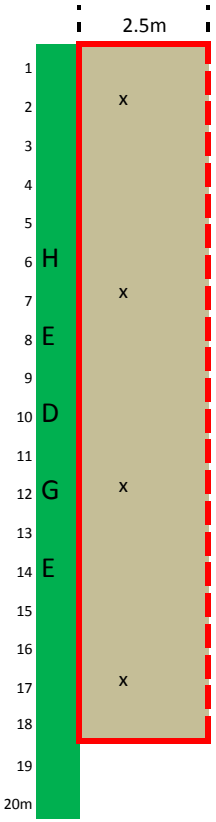
Job BUCKINGHAM HOTEL, BUXTON

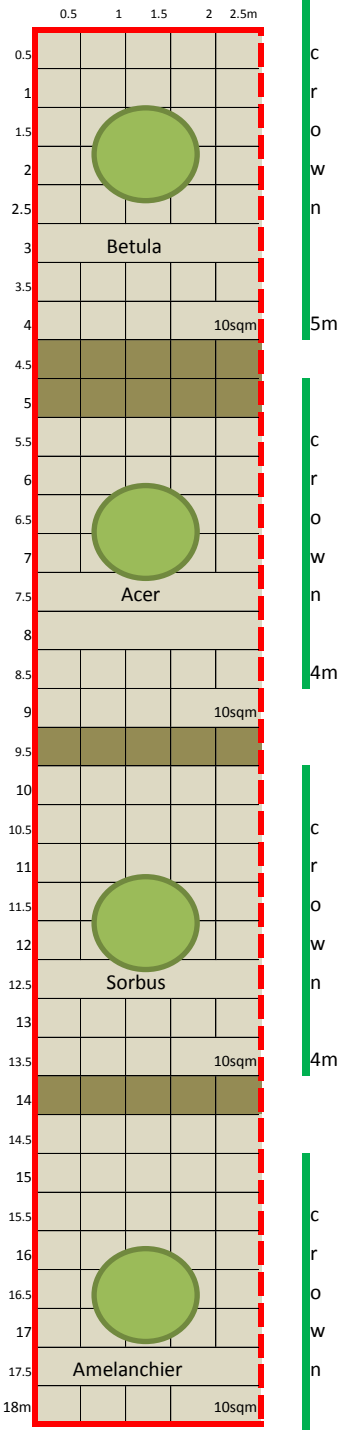
Title REPLACEMENT TREE PLANTING

scale@A3	drawn	date	job number	number	revision
1:250	GG	FEB 16	580	BHB 03	-

Replacement Tree Planting: details and benefits



TREES (4 x deciduous)		Planting DBH	Mature Size ht	Mature Size spread	Crown	Interest: Spring	Interest: Summer	Interest: Autumn	Interest: Winter	Soil pH	Wildlife Value: pollen	Wildlife Value: nectar	Wildlife Value: other
1 ***Betula utilis var. jacquemontii* 'Grayswood Ghost' AGM** (MS) Himalayan birch 'Grayswood Ghost'	H6	40cm+	15m	4-8m	oval/conical	stem catkins	stem	stem leaf colour	stem	any	yes	-	food & habitat for 300+ insects
2 ***Acer griseum* AGM** (MS) paperbark maple	H5	25cm+	8-12m	4m+	vase/oval/upright	stem flowers	stem	stem winged fruit leaf colour	stem	any	yes	rare (may)	
3 ***Sorbus* 'Sunshine'** Yellow Berried Rowan	H6	25cm+	8-10m	4m+	oval/round/upright	flowers		berries leaf colour	berries	6.5-7.0	yes	yes (spring)	birds
4 ***Amelanchier × grandiflora* 'Robin Hill' AGM** (MS) Juneberry	H6	25cm+	6-10m	4m +	oval/round/upright	flowers leaf colour	berries	leaf colour		6.5-7.0	yes	yes (spring)	birds
HEDGING (evergreen) Any of the below (or mixed)													
Photinia davidiana	H4					flowers leaf colour		berries leaf colour	berries leaf colour	6.5-7.0	yes	yes (spring)	insects
***Photinia* 'Redstart'**	H4					flowers leaf colour		berries leaf colour	berries leaf colour	6.5-7.0	yes	yes (spring)	insects
***Photinia davidiana* var. *undulata* 'Fructu Luteo'**	H4					flowers leaf colour		berries leaf colour	berries leaf colour	6.5-7.0	yes	yes (spring)	insects



Replacement Tree Planting: rooting area considerations

The illustration shows the proposed rootball planting locations of the four trees in the available planting area (18 x 2.5m)

The rootball size for all four trees is shown as 1.2m diameter (0.8m rootball ht), which is the accepted measure for semi-mature trees of 45-50cm girth. Of the four trees, only the first (Betula utilis var. jacquemontii 'Grayswood Ghost' AGM) is proposed as having a 40cm+ girth at planting. The reminder are proposed at 25cm+ and in all likelihood will not exceed 35cm, which equates to a rootball size of 0.9m.

The RHS recommendation for rootball trees is that their planting holes are up to three times the diameter of the root system. This is in terms of overall available soil area and doesn't require the rooting area to evenly distributed around the rootball.

A 1.2m rootball will therefore require the equivalent rooting area of a 3.6m diameter circle = 10.2 sqm. All rooting areas are shown to be a minimum of 10 sqm, with additional and shared rooting areas available too. Under hedge and pavement areas have been ignored as previously explained. Mature crown diameters are shown for the four trees (5m/4m/4m/4m).

The Forestry Commission's Research Report (Trees, people and the built environment, 2012) refers to root space requirements (p68) as determined by Lindsey and Bassuk, 1991 who wrote:

> 'While the soil serves many functions as a physical and biological medium of growth, it is in its role as a reservoir for water that is of primary interest in soil volume calculations'

They recommend 2ft^3 of soil for per ft^2 of crown projection area (0.06m^3 soil /0.09m^2 CPA). Applying this to the proposed planting suggests that a soil volume of 38m^3 would be required (see below). The available area is 18 x 2.5 x 1m depth = 45 m^3 (soil depth below 1m is ignored).

	crown dia	crown protectn area (m^2)	soil vol (m^3)
Betula	5m	20	13
Acer	4m	13	8
Sorbus	4m	13	8
Amelanchier	4m	13	8
			38

The Research Report mentions computer modelling that uses climatological data to estimate the soil volume necessary to provide moisture during the driest growing conditions likely to be encountered for an area. The example used is New York City where a 6m crown diameter tree (28m^2 crown projection area) with 17m^3 of soil as recommended by Lindsey and Bassuk (1991), and without irrigation, would face a water deficit every other year. With only 4.3m^3 of root space soil, the tree would need irrigation every fifth day to face a deficit only once in 10 years (DeGaetano, 2000).

Based on the above, the 38m^3 soil volume calculated in accordance with Lindsey and Bassuk would provide suitable moisture in Buxton bearing in mind its cooler climate than New York (rainfalls are similar) and that the planted trees will be suitably irrigated all times in non compacted soil.

1.2m rootball (45/50cm girth) tree rooting area (3 x rootball dia) additional rooting area