# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Company profile</td>
<td>9</td>
</tr>
<tr>
<td>Sustainability</td>
<td>11</td>
</tr>
<tr>
<td>Forest v City</td>
<td>13</td>
</tr>
<tr>
<td>How to use this design guide</td>
<td>15</td>
</tr>
<tr>
<td>The benefits of urban trees</td>
<td>16</td>
</tr>
<tr>
<td>Trees and climate change</td>
<td>19</td>
</tr>
<tr>
<td>Identifying opportunities for urban tree planting</td>
<td>20</td>
</tr>
<tr>
<td>The process of successful tree pit design</td>
<td>22</td>
</tr>
<tr>
<td>Pitfalls and challenges</td>
<td>24</td>
</tr>
<tr>
<td>2 Products</td>
<td></td>
</tr>
<tr>
<td>Arborsystem</td>
<td>29</td>
</tr>
<tr>
<td>Root management</td>
<td>30</td>
</tr>
<tr>
<td>Soil structure systems</td>
<td>42</td>
</tr>
<tr>
<td>Soil range</td>
<td>54</td>
</tr>
<tr>
<td>Tree pit irrigation and aeration systems</td>
<td>59</td>
</tr>
<tr>
<td>Guying and ties</td>
<td>71</td>
</tr>
<tr>
<td>Tree grilles and guards</td>
<td>79</td>
</tr>
<tr>
<td>Tree pit surfacing</td>
<td>90</td>
</tr>
<tr>
<td>Arborflow SUDS tree pits</td>
<td>95</td>
</tr>
<tr>
<td>WSUD products</td>
<td>100</td>
</tr>
<tr>
<td>Kerb flow inlets</td>
<td>101</td>
</tr>
<tr>
<td>3 Complete Tree Pit Systems</td>
<td></td>
</tr>
<tr>
<td>Standard tree pit packages</td>
<td>106</td>
</tr>
<tr>
<td>Podiam detail</td>
<td>128</td>
</tr>
<tr>
<td>SUDS tree pit packages</td>
<td>136</td>
</tr>
<tr>
<td>4 Project Support and Advisory Service</td>
<td></td>
</tr>
<tr>
<td>Specification support service</td>
<td>140</td>
</tr>
<tr>
<td>NBS Plus</td>
<td>141</td>
</tr>
<tr>
<td>GreenBlue Urban training centre</td>
<td>142</td>
</tr>
<tr>
<td>CPD</td>
<td>143</td>
</tr>
<tr>
<td>Arborsystem approved contractors scheme</td>
<td>145</td>
</tr>
<tr>
<td>5 The Trees</td>
<td></td>
</tr>
<tr>
<td>Tree species list</td>
<td>150</td>
</tr>
<tr>
<td>Maintenance</td>
<td>157</td>
</tr>
<tr>
<td>6 Case Studies</td>
<td></td>
</tr>
<tr>
<td>Project profiles</td>
<td>161</td>
</tr>
<tr>
<td>WSUDs case studies</td>
<td>174</td>
</tr>
<tr>
<td>Traffic impact case study</td>
<td>176</td>
</tr>
</tbody>
</table>
7 | Research Insights
   Re-excavated tree .................................................. 182
   Root radar survey .................................................... 184
   Leaf chlorophyll fluorescence testing ......................... 186

8 | GreenBlue International
   GGIG overview .......................................................... 190
   Partner companies ..................................................... 191
   International projects ................................................ 192

9 | Information
   Environmental policy .................................................. 197
   Eco-Schools programme ............................................ 198
   ArborAdvance .......................................................... 200
   Green infrastructure valuation ................................... 201
   FAQ’s ...................................................................... 202
   How to order .............................................................. 207
   Datasheets ................................................................. 211
   Useful organisations ................................................... 243

10 | Index
    Alphabetical Index .................................................... 245
“No other single element can bring such a diverse and long lasting range of benefits to urban space, than established canopy volume trees.”

Trees. They are the largest living things on earth - and live the longest.
What other single element, when carefully planted into a paved area, will bring the following benefits?

1. Increase property value
2. Increase in retail sales
3. Sound attenuation
4. Biodiversity
5. Shade
6. Cooling
7. Improving traffic behaviours
8. Improve physical health
9. Provide ‘sense of place’
10. Give seasonal interest
11. Reduce storm water run off
12. Sequester carbon
13. Reduction in crime rates
14. Bring nature into the built environment
15. Improve habitats for birds and other wildlife
16. Assist in education
17. Improve mental health
18. Accelerate healing
19. Reduce windspeed
20. Life
21. Remove airborne pollutants
22. Provide oxygen

This is why it is so important that when we plant a tree in the built environment, we provide the very best environment below ground. A tree in a paved surround in an essentially a hostile and highly compacted rooting area - as far removed from a forest floor situation as it is possible to get.

Heavy ground compaction - the friend of the civil engineer - is also public enemy number 1 for the root system of an urban tree.

At GreenBlue Urban, our heritage is urban trees - this is our specialist area and our business is devoted to the development of products and methodologies which will bring canopy volume trees to our urban landscapes - for the generations to come.

The key to success is below ground - an investment which is out of sight immediately, but potentially manifest above ground for many decades, even centuries.

Enjoy this planting guide!
Company profile

Founded in 1992, Greenleaf was set up to research and provide solutions for assisting trees in their battle to establish in urban spaces.

With the goal of drastically improving urban planting success and increasing leaf canopy in urban areas, Greenleaf tirelessly analysed the challenges, the causes of failure and premature mortality endured by trees. We then examined the negative impact poor planting can have on urban infrastructures. Having established the key issues for both of these, we then systematically researched the reasons for those issues and designed practical products, solutions and systems for trees.

In 2013, Greenleaf became GreenBlue Urban Ltd. The new name reflecting the increased importance of integrating green infrastructure with water sensitive urban design (WSUD).

The last two decades have seen relentless product development and advances in tree system technologies. The result is seen in GreenBlue Urban’s enviable track record of successful schemes and the development of ‘state of the art’ sustainable tree pit designs. Local authorities, landscape architects, engineers and other related professionals increasingly turn to GreenBlue Urban for guidance and best practice advice in tree planting implementation.

In 2015, GreenBlue Urban moved to their new purpose built premises in East Sussex. This new facility offers training workshops and demonstration planting areas for the latest generation of tree pit and WSUD planting systems.

As the UK’s market leader in specialist tree pit products, we are pleased to be in a position to present you with the definitive urban tree design manual – a result of 23 years of frontline experience in the field, exhaustive research, product development and field trials.

Coupled with this, we offer you to sample our support service – unrivalled in the tree planting world – let us help you achieve your vision.

Based in East Sussex but with offices and distribution points UK wide, GreenBlue Urban has grown every year since its inception. Our programme of continuous product development ensures that specifiers and clients can rest assured that the systems we offer for urban planting schemes represent the best in the sector.
Sustainability

Our commitment to sustainability is evidenced by the consistent use of recycled materials wherever possible in our products. **GreenBlue Urban’s** contribution to tree planting projects worldwide is virtually incalculable and gives us an enviable carbon positive position. Furthermore, local sourcing policies mean that 90% of our specialist tree products are manufactured within the UK.

**We are here to support you right from the outset of your scheme. Our service covers every stage, from initial feasibility studies through to planting.**

We live in times when the international debate on climate change has moved urban tree planting further up the political agenda. Local authorities in the UK and other large corporate organisations are being held accountable for climate mitigation strategies through the NI 188 reporting system. Tree strategies can play a vital role in meeting these goals.
Forest v City

Consider the contrast

Trees are forestry plants. As soon as we forget this simple fact we are likely to make mistakes when planting them in town and city environments.

The trees shown opposite are in a beautiful wooded setting and have near perfect conditions. Sheltered microclimate, rich fertile soil with an abundance of nutrients and humus, uncompacted leaf mould, rich rooting volume with plenty of moisture and pore space.

Now spare a thought for the tree in the town. A harsh paved surround increasing microclimate temperatures and reflected glare, exposure to wind, de-icing salt and gratuitous vandalism. Below ground an equally hostile environment of compacted soils, lack of quality rootable volume, competition for space with multiple utilities and if the tree does manage to spread its root system someone will mutilate it, through trenching or pavement reinstatement.

With these factors in mind, we can begin the process of successfully integrating trees in built up areas. By protecting them above and below ground, managing and providing for delicate root systems, we can as far as possible recreate optimum conditions for our trees to establish.

We cannot recreate entirely the conditions trees enjoy in woodlands but we can go a huge distance in improving their chances of thriving in challenging conditions by tree literate design.
How to use this design guide

This manual is designed to logically guide you through the process of successfully planting urban trees. The format will assist you whether you are an experienced landscape designer or someone facing a new task challenge.

1.0 Introduction
   - The benefits of urban trees
   - Trees and climate change
   - Identifying opportunities for urban tree planting
   - The process of successful tree pit design
   - Pitfalls and challenges

2.0 Product Finder
   Includes important information such as: typical installation specification, product specifications, compatible products, product codes and cross references to our tree pit details.
   - Arborsystem
   - Root management products
   - Soil structure systems
   - Soil range
   - Tree pit irrigation & aeration systems
   - Tree support
   - Tree grilles and guards
   - Tree pit surfacing
   - Arborflow
   - WSUD products

3.0 Complete Tree Pit Systems
   GBU range of standard tree pit system packages to suit different locations and budgets

4.0 Project Support and Advisory Service
   - Specification support service
   - NBS Plus
   - GreenBlue Urban training centre
   - CPD
   - Arborsystem approved contractors scheme

5.0 The Trees
   - Tree species lists
   - Maintenance

6.0 Case Studies
   - Frinton
   - Aylesbury
   - Blackheath
   - Bromley
   - Cardiff
   - Lambeth
   - Goldhawk
   - Leonard Circus

7.0 Research Insights
   - Re-excavated tree
   - Root radar survey
   - Leaf chlorophyl fluorescence testing

8.0 GreenBlue International
   - GGIG overview
   - Partner companies
   - International projects

9.0 Information
   - Environmental policy
   - Eco-Schools programme
   - ArborAdvance
   - Green infrastructure valuation
   - FAQ's
   - How to order
   -Datasheets
   - Useful organisations

10.0 Index
The benefits of urban trees

Sadly, for many years now, the tree canopy in our towns and cities has been diminishing. Large mature trees which reach the end of their lives are frequently felled and replaced with smaller species or not at all. Replanted trees struggle to establish due to the demands of engineered surfaces around them.

However, as time has gone on, more and more research has confirmed the value and benefit of mature trees in urban environments. Charities and organisations such as ‘Trees for Cities,’ actively campaign in support of trees in urban areas.

Here we summarise some of the principle benefits that local authorities, developers, urban planners, architects and specifiers need to be aware of:

- **Aesthetics** – few things can compare with the visual impact and seasonal interest that a tree brings.
- For every 10% increase in a city tree canopy, ozone is reduced by between 3-7%.
- **Health** – trees have a positive impact on the incidence of skin cancer, asthma, hypertension and stress related illness by filtering out polluted air, reducing smog formation, providing shade from solar radiation and giving an attractive, calming setting for recreation.
- One study by Natural England calculated that every £1 spent on tree planting, would yield £7 savings, which if taken nationally would amount to annual potential savings of £2.1bn.
- **Carbon reduction** – trees are proven to absorb carbon. Having removed it from the air it is stored as cellulose in their trunks, leaves and branches (a process known as sequestration). Planting trees remains one of the cheapest, most cost effective means of drawing excess CO₂ from the atmosphere.
- A single mature tree can absorb carbon dioxide at a rate of 21.6kg/year and release enough oxygen back into the atmosphere to support 2 human beings.
- **Storm water management and buffering** – the crown of a large tree is a free standing anti-flood reservoir. One hundred mature trees capture about 1,137,500 litres of rainwater per year, allowing some to evaporate, drawing up more through the roots and slowly allowing the rest to soak into the ground.
- For every 5% of tree cover in a community, storm water runoff is reduced by 2%.
- **Biodiversity** – the benefits of providing natural habitats for birds, squirrels and other fauna are incalculable.
The benefits of urban trees

- Improves the liveability of urban areas.
- Trees can increase real estate values. Independent studies show a consistent increase in property values in tree lined streets between 5-15%.
- Crime reduction – researchers have discovered reductions in both violent and petty crime, including domestic violence through the therapeutic, calming influence of mature tree planting.
- Pollutant removal – Sulphur Dioxide, Nitrogen Oxides and particulates, Carbon Monoxide, Cadmium, Nickel and Lead are all substances that a tree will work to remove and store 24/7 365 days of the year.
- Research has shown a 60% reduction in particulates from exhaust fumes etc in tree lined streets.
- Erosion reduction – reducing topsoil erosion through run off and preventing harmful chemicals reaching water courses.
- Cooling effect – reducing temperatures by both shade and transpiring water. This helps reduce air conditioning bills and energy use. One mature tree can produce the same cooling effect as 10 room sized air conditioners.
- This same cooling effect – becomes an effective tool in reducing urban heat islands and hot spots in cities.
- Trees can save up to 10% of local energy consumption through their moderation of local climate.
- Noise reduction – trees form an effective sound absorbing barrier.
- Wind speed reduction – buildings increase wind speed as wind is forced to travel further around them. Trees significantly reduce wind speed up to a distance of 10 times their height.
- Managing traffic behaviours – see case studies
Trees and climate change

“If local authorities are to meet the stringent carbon reduction targets laid on them by 2020 and 2050, then trees need to be planted now! Furthermore these trees need to be planted in such a way that they stand a good chance of establishing well and reaching maturity.”

By signing up to international climate reduction targets, central government has issued a challenge to everyone involved in urban space design. Whilst we cannot realistically claim that planting trees in towns will significantly affect global climate, what we do know is that they have a major role to play in city climate mitigation and adaptation strategies.

Trees can, by providing shade and cooling through transpiration and evaporation processes, reduce temperatures around them. Clusters of well established trees probably represent the most effective tool available to urban designers in combating urban heat islands and heat sinks in cities. (These pockets of heat build up in urban areas with solar energy and glare reflecting off engineered hard surfaces. These same surfaces store the heat and release it overnight, scarcely having time to cool before the next sunrise.)

As mentioned earlier, one well established tree can have the effect of 10 room sized air conditioners – but of course from a totally sustainable, zero energy source!

The targets set for CO₂ reduction are extremely challenging – by 2020, a reduction of 1.2m tonnes of CO₂ per annum is looked for in the UK, and by 2050 a reduction target of 80% of 2009 levels. If trees are to play a part in implementing this reduction, a lot needs to happen quickly.
Identifying opportunities for urban tree planting

Clearly, we cannot just simply drop trees in anywhere. To have a chance of success, tree species and location are the first priority in our goal of establishing trees in towns. Planting potentially large trees in wrong locations is counterproductive and will simply turn people against trees. However, equally often we see tree planting sites which could support larger species, populated with smaller ‘whitebeam’ or ‘prunus’ species which really represent a lost opportunity. Big trees bring big benefits but they must be located wisely.

Right tree, right place

Trees need space, they need soil volume – there is a direct correlation between the provision of adequate root environment and the achievement of canopy potential.

Architects and engineers would never seriously consider building a structure with inadequate foundations and yet many will routinely plant trees on their schemes in tiny tree pits just a fraction of what they really need to do well.

Where possible, plant trees in groups with shared soil space. Trees can then spread out happily between themselves and benefit from additional soil volume. One common method is the use of continuous trench planting and this is a very good way of providing adequate volume.
Consider planting trees in the following locations:

- **Build outs in road schemes** – one of the most demanding places to plant a tree but one in which successful established trees have a huge impact. These can be used as part of traffic calming projects (thus fulfilling two roles in one), or simply parking delineation.

- **Verges** – the most common area for urban tree location.

- **Pavements** – demanding on the tree but can be achieved successfully with careful attention to tree pit design.

- **Car parks** – again a potentially hostile place to plant a tree but greatly beneficial in providing cool shade for vehicles in bright weather.

- **Plazas** – these are where trees can really have huge aesthetic and beneficial impact – there is nothing else that can be incorporated in these kind of spaces that will confer the same degree of benefit.

- **Parkland** – few things can compete with established trees in a park setting – indeed try imagining a park without trees.

- **New forest pockets** – creating tree clusters in urban spaces and pocket parks is an excellent strategy to increase tree canopy for climate mitigation and adaptation.

- **SUDS** – Consider the use of trees as part of a storm water retention strategy – SUDS tree pit designs are now workable.
The process of successful tree pit design

Having made a decision on species and location, the following process should be observed when designing the exact profile of the tree pit and ancillaries:

- **Available root space** – Soil volume requirements for trees can be estimated using several methods. As stated earlier, in a natural environment a root system can extend two to three times the radius of the tree canopy. Probably the simplest way of calculating a minimum required soil volume is to take the projected canopy area of the mature tree, multiplied by a depth of 0.6m. The shape of this area can be configured to suit the particular site. Other methods are based on mature trunk girth and are possibly more accurate as they provide for different foliage shapes. The old method of providing an area the size of the pavement opening is clearly insufficient, and commits the tree to an untimely death, or a lifetime of costly repairs.

