

TREE PLANTING, STANDARD SPECIFICATION

Existing trees of good quality can enhance the highway by providing shade, by filtering air-borne particulates, by cooling summer temperatures in urban areas and by intercepting rainfall. Highway trees should be retained where possible, therefore when considering road layout, proposals should make space for retaining existing trees and / or accommodating new planting.

To ensure that trees on a highway site are fully considered at an early stage in the design process, a Tree Survey should be carried out in accordance with British Standard BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'. This will help to identify trees that merit retention due to their good condition, high visual amenity, and potential longevity. Trees should not be considered as constraints to the design. During development, retained trees must be protected in accordance with BS5837:2012.

On occasions there will be no choice but to remove trees to facilitate highway works or for reasons of safety. Replacement planting of three trees for each one lost will normally be required to mitigate for tree loss, unless space is limited in which case two larger trees would normally be expected. It may be appropriate to position replacement tree planting where this will also contribute to visual mitigation of the highway. By preference, where space permits, a species / variety that will ultimately achieve a similar stature should be used. On more constrained sites an ultimately smaller stature tree may be more appropriate. Planting in countryside or on urban fringe sites should generally consist of native species that are ecologically appropriate to the location and congruent with the local landscape character type. Non-native species or cultivated varieties may be more appropriate in urban situations to achieve a desired visual effect or to withstand more stressful environmental factors.

This 'Standard Specification' has been prepared to provide general guidance to SCC Highways on tree planting. Planting methods will need to be informed by the particular conditions and constraints of an individual site. For technical advice concerning planting specifications or species selection, expert advice should always be sought. Any proprietary products used should be installed in accordance with the manufacturer's recommendations.

Planting into paved areas will require additional tree pit irrigation/aeration systems and may require structural soil systems and root management

products including pavement support systems. Expert advice should always be sought in these circumstances.

Notes on Tree Specification

Trees are specified as girth size with the 'girth' being measured around the trunk at 1m above ground level, thus 12-14cm girth.

Standards start from 8-10cm up to 14-16cm girth. Advanced Nursery Stock comprises sizes 16-18cm and 18-20cm girth and semi-mature trees start at 20cm girth and progress in increments of 5cm, thus 20-25cm and 25-30cm girth etc.

Conifers and multi-stemmed trees are generally specified by overall height in increments of 50cm, thus 250-300cm or 300-350cm and are supplied 'feathered' i.e., with lateral branches to just above ground level.

If a conifer is required as a clear stemmed tree, it should be specified by its girth in the same way as a standard tree, i.e., 14-16cm.

TREE DIMENSIONS

Trees supplied to a specified size generally meet the following dimensions

Designation	Girth Stem circumference measured 1m above ground	Overall height from ground in metres
Standard	8 - 10cm	2.5 - 3.0
Select standard	10 - 12cm	3.0 - 3.5
Heavy standard	12 - 14cm	3.5 - 4.0
Extra heavy standard	14 - 16cm	4.0 - 4.5
Advanced nursery stock	16 - 18cm	4.0 - 4.5
Advanced nursery stock	18 - 20cm	4.5 - 5.0
Semi-mature	20 - 25cm	5.0 - 5.5
Semi-mature	25 - 30cm	5.5 - 6.0
Semi-mature	30 - 35cm	6.0 - 6.5
Super semi-mature	40 - 45cm	7.0+

Generally, smaller planting sizes will establish better than larger ones. A Select Standard provides a good balance between a small tree and a new planting scheme having a degree of initial impact. Specification of tree

sizes should be considered carefully on a site by site basis. If the tree planting is in a paved area in a town centre, larger sizes may be more appropriate as a Select Standard might look "lost" in such an environment. Larger sizes can also be more resistant to vandalism as they are harder to snap. Expert advice should be sought.

Illustrative Tree Planting Specification

1.0 TOPSOIL

1.1 TOPSOIL GENERALLY

Where possible use in situ soils. Site soils should be protected, managed and handled in accordance with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra 2009)

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb13298-code-of-practice-090910.pdf

Select and use plant to minimise disturbance, trafficking and compaction. Do not contaminate with subsoil, stone, hardcore, rubbish or material from demolition work. Handle topsoil in the driest conditions possible. Do not handle during or after heavy rainfall or when it is wetter than the plastic limit as defined by BS 3882, Annex N2.