- **Engineering requirements** – With many trees being planted immediately adjacent to highways and engineered structures, it is vital that root volume beneath or around such is considered. Engineering requirements for hard surfaces are directly opposed to horticultural requirements. Structural soil modules or similar must be considered early enough in a project to be incorporated during the civils or groundwork stage.
Root management – paved surrounds or utilities nearby? If so, root management should be specified depending on what needs protecting and where it is in relation to the tree. For continuous paved surrounds for example, roots will need managing downwards by at least 300mm to design out paving heave. See our section on root management for further details.

Irrigation – lack of water and nutrients are the biggest single killers of newly planted trees in the UK. It is very important to incorporate the means to irrigate efficiently, particularly for the first three years.

Drainage – water logged tree pits can become anaerobic and this will kill the tree – please ensure that potential drainage issues have been addressed early on in your scheme.

Aeration – less widely known but none the less important, soils and roots need air to live. If the root plate of the tree is covered with impervious paving, vital gaseous exchange in the root zone cannot take place. Appropriate tree pit design should include a means of facilitating air supply below ground.

Support – how will you ensure the tree is securely located? Underground guying is widely favoured for urban areas as it is unobtrusive. Staking and tying is an alternative but this will require maintenance.

Above ground – What sort of environment will you be planting in – in some locations above ground protection from carelessness and/or gratuitous vandalism becomes critical to tree survival. A decision will need to be made on whether there is a need for tree grilles, vertical guards and other protective measures.

Having considered and provided for all the above items, we are well on the way to ensuring that our tree planting programme is going to be efficient and successful. The above factors cover well over 90% of the reasons for urban tree failure. We now need to look at the specific products required to help us design these features into our schemes.
Pitfalls and challenges

Each of these photographs tell a story. Learning from both our own and others’ mistakes is imperative if we are to pursue the goal of increasing urban tree canopy cover.

This guard is killing the very article it was supposed to protect

Inappropriate product selection can blight the result

A healthy tree: With the right product selection urban trees can thrive
Pitfalls and challenges

- Insufficient rooting volume – after a good start these trees exhausted available soil
- Makeshift and untidy – a home for rats and mice
- A healthy tree: With the right product selection urban trees can thrive
- Surface root heave
- Poor planting techniques harm trees
- Poor drainage can kill
Research has shown a 60% reduction in particulates from exhaust fumes in tree lined streets.

“"I can improve the environment"
2 Products
Finding success

Arborsystem
- The definitive urban tree pit package ............. 29

Root management
- Root management products, overview .......... 30
- Root management selector chart ................. 31
- ReRoot 300
  Linear pavement protection ....................... 32
- ReRoot 600/1000
  Linear pavement protection ....................... 34
- ReRoot 2000
  Deep application root barrier ................... 36
- RootDirector
  Modular root protection system .................. 38
- RootForm
  Structural RootDirector .......................... 40

Structural structure systems
- Overview ........................................... 42
- RootSpace – High volume soil system .......... 43
- StrataCell – Soil structure system ............. 48
- RootCell – Soil structure system ............... 52
- Soil range ......................................... 54
- RootStart – Mycorrhizal funghi ................. 56

Tree pit irrigation & aeration
- Overview ........................................... 59
- RootRain Metro – Irrigation ....................... 60
- RootRain Urban – Irrigation and aeration ...... 62
- RootRain Civic – Large capacity irrigation ..... 64
- RootRain Hydrogrille - For heavily trafficked areas ............................................. 66
- RootRain Arborvent - For heavily trafficked areas ............................................. 68

Guying and ties
- Support and protection ............................. 71
- Arborguy – Underground guying ................. 72
- Tree Ties - Securing large root balled trees ... 74
- Naturetie – Biodegradable tree tie ............... 76
- Tree Guard Tie – for use with tree guard ...... 77

Tree grilles and guards
- Overview ........................................... 79
- Fully integrated grille systems ................... 80
- Standard tree grille range:
  Adur, Avon, Clyde, Dart, Tay and Yare ......... 82
- Design line tree grille range:
  Zeta - Low profile paving support
  Boulevard – Ductile iron grille
  Castle – Heavy duty recessed grille
  Medway / Mersey – Light grille for use for 600mm paving
  ArborAdvance – Non-slip ventilated grille
  Bespoke ............................................. 84
- Vertical tree guards:
  Ullswater, Coniston, Derwent, Ennerdale, Thirlmere, Windermere, bespoke
  and weldedmesh guards ........................... 88
- Arboresin – Porous tree pit surface ............. 90
- Precast Arboresin
  Porous tree pit surface ............................ 92

Sustainable urban drainage tree pit systems
- Arborflow – trees and sustainable urban drainage systems ............................. 95
- Arborflow 100 Series – compact SUDS ........... 98
- Big WSUDs package ................................ 100
- Kerb flow inlet ...................................... 101
Arborsystem
The definitive urban tree pit package

The GreenBlue Urban Arborsystem brings together the key elements of successful tree pit design and simplifies the design and installation process for specifiers and installers.

By using our USB drive or hard copy, landscape professionals can combine root management, structural soil components, aeration, irrigation and choose an appropriate above ground surface grille and vertical guard – in a single package.

Since its inception and development over recent years, the Arborsystem integrated tree pit product package has proved itself in many demanding locations. For many landscape specifiers, Arborsystem has become the system of choice for integrating trees into the urban environment.

By utilising Arborsystem, landscape designers can:

- Ensure product compatibility
- Drastically reduce time spent on specifying, quoting and ordering
- Adapt a system to suit differing location and budget constraints
- Demonstrate to clients a professional long term approach to tree planning and management issues
- Benefit from our on site support service for peace of mind

Click here to view our website
Root management products

Overview

With today’s clients requiring ‘complete life costing’ and ‘duty of care’ obligations, it is no longer sufficient to plant a tree in an urban location, simply hoping that the roots will keep out of trouble. This guide sets out current ‘best practice’ in tree root management.

GreenBlue Urban has developed a range of specialist root management products. Different situations often require a different approach.

Rather than take a ‘one size fits all’ attitude we have designed our root management range to give the tree as much growing advantage as possible.

Therefore, if one is simply wanting to protect paved surfaces from root heave, it is unnecessarily restrictive on the tree to install a vertical sheet barrier 1.5m deep all round. The RootDirector product diverts roots downwards to a level where they can safely establish without surface damage.

So, whether designing a root free corridor for utilities, protecting building foundations or designing trees into a pedestrianised area, GreenBlue Urban has the cost effective root management solution.

Increasingly, we see root barrier products used in conjunction with provision of ‘optimal’ rootzones such as GreenBlue Urban RootSpace. This means that tree roots are not just diverted - but are encouraged to establish in preferred areas by provision of quality uncompacted topsoil. A truly holistic approach.

For technical advice on the product application phone 01580 830 800.
Root management selector chart

It is intended that the diagram below will be of assistance in determining which product should be used in most situations.

It is a guide only and should be read in conjunction with our main catalogue. If necessary phone our technical line for help on 01580 830 800.

What are you needing to protect from roots?

- Building foundations
- Pavements
- Underground services/utilities
- Pavements & underground services/utilities

- What is the predicted girth (circumference) of the mature trunk?
  - Up to 450mm
  - Up to 550mm
  - Up to 1250mm

- How deep are your services/utilities?
  - Up to 450mm
  - Up to 600mm
  - Deeper than 800mm

- Depth of services determines barrier type

- Surround or Linear
- Surround
- Linear

Suitable products:

- ReRoot 2000
- High density root barrier
- RD510
- Root Director
- RD640
- Root Director
- RD1050
- Root Director
- Root Form
- RD1400
- Root Director
- ReRoot 600
- ReRoot 1000
- Root Form
- ReRoot 300
- ReRoot 600
- ReRoot 1000
- Root Form
- ReRoot 600
- ReRoot 1000
- ReRoot 2000
- 1m deep
- Available in 1m, 1.5m & 2m stock depths, deeper barriers to special order
ReRoot 300
Linear pavement protection

ReRoot 300 linear ribbed root barrier has been designed for applications where it is not necessary to deflect tree root systems too deeply. This high density root barrier is supplied in 300mm deep rolls. The barrier will deflect the growing roots downward sufficiently to protect a standard pedestrian kerbline from surface rooting.

Benefits

- Deeper root system means greater drought tolerance and improved tree stability
- Deeper root system is not vulnerable to de-icing salts, used extensively on footpaths and cycle paths
- Protection of pedestrian kerbs from root heave
- Retrofitting around recently planted trees
- Protects tree when pavement re-instatement works are carried out
- Supplied in roll form to any 10 lin.m increment
- HDPE
- 100% recycled

ReRoot 300, 600 & 1000 are protected by patent (Patent no. 2311309) as the only roll form root barrier with integral root deflecting ribs.
Illustrated is the ReRoot 300 product being used in conjunction with RootCells. The barrier diverts shallow lateral root growth into the preferred rooting zone.

ReRoot 300 was used to protect paved surfaces and direct roots on this project in Swindon.

ReRoot 300 can be used to protect cycle paths through rural areas from tree root damage.

Typical Installation specification

Install ReRoot 300 ribbed root barrier to protect all hard surfaces from tree root damage. Root barrier should be installed with the ribs facing the tree. The top edge of the root barrier should finish 10mm above any growing media tree side. To join roll ends, overlap by 500mm and tape both sides with GreenBlue Urban root barrier jointing tape.

Compatible ‘Arborsystem’ products

- Tree pit irrigation. See page 59
- Soil structure systems. See page 42
- Root ball guyin and ties. See page 71
- Tree grilles and guards. See page 79

Product specification and codes

<table>
<thead>
<tr>
<th>Product</th>
<th>Thickness</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ReRoot 300</td>
<td>1.0mm</td>
<td>RER300A</td>
</tr>
<tr>
<td>ReRoot Joint Tape</td>
<td>(10m roll)</td>
<td>-</td>
</tr>
<tr>
<td>ReRoot Joint Tape</td>
<td>(10m roll)</td>
<td>-</td>
</tr>
</tbody>
</table>

Standard tree pit details

To clearly illustrate correct product application, please refer to our standard tree pit details which are in the tree product packages section.

Sales and Service: +44 (0) 1580 830 800
E-mail: enquiries@greenblueurban.com
Website: greenblueurban.com
ReRoot 600/1000
Linear pavement protection

**Benefits**
- Easy to install, no specialist equipment needed
- Available in 600mm and 1000mm depth
- Supplied in roll form to any 10 lin.m increment
- Ribbed construction prevents root swirl and directs roots downward and outward
- Flexible design allows the barrier to curve around obstacles but is rigid enough to hold its form when backfilling
- ReRoot jointing tape will ensure root proof joints when joining roll ends

**Typical installation specification**
Install ReRoot 600 linear root barrier with integral root deflecting ground lock ribs as follows: Excavate narrow trench to a depth of 600mm. Ensure that the base of the trench is firm and level.

ReRoot 600 and ReRoot 1000 products are ribbed root barriers designed for the protection of paved surfaces, shallow service ducts and utilities.

Available in roll form and in two different depths. The numbers 600 and 1000 denote the depth in mm.

This versatile root management system can be used to surround individual or groups of trees because the ribs are proven to divert lateral root growth downwards.
Many local authorities now state in their planning policy that trees planted in soft areas within 3m of a paved/hard surface, that will be adopted by the council, must be lined with a root barrier. This protects the pavement in the long term and the trees’ root system in the event of pavement excavation.

Remove any sharp objects from close proximity to the trench walls. Install root barrier with the ribs facing the tree roots.

Backfill the tree side with good quality topsoil and the rear side of the barrier simultaneously with subsoil allowing for surface finishing – kerbing etc.

Backfilling should be in layers. Concrete is permissible on the rear side of the barrier if required to support hard landscape surface. Care should be taken to remove any sharp objects from the backfill material. The top edge of the root barrier must remain 10mm above the surface tree side. To join roll ends tape both sides with GreenBlue Urban ReRoot jointing tape.

For ReRoot 1000, only the excavation depth differs from the above.

Compatible ‘Arborsystem’ products

- Tree pit irrigation. See page 59
- Soil structure systems. See page 42
- Root ball guying and ties. See page 71
- Tree grilles and guards. See page 79

---

**Product specification and codes**

<table>
<thead>
<tr>
<th>Product</th>
<th>Thickness</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ReRoot 600</td>
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<td>RER600A</td>
</tr>
<tr>
<td>ReRoot 1000</td>
<td>1.0mm</td>
<td>RER1000A</td>
</tr>
<tr>
<td>ReRoot Joint Tape (10m roll)</td>
<td>-</td>
<td>RERUTA</td>
</tr>
</tbody>
</table>

To clearly illustrate correct product application, please refer to our standard tree pit details which are in the tree product packages section.
ReRoot 2000
Deep application root barrier

ReRoot 2000 was specified and installed at this industrial park at Speke, Liverpool. Note how trees have been planted parallel to a major gas main with the approval of Transco.

Benefits

- Resistant to puncture by sharp objects or tearing as a result of soil movement
- Durable, resistant to biodegradation and photodegradation
- Easy to install, no specialist equipment needed
- Available in standard 0.6m, 1.0m, 1.5m and 2.0m depth rolls
- Supplied in roll form to any 10 lin.m increment
- Available in 1.0mm (product code RER210), and 2.0mm thickness (product code RER220)
- Effective in the control of Japanese Knotweed and other invasive plants
- ReRoot 2000 fulfils all the Arboricultural Advisory and Information Service guidelines for root barriers
- Manufactured from 100% recycled material
- HDPE

ReRoot 2000 is a high strength root barrier for deeper applications. This product has been used extensively on many projects around the UK, particularly in new service infrastructure projects, business parks and housing developments.

ReRoot 2000 is rigid enough to hold its form when placed into a trench. This is a big advantage as it will not be dragged downward during backfilling. Market leading puncture resistance and strength, mean that this is the root barrier of choice for specifiers and utility companies requiring root free service corridors.

The high puncture resistance of ReRoot 2000 allows easier compaction close to the barrier ensuring an excellent product/soil interface.
Install ReRoot 2000 (including relevant product code) linear root barrier as follows:

Excavate narrow trench between the tree and the structure to be protected. Please note: the positioning of the trench will depend on tree species and other site conditions. Please consult a qualified arboriculturist.

The barrier should be positioned in the trench against the side of the trench nearest the tree. Any sharp objects should be removed from the trench walls and the backfill material.

ReRoot 2000 roll ends can be joined by overlapping at least 500mm and securing both sides with GreenBlue Urban root barrier jointing tape. For critical applications the material can be seam welded.

Ensure that the top of the barrier finishes at least 10mm above finished soil levels tree side, to avoid subsequent root over growth. The barrier can be trimmed using a sharp knife. Backfill the trench in layers, compacting carefully.

It may be desirable, depending on site conditions, to encapsulate the top edge of the barrier in concrete haunching to protect the barrier and to finish the installation tidily.
RootDirector
Preformed root protection system

Designed for the protection of pavements and hard landscaped areas, the ribbed RootDirector system prevents root swirl and diverts root growth downward and outward thus avoiding the unsightly and hazardous root damage so commonly seen in urban areas.

The RootDirector’s rigid, one-piece construction makes installation simple. As a product within the ‘Arborsystem’ range, it is compatible with the RootRain irrigation system, GreenBlue Urban structural soil cell systems and our extensive tree grille and guard range.

Benefits

- Protection for paved surrounds
- Encourages deep root growth
- Improved drought tolerance
- Greatly enhanced tree stability
- Integral ribbed construction which prevents root swirl
- Optional irrigation facility
- Compatible with GreenBlue Urban Arborsystem products
- Simple to install
- 100% recycled plastic

Click here to view our website
RootDirector RD1400A during installation

RootDirectors are the ideal root management solution for individual tree planting schemes, and were used in both the above projects.

Typical installation specification

Install RootDirector preformed root barrier system with integral root deflecting ribs.

Excavate planting pit to accept RootDirector. Ensure adequate drainage to pit. If using in conjunction with RootCells, these should be installed first. The lower flange of the RootDirector should be level and on a firm even base to avoid settlement. Ensure top edge of RootDirector is level with finished surround unless installing with a tree grille. If a tree grille is being used, check depth of support frame.

Backfill inside and outside simultaneously, firming in 150mm layers. Topsoil inside the RootDirector should not overflow the top flange.

Compatible ‘Arborsystem’ products

- Tree pit irrigation. See page 59
- Soil structure systems. See page 42
- Root ball guying and ties. See page 71
- Tree grilles and guards. See page 79

Product specification and codes

<table>
<thead>
<tr>
<th>Product</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<tr>
<td>RootDirector</td>
<td>510mm</td>
<td>595mm</td>
<td>310mm</td>
<td>425mm</td>
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<td>RootDirector</td>
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<td>455mm</td>
<td>575mm</td>
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<td>RootDirector</td>
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<td>545mm</td>
<td>860mm</td>
<td>RD1050A</td>
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<tr>
<td>RootDirector</td>
<td>1300mm</td>
<td>1805mm</td>
<td>500mm</td>
<td>1200mm</td>
<td>RD1400A</td>
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</tbody>
</table>

Standard tree pit details

To clearly illustrate correct product application, please refer to our standard tree pit details which are in the tree product packages section.
RootForm
The high strength RootDirector solution for structural tree pits

Installation Specification
Supply and install hollow interlocking sectional root management system with integral root deflecting ribs. Once located, infill the root management system in accordance with the manufacturer’s instructions, with concrete to engineer’s specification. Product supplier is GreenBlue Urban, product name: RootForm, Code: GBURF15A

Recommended Compatible Products
- RootRain Irrigation - See Page 59
- RootSpace or Stratacell soil structure - See Page 42
- Arborvent - See Page 68
- Tree grilles and guards - See Page 79

RootForm is a root management product for guiding roots to deeper profiles. The hollow sections are designed to be filled in situ with a concrete or similar structural fill material giving very high strength. Strength can be further increased by incorporating steel reinforcing within the concrete infill.

The product once installed is ideally suited to carpark and other road situations where granular road base material is to be used alongside the tree pit.

GreenBlue Urban recommend that this product is used with a load bearing soil structure at its base such as RootSpace or Stratacell.

Modular construction gives flexibility on tree pit opening dimensions. 300mm and 500mm standard sections allow for 1000, 1200, 1500, 1800 openings and beyond, giving the designer scope to create optimal opening size for the tree species selected, and the space available.

<table>
<thead>
<tr>
<th>Components</th>
<th>Dimensions L x W x H</th>
<th>Product code</th>
</tr>
</thead>
<tbody>
<tr>
<td>RootForm Corner</td>
<td>350 x 150 x 400</td>
<td>GBURFC400</td>
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<tr>
<td>RootForm 300</td>
<td>300 x 150 x 400</td>
<td>GBURFS300</td>
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<tr>
<td>RootForm 500</td>
<td>500 x 150 x 400</td>
<td>GBURFS500</td>
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<tr>
<td>Square Tree Pit Sets</td>
<td>L x D</td>
<td></td>
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<tr>
<td>Complete 1200 set</td>
<td>1200 x 400</td>
<td>GBURF12</td>
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<tr>
<td>Complete 1500 set</td>
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<tr>
<td>Complete 1800 set</td>
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Due for launch by end of 2015
Soil structure systems
RootSpace, RootCells, StrataCells & Arborsoil

What is soil structure?
Soil structure is the arrangement of soil particles, including silt, sand and clay that aggregate together and the pore spaces between them. It is soil structure which supports trees and plants and gives them foundation and stability.

Why do we need soil structure systems?
Not every soil structure is conducive to the growth of plants and trees. Tree growth and fertility are strongly influenced by soil structure, as it affects the movement of air, water and other nutrients required for trees to flourish. Effectively the ‘architecture of the soil’, soil structure is usually the most critical element for the success, or failure, of the urban tree to grow and thrive. A well-structured soil functions like a reservoir, enables the tree to accept, store and transmit water, nutrients and energy, providing room in which roots can propagate and allowing the space it needs for life and the necessary biochemical exchanges for growth. Too often trees are planted in cramped planting pits and in poor subsoil, resulting in retarded growth, with roots tending to colonise the area immediately underneath the paved surface, leading also to structural pavement damage. Paved surfaces require solid, compacted ground for pedestrian movement and vehicular traffic. Without compromising or damaging the structural integrity of paved surfaces, how can urban trees be adequately provided for in their urban setting?

How they work
Soil in urban areas rarely provides the favourable environment for trees to grow and flourish. Hard compaction, lack of aeration, poor drainage, low nutrient levels and the existence of pollutants in soil structures retard root growth and make it almost impossible for urban trees to grow and thrive. GreenBlue Urban offers landscape architects, engineers and arborists strong soil structure systems that, while conducive to root growth, also give adequate support for roads and pavements.
RootSpace™ introduction

RootSpace® is the next generation soil protection product, developed by GreenBlue Urban to reduce cost, cut down installation time, and incorporate industry leading soil aeration methodology – a vital and often overlooked component in tree pit design.

We have developed the RootSpace soil panel system – taking the benefits of previous soil cell systems and improving functionality – making long term root zone construction more affordable for any size project.

For civil engineers, RootSpace represents class leading strength and unique lateral stability benefits.

For foresters and arboricultalists, RootSpace gives optimal aerated soil volumes for unimpeded root growth.

For utility companies, RootSpace offers the first tree soil support system designed to allow retro access to services running through the tree root zone.

For developers and contractors, RootSpace gives the fastest assembly and filling times – with the added attraction of competitive product cost and GreenBlue Urban site support.
The GreenBlue Urban RootSpace system is essentially a soil support system – designed for maximum soil and rooting volume, to be ‘utility friendly’, with economic freight and industry leading strength characteristics.

In 2001, GreenBlue Urban produced the world’s first purpose made commercial structural soil cell for urban tree planting. Since that time, thousands of trees have benefited and continue to benefit, from access to uncompacted soil volumes – beneath heavily engineered pavements and roadways.

RootSpace – GreenBlue Urban’s new soil support system, gathers up all the years of experience as leaders in the field, to offer the definitive urban tree root protection product.

Essentially, urban tree success is all about the soil the tree is planted in – a large volume of uncompacted, good quality soil is required for the establishment and long term health of a tree in paving.

Predict – how much soil your tree will require as it matures

Provide – give the tree enough quality uncompacted soil in zones into which it can freely spread its roots

Protect – Look after the vital soil structure itself – overcome potentially fatal compaction of the soil and ensure access to drainage and ventilation.
### Name

<table>
<thead>
<tr>
<th>Name</th>
<th>Dimensions</th>
<th>Picture</th>
<th>Product Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>RootSpace 600 Upright</td>
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<td>GBURAC600A</td>
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<tr>
<td>RootSpace Aeration Cap</td>
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<tr>
<td>RootSpace 600 Side panel</td>
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<td>GBURSP65PA</td>
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</table>

also recommended Arborvent 150 kit – two per tree location

See our standard tree pit details for a complete tree pit incorporating RootSpace. GBU1015 is shown in this section

### RootSpace 600 Upright

Interlocking high strength vertical panel – designed for fast location and connection with neighbouring panels to build extensive structures quickly

### RootSpace Airflow QR (Quick Release) Top

Designed to allow air movement over the soil profile, fast interconnection with neighbouring cap and class leading structural strength. Central aperture designed to collect debris and diffuse water flow into soil zone, reducing potential for water flow erosion.

### RootSpace 600 Infill

RootSpace is the only structural soil system to provide an optional side panel for increased stability against lateral ground movements. Can be used around perimeter of the installation where there is a likelihood of post planting subterranean ground settlement.
RootSpace™

Arborflow 100 series 1500mm x 750mm SUDS modular array
SASLCB Arbonguy strapped anchor system c/w ground anchors
RRARBV150A Arborvent 150 double inlet aeration/irrigation system with cast inlets fitted to RootSpace Airflow inlet
Drainage layer - 150mm depth of clean angular stone around sides and base of RootSpace structure
RootSpace structure - 2 modules deep x 10 modules across (1 x 2 x 2 module void below root ball) loaded with Rootsoil Hydro

ARBPC1507A 1500mm x 750mm tree grille
Galvanised tree grille support frame recessed into and attached to Arborflow 100
Footway/road construction to engineer’s details
GLTWGNA twinwall geonet laid over Rootspace structure
GRN30 plastic open reinforcing mesh, 30mm aperture laid below and around sides of RootSpace structure
SASLP Arborguy strapped anchor system

Note:
Special drive rod required for SASLP installation
Structural engineer’s note:
For increased strength and stability in soft ground conditions, specify RootSpace modules to incorporate side panel inserts to tree pit perimeter

Sub-base and drainage installed below RootSpace to structural engineer’s/engineer’s requirement/detail

Package includes the following GreenBlue Urban products:
RootSpace uprights - 432 No. 500mm x 500mm x 600mm
RootSpace Airflow deck - 96 No. 500mm x 500mm x 70mm
Rootsoil Hydro topsoil to fill RootSpace and Root Director spaces (including root ball volume) - allow 30.85 Cu. m per tree. Additional allowance needs to be made for settlement
RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree
Arborvent 150 inlet aeration system with cast inlets - 4 per tree
Arborflow 100 series SUDS modular array - 6 No. 750mm linear modules and 4 No. corner modules
GLTWGNA twinwall geonet - 25 Sq. m
GBU GRN30 plastic open reinforcing mesh, 30mm aperture - 50 Sq. m
SASLP Arborguy strapped anchor system - large ARBPC1507A 1500mm x 750mm tree grille

All dimensions and details are approximate and must be checked on site not scaled from the drawing.

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StrataCell™
Soil structure system

Benefits

- Designed to support enormous vertical as well as lateral loads
- Excellent modular strength
- Integrated matrix means modules are simple and fast to click together
- In excess of 94% of total soil volume is available for tree-root growth
- Generously designed apertures permit common conduits, service pipes and aeration systems
- Significant volume reduction for freight and lower transport costs
- Reduced installation costs
- Constructed from 100% post-industrial waste material

Designed to highly advanced engineering specifications to support greater vertical loads, StrataCell brings tree-root systems closer to pavement surfaces. Engineers have calculated that, with only 300mm of granular pavement depth, a StrataCell matrix can support maximum traffic loads.

Click here to view our website
Designed to highly advanced engineering specifications to support greater vertical loads, StrataCell brings tree-root systems closer to pavement surfaces. Engineers have calculated that, with only 300mm of granular pavement depth, a StrataCell matrix can support maximum traffic loads.

With vertical and lateral forces also considered in the engineering make-up of tree pits, StrataCell’s well-designed matrix units lock together well, forming a monolithic framework with excellent modular strength. Highly secure connectors allow for StrataCell modules to click together fast and simply.

Its open and skeletal structure provides an enormous growth zone for delicate root systems, with in excess of 94% of the soil volume allocated for tree-root growth. These high soil-volume tree pits are distinctly more advantageous for trees as optimum conditions for nature and nurture are recreated for trees to live and flourish. StrataCell apertures are built to generous specifications, permitting common conduits, service pipes and aeration mechanisms to be incorporated into the structure’s design.
Typical installation specification
Please contact GreenBlue Urban for full installation specification.

Compatible ‘Arborsystem’ products
- Root management. See page 30
- Underground root ball guyings. See page 71
- Tree grilles and guards. See page 79
- Porous resin bound gravel. See page 90

Standard Tree Pit Details
To clearly illustrate correct product application, please refer to our standard tree pit details which are in the tree product packages section refs: GBU1007 - GBU1009 and GBU1012 - GBU1013

StrataCell Module specification (60 series)

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<tr>
<td>Description</td>
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<tr>
<td>Material</td>
<td>Advanced glass reinforced polypropylene</td>
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<tr>
<td>Dimensions</td>
<td>500mm x 500mm x 250mm</td>
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<tr>
<td>Loading capacity</td>
<td>550Kpa vertical load</td>
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StrataCell Module specification (30 series)

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<th>Product code</th>
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<td>Description</td>
<td>Recycled plastic rigid skeletal interlocking octagonal structure</td>
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<tr>
<td>Material</td>
<td>Recycled polypropylene</td>
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<tr>
<td>Dimensions</td>
<td>500mm x 500mm x 250mm</td>
</tr>
<tr>
<td>Loading capacity</td>
<td>260Kpa vertical load</td>
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</table>
The RootCell system originally developed in 2001 following consultation with landscape architects, local authorities and leading tree experts. The concept is simple – topsoil is the most favourable, natural rooting medium. RootCells provide the load bearing structure preventing the soil from becoming compacted and lifeless. Furthermore, the long term root zone can be maintained by incorporating RootRain irrigation/aeration in the design.

**Benefits**

- **Load bearing** – RootCells have been independently tested to sustain loads of up to 80 tonnes per square metre evenly distributed.
- **When loaded with topsoil**, RootCells are 92% soil by volume.
- **Maximises rooting area for the tree**.
- **Easily installed in modular form**.
- **Constructed from 100% recycled plastic**.
- **Long term root zone management is possible when installed in conjunction with RootRain & RootDirector products as shown**.
- **Promotes a multiple rooting pattern more suited to urban locations**.

**Typical installation specification**

Install GreenBlue Urban root management system comprising RootCells, RootDirector and RootRain Hydrogrille or Arborvent.

[Click here to view our website]
RootCells should be installed on a firm, level, free draining base. The contractor should allow for installing a land drain in areas prone to waterlogging.

RootCells should be loaded in situ with a good quality, free draining topsoil. A sandy loam with a neutral pH is recommended. RootCells can be loaded with topsoil four layers at a time. The soil mixture must be dry for this operation.

Where exceptionally heavy loading is anticipated, e.g. occasional HGV overrun, it is advisable not to lay modules more than four deep. The load capacity begins to decrease with depth. If in doubt, consult our technical department.

Specify the number of modules to be used per tree pit. Quantity will depend on space available and budget – contact our sales office for costings.

**RootCell Module specification**

- **Product code**: GLRROMA
- **Description**: Recycled plastic rigid skeletal interlocking ring structure
- **Material**: Recycled HDPE
- **Dimensions**: 250mm x 250mm x 90mm
- **Loading capacity**: 80 metric tonnes per square meter evenly distributed load

**Compatible ‘Arborsystem’ products**

- Root management. See page 30
- Underground root ball guying. See page 71
- Tree grilles and guards. See page 79
- Porous resin bound gravel. See page 90

**Standard Tree Pit Details**

To clearly illustrate correct product application, please refer to our standard tree pit details which are in the tree product package section ref: GBU1006
Soils and soil mixes

In the long term, urban tree health is inextricably linked to the soil the roots are growing into. GreenBlue Urban have made a study of this subject and our goal is the provision for the urban tree of a soil which mirrors, as closely as possible, a ‘forest floor’ soil condition and content.

Our studies have led us to excavations in natural forests as well as urban tree planting sites around the UK, seeking out the most favourable rooting conditions – and their common characteristics. This has revealed that uncompacted, free draining fertile loam soil is the most root friendly substance on the planet.

Sand alone is not sufficient – or the Sahara would not be a desert. Rocky terrain likewise – without soil in, is not conducive to a healthy long term rooting structure. Roots in rock soil substrate mixtures, tend to be artificially elongated as they have to travel further to access nutrient and moisture – hence the need in this type of system for huge volumes (typically -50 cubic meters per tree, provides approximately 12 cubic meters of actual soil for roots)

This type of planting method has been used in Scandinavia due to the abundance of low cost stone. It has the advantage of being very free draining and can be poured around obstructions. However, topsoil is still required in and around the tree pit sufficient for the roots zone of rapid taper before it enters the rock soil matrix. Correct mixing, and close installation supervision by qualified personnel, are vital to their successful use of this product. Although it has a role in some urban tree planting situations, the high cubic volumes required tends to preclude the use of this system widely in the UK.

Compacted ground and soil conditions are the principle reason for the demise of urban trees, hence the necessity for a good quality uncompacted soil – within a system such as RootSpace, which cares for the actual physical soil structure.

At GreenBlue Urban, our recommendation will always be to provide tree roots with the substance nature intended – actual good quality uncompacted topsoil – trees have been successfully growing in this for thousands of years.
RootSoil 20™
Our premium quality soil – blended to our specification for use in below ground structural support systems. This product incorporates consistent sand/clay/silt proportions to ensure good drainage, excellent nutrient holding capacity and good cationic exchange levels, ensuring the tree root can access the nutrient in the soil.

Stratasoil 20
A more general purpose soil – frequently used for both general landscaping as well as tree planting. This soil is a good quality soil but with some variation on actual content due to being sourced from multiple UK sites to reduce road haulage.

RootSoil Hydro
This soil mix is specifically blended for SUDS tree pits - to incorporate a high tolerance to repeated flooding. Designed to drain freely so that a tree pit can be used for water attenuation without affecting the health of the tree, but retaining adequate nutrient levels.

Arborsoil
This soil mix is a load bearing compactible root zone material. We principally sell this product for secondary rooting zones where it is impossible to use a better quality uncompacted soil in a structural support system such as RootSpace.

Arborsoil is a useful addition to our range and is sometimes used in conjunction with load bearing stormwater crates forming a raft over the top. This spreads point loading, and aids water dispersion in a SUDS application.

Developed in the Netherlands to cope with high water table levels it works well, despite a fast leaching high sand content, provided it receives an annual liquid nutrient application. This is a requirement due to the high sand content in which nutrient can be leached away quickly.

Please note – close site supervision is vital to ensure correct compaction levels, even when used under load bearing stormwater crates. Over compaction is detrimental to root growth, under compaction leaves a liability to settlement.

Specifiers Note: Please provide in the maintenance program, for the annual application of liquid NPK nutrient to the root zone, when using this type of sand based product.
RootStart
Mycorrhizal Fungi

Key Benefits

- One treatment lasts a lifetime – as the plant grows the fungal partner grows
- Reduced mortality – for bare rooted, root balled and specimen plants
- Better drought tolerance – the vast fungal root system makes best use of all available soil moisture
- Earlier and better growth – in 2-4 weeks after planting, the mycorrhizal fungi can increase the active root area of plants by up to 700 times
- Better uptake of fertilisers – when applied after planting, the network of mycorrhizal fungi acts like a net catching nutrients and prevents leaching
- Increased uptake of trace elements – from the soil leading to increased plant health (the ultra-fine fungal mycelium can unlock nutrients from the soil)
- Easy to use – simply sprinkle into the planting pit as directed

RootStart is GreenBlue Urban mycorrhiza inoculant for use when planting trees in urban areas. Mycorrhiza occurs naturally in forest situations and is hugely beneficial to as root systems, increasing exponentially the ability of roots to absorb vital water and nutrients from the soil. Having studied the research related to this product, we are now offering this soil additive for all new urban tree planting schemes.