1.2 TREE PLANTING MEDIA

For planting in urban locations using a pavement support system, a specially blended topsoil should be used. A blended topsoil will provide the tree with the correct amount of nutrients, will be well-draining and will minimise the need to apply fertiliser. Specialist advice should be sought from the manufacturer.

1.3 SAMPLING AND ANALYSIS

Testing is recommended to establish soil texture, organic matter content, nutrient availability and the presence of any contaminants. Analysis should be used to determine if amelioration is required to promote healthy growth.

1.4 IMPORTED TOPSOIL (IF REQUIRED)

Only use if suitable in situ soils are unavailable. Imported topsoil to be to BS 3882:2015 classification, 'Multipurpose'.

Textural class, sandy loam.

Soil pH 6 - 7.5.

Maximum stone size of 50mm in any dimension.

Topsoil to be free from an excessive amount of weed seeds, roots of perennial weeds, subsoil and extraneous matter.

1.5 TOPSOIL INSPECTION

An inspection of the source site is recommended to observe how the topsoil which is to be imported has been handled and stored. A full description should be made available from the source site including a description of soil components, the location and depth of all soils by type and grade. Request a Declaration of Analysis in accordance with BS3882, clause 6 and table 1.

2.0 PLANTS AND TREES GENERALLY

- 2.1 All trees and shrubs shall conform to the specification for nursery stock as set out in BS 3936-1-11 'Specification for Nursery Stock' and BS 8545:2014 'Trees from nursery to independence in the landscape: Recommendations'.
- 2.2 Stock shall be materially undamaged, sturdy, healthy and vigorous, of good shape and without elongated shoots, and free from pests and diseases, discolouration, weeds and physiological disorders. Plants shall have been grown in a suitable environment and hardened off. The root system shall be to the requirements of the British Standards stated above containing a fully fibrous and balanced, branched system. Containerized or container grown trees must be free from circling or girdled roots and should be rejected if this is present.
- 2.3 Tree species should be selected to be suitable for the soil type and ground conditions of the site.
- 2.4 Native species specified shall be of local provenance and preferably from seed collected from semi-natural parent trees within the appropriate region of provenance zone as set out in the Forestry Commission Practice Note "Using local stock for planting native trees and shrubs".
- 2.5 Where a change from the approved species is required due to a lack of availability then a substitute will need to be approved by the appropriate authority – SCC Highways or the Local Planning Authority depending on the circumstances of the project.

3.0 PREPARATION

3.1 RETAINED TREES

Retain and protect trees indicated on drawings in accordance with BS5837:2012 'Trees in relation to design, demolition and

construction – Recommendations’. If working within Root Protection Areas operations must comply with a Method Statement agreed with the LPA.

3.2 SITE CLEARANCE

Remove rubbish, concrete, metal, glass, decayed vegetation and contaminated topsoil. Remove stones with largest dimension exceeding 50mm. Substances injurious to plant growth including subsoil, rubble, fuel and lubricants to be removed from site.

3.3 PLANTING CONDITIONS

Deciduous trees and shrubs: Plant during the season November - March. Container grown material may be planted outside the planting season and when the soil is in a friable condition, but only with provision for supplementary watering. Conifers and evergreens may be planted September/October or April/May.

Carry out preparation and planting while soil and weather conditions are suitable. Do not plant in periods of wet weather when working the soil would result in a loss of structure, or during periods of heavy frost or strong winds.

3.4 WATERING

Trees should be watered prior to planting and backfilled planting pits watered to full depth of topsoil after planting. Apply evenly and without damaging or displacing plants or soil.

4.0 MATERIALS

4.1 BACKFILLING MEDIUM

By preference soils excavated from the tree pit should be used as backfill, replaced to replicate the natural soil profile. If there is insufficient topsoil, the backfill medium should be as close as possible in texture and structure to the soil excavated from the tree pit.

If soil analysis indicates that amelioration is necessary to promote healthy growth then soil ameliorants (compost and fertiliser) should be used, sparingly. Tree planting compost should be entirely free of peat; proprietary products based on composted straw, manure or coir are acceptable, but products based on wood chips or bark should not be used. Recycled compost material must comply with BS PAS 100:2018 ‘Specification for composted materials’.

4.2 ROOT DEFLECTORS/ ROOT BARRIERS

Root deflectors / geotextile root barriers should not be used routinely and only where there is a specific requirement to inhibit root growth as determined by the design or location of underground plant. If required install in accordance with the manufacturer's recommendations.

4.3 TREE IRRIGATION AND AERATION PIPES

A perforated plastic irrigation pipe should be fitted to all tree pits. This provides the means to water the tree and allows for gaseous exchange within the soil around the roots. Install pipe in accordance with manufacturer's recommendations.

4.4 TREE PIT PAVEMENT SUPPORT SYSTEMS

For planting in urban situations within hard surfaced areas, the installation of a pavement support system should be considered. A pavement support system provides adequate soil rooting volume and allows for the movement of water, air and nutrients whilst supporting the paved surface above. It will also accommodate underground services helping to protect them from root damage. Specialist advice should be sought from the manufacturer.

4.5 MULCH

When planting in grassed areas, a 75mm depth layer of Medium Grade bark mulch is to be applied to the surface of the tree pit after planting and watering. Size, 5 – 75mm with < 5 % dust and fines and less than 15% wood content. The pH to be between 4.5 and 5.5. The product shall be pest, disease and weed free and not have been treated with Methyl Bromide or any additives. The product shall be Forest Stewardship Council (FSC) certified. The product shall have been tested in accordance with the requirements of BS 4790:1987, for fire resistance.

4.6 TREE SHELTERS / TREE PROTECTION

Where there is a risk of rabbit, hare or deer damage trees should be provided with an individual guard or tree shelter to a height appropriate for the protection required.

4.7 TREE SUPPORT

Staking is recommended unless underground methods are desirable due to location and land use. All timber should be peeled and preserved in accordance with BS 8417. The type of tree support will depend on the tree size, location and degree of exposure. Generally

the support point should be low, however a higher support point should be considered on exposed sites. Double stakes and a cross bar should be avoided. Expert advice should be sought regarding the most appropriate support method for each site.

4.8 SOURCES

All materials must originate from an environmentally acceptable source. In the case of timber products, they shall be from a sustainable certified commercial timber resource. The Contractor must be prepared to name the source of any materials including soil, sand, gravel, timber and plant materials and must be aware of any procedures involved in their preparation for site use.

5.0 PLANTING

5.1 SERVICES

Check for below and above ground services, including land drainage in the vicinity. Comply with Arboriculture and Forestry Group Safety leaflets. Be aware of the easements required by different services providers.

5.2 PLANTING PITS GENERALLY:

Tree pit sizes should be at least 150mm wider and no deeper than the tree root system when fully spread. Where space permits the planting pit should splay out towards the top to maximise the rooting zone in the top 200-300mm of the tree pit. Break up pans, break up any soil smearing resulting from pit excavation. Loosen base of pit to encourage drainage and roughen any smooth sides of pit.

Use soils excavated from planting pits separated as subsoil and topsoil, for backfill, unless unsuitable due to contaminants. Backfill should as far as practicable replicate the existing soil profile, though topsoil depth should be increased to 200mm - 300mm if existing topsoil profile is shallower. Where soils have high clay or silt content the addition of sand in the lower layers of backfill will help to improve drainage.

Tree pits would typically be expected to have the following approximate minimum dimensions:

	Diameter (mm)	Depth (mm)
Feathered	450 x 450	300
Standard, Selected Standard (up to 10-12cm girth)	500 x 500	400
Heavy Standard	600 x 600	500
Extra Heavy Standard	700 x 700	500

5.3 TREE SUPPORT

Stakes are to be hammered into the ground before the tree is positioned in the pit. Consideration should be given to the size of tree being supported and the exposure of the planting site when deciding on the type of staking. Ties should secure the tree firmly but not rigidly to the stake. Prevent movement of the rootball. If planting in hard surfaced areas an underground anchoring system may be more appropriate. Install according to manufacturer's recommendations.