Whilst in a healthy forest floor situation mycorrhiza occurs naturally, with the majority of new urban tree planting projects we are using locally sourced ‘manufactured’ soils. Whilst these soils are made to exacting mineral specifications and contain green waste and organic matter, they are frequently biologically inert and deprived of natural mycorrhiza. Hence we are suggesting that for a minimal investment, a small amount of RootStart mycorrhiza added to the backfill immediately surrounding the root ball, will increase the establishment rate of the root system.
Tree pit irrigation

Overview

Drought stress causes more urban tree mortality than any other factor. It is not only required for all the biochemical requirements for growth photosynthesis, respiration and transport, but also mechanical support to leaf and stem tissue.

Insufficient (or inefficient) watering will result in loss of leaf turgor and consequent reduction in new shoot extension. Eventually this will lead to die-back and, if not remedied, the loss of the tree.

Research has shown that trees irrigated ‘proactively’ i.e. by implementing a regular watering regime, have over three times the weight of new roots growing into backfill soil material compared to those watered ‘reactively’.

Waiting until the tree shows signs of drought stress before watering is known as ‘reactive’ irrigation. Whilst this might keep the tree alive, it will often result in stem die-back and possibly long term structural defects in the tree.

Tree watering requirements

<table>
<thead>
<tr>
<th>Girth (cm)</th>
<th>Height (m)</th>
<th>Estimated daily* transpiration rate (litres)</th>
<th>Suggested first season summer watering requirements (litres per month)</th>
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<tr>
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<td>1.8 - 3.0</td>
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<tr>
<td>Light Standard</td>
<td>6 - 8</td>
<td>2.4 - 2.7</td>
<td>36</td>
</tr>
<tr>
<td>Standard</td>
<td>8 - 10</td>
<td>2.7 - 3.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Selected Standard</td>
<td>10 - 12</td>
<td>3.0 - 3.6</td>
<td>45</td>
</tr>
<tr>
<td>Heavy standard</td>
<td>12 - 14</td>
<td>3.6 - 4.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Extra Heavy</td>
<td>14 - 16</td>
<td>4.2 - 4.8</td>
<td>3.0</td>
</tr>
<tr>
<td>Semi Mature</td>
<td>16 - 20</td>
<td>4.8 - 5.4</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>16 - 20</td>
<td>5.4 - 6.0</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>20+</td>
<td>6.0+</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>7.0+</td>
<td>7.0+</td>
<td>115</td>
</tr>
<tr>
<td></td>
<td>14 - 18</td>
<td>6.0+</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>18 - 20</td>
<td>5.4 - 6.0</td>
<td>190</td>
</tr>
<tr>
<td></td>
<td>20+</td>
<td>6.0+</td>
<td>220</td>
</tr>
<tr>
<td></td>
<td>7.0+</td>
<td>7.0+</td>
<td>300+</td>
</tr>
</tbody>
</table>

*Calculations for transpiration and suggested watering requirement are based on a typical plane tree in a tree pit ameliorated with 25% peat and with a 50mm mulch layer. The figures are approximate and are for guidance only. Allow an extra day for every 10mm of rainfall.
The original RootRain Metro system is the most widely specified proprietary tree pit irrigation system in the UK. Designed and manufactured in Britain, the Metro is available in three different sizes and with three different cap configurations.

The system is also available in contractor pack form for self assembly.

**Benefits**

- Quick and easy to install
- Extremely cost effective
- Improved drought tolerance
- Fast watering (60 litres per minute in porous soil)
- Reduces water volume requirements by eliminating wastage
- 100% Recycled material

**Typical installation specification**

Install RootRain Metro (state product code) c/w pipe and fixing bracket with attached top cap as follows:

Loop the free end of the 35mm perforated irrigation pipe around the root system.
Effective Discreet Unobtrusive

Simply loop around the shoulder of the root ball.
Nail the bracket to the tree stake before backfilling to conceal the Metro bracket.

Root management. See page 30

Compatible ‘Arborsystem’ products

Standard tree pit details

To clearly illustrate correct product application, please refer to our standard tree pit details which are in the installation, tree product packages section ref: GBU1001, GBU1002, GBU1006

<table>
<thead>
<tr>
<th>Product</th>
<th>Pipe diameter</th>
<th>Length</th>
<th>Rootball diameter</th>
<th>Cap type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>RootRain Metro</td>
<td>35mm</td>
<td>1.25m</td>
<td>0.4m</td>
<td>Plastic</td>
<td>RR1A</td>
</tr>
<tr>
<td>RootRain Metro</td>
<td>35mm</td>
<td>1.25m</td>
<td>0.4m</td>
<td>Plastic with chain</td>
<td>RRPC1A</td>
</tr>
<tr>
<td>RootRain Metro</td>
<td>35mm</td>
<td>1.75m</td>
<td>0.55m</td>
<td>Metal with chain</td>
<td>RRMC1A</td>
</tr>
<tr>
<td>RootRain Metro</td>
<td>35mm</td>
<td>1.75m</td>
<td>0.55m</td>
<td>Plastic</td>
<td>RR2A</td>
</tr>
<tr>
<td>RootRain Metro</td>
<td>35mm</td>
<td>2.5m</td>
<td>0.8m</td>
<td>Plastic</td>
<td>RR3A</td>
</tr>
<tr>
<td>RootRain Metro</td>
<td>35mm</td>
<td>2.5m</td>
<td>0.8m</td>
<td>Plastic with chain</td>
<td>RRPC2A</td>
</tr>
<tr>
<td>RootRain Metro</td>
<td>35mm</td>
<td>2.5m</td>
<td>0.8m</td>
<td>Metal with chain</td>
<td>RRMC2A</td>
</tr>
</tbody>
</table>

approximately 250mm below finished level. Plug the pipe into the bracket bottom cap. Nail the bracket to the tree stake to prevent theft. Backfill the rest of the tree pit. It is important to ensure that the inlet pipe and top cap protrude between 10mm and 50mm from the finished surround level. The main bracket section should not be visible.
RootRain Urban
Irrigation and aeration system

Benefits

- Large capacity 80mm inlet with 60mm watering circuit.
- Easy and quick installation.
- Cost effective on the largest or smallest schemes.
- Extremely vandal resistant.
- Discreet and unobtrusive appearance.
- Fast watering (100 litres per minute in porous soil)

Typical installation specification

Install RootRain Urban (1, 2 or 3) irrigation system as follows:

Loop the 60mm irrigation pipe around the shoulder of the root ball (200mm-300mm below ground level) and connect securely to the tee piece. The vertical piece of pipe can be cut to length to ensure that the inlet is flush or slightly (25mm maximum) proud of the final pit surround.

A large capacity irrigation system with a fixed non-removable grid inlet. The grid allows water and air through but prevents ingress of litter and debris.

The RootRain Urban is particularly suited to roadside verge and open space tree planting. The inlets are strimmer resistant and can be set below mowing machine height. They have very little vandal appeal and no theft value, making them ideal for housing estates and public areas.

Click here to view our website
Design Guide – Trees in the urban environment (Edition 8)

Product specification

- Inlet: 80mm heavy duty HDPE moulded grid top
- Reducer: 80/60mm HDPE with integral strengthening fins
- Vertical pipe: 60mm PE perforated pipe
- Tee section: Heavy duty HDPE with non return locking lugs to secure pipe work

Compatible ‘Arborsystem’ products

- Root management. See page 30
- Root ball guying. See page 71

Product specification and order codes

<table>
<thead>
<tr>
<th>Product</th>
<th>Diameter D</th>
<th>Pipe length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>RootRain Urban</td>
<td>895mm</td>
<td>3m</td>
<td>RRURB1A</td>
</tr>
<tr>
<td>RootRain Urban</td>
<td>1530mm</td>
<td>5m</td>
<td>RRURB2A</td>
</tr>
<tr>
<td>RootRain Urban</td>
<td>2490mm</td>
<td>8m</td>
<td>RRURB3A</td>
</tr>
</tbody>
</table>

Using the table below, the specifier can select the correct size in relation to root ball diameter.

This illustrates the correct level for the RootRain Urban inlet. Too low could lead to blockages; too high can look obtrusive.

RootRain Urban – the cost effective high capacity tree waterer designed for durability.

Standard tree pit details

To clearly illustrate correct product application, please refer to our standard tree pit details which are in the tree product packages section, ref: GBU1003 - GBU1005
RootRain Civic
Large capacity irrigation system

The RootRain Civic system is a very well proven large capacity irrigation system which has a vandal resistant inlet with a powder coated aluminium cap on a retainer chain. Popular with landscape architects and contractors, the Civic has been widely used on projects demanding a high level of specification.

Benefits

- Large capacity 80mm inlet with 60mm watering circuit
- Vented aluminium cap on retainer chain
- Prevents fines entering irrigation system
- Quick and easy to install

Typical installation Specification

Install RootRain Civic (1, 2 or 3) irrigation system, complete with aluminium cap and retainer chain.

Loop the 60mm irrigation pipe around the shoulder of the root ball (200mm-300mm below ground level) and connect securely to the tee piece. The vertical piece of pipe can be cut to length to ensure that the inlet is flush or slightly (25mm maximum) proud of the final pit surround.

When installed correctly, only the aluminium cap should be visible.
Product specification

- Inlet: 80mm heavy duty HDPE moulded grid top
- Inlet cap: Aluminium powder coated with retainer chain, finished in black
- Reducer: 80/60mm HDPE with integral strengthening fins
- Vertical pipe: 60mm PE perforated pipe
- Tee section: Heavy duty HDPE with non return locking lugs to secure pipe work
- Pipe circuit: 60mm PE perforated pipe

Compatible ‘Arborsystem’ Products

- Root management. See page 30
- Root ball guying. See page 71

Product specification and codes

<table>
<thead>
<tr>
<th>Product</th>
<th>Diameter D</th>
<th>Pipe length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>RootRain Civic</td>
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<td>3m</td>
<td>RRCIVIC1A</td>
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<tr>
<td>RootRain Civic</td>
<td>1530mm</td>
<td>5m</td>
<td>RRCIVIC2A</td>
</tr>
<tr>
<td>RootRain Civic</td>
<td>2490mm</td>
<td>8m</td>
<td>RRCIVIC3A</td>
</tr>
</tbody>
</table>
RootRain Hydrogrille

For heavily trafficked areas

The new RootRain Hydrogrille tree aeration system maintains long term soil health and fertility by facilitating high volumes of water and oxygen to reach the tree rooting area directly and allowing toxic gases to escape – a critical tree welfare factor.

The lift and swing lid has the added benefit of easy access for cleaning and has the capacity to withstand heavy vehicular overrun, including from street sweepers.

Benefits

- Heavy cast LM6 grade aluminium inlet – withstands high loads
- Steel vent lid permanently attached to inlet by stainless steel fitting
- Lid lifts and swings to one side for fast irrigation
- Inlet twistlocks into GreenBlue Urban’s range of tree grilles
- Can be used in conjunction with Arboresin porous bound gravel
- Flush finish ensures no trip hazard

Typical Installation Specification

Install RootRain Hydrogrille (1, 2 or 3) irrigation system c/w cast aluminium inlet as follows: Loop the 60mm irrigation pipe around the shoulder of the root ball (200mm-300mm below ground level) and connect securely to the tee piece.

The Hydrogrille is frequently used to provide several irrigation/aeration points around individual large trees in conjunction with the RootCell system.

Click here to view our website
Product specification

- Inlet: 120mm diameter to suit tree grilles. Heavy cast aluminium/bronze inlet with lift and swivel vent lid.
- Vertical pipe: 60mm PE perforated pipe
- Tee section: Heavy duty HDPE with non-return locking lugs to secure pipe work
- Pipe circuit: 60mm PE perforated pipe

Compatible ‘Arborsystem’ products

- Root management. See page 30
- Soil structure systems. See page 42
- Underground root ball guying. See page 71
- Tree grilles and guards. See page 79
- Porous resin bound gravel page 90

Product specification and codes

<table>
<thead>
<tr>
<th>Product</th>
<th>Diameter D</th>
<th>Pipe length</th>
<th>Code</th>
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<tbody>
<tr>
<td>RootRain Hydrogrille</td>
<td>895mm</td>
<td>3m</td>
<td>RRHYDR1A</td>
</tr>
<tr>
<td>RootRain Hydrogrille</td>
<td>1530mm</td>
<td>5m</td>
<td>RRHYDR2A</td>
</tr>
<tr>
<td>RootRain Hydrogrille</td>
<td>2490mm</td>
<td>8m</td>
<td>RRHYDR3A</td>
</tr>
<tr>
<td>RootRain Hydrogrille*</td>
<td>2490mm</td>
<td>8m</td>
<td>RRHYDRD13A</td>
</tr>
</tbody>
</table>

*double inlet
RootRain Arborvent 100/150

For heavily trafficked areas

Benefits

- Heavy cast LM6 grade aluminium inlet – withstands high loads
- Aluminium vent lid permanently attached to inlet by stainless steel fitting
- Lid lifts and swings to one side for fast irrigation
- Can be used in conjunction with Arboresin porous bound gravel
- Flush finish ensures no trip hazard
- Specify Arborvent 150 for all WSUDS tree pit installations requiring optimal aeration

Typical Installation Specification

Install RootRain Arborvent (1, 2 or 3) irrigation system c/w cast aluminium inlet as follows: Loop the 60mm irrigation pipe around the shoulder of the root ball (200mm-300mm below ground level) and connect securely to the tee piece.

The new RootRain Arborvent 100 / 150 tree aeration system maintains long term soil health and fertility by facilitating high volumes of oxygen to reach the tree rooting area directly and allowing toxic gases to escape – a critical tree welfare factor.

The lift and swing lid has the added benefit of easy access for cleaning and has the capacity to withstand heavy vehicular overrun, including from street sweepers.

The Arborvent is frequently used to provide several irrigation/aeration points around individual large trees in conjunction with the RootCell system.
Using the tables below, the specifier can select the correct size in relation to root ball diameter.

The vertical piece of pipe can be cut to length to ensure that the inlet is flush with the paving surround. If fitting into a tree grille, ensure inlet is connected to vertical 60mm riser pipe, locate inlet into purpose formed aperture within the grille and twist to lock into place.

### Product specification

- **Inlet:** 120mm diameter to suit tree grilles. Heavy cast aluminium inlet with lift and swivel vent lid. Arborvent 110mm x 110mm
- **Vertical pipe:** 60mm PE perforated pipe
- **Tee section:** Heavy duty HDPE with non return locking lugs to secure pipe work
- **Pipe circuit:** 60mm PE perforated pipe

### Compatible ‘Arborsystem’ products

- Root management. See page 30
- Soil structure systems. See page 42
- Underground root ball guying. See page 71
- Tree grilles and guards. See page 79
- Porous resin bound gravel page 90

### Standard tree pit details

To clearly illustrate correct product application, please refer to our standard tree pit details which are in the tree product packages section refs: GBU1014 - GBU1016

**Product specification and codes**

<table>
<thead>
<tr>
<th>Product</th>
<th>Diameter D</th>
<th>Pipe length</th>
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<td>Arborvent 100</td>
<td>1530mm</td>
<td>5m</td>
<td>RRARBV2D</td>
</tr>
<tr>
<td>Arborvent 100</td>
<td>2490mm</td>
<td>8m</td>
<td>RRARBV3D</td>
</tr>
<tr>
<td>Arborvent double inlet</td>
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<td>8m</td>
<td>RRARBVDI3D</td>
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<tr>
<td>Arborvent 150</td>
<td>-</td>
<td>700mm</td>
<td>RRARBV150A</td>
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</table>
Guying and ties
Support and protection

GreenBlue Urban offers a comprehensive range of products for guying, tying and protecting new tree planting.

Extensive research has resulted in the launch of the GreenBlue Urban ‘Arborguy’ tree guying system. The patented design, unique to GreenBlue Urban provides fast easy installation.

The Arborguy anchor has been designed to be as streamlined as possible for driving into compacted sub soils, whilst combining superb ‘groundlock’ technology for secure tree anchoring – testing shows in excess of 1340kgs of upward force on just one anchor driven into subsoil from ground level.

If specifying plastic or rubber tree ties, ensure these are checked regularly during the maintenance period and removed as soon as the tree has established its own anchorage. Unremoved ties can eventually strangle the tree as its trunk expands.

An alternative for small trees is to specify our biodegradable tree tie. Naturetie made from hessian, which will break down naturally over time as the tree establishes its own anchorage. In exposed areas, it may be necessary to retie trees during the maintenance period.
This method of securing trees has many advantages over staking and is suitable for large root-balled trees. The root ball is held in position by driving three anchors into the base of the tree pit and then fastening the Arborguy rachet strap as shown.

If required, the system can be re-tensioned at a later date.

Benefits
- A guying system to fully complement GreenBlue Urban tree packages
- Designed for trees in the urban and rural environments
- An effective and out of sight method of guying trees in preference to staking
- Strapping will not cut the rootball, therefore no mats or timber required
- Ground anchors manufactured from advanced high strength composite

Strap to be threaded through rings, over rootball, into rachet tensioner and tensioned as necessary.
### Product specification and codes

<table>
<thead>
<tr>
<th>Product</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arborguy</strong> strapped medium anchor system with drive in</td>
<td>SASMCB</td>
</tr>
<tr>
<td>heavy duty composite anchors. Includes webbing strap and</td>
<td></td>
</tr>
<tr>
<td>rachet tensioner. Suitable for trees up to 20cm girth.</td>
<td></td>
</tr>
<tr>
<td><strong>Arborguy</strong> strapped large anchor system with drive in</td>
<td>SASLCB</td>
</tr>
<tr>
<td>large heavy duty composite anchors. Includes webbing strap</td>
<td></td>
</tr>
<tr>
<td>and rachet tensioner. Suitable for trees up to 40cm girth</td>
<td></td>
</tr>
<tr>
<td><strong>Arborguy</strong> strapped anchor deadman guying system supplied</td>
<td>SASDMB</td>
</tr>
<tr>
<td>with 3 slip knot guys webbing strap and rachet tensioner.</td>
<td></td>
</tr>
<tr>
<td>For trees up to 40cm girth.</td>
<td></td>
</tr>
<tr>
<td>Tool kit for installation of SASM systems – including extra</td>
<td>SASKITXMA</td>
</tr>
<tr>
<td>length drive rod, drive rod rammer, setting tool and drive</td>
<td></td>
</tr>
<tr>
<td>rod pull out tool</td>
<td></td>
</tr>
<tr>
<td>Tool kit for installation of SASL systems – including extra</td>
<td>SASKITXLA</td>
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<tr>
<td>length drive rod, drive rod rammer, setting tool and drive</td>
<td></td>
</tr>
<tr>
<td>rod pull out tool</td>
<td></td>
</tr>
</tbody>
</table>

**Arborguy deadman guying system**

The **Arborguy** ‘deadman’ system is ideal where there is a risk of underground utilities in the immediate vicinity of the tree pit.

As shown in the diagram, three deadman anchors (heavy timbers) are placed in the base of the tree pit in a triangle shape to secure the wires to.

For each of the three cables, loop the D ring end of each cable through the wire loop on the opposite end to create a slip knot noose. This noose is then positioned over the end of each of the three deadman anchors and tensioned up in the centre. Once this has been done in the centre of each of the deadmen (three times), the nylon webbing passes through the small loop on the end of each cable and is ratcheted up tight over the top of the rootball.

Underground guying is the most unobtrusive method for supporting large rootballed trees.
Tree ties
Securing large root balled trees

When selecting a method and the material for tree tying the following factors should be considered.

1. Size of tree.
2. Location.
3. Maintenance requirements.
4. Likely wind loading and other environmental considerations.
5. Durability and cost.
6. Vandalism.
7. Aesthetic appearance.

GreenBlue Urban stocks an extensive range of tree tie products to suit many varying applications.
### Types of belt

Reinforced – Nylon reinforced rubber belt, most popular version for local authorities and landscapers

<table>
<thead>
<tr>
<th>Product</th>
<th>Length (m)</th>
<th>Width (mm)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforced</td>
<td>10</td>
<td>25</td>
<td>GLB25B</td>
</tr>
<tr>
<td>Reinforced</td>
<td>10</td>
<td>35</td>
<td>GLB35B</td>
</tr>
</tbody>
</table>

### Pads, blocks, collars and sleeves

<table>
<thead>
<tr>
<th>Block code</th>
<th>Description</th>
<th>Belt size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLPAA</td>
<td>Standard pad</td>
<td>25mm belt</td>
</tr>
<tr>
<td>GLPAAA</td>
<td>Extra large pad</td>
<td>38mm belt</td>
</tr>
<tr>
<td>GLPBA</td>
<td>Chunky pad</td>
<td>25mm belt</td>
</tr>
<tr>
<td>GLPFA</td>
<td>Plastic sleeve (300mm)</td>
<td>25mm belt</td>
</tr>
<tr>
<td>GLPFFA</td>
<td>Plastic sleeve (300mm)</td>
<td>38mm belt</td>
</tr>
</tbody>
</table>
Naturetie
Biodegradable tree tie material

In general, **Naturetie** can be used similarly to other tie materials, but without the need of a spacer between the tree and the stake. The spacer can be formed by the material itself.

This product has many advantages over plastic and rubber. It will not strangle the tree as the tree grows but will biodegrade gradually as the tree establishes its own roots for anchorage.

**Benefits**

- 100% natural material, environmentally friendly from sustainable sources.
- Strong, versatile and fast to install.
- Very cost effective for large tree planting/forestry schemes.
- Will not strangle the tree.
- Reduces maintenance costs.

**Product codes**

<table>
<thead>
<tr>
<th>Product</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naturetie (30m rolls)</td>
<td>GLNTA</td>
</tr>
</tbody>
</table>
Tree Guard Tie

The GreenBlue Urban Tree Guard Tie is designed to keep the trunk of a newly planted tree central in relation to the top of the tree guard.

In a real life situation it is not always possible to plant the tree dead central in relation to the tree guard together with being vertically plumb. With this in mind trees are often seen chafing at the top of a tree guard in windy conditions. This can cause serious damage to the tree together with looking unsightly as the tree is at an undue angle.

The heavy duty buckle tie is secured by passing through a special L shaped bracket at the top of the tree guard. This is then joined to another buckled tie which surrounds the tree trunk and fixes to another bracket on the opposite side of the tree guard. The tie does not hold the tree rigidly but prevents the possibility of the tree trunk from making contact with the tree guard.

Benefits

- Strong, versatile and fast to install.
- Very cost effective for large tree planting/forestry schemes.
- Will not strangle the tree.
- Reduces maintenance costs.

Product codes

<table>
<thead>
<tr>
<th>Product</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Guard Tie</td>
<td>GLGTAA</td>
</tr>
</tbody>
</table>
Tree grilles and guards

Attractive and functional, grilles have an important role to play in maintaining healthy tree pit conditions. GreenBlue Urban’s range, all named after rivers in Great Britain, offer value for money and the quality you would expect from the country’s leading specialist supplier of urban tree planting products.
Tree grilles
Fully integrated grille systems

During the last two decades, GreenBlue Urban has been developing innovative products to assist trees below ground in their battle to establish and grow in hostile urban environments. Now with the Arborsystem tree grille range, that same attention to detail has been turned to tree pit surround systems.

Arborsystem tree surrounds are engineered to an extremely high standard under rigorous quality controls. GreenBlue Urban is an ISO 9002 company and takes product development and quality seriously. Consequently, the range detailed in this design guide represents the latest technology in tree surrounds. Illustrated are just some of the design features integral to the Arborsystem brand that have lifted our range to new levels of excellence.

Benefits
- Enables the tree to receive natural water
- Prevents surrounding soil from being compacted
- Adds architectural flair to paved surfaces
- Available in many different finishes including powder coating to any RAL colour
- The grille frames can be disassembled once installed. This gives the contractor the option of planting the tree before or after installation

Avon DTS ductile iron tree grille with integrated RootRain Hydrogrille
Clyde tree grille with a galvanised finish
Design
Our product development team has worked hard to ensure that even the most standard designs work well, look smart and give a trouble free life. Research and trials have helped us to arrive at the most effective and robust coatings where applicable for our product range.

Inner ring design
Allows for a neat and professional central opening. This gives additional tensile strength as well as providing fixing points for the vertical steel guard system.

Support frames
Arborsystem support frames have involved many hours of development to produce a design that is easy to install, vandal resistant, cost effective to manufacture and unobtrusive in use. These frames are engineered to the highest standards and can be rated to handle different loading requirements.

Built for strength
These tree surrounds are manufactured to withstand the everyday traffic and loadings expected of urban hardscapes. Our product advisors can work with you to ensure that the grille you select is suited to the types of traffic you are expecting to use the area. The DTS grille range is designed to withstand any reasonable traffic overrun.

Irrigation inlet fitting
Arborsystem RootRain Hydrogrille irrigation inlet fitting – another example of products engineered for purpose – heavy duty cast LM6 material giving a permanent access point for water and air, so vital for the tree. Plus, retaining bracket to ensure simple installation and alignment of irrigation pipe.

Integral features
These high quality cast ductile grilles can incorporate integral apertures for irrigation aeration inlets and uplighters. Twist lock aperture secures the fittings to avoid theft or sub surface settlement differentiation.
Standard tree grilles
Fully integrated grille systems

DTS Grille Systems

The standard Arborsystem tree grille range shown here is designed to integrate with a variety of different settings. Choice of design will be influenced by the following aspects:

- Existing site parameters and design elements
- Access requirements
- Anticipated vehicle traffic
- Disabled access
- Designer’s personal judgement on aesthetics.

Arborsystem grilles integrate with below ground root management, irrigation, aeration and guying systems. It is important that the below ground aspect of tree pit design is given careful consideration at the design stage. Tree literate design will pay dividends for years to come in the form of healthy, attractive trees.

The majority of our tree grilles are manufactured from cast ductile iron. However, we also offer a range of fabricated grilles which can be produced in mild or stainless steel. Our range of tree grilles can be made to suit any application. If they are going to be subject to exceptional loading, heavy duty frames will be required for the cast ductile grilles and the fabricated steel grilles will be manufactured from larger section material.

The standard finish is matt black polyester powder coated. This high quality finish is extremely durable. Any colour from the RAL range is available as an option. For extra protection on mild steel products zinc galvanising is standard, followed by a high quality coating to any RAL colour.

Some grilles and guards are now available from stock. Please contact GreenBlue Urban sales line for a competitive quotation and stock availability.

Avon tree grille.

‘Clyde’ grille, in central London, manufactured from grade 316 stainless steel.
### Typical installation specification

Ensure the depth around edge of tree grille frame has a minimum of 100mm of concrete. Reinforce if loading requires it. Place outer frame on concrete ensuring that top is level and at a height to suit adjacent surfacing. When concrete foundation has set sufficiently, fit tree grille segments and fasten anti-vandal bolts. RootRain Hydrogrille inlet and vertical steel guard can now be fitted.

### Standard tree grille range availability

<table>
<thead>
<tr>
<th>Size square</th>
<th>1000mm</th>
<th>1200mm</th>
<th>1500mm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adur</strong></td>
<td>ADUR10A</td>
<td>ADUR12B</td>
<td>ADUR15A</td>
</tr>
<tr>
<td><strong>Avon</strong></td>
<td>AVON10B</td>
<td>AVON12B</td>
<td>AVON15A</td>
</tr>
<tr>
<td><strong>Clyde</strong> (galvanised)</td>
<td>CLYDE10GA</td>
<td>CLYDE12GA</td>
<td>CLYDE15GA</td>
</tr>
<tr>
<td><strong>Clyde</strong> (black powder coated)</td>
<td>CLYDE10BA</td>
<td>CLYDE12BA</td>
<td>CLYDE15BA</td>
</tr>
<tr>
<td><strong>Tay</strong> (budget)</td>
<td>N/A</td>
<td>TAY12C</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Yare</strong></td>
<td>YARE10A</td>
<td>YARE12A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internal aperture diameter</th>
<th>500mm</th>
<th>600mm</th>
<th>600mm</th>
</tr>
</thead>
</table>

**NOTE:** Other sizes available to special order.
Tree grilles
Fully integrated grille systems

GreenBlue Urban have developed a range of four ‘design line’ tree grilles to compliment landscaping schemes of the highest quality. Individual data sheets are available for each grille design. This range can be manufactured in almost any size to suit your designs.

Well designed grilles enable the tree to receive natural water, prevent surrounding soil from being compacted and add architectural flair to the paved surface.

Designs vary to function under different circumstances. Grille patterns with smaller gaps are chosen where minimum change to the surface is needed. They will retain planting material but allow the free passage of pushchairs, wheelchairs and supermarket trolleys.

Available in a wide range of different sizes, tree grilles can be specified as part of the Arborsystem package, incorporating vertical guard, root management, irrigation and uplighter integration.

Zeta
- Low profile paving support grille
- High strength design to support vehicular overrun
- Provision for Arborvent root plate ventilation
- Unique adjustable central opening location to allow precision adjustment
- Our most discreet tree surround design

Castle
- Allows specifiers to continue their choice of paving over the tree pit area
- Available to comply with all regular load specifications.
- Removable inner section allows for tree growth
- Heavy duty recessed tree grille
- Built-in tree irrigation/ventilation inlets
- Robust galvanised construction
- Available in different sizes
**Boulevard**
- Design flexibility – additional parallel segments available provide for longer tree pit surface protection.
- Design maximises tree pit surface openness for water and air.
- Natural rust oxidisation provides long term protection.
- High strength ductile iron construction.
- Contemporary design.

**Medway / Mersey**
- New 600mm square compact tree grille system.
- Oval central aperture to allow fitting of tree stake.
- Very strong laser cut steel construction.
- Supplied with RD510A RootDirector.
- Design can be customized to include names of Streetscape/District etc.
- High quality powder coated finishes available in different colours.
- Mersey has a round central aperture.

**Bespoke**
- For designers who wish to create their own signature on a project, bespoke tree grilles can be an invaluable tool.
- Our product design team will be pleased to work with clients to create a working tree grille design from their visual ideas. Contact our sales office for details.
- Designs can be created from a range of materials i.e. Cast Iron, Ductile Iron and Stainless Steel.
- A wide choice of finishes is available from galvanizing to powder coating.
Tree grille frames
Fully integrated grille systems

Benefits

- Helps to stabilise grille and prevent it sagging around the tree
- Incorporating bolt holes for securing to concrete haunch
- Universal design to suit varying grille patterns
- Supplied with unique security fixing system

Frames are necessary to stabilise the grilles and prevent sagging around trees. All types of frames are supplied with a high quality galvanised finish.

Support frames can be customised to site requirements. For example, tree grilles on a slope can be designed to support the grille at an angle and the tree guard vertically. Frames are also available with a large outer ledge to support paving surrounds.
Typical installation specification

The correct choice of frame will depend on the following factors:

- Size of tree grille; some very large grilles require extra support.
- Potential loading which will be exerted on the grille. If heavy vehicles are likely to run over grilles then our heavy duty frame must be specified. Please contact our technical department to ensure the correct frame is specified.

Additional features

Please note that additional features can be added such as concrete ties and an outer rim to support the adjacent paving.
A galvanised finish is standard.
Vertical tree guards
Protection in an urban setting

Benefits
- Protection against vandalism and accidental damage
- Designed to fit within GreenBlue Urban tree grille range
- Adds to quality design

In an urban setting, young trees in particular are vulnerable to damage from bicycles and other equipment, as well as gratuitous vandalism. Tree guards offered by GreenBlue Urban are of strong construction and varying design and provide the ideal answer to such problems.

Tree guards can equally make a high quality visual design statement on public realm landscape schemes. The guards shown may be fitted to medium or heavy duty frames or ground fixed when used in parkland. The simple adjusting mechanism allows guards to be easily set on most gradients.

Each guard type is manufactured in a number of standard sizes to fit all grilles. Phone our sales line for prices and availability.

Click here to view our website
Vertical tree guards

Greencoat tree guards

These weldmesh guards have a green plastic protective coating to protect them and enhance their appearance. Available at 1.2m and 1.8m high and in two different styles. The high quality coating has a 10 year anti-corrosion warranty. Phone our sales line for prices and availability.

Weldmesh tree guards

Made from 3” x 1” x 12 gauge HDG welded mesh. To be secured to stake using 3 galvanized staples.

Weldmesh Guards product specification and order codes

<table>
<thead>
<tr>
<th>Galvanised weldmesh tree guards 300mm dia</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200mm high</td>
<td>GLWMG12X3A</td>
</tr>
<tr>
<td>1800mm high</td>
<td>GLWMG18X3A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Greencoat weldmesh tree guards 300mm dia</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200mm high</td>
<td>GLGCG12X3A</td>
</tr>
<tr>
<td>1800mm high</td>
<td>GLGCG18X3A</td>
</tr>
</tbody>
</table>

NOTE: Larger or smaller diameters can be manufactured to order.
**Arboresin**

Porous tree pit surface

**Benefits**

- Surface allows free flow of air and water to the root zone
- Will support light vehicular traffic (when laid to a minimum depth of 75mm)
- Avoids problems associated with loose gravel
- A choice of different aggregates available
- Can be retrofitted around existing trees reducing trip hazards
- Detailed installation specification available on request

**Arboresin** is a well proven hard wearing, attractive porous tree pit surface. Loose stones are a nuisance in pedestrian environments and tarmacadam or conventional paving has the effect of an impervious cap over the tree pit.

With **Arboresin**, the stone is bound together using a very high strength resin which prevents the gravel migrating beyond the tree pit. The nature of the resin bond results in a highly porous tree friendly surface immediately adjacent to the tree.

**Compatible ‘Arborsystem’ Products**

- Root management. See page 30
- Tree pit irrigation. See page 59
- Underground root ball guy ing. See page 71

Tree pit using Arboresin
Product specification

- Triple washed and dried stone graded to 10mm, supplied in 25kg bags.
- Arboresin two part resin system. (Colour UV stabilized resin available as an option).
- Arboresin installation kit.
- Arboresin solvent cleaner.
- Standard galvanised frames are available to provide a paving/bound gravel edge and help support paving loading for light traffic.

Standard Tree pit details

To clearly illustrate correct product application, please refer to our standard tree pit details which are in the tree product packages section ref: GBU1007 and GBU1013.
Precast Arboresin is a significant new development from GreenBlue Urban. This system consists of precast resin bound segments which are manufactured off site in a quality controlled environment. This does away with any on site mixing as the segments are already cast and simply locate into our standard 1200mm square DTS tree grille frame.