5.4 BARE ROOT STOCK

Slight doming under the base of the tree provides support against shrinkage and ensures correct planting level, however soils should not be compacted and or impede drainage. Spread friable mixed topsoil/compost backfill over the roots in successive layers, working plant up and down between each layer to ensure a distribution of soil between all roots and an intimate contact between roots and soil particles. Firm the soil by treading with the heel and add more soil if necessary to bring the surface level to that of adjacent areas and also to the mark on the plant stem which indicates the nursery planted level. Water, and apply mulch after planting.

5.5 CONTAINER GROWN AND ROOT-BALLED STOCK

The root-ball should be placed directly on a structural soil at the base of the tree pit. If suitable soil is not available, sit the root-ball on sand. Do not sit the rootball on topsoil or compost as the weight of the root-ball can compact the soil resulting in anaerobic conditions and a release of toxins into the soil. Install the proprietary capped irrigation pipe system if required.

5.6 BACKFILLING INCLUDING AMELIORANTS

If the soil analysis recommends the addition of a compost, incorporate into the topsoil at the recommended application rate during backfilling. Ensure the compost is thoroughly mixed into the full depth of topsoil. Increase topsoil/compost depth to 300mm if the existing topsoil depth is shallower. Firm but do not overly compact.

5.7 COMPLETION

Water tree immediately after planting, thoroughly and without damaging or displacing soil. Lightly firm soil around tree, fork or rake soil without damaging roots to a fine tilth with gentle cambers and no hollows. Apply bark mulch to 75mm depth in a circle 750mm diameter around the tree.

Remove subsoil, stones, debris, wrapping material, ties, temporary labelling, rubbish, prunings and other arisings. Sweep all adjoining hard areas and leave the works in a clean and tidy condition.

6.0 AFTERCARE

6.1 A 5-year aftercare period is normally required, during which time trees shall be maintained regularly to ensure establishment. Tree condition is to be assessed annually at the end of each growing season and any trees that die or are badly misshapen by dieback, disease or damage shall be replaced during the planting season in the year the fault was identified. Replacement stock shall be of the same size and species as that originally specified.

6.2 Monthly maintenance visits through the growing season should include:

Weeding

Maintain an area of clean ground 1m diameter around each tree by hand weeding. Do not damage tree stem. Return bark mulch to a level and even surface after maintenance works.

Watering

Water as necessary to promote establishment and continued thriving of planting. If watering mass planting, wet topsoil to full depth without damaging or loosening plants. Unless weather conditions are excessively wet, standards and advanced nursery stock trees shall be watered to the following regime for the first three years after planting;

1 visit during the last week of March,

3 visits a month during the period April – September inclusive,

1 visit during the first week of October.

Watering frequency should be increased during the April to September period during extended dry conditions. Each tree should receive 40L of water per visit. The irrigation pipe cap should be securely closed after each visit.

Stakes and Ties

All trees and stakes are to be maintained in firm positions within the ground and with all ties securely fixed and adjusted to allow for the increase in stem girth. Inspect once a month and immediately after strong winds. Loose or broken stakes should be replaced without delay. Adjust, re-fix or replace loose or defective ties, allowing for growth and to prevent chafing. Remove stakes and ties once the tree has become self-supporting. Fill stake holes with topsoil.

6.3 MULCH

Bark mulches should be hand weeded as necessary and replenished to their original depth at least once annually.

6.4 PRUNING

Remove all dead wood and diseased tissue from all planted material at the end of each growing season, and all stem growths from standard trees immediately before the completion of the maintenance period. Prune tree crowns if necessary to encourage development of good shape.

6.5 PRUNING OF EXCESSIVE OVERHANG

Cut back tree growth overhanging roads, pavements and signs as necessary. Ensure vehicle visibility splays, road signs and road lighting is not obscured by overhanging vegetation at any time.

6.6 ADOPTION

At the end of the aftercare period, contact should be made with Staffordshire County Council's Asset and Network Management Team to ensure a smooth transition regarding responsibility for maintenance and safety.

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