Cast within each segment is a specially designed preformed matrix of steel reinforcing rods. These add significant strength to the segments as well as providing a fixing point for the inner ring. A GreenBlue Urban vertical steel tree guard can then be bolted to the inner ring. Also cast into one half of the precast segments is a GreenBlue Urban Arborvent irrigation inlet. This durable cast aluminium inlet is simply connected to the 60mm diameter perforated pipe system surrounding the root ball.
GreenBlue Urban’s Precast Arboresin can be supplied in any of the following standard aggregate colours.

- Brittany Bronze
- Dorset Gold
- Silver Grey
- Red Granite

**Product specification**

- 1200mm two part DTS galvanised outer edge frame
- 2 No. 1200 x 600mm Precast steel reinforced Arboresin segments (colour of aggregate to be specified)
- Arborvent cast aluminium irrigation inlet – precast into one half segment
- Irrigation pipe grip bracket ensuring correct alignment of pipe with Arborvent inlet
- 2 No half rings for internal connection of precast segments

**Standard Tree pit details**

To clearly illustrate correct product application, please refer to our standard tree pit details which are in the tree product packages section ref: GBU1015, GBU1013
New developments in built-up conurbations and the unstoppable urbanisation of areas have exacerbated the potentially damaging effects of conventional surface-water drainage.

Traditional drainage of surface water run-off has been designed to convey rainwater, as rapidly as possible, from where it has fallen, to either a soakaway or a watercourse. This old method increases the risks of flooding, environmental damage and urban diffuse pollution, as run-off water usually carries contaminants including oils, heavy metals, pesticides, fertilisers, chemicals and other organic matter.

The implementation of sustainable drainage systems – demonstrated in outline as well as detailed applications and design submissions – is now demanded by authorities as a prerequisite of planning considerations, from early site evaluations, design and environmental-impact assessments.

### Arborflow™

Trees and sustainable urban drainage systems (SUDS)

Trees are playing an increasingly important role with SUDS designs

- **Trees slow water run-off.** For every 5% of tree cover added to a community, storm water run-off is reduced by approximately 2%

- **Tree root systems remove nutrients which are harmful to water ecology and quality**

- **Trees act as natural pollution filters.** Their canopies, trunks, roots and associated soil, filter polluted particulate matter out of the flow towards the storm sewers
Arborflow™

How it works

Benefits

- Ideal for use in an urban environment where lack of space is a challenge
- Prevents flooding as it absorbs and contains water in the tree pit system
- Reduces the flow rate of water run-off so that the system meets authorities’ allowable discharge rates
- Surface water is either discharged into surrounding subsoil, absorbed by roots or flows into tree pit’s control chamber
- Drainage channels trap salt and other organic matter, such as leaves
- Manages water run-off at source, or as close as possible to the point where water falls
- 100% post-consumer materials used have minimal or zero-impact on environment
- Increases chances of newly planted trees reaching their full potential
- Design and implementation meet new planning guidelines and regulations

GreenBlue Urban’s urban-drainage system – Arborflow – has been developed as a more sustainable, efficacious and environmentally robust process of managing surface water run-off.

Ideal for use in urban areas where space is at a premium, Arborflow provides attenuation within the tree pit as well as absorption into the surrounding ground and by the tree’s root system – a mature tree has the capacity to absorb over 200 litres of water a day.

GreenBlue Urban has designed a tree-pit system that markedly reduces the velocity and flow rate of surface water run-off in urban areas. The Arborflow system can be designed to assist with meeting discharge rates allowed and set by regulatory authorities.

Arborflow’s design allows the water to either be discharged into the surrounding subsoil, to be absorbed by the trees’ root systems, or to find its way into the specially designed flow-control chamber positioned on the outfall of the tree pit.

Phragmites reed has the ability to remove pollutants from water

Click here to view our website
The soil used within the RootSpace rooting profile has been specially designed to withstand frequent short term water logging conditions without any change in its physical structure or chemical properties.

As water is biochemically vital for the growth of a tree, for its photosynthesis and the transport of necessary nutrients, GreenBlue Urban’s Arborflow gives water every opportunity to penetrate a tree’s deeper root zone – essential for its growth and full-maturity potential.

Sustainability and the achievement of the highest standards of environmental performance are at the forefront of GreenBlue Urban’s activities. To combine storm water management within urban tree planting design achieves just this.

Standard Tree pit details
To clearly illustrate correct product application, please refer to our standard tree pit details which are in the tree product packages section ref: GBU1014
Arborflow™ 100 Series
SUDS Tree Pit System

This innovative product brings a new tool to the urban designer’s toolkit. A modular tree planting system specifically designed to bring measurable and sustainable benefits in storm water management when planting trees in paved surrounds.

The dual purpose interlocking panel system (patent applied for) provides water storage, dispersion, filtration and tree root management.

Key Benefits
- Measurable proven water attenuation capability
- Fast water dispersion below ground
- Linear or surround application
- Flexible tree pit size
- Fast Installation
- No specialist lifting equipment or installation techniques required
- Integral root training to prevent paving root heave
- Flood level indicator
- Maintainable pre-treatment gullies
- Simplicity of maintenance
- Able to be installed as ‘standalone’ or an integral part of a SUDS train
- Designed for retro fitting into established street scapes

Arborflow 100
A system to suit your site – standard packages easily adapted to both site conditions, budget, tree type, water attenuation requirements.

<table>
<thead>
<tr>
<th>Each System</th>
<th>Panel Configuration Panels + Corners</th>
<th>Outer Tree Pit Dimensions W x L x D inc. cells</th>
<th>Water attenuation capacity</th>
<th>Product Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arborflow 100</td>
<td>4 + 4</td>
<td>1500x1500x1000</td>
<td>250 litres</td>
<td>GBUABF100</td>
</tr>
<tr>
<td>Arborflow 200</td>
<td>6 + 4</td>
<td>2000x1500x1000</td>
<td>450 litres</td>
<td>GBUABF200</td>
</tr>
<tr>
<td>Arborflow 300</td>
<td>8 + 4</td>
<td>2000x2000x1000</td>
<td>950 litres</td>
<td>GBUABF300</td>
</tr>
</tbody>
</table>

Figure 1: Standard Arborflow 100 Assembly
Figure 2: View showing a six panel, four corner assembly configuration (Arborflow 200)
Figure 3: Top view - showing grille design and flood level indicator
Figure 4: Side view of panel plus two corners

Click here to view our website
Arborflow™ 100 Series

How it works

Rain falls – (as tree grows, canopy interception increases,) surplus runoff flows into Arborflow collector channel, with first stage filtration, then into the panel reservoir.

Water is collected, stored and dispersed through the panels, into the surrounding root zone Stratacelis or RootSpace system – allowing ground recharge, utilizing storage capacity in the Arborsoil-Hydro substrate.

Eventually, as the tree pit nears field capacity, the water begins to flow towards the next stage of the drainage system or SUDS train.
Big WSUDS Package

By utilizing the Arborflow 100 series tree package, specifics can simply scale up the RootSpace structure or link tree pits in series to meet project requirements.

Linking tree pits together not only provides more attenuation volumes, but dramatically increases available rooming area for long term tree growth.
Kerb Flow Inlets

Closable storm water inlet for incorporation in road side SUDS tree pit designs

Heavy duty steel inlet, available in both Corten and galvanized steel. This inlet gives a simple and durable means of conveying rain water run-off into the catchment zone for attenuation.

The inlet is closable with a simple tool, so that in the event of prolonged winter waterlogging bringing a risk of over saturation to the tree pit, the installation can be quickly isolated. This may also be needed in areas liable to occasional pollutant or heavy de-icing salt intakes.

<table>
<thead>
<tr>
<th>Kerb Product</th>
<th>Length</th>
<th>Depth</th>
<th>Height</th>
<th>Specification Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>GBUKI 3 Gate</td>
<td>323</td>
<td>120</td>
<td>250</td>
<td>GBUKI3G</td>
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<tr>
<td>GBUKI 5 Gate</td>
<td>531</td>
<td>120</td>
<td>250</td>
<td>GBUK5G</td>
</tr>
</tbody>
</table>
“I can have a positive impact on your health”

Trees filter out polluted air, reducing smog, provide shade from solar radiation and provide an attractive, calming setting.
3 Complete Tree Pit Systems

- GBU1001 Soft landscape tree detail .............. 106
- GBU1002 Soft landscape tree detail with root barrier for highway protection .............. 108
- GBU1003 Roadside verge tree detail .............. 110
- GBU1004 Medium verge tree detail with root management ........................................ 112
- GBU1005 Root ball tree - soft landscape detail with services below ............................. 114
- GBU1006 Micro tree pit detail for small trees in narrow footpaths .............................. 116
- GBU1007 Standard car park tree detail - Arboresin .................................................. 118
- GBU1008 Standard car park tree detail - tree grille .................................................... 120
- GBU1009 Linear tree pit in hard surface .............. 122
- GBU1010 Linear tree pit - RootSpace .............. 124
- GBU1011 Linear tree pit - RootSpace & tree grille .................................................. 126
- GBU1012 Shallow podium tree detail .............. 128
- GBU1013 Highway build out tree pit .............. 130
- GBU1014 Heavy duty standard tree pit - reinforced root management - RootForm ........ 232
- GBU1015 High capacity SuDs tree detail .............. 234
- GBU1016 Standard capacity SuDs tree detail .................................................. 136

NOTES:
These tree pit drawings can be amended to suit varying locations
Trees shown not to scale
To simplify the specification and installation of our range of products, we show in these pages a series of tree pit details.

These have been drawn in consultation with landscape architects and tree planting professionals. All GBU line drawings are available in CAD, DWG or DXF and PDF format. Please call our sales team on 01580 830 800.

- Assists architects and specifiers in showing how products should be drawn in relation to different location scenarios.
- Facilitates specifying for tree planting with a single product code – a real time saver.
- Adaptable for different locations.
- Contractors can order utilising a single product code and quantities.
- Ensures product compatibility.
- Please note - soil volumes indicated are approximate
These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.

GBU1001
Tree pit system installation

Package includes:
- RRPC2A RootRain Metro
- GLPFA spacer sleeve
- GLB25A belt
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree

Timber tree stake 75mm diameter x 1.8m long (tanalised) - by others
GLB25A belt and GLPFA spacer sleeve
RRPC2A RootRain Metro irrigation system
Nail to stake with 50mm galvanised nail
Ensure filler cap finishes slightly above mulch level
75mm mulch layer - by others
Loosen and shape base as shown to aid root penetration and pit drainage
Tree product packages – GBU1001

Timber tree stake 75mm diameter x 1.8m long (tanalised) - by others

GLB25A belt and GLPFA spacer sleeve

RRPC2A RootRain Metro irrigation system

Nail to stake with 50mm galvanised nail

Ensure filler cap finishes slightly above mulch level

75mm mulch layer - by others

Loosen and shape base as shown to aid root penetration and pit drainage

PACKAGE INCLUDES THE FOLLOWING GREENBLUE URBAN PRODUCTS:

RRPC2A RootRain Metro aeration/irrigation system
GLB25A belt
GLPFA spacer sleeve

PLAN WITH CANOPY HIDDEN

SECTION A-A
GBU1002
Tree pit system installation

Package includes:
- RRPC3A RootRain Metro aeration/irrigation system
- RER600A ReRoot 600 ribbed root barrier
- GLB25A belt
- GLPAA pad
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree

PLAN WITH CANOPY HIDDEN 1:100

SECTION B-B
Loosen and shape base as shown to aid root penetration and pit drainage

Highway

RER600A ReRoot 600 with root deflecting ribs
Install with ribs facing the tree
Root barriers must extend a minimum of 2m beyond the expected canopy of the mature tree
No growing medium over top of barrier

GLB25A belt and GLPAAA pad
75mm mulch layer - by others

Timber tree stake 75mm diameter x 1.8m long (tanalised) - by others

RRPC3A RootRain Metro irrigation system
Nail to stake with 50mm galvanised nail
Ensure filler cap finishes slightly above mulch level

RRPC3A RootRain Metro irrigation system
Nail to stake with 50mm galvanised nail
Ensure filler cap finishes slightly above mulch level

SECTION A-A
These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.

**GBU1003**

Tree pit system installation

---

**Package includes:**

- RRURB1A RootRain Urban aeration/irrigation system
- RER600A ReRoot 600 ribbed root barrier
- RERJT A ReRoot joint tape - 1 roll
- GLCG18X3A Greencoat weldmesh tree guard 1.8m high x 300mm diameter
- GLB25A belt
- GLLAAA pad
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer's recommendations - allow 200g per tree

---

Click here to download CAD

These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.
GLGCG18X3A Greencoat welded mesh tree guard
1.8m high x 300mm diameter, secured to tree stake with 4 no. galvanised staples

GLB25A belt and GLPAAA pad

75mm mulch layer - by others

Cycle path/footpath construction

RER600A ReRoot 600 with root deflecting ribs
Install with ribs facing the tree
Install around the upper 600mm of the tree pit
No growing medium over top of barrier

RER600A ReRoot 600 extends 2m beyond mature tree canopy

Extent of tree canopy

PLAN WITH CANOPY HIDDEN 1:100

SECTION A-A
GBU1004
Tree pit system installation

Package includes:

- RRURB1A RootRain Urban aeration/irrigation system
- RER600A ReRoot 600 ribbed root barrier
- SASMCB Arborguy strapped anchor system - Medium

Note: Special drive rod required for SASMCB installation

- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree
RRURB1A RootRain Urban irrigation system installed around the guyed root ball. Ensure inlet is slightly above finished surround level.

SASMCB Arborguy strapped anchor system c/w ground anchors. Loosen and shape base as shown to aid root penetration and pit drainage.

RER600A ReRoot 600 with root deflecting ribs. Install with ribs facing the tree. Installed along the upper 600mm of the tree pit, on just two sides. Root barriers must extend a minimum of 2.0m beyond the expected canopy of the mature tree. No growing medium over top of barrier.

75mm mulch layer - by others.

Cycle path/footpath construction.

Extent of tree canopy: 1500 Approx., 900 Approx., 570 Approx., 1000 Approx.

PLAN WITH CANOPY HIDDEN

SECTION A-A
GBU1005
Tree pit system installation

Package includes:
- RRURB1A RootRain Urban irrigation system
- RER220X2.0A ReRoot 2000 root barrier
- SASDMB Deadman Arborguy strapped anchor system
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer's recommendations - allow 200g per tree

RRURB1A RootRain Urban irrigation system installed around the guyed root ball. Ensure inlet is slightly above finished surround level.

SASDMB Deadman Arborguy strapped anchor system.

75mm mulch layer - by others.

Underground services.

Soft Landscape.

RER220X2.0A ReRoot 2000 installed at the base of the tree pit. Root barriers must extend a minimum of 2m beyond the expected canopy of the mature tree.

Loosen and shape base as shown to aid root penetration and pit drainage.

SECTION A-A
Package includes the following GreenBlue Urban products:

- RRURB1A RootRain Urban irrigation system
- RER2000A ReRoot 2000 root barrier
- SASMP Arborguy strapped anchor system

All dimensions and details are approximate and must be checked on site not scaled from the drawing. No part of this drawing can be reproduced or transmitted by any means electronic or mechanical including photocopy without prior permission in writing from GreenBlue Urban.
GBU1006
Tree pit system installation

Package includes:

- GLRCMA RootCells - 24 No. 250mm x 250mm x 90mm
- RRPC2A RootRain Metro irrigation system
- RD510A RootDirector
- GLTWGNA twinwall geonet - 1 sq. m
- GLGCG18X3A Greencoat weldmesh guard 1.2m high x 300mm diameter
- MEDW06A Medway 600mm x 600mm tree grille
- GLB25A belt
- GLPAAA pad
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree

Ensure inlet is slightly above the finished surround level

Concrete haunching cast between RD510A RootDirector and the existing soil/sub-base

GLRCMA RootCell structure 2 modules deep x 4 modules square (2 x 2 x 2 module void below centre of Root Director) loaded with topsoil - sandy loam to BS3882

GLTWGNA twinwall geonet laid over Rootcells

Drainage to engineer’s details

Existing paved area

600 Approx.
590 Approx.
1000 Approx.
750 Approx.
310 Approx.
510 Approx.

Click here to download CAD

These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.
PLAN WITH CANOPY HIDDEN

MEDW06A Medway 600mm x 600mm tree grille

 Timber tree stake 75mm diameter x 1.8m long (tanalised) - by others

GLB25A belt and GLPAAA pad

RRPC2A RootRain Metro irrigation system installed around the rootball

Ensure inlet is slightly above the finished surround level

RD510A Root Director extra small root barrier system

Concrete haunching cast between RD510A Root Director and the existing soil/sub-base

GLRCMA RootCell structure 2 modules deep x 4 modules square (2 x 2 x 2 module void below centre of Root Director) loaded with topsoil - sandy loam to BS3882

GLTWGNA twinwall geonet laid over Rootcells

Drainage to engineer’s details

GLGCG1.2A Greencoat weldmesh tree guard 1.2m high x 300mm diameter

MERS06A Mersey 600mm x 600mm tree grille with brackets to secure tree guard

GLB25A belt

GLPFA spacer sleeve

Note:
RD510A is designed for small tree species

SECTION A-A

ISOMETRIC WITH CUT-AWAY TO SHOW PRODUCTS

1:50 @ A3

MICRO TREE PIT SYSTEM

- PAVEMENT

- SECTION A-A

Existing paved area

310

750 Approx.

590 Approx.

590 Approx.

1000 Approx.

750 Approx.
GBU1007
Tree pit system installation

Package includes:
- GLCM30A StrataCells - 64 No. 500mm x 500mm x 250mm
- Rootsoil 20 to fill StrataCell and RootDirector spaces (including root ball volume) - allow 5.5 Cu. m per tree. Additional allowance needs to be made for settlement
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree
- RRARBV1D Arborvent single inlet aeration/irrigation system with cast inlet
- RRARBVDI3D Arborvent double inlet aeration/irrigation system with cast inlets
- RD1050A RootDirector
- GLWNA twinwall geonet - 18 Sq. m
- SASLCB Arborguy strapped anchor system - large
- ULLSSP156A Ullswater vertical steel tree guard, with rolled angle-section rings, 16mm round vertical bars topped with 50mm diameter ball finials, finished in black
- GLARBBB Brittany bronze Arboresin porous bound stone surfacing, 1200mm x 1200mm x 50mm thick - 6 units
- RRARBVDI3C Arborvent double inlet aeration/irrigation system with cast inlets
- GLGTTA Tree guard tie

Note:
Special drive rod required for SASLCB installation

These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.
STANDARD CAR PARK TREE PIT

Package includes the following GreenBlue Urban products:

- **ULLSSP156A** Ullswater vertical steel tree guard 1.5m high x 600mm diameter secured to grille
- **RRARBV1D** Arborvent irrigation system installed around the guyed root ball
- **SPFR12A** Arboresin galvanised steel support frame 1200mm x 1200mm
- **SASLP** Arborguy strapped anchor system - large
- **GLTWGNA** Twinwall geonet - 18 Sq. m
- **GLARBBB** Brittany bronze Arboresin porous bound stone surfacing
- **GLSCM30A** StrataCell structure - 2 units
- **RD1050A** Root Director, medium, modular root barrier system
- **GLTWGNA** Twinwall geonet laid below StrataCell structure to structural engineer’s requirement
- **GLARBBB** Arboresin slab and finished flush with top surface
- **RRARBVDI3D** Arborvent double inlet aeration/irrigation system with cast inlets
- **GLTWGNA** Twinwall geonet - 18 Sq. m
- **GLSCM30A** StrataCell structure - 2 units
- **GLTWGNA** Twinwall geonet laid below StrataCell structure to structural engineer’s requirement

Note:
- **RRARBV1C** Arborvent single inlet aeration/irrigation system with cast inlet
- **RootStart Mycorrhiza** - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree
- **GLTWGNA** Twinwall geonet laid below StrataCell structure to structural engineer’s requirement
- **GLARBBB** Brittany bronze Arboresin porous bound stone surfacing
- **GLSCM30A** StrataCell structure - 2 units
- **GLTWGNA** Twinwall geonet laid below StrataCell structure to structural engineer’s requirement

Sub-base installed below StrataCells to structural engineer’s requirement

Clean stone layer surrounding modular root barrier system

Drainage layer - 100mm depth of clean angular stone

Drainage to engineer’s detail

Footpath/road construction

Drainage to engineer’s detail

Drainage layer - 100mm depth of clean angular stone

Angular stone

Clean stone layer surrounding modular root barrier system

Laid over StrataCell structure

Section A-A
GBP1008
Tree pit system installation

Package includes:

- GLCM36A StrataCells - 64 No. 500mm x 500mm x 250mm
- Rootsoil 20 to fill StrataCell and RootDirector spaces (including root ball volume) - allow 5.5 Cu. m per tree. Additional allowance needs to be made for settlement
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree
- RRHYDR1A RootRain Hydrogrille single inlet aeration/irrigation system with cast inlet
- RRABVDI3D Arborvent double inlet aeration/irrigation system with cast inlets
- RD1050A RootDirector
- GLTWGNA twinwall geonet - 18 Sq. m
- SASLCB Arborguy strapped anchor system - large
- ULLSSP6A Ullswater vertical steel tree guard, with rolled angle-section rings, 16mm round vertical bars topped with 50mm diameter ball finials, finished in black
- ADUR12B Adur 1200mm x 1200mm tree grille, finished in black with galvanised steel support frame
- GLGTTA Tree guard tie

Note:
Special drive rod required for SASLCB installation

These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.
PLAN WITH CANOPY HIDDEN

SECTION A-A

- ULLSSP6A Ullswater vertical steel tree guard, 1.8m high x 600mm diameter secured to grille
- RRHYDR1A RootRain Hydrogrille irrigation system
- RRARBVDI3D Arborvent double inlet aeration/irrigation system with cast inlets
- SASLCB Arborguy strapped anchor system c/w ground anchors
- GLTWGNA twinwall geonet laid below StrataCell structure
- GLSCM30A StrataCell structure - 2 modules deep x 6 modules square (2 x 2 x 2 void below Root Director) loaded with topsoil - sandy loam to BS3882
- Drainage layer - 100mm depth of clean angular stone
- ADUR12B 1200mm x 1200mm tree grille c/w RootRain Precinct irrigation inlet
- Galvanised tree grille support frame set on concrete haunch
- Footpath/road construction
- RD1050A Root Director, medium, modular root barrier system
- GLTWGNA twinwall geonet laid over StrataCell structure
- GLSCM30A StrataCell structure - 2 modules deep x 6 modules square (2 x 2 x 2 void below Root Director) loaded with topsoil - sandy loam to BS3882
- Drainage layer - 100mm depth of clean angular stone

GLGTTA Tree guard tie attached to the top ring of the tree guard

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GBU1009
Tree pit system installation

Package includes:
- GLSCM30A StrataCells - 72 No. 500mm x 500mm x 250mm
- Rootsoil 20 to fill StrataCell and RootDirector spaces (including root ball volume) - allow 6 Cu. m per tree. Additional allowance needs to be made for settlement
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree
- RRHYDR1A RootRain Hydrogrille single inlet aeration/irrigation system with cast inlet
- RRARBVDI3D Arborvent double inlet aeration/irrigation system with cast inlets
- RD1050A RootDirector
- GLTWGNA twinwall geonet -20 Sq. m
- SASCB Arbortuy strapped anchor system - large
- ULLSSP6A Ullswater vertical steel tree guard with rolled angle-section rings, 16mm round bars topped with 50mm diameter ball finials, finished in black
- ADUR12B Adur 1200mm x 1200mm tree grille, finished in black with galvanised steel support frame
- GLGTTA Tree guard tie

Note:
Special drive rod required for SASLCB installation

These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.
GLGTTA Tree guard tie attached to the top ring of the tree guard

Plan with Canopy Hidden

SECTION A-A

Package includes the following GreenBlue Urban products:

**Tree Product Packages**

- **RRARBVDI3D Arborvent double inlet aeration/irrigation system with cast inlets**
- **RRPREC1C RootRain Precinct single inlet aeration/irrigation system with cast inlet**
- **GLTWGNA twinwall geonet - 20 Sq. m**
- **GLSCMA30 StrataCells - 72 No. 500mm x 500mm x 250mm**
- **Ullswater vertical steel tree guard with rolled angle-section rings, 16mm (ULLSSP6A)**
- **ADUR12B Adur 1200mm x 1200mm tree grille, finished in black with galvanised steel**
- **RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree**
- **Rootsoil 20 to fill StrataCell and Root Director spaces (including root ball volume) - allow 6 Cu. m per tree. Additional allowance needs to be made for settlement**
- **Special drive rod required for SASLCB installation**
- **SASLP Arborguy strapped anchor system - large support frame**
- **GLTGTTA Tree guard tie attached to the top ring of the tree guard**
- **Ullswater vertical steel tree guard with rolled angle-section rings, 16mm (ULLSSP6A)**
- **RRHYDR1A RootRain Hydrogrille irrigation system loaded with topsoil - sandy loam to BS3882 (2 x 2 x 2 module void below Root Director)**
- **GLSCMA30 StrataCell structure - 2 modules deep x 10 modules across x 4 modules wide**
- **Drainage layer - 100mm depth of clean angular stone**
- **Sub-base and drainage installed below StrataCells to structural engineer’s requirement**
- **Galvanised tree grille support frame set on concrete haunch**
- **RD1050A Root Director, medium, modular root barrier system**
- **RRARBVDI3D Arborvent double inlet aeration/irrigation system with cast inlets**
- **SASLCB Arborguy strapped anchor system c/w ground anchors**
- **GLTWGNA twinwall geonet laid below StrataCell structure to structural engineer’s requirement**
- **1.8m high x 600mm diameter secured to grille**
- **Footpath/road construction**
- **Sub-base and drainage installed below StrataCells to structural engineer’s requirement/detail**
GBU1010
Tree pit system installation

Package includes:

- RootSpace uprights - 140 No. 500mm x 500mm x 600mm per tree
- RootSpace Airflow deck - 68 No. 500mm x 500mm x 70mm
- Rootsoil 20 to fill RootSpace and RootDirector spaces (including root ball volume) - allow 11.5 Cu. m per tree. Additional allowance needs to be made for settlement
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer's recommendations - allow 200g per tree
- RRHYDR1A RootRain Hydrogrille single inlet aeration/irrigation system with cast inlet
- RRARBV150A Arborvent 150 Double inlet aeration/irrigation system with cast inlets including 2m 100mm diameter pipe
- RD1050A RootDirector - medium
- GLTWGNA twinwall geonet - 15 Sq. m
- GBUGRN30 plastic open reinforcing mesh, 30mm aperture - 25 Sq. m
- SASLCB Arborguy strapped anchor system - large
- ULLSSP156A Ullswater vertical steel tree guard with round angle-section rings, 16mm round bars topped with 50mm diameter ball finials, finished in black
- ADUR12B Adur 1200mm x 1200mm tree grille, finished in black, with galvanised steel support frame

Note:
Special drive rod required for SASLCB installation
ULLS156A Ullswater vertical steel tree guard with round
RD1050A Root Director - medium
RRPREC1C RootRain Precinct single inlet aeration/
Rootsoil 20 to fill RootSpace and Root Director spaces
RootSpace Airflow deck - 68 No. 500mm x 500mm x 70mm
For heavy load applications, install RootSpace side panels
irrigation system with cast inlet

Package includes the following GreenBlue Urban
plants:
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GBU GRN30 plastic open reinforcing mesh, 30mm aperture
GLTWGNA twinwall geonet - 15 Sq. m
- 25 Sq. m

ADUR12B 1200mm x 1200mm tree grille, finished in
black, with galvanised steel support frame
SASLP Arborguy strapped anchor system - large
GLGTTA Tree guard tie attached

1.5m high x 600mm diameter secured to grille
RootSpace structure - 1 module deep x
(1 x 2 x 2 module void below Root Director)
GLTWGNA twinwall geonet laid over RootSpace
30mm aperture laid below and around
sides of RootSpace structure
Drainage layer - 150mm depth of clean
angular stone around sides and base of
RootSpace structure
Drainage to engineer's detail

Additional allowance needs to be made for settlement
200g per tree

to installation as directed by engineer

1:50 @ A3

Urban Tree Design Guide (Edition 8)
GBU1011
Tree pit system installation

Package includes:

- GBURAC600A RootSpace uprights - 210 No. 500mm x 500mm x 600mm
- GBURAC500A RootSpace Airflow deck - 96 No. 500mm x 500mm x 70mm
- Rootsoil 20 to fill RootSpace and RootDirector spaces (including root ball volume) - allow 15 Cu. m per tree. Additional allowance needs to be made for settlement
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree
- RRARB150VA Arborvent 150 double inlet aeration/irrigation system with cast inlets
- RD1050A RootDirector - medium
- GLTWGNA twinwall geonet - 24 Sq. m
- GBUGRN30 plastic open reinforcing mesh, 30mm aperture - 39 Sq. m
- SASLCB Arborguy strapped anchor system - large
- ULLSSP6A Ullswater vertical steel tree guard with round angle-section rings, 16mm round bars topped with 50mm diameter ball finials, finished in black
- CASTLE12B Castle 1200mm x 1200mm double tray tree grille, galvanised finish, with galvanised steel support frame and corner brackets

Note:
Special drive rod required for SASLCB installation

These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.
RootStart Mycorrhiza - apply to tree pit at time of planting in

RootSpace Airflow deck - 96 No. 500mm x 500mm x 70mm

RootSpace uprights - 210 No. 500mm x 500mm x 600mm

ULLS186A Ullswater vertical steel tree guard with round

RD1050A Root Director - medium

products:

Package includes the following GreenBlue Urban

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GBU Hydrogrille irrigation system

Castle 1200mm x 1200mm tree grille, galvanised finish,

GBU GRN30 plastic open reinforcing mesh, 30mm aperture

GLTWGNA twinwall geonet - 24 Sq. m

accordance with manufacturer's recommendations - allow

200g per tree

Additional allowance needs to be made for settlement

Arborvent 150 double inlet aeration/irrigation system

with cast inlets

Galvanised tree grille support frame

SASLCB Arborguy strapped anchor

RootSpace to structural engineer's/

RootRain Arborgrate 100 irrigation inlet

16 modules across x 6 modules wide

70

Sub-base and drainage installed below

RRARBV150A Arborvent 150 double inlet aeration/irrigation system c/w ground anchors

CASTLE12B Castle 1200mm x 1200mm double tray

RootSpace structure - 1 module deep x

(1 x 2 x 2 module void below Root

GLTWGNA twinwall geonet wrapped around

GRN30 plastic open reinforcing mesh,

sides of RootSpace structure

30mm aperture laid below and around

1.8m high x 600mm diameter secured to grille

ULLSSP6A Ullswater vertical steel tree guard

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Website: greenblueurban.com
GBU1012
Tree pit system installation

Package includes:

■ RRHYDRIA RootRain Hydrogrille single inlet aeration/irrigation system with cast inlet
■ RRARBVD13D Arborvent double inlet aeration/irrigation system with cast inlets
■ GLSCM60A StrataCells, 60 No. 500mm x 500mm x 250mm
■ RER300A ReRoot 300 ribbed root barrier
■ GLTWGNA twinwall geonet
■ SASLCB Arborguy strapped anchor system secured with 1200mm sq steel rebar grid flat underneath root ball

Note:
Special drive rod required for SASLCB installation

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PLAN WITH CANOPY HIDDEN

SECTION B-B
These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.

GBU1013
Tree pit system installation

Package includes:
- GLSCM60A StrataCells - 64 No. 500mm x 500mm x 250mm
- Rootsoil 20 to fill RootSpace and RootDirector spaces (including root ball volume) - allow 5.5 Cu. m per tree. Additional allowance needs to be made for settlement
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree
- RRHYDRIA RootRain Hydrogrille single inlet aeration/irrigation system with cast inlets
- RRARBVD13D Arborvent double inlet aeration/irrigation system, with cast inlets
- RD1050A RootDirector root barrier

- GLTWGNA twinwall geonet
- SASLCB Arboguy strapped anchor system secured with ground anchors
- ULLSSP6A Ullswater vertical steel tree guard 1.8m high x 600mm diameter secured to grille
- ARBPC12A Precast Arboresin tree grille 1200mm x 1200mm

Note:
Special drive rod required for SASLCB installation

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Additional allowance needs to be made for settlement and must be checked on site not scaled from the drawing.

All dimensions and details are approximate.

1.8m high x 600mm diameter secured to grille

ULLSSP6A Ullswater vertical steel tree guard

Galvanised tree grille support frame set on StrataCells to structural engineer’s/engineer’s requirement/detail

ARBPC12A Precast Arboresin tree grille

SASLCB Arborguy strapped anchor

StrataCells to structural engineer’s/engineer’s requirement/detail

modular root barrier system c/w ground anchors

RD1050A Root Director root barrier

RRARBVD13C Arborvent double inlet aeration/irrigation system

GLSCM60A StrataCell structure - 2 modules

GLTWGNA twinwall geonet laid below StrataCell structure

GLTWGNA twinwall geonet laid over StrataCell structure

GBU Hydrogrille irrigation system with cast inlets

RRHYDRI1 RootRain Hydrogrille single inlet aeration/irrigation system

20g per tree

20Sub-base and drainage installed below void below Root Director) loaded with Rootsoil

1500mm square

GLSCMA60 StrataCells - 64 No. 500mm x 500mm x 250mm

SPFR12A Arboresin galvanised steel support frame

SASLP Arborguy strapped anchor system secured with ground anchors

1200mm x 1200mm, in two halves, with inner ring & 1200mm x 1200mm x 50mm thick

Rootsoil 20 to fill RootSpace and Root Director spaces

RootStart Mycorrhiza - apply to tree pit at time of planting in (including root ball volume) - allow 5.5 Cu. m per tree.

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Website: greenblueurban.com
GBU1014
Tree pit system installation

Package includes:

- **GBURAC600A RootSpace uprights**: 432 No. 500mm x 500mm x 600mm
- **GBURAC500A RootSpace Airflow deck**: 96 No. 500mm x 500mm x 70mm
- **Rootsoil 20** to fill RootSpace and RootDirector spaces (including root ball volume) - allow 30.85 Cu. m per tree. Additional allowance needs to be made for settlement
- **RootStart Mycorrhiza**: apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree
- **RRHYDRIA RootRain Hydrogrille** single inlet aeration/irrigation system with cast inlets
- **RRARBV150A Arborvent 150** double inlet aeration/irrigation system with cast inlets
- **RootForm root barrier**
- **GLTWGNA twinwall geonet**: 25 Sq. m
- **GBUGRN30 plastic open reinforcing mesh**: 50 Sq. m

**Note:**
Special drive rod required for SASLCB installation

These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.
RootStart Mycorrhiza - apply to tree pit at time of planting in
Rootsoil 20 to fill RootSpace and Root Director spaces

RootSpace Airflow deck - 96 No. 500mm x 500mm x 70mm
RootSpace uprights - 432 No. 500mm x 500mm x 600mm

GLTWGNA twinwall geonet - 25 Sq. m
RRHYDRIA RootRain Hydrogrille single aeration/irrigation system with cast inlets
Arborvent 150 double inlet aeration/irrigation system with cast inlets

RootSpace structure - 2 modules deep x (1 x 2 x 2 module void below Root
clean angular stone around sides
Drainage layer - 150mm depth of
and base of RootSpace structure
fitted to RootSpace Airflow inlet
root barrier filled with concrete
RootForm1500mm x 1500mm
system c/w ground anchors
to engineer's specification
specify RootSpace modules to incorporate side panel inserts
Note:
Structural engineer's note:
Special drive rod required for SASLP installation
SASLP Arborguy strapped anchor system secured with
ground anchors
to tree pit perimeter

Road construction to engineer's details
Sub-base and drainage installed below
sides of RootSpace structure
laid over RootSpace structure
ZETA 1500mm x 1500mm tree grille

For increased strength and stability in soft ground conditions,

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GBU1015
Tree pit system installation

Package includes:

- **GBURAC600A RootSpace uprights** - 432 No. 500mm x 500mm x 600mm
- **GBURAC500A RootSpace Airflow deck** - 96 No. 500mm x 500mm x 70mm
- **Rootsoil Hydro topsoil to fill RootSpace and RootDirector spaces (including root ball volume)** - allow 30.85 Cu. m per tree. Additional allowance needs to be made for settlement
- **RootStart Mycorrhiza** - apply to tree pit at time of planting in accordance with manufacturer's recommendations - allow 200g per tree
- **RRARBV150A Arborvent 150 inlet aeration system with cast inlets** - 4 per tree
- **ARBPC1507A 1500mm x 750mm tree grille**

Note:
- Special drive rod required for SASLCB installation

---

**GBURAC600A RootSpace uprights**

- Depth: 600mm
- Width: 500mm
- Length: 500mm

**GBURAC500A RootSpace Airflow deck**

- Depth: 70mm
- Width: 500mm
- Length: 500mm

**Rootsoil Hydro**

- Volume: 30.85 Cu. m per tree
- Additional allowance for settlement

**RootStart Mycorrhiza**

- Application: At planting according to manufacturer's recommendations
- Amount: 200g per tree

**Arborvent 150 inlet aeration system**

- Inlet count: 4 per tree

**ARBPC1507A 1500mm x 750mm tree grille**

- Dimensions: 1500mm x 750mm

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**Click here to download CAD**

These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.
Tree product packages

**HIGH VOLUME WITH SUDS**

**TREE PIT DETAIL**

- **Rootsoil Hydro**: topsoil to fill RootSpace and Root Director
- **RootSpace Airflow deck**: 96 units, 500mm x 500mm x 70mm
- **RootSpace uprights**: 432 units, 500mm x 500mm x 600mm

**Products**

- **GRN30 plastic open reinforcing mesh**: 30mm aperture, laid below and around Rootsoil Hydro
- **GLTWGNA twinwall geonet**: 25 Sq. m linear modules and 4 corner modules
- **ARBPC1507A 1500mm x 750mm tree grille**
- **Arborflow 100 series SUDS modular array**: 6 units, 750mm
- **Arborvent 150 inlet aeration system**: with cast inlets, 4 per tree
- **RRARBV150A Arborvent 150 double inlet aeration/irrigation system**
- **SASLCB Arborguy strapped anchor system**: large spaces (including root ball volume), 30.85 Cu. m per 50 Sq. m
- **SASLP Arborguy strapped anchor system**: for increased strength and stability in soft ground conditions

**Footway/road construction**

- Grouted sub-base and drainage installed, recessed into and attached to Galvanised tree grille support frame

**Special Drive Rod**

- Special drive rod required for SASLP installation

**Note**

- Specify RootSpace modules to incorporate side panel inserts to tree pit perimeter

**Section A-A Plan with Canopy Hidden**

**Section B-B**

**Plan with Canopy Hidden**

For increased strength and stability in soft ground conditions.
GBU1016
Tree pit system installation

Package includes:

- GBURAC600A RootSpace uprights - 112 No. 500mm x 500mm x 600mm
- GBURAC500A RootSpace Airflow deck - 48 No. 500mm x 500mm x 70mm
- Rootsoil Hydro topsoil to fill RootSpace and RootDirector spaces (including root ball volume) - allow 8 Cu. m per tree. Additional allowance needs to be made for settlement
- RootStart Mycorrhiza - apply to tree pit at time of planting in accordance with manufacturer’s recommendations - allow 200g per tree
- RRHYDRIA RootRain Hydrogrille single inlet aeration/irrigation system with cast inlet
- RRARBV150A Arborvent 150mm inlet aeration system with cast inlets
- Arborflow 150 SUDS modular array - 8 No. 750mm linear modules and 4 No. corner modules
- GLTWGNA twinwall geonet - 12.25 Sq. m
- GBUGRN30 plastic open reinforcing mesh, 30mm aperture - 22 Sq. m
- SASLCB Arborguy strapped anchor system - large
- ADUR15A Adur 1500mm x 1500mm tree grille, finished in black, with galvanised steel support frame

Note:
Special drive rod required for SASLCB installation

Click here to download CAD

These drawings are available on a USB drive and can enlarge to show further detail. Please contact sales for further information.
RootStart Mycorrhiza - apply to tree pit at time of planting

RootSpace Airflow deck - 48 No. 500mm x 500mm x 70mm

RootSpace uprights - 112 No. 500mm x 500mm x 600mm

Package includes the following GreenBlue Urban products:

- GBU GRN30 plastic open reinforcing mesh, 30mm aperture
- GLTWGNA twinwall geonet - 12.25 Sq. m
- SASLP Arborguy strapped anchor system - large

Accordance with manufacturer’s recommendations - allow spaces (including root ball volume) - allow 8 Cu. m per tree.

Additional allowance needs to be made for settlement.

For increased strength and stability in soft ground conditions, specify RootSpace modules to incorporate side panel inserts.

Structural engineer’s note:

- RootSpace to structural engineer’s/detail
- Footway/road construction to engineer’s requirement/detail
- Sub-base and drainage installed below engineer’s details

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Website: greenblueurban.com
“I can increase retail footflow”

The presence of large species trees positively influences shoppers perceptions and behaviours
4.1 Project Support and Advisory Service

- Specification support service .......................... 140
- NBS Plus ............................................. 141
- GreenBlue Urban Training Centre .................. 142
- CPD .................................................... 143
- Arborsystem approved contractors scheme ....... 145
Specification support service

GreenBlue Urban offer an easy to access support service, tailored to provide the back up and assurance specifiers need. We appreciate that many of today’s building projects can be very involved and complex; involving many fields of expertise of which the actual tree planting may be just a part.

Many professionals involved in tree planting benefit from our easy to use CAD series of Arborsystem tree pits, thus saving themselves many hours of design time and at the same time giving peace of mind that the key features of successful tree pit design have been covered.

Alternatively, you can email (enquiries@greenblueurban.com) your own tree pit detail through to our team of specialists for a detailed appraisal. We can then advise you, without obligation to purchase, on what we feel the best option is for you, or of potential opportunities on your drawing for improving the trees’ long term chances of thriving.
GreenBlue Urban are included on the NBS and NBS Plus service database. This service delivers expert solutions to the construction industry through innovative specification products and information resources.

It is invaluable for those landscape and building professionals who subscribe, who can access a wide range of specification clauses and details for the wording of contract documents and bills of quantities.

NBS Plus is a library of manufacturers product information integrated into the NBS software suite (NBS Building, Engineering Services and Landscape) that places manufacturer’s information in front of specifiers when they most need it – at the specification stage. Now at the click of a mouse using the proprietary specification method, products can easily be brought into a project specification, edited to suit and help create a complete and concise specification.

GreenBlue Urban have invested a lot of time into the details available for subscribers to ensure that the detail is relevant, helpful and accurate.

The NBS service covers the complete range:

- Root management
- Tree pit irrigation
- Structural soil modules
- Grilles and guards
- Tree anchoring
- Complete Arborsystem packages
GreenBlue Urban Training Centre

At our new premises in East Sussex, we can now offer a condensed half day training workshop for small groups, on urban tree pit theory and practice.

Typical workshop session includes:

- Welcome and refreshment
- Meet the GBU team
- Tour of the facility including tree planting around the building
- PowerPoint presentation on Urban Tree Pit Design, drawing on extensive project case histories
- Focus on root management and root morphology
- SUDS tree pit design
- Question and answer session
- Comfort Break
- Build a tree pit – hands on with the products to see how they fit together – even construct the tree pit you have in mind for your project

Close of session and buffet lunch provided.

Workshop content can be tailored to suit specific group requirements – please contact our admin team to book a session for your company or local authority.
CPD Service

Keep your team up to date with current best practice tree pit design.

GreenBlue Urban offer a tree pit design workshop CPD to give specifiers and local authorities a condensed overview of the principles and products available to them when designing for canopy volume trees in urban space.

The CPD explores tree root morphology, root management techniques, load bearing soil structure options and tree pit design in conjunction with water sensitive urban drainage (WSUDS).

Case studies and planning law are discussed, and time is given for attendees to ask questions or get advice on their specific tree planting challenges.

The feedback has consistently been extremely positive. The main comments being how well informed they now feel as to what is possible when planting trees on challenging sites and how they feel more confident recommending such technologies and solutions to clients, in order to see trees more successfully established in the long term.

To arrange your in-house CPD session:

Register online at www.greenblueurban.com or email enquiries@greenblueurban.com

Testimonials

“On behalf of all attendees from the Practice today, I want to thank you for a really informative, technical presentation and for your time to come to us today.”

“Thank you for coming to The Hub to present on successful trees within hard environments; it was very informative and delivered in a refreshing and entertaining manner.”
Arborsystem approved contractors scheme

An introduction to the aims and intentions of the GreenBlue Urban Arborsystem Approved Contractor Scheme.

Background

This scheme was set up in response to many requests from Landscape Architects for a recommended contractor who they can be confident will install GreenBlue Urban products to the highest possible standards of workmanship and integrity.

We initially chose a small number of well established landscape contractors who have had a long-standing working relationship with GreenBlue Urban, because we felt this was the safest way to manage the preliminary list.

Using this preliminary list, a series of introductory seminars were arranged to introduce the scheme to the landscape contracting firm’s managements and these were very well received indeed. The next stage was to evaluate the contractor’s performance in the field, commencing a long term ongoing site inspection regime at periodic intervals to ensure that these standards are maintained.
Arborsystem Approved Contractors Scheme

Knowledgeable installers leads to quality installations

To be successful, the landscape contractor will undergo a training course (on their own premises) by GreenBlue Urban. At the same time, the contractors commitment and attitude to all aspects of tree planting is carefully evaluated. Following this training session, the next Arborsystem installation undertaken by the contractor is carefully inspected. Special attention is given to detailed on-site workmanship.
Assuming the company passes these examinations, they will then, and only then, be included on an exclusive list of GreenBlue Urban Arborsystem Approved Contractors. This list and indeed the whole concept will be included in our future marketing plan to prove our ongoing commitment to tree planting systems and installations of the highest standards.

Review Procedures

To remain on the Arborsystem Approved register, landscaping firms will need to demonstrate the following:

1. Continual high standards of workmanship on site
2. Complete integrity when working to architects specifications
3. Compliance with all architects site instructions
4. Detailed reporting procedure for onsite issues that may arise
5. A good commitment to continuous improvement
6. Financial integrity

All contractors will be expected to co-operate fully with GreenBlue Urban Arborsystem review procedures which will be carried out on a routine annual basis, but will also be considered every time a project requires a list to be issued. Any contractor refusing to cooperate with GreenBlue Urban site inspectors will be removed from the GreenBlue Urban Arborsystem Approved Contractor Scheme.
"I can reduce crime"

Large street trees are associated with lower crime rates
5 | The Trees

Tree species index

Yellow Foliage
- ACER Pseudoplatanus

Flowering
- Paulownia Tomentosa

Trees for bees
- Liriodendron
- Tilia Europaea
- Tilia Cordata

Variegated Trees
- Liriodendron Tulipifera
- Liquidambar Styraciflua

Avenue Trees
- Tilia Europaea
- Quercus Palustris

Native Trees
- Tilia Cordata
- Acer Campestre

Extreme PH acid/alkaline
- Sorbus Intermedia

Autumn Colours
- Parrotia Persica
- Liquidambar Styraciflua

Urban Trees
- Gingko Bilboa
- Platanus Hispanica

Garden
- Amelanchier Arboria

Bark interest
- Betula Albosinensis
Careful analysis of species characteristics has refined tree selection. Public parks and gardens offer scope for expansive tree species. For optimum benefits in other public realm and highway opportunities the surrounding built environment may impose a more limited species selection.

A number of factors, including maintenance costings, canopy shape and size, mechanical strength and ‘apical dominance’ (Trees with a single leader), will indicate the suitability of a tree species for its intended location.

Only a few years ago, many city arboricultural officers regarded the ‘useful’ life of an urban tree as a mere ten to fifteen years. In inner cities intense networks of utility runs, susceptible to tree root damage, and the absence of effective root direction systems resulted in cramped tree pits and compacted soil conditions. Versatile tree root management systems now enable landscape architects and arboricultural professionals to plan for tree growth to continue for many years.

From being merely a desirable option, urban tree planting has been elevated, over the last two decades, to centre stage in the quest for environmental improvement and public realm regeneration. To facilitate that priority-up-grade GreenBlue Urban Ltd has been intensively developing innovative engineering and horticultural methodology to ensure maximum gain from mature and healthy trees.

GreenBlue Urban Ltd gladly acknowledge their indebtedness to Barcham Trees Plc. of Ely, Cambs. for their permission to base this section, including pictures, on their excellent book ‘Time for Trees’ which contains fuller information and additional selections of species.
ACCA sellowiana - A small evergreen tree, thriving on most soils but requiring a warm sheltered location, it is a native of South America. Highly prized for its spectacular crimson and white flowers as well as its grey-green leaves, white felted on the underside.

ACER campestre - This classification embraces a number of mainly native maple cultivars suitable for urban planting. Barcham select ‘campestre Elegant’ as ‘pick of the bunch for street planting’ but have variations for specific local requirements. All feature good rounded shape, tolerance and attractive seasonal colour variation.

ACER pseudoplatanus (Spaethii) - Another cultivar specifically recommended for salt laden, windy, coastal sites. With dramatic autumn colours and green leaves with purple under-sides this large ornamental tree can significantly uplift an otherwise drab landscape short of species suitable for wind defence cover.
AMELANCHIER arboria  (Robin Hill) - With a dense, compact oval form this clone ideally fits street planting and residential locations. It is also very low maintenance and thrives best in moist, well drained lime free soils. The coppery red leaves of spring mature to summer green and vivid red in autumn. It also produces a profusion of spring flowers opening pink and turning white. Its limited final size and low maintenance commend it for urban planting closer to buildings than most trees.

BETULA albosinensis  (Fascination / Chinese Birch) - Growing well on most soils and highly regarded for parks and verges, this medium sized oval format tree is distinguished by rich yellow-brown catkins up to 10 cm long. The outstanding feature is the bark, changing as the tree matures, from a rich orange-red peeling to pink and cream and finally a pure white when the stem reaches a girth beyond 30cm.

CARPINUS betulus  (Hornbeam) - A most useful large tree for poor planting conditions, including clay and chalk, either in a parkland setting, in groups, or used for pleaching (intertwined hedging) the foliage, large ovate and serrated leaves, turn a lovely clear yellow in autumn. The trunk is a characteristic fluted grey and yields a hard, finely grained, timber traditionally used for skittles, mallets and even moving parts of pianos.

GINGKO biloba - A tough survivor from prehistoric times, Gingko has the qualities to survive urban adversities such as air pollution and reflected heat. Its narrow conical form and deep rooting habit enhance its claims for consideration as an attractive specimen for paved areas, avenues and parks. Fruiting, on female trees, only commences after about 35 years. Newer male clones, although more expensive to produce, have yielded some interesting and attractive variations.
LIQUIDAMBAR styraciflua (Worplesdon) - A magnificent, large and architecturally pyramidal specimen tree, worthy to adorn any urban planting where space allows, this cultivar has the most outstanding autumn colouring commencing in September when some leaves turn yellow through to orange with the outermost leaves displaying a magnificent claret red.

LIRIODENDRON chinense and tulipifera - Wonderful avenue or specimen parkland trees, not frequently seen, but with large spring buds rapidly opening to yield striking and ornate foliage turning vivid yellow in autumn. Tulipifera, a very large and quick growing tree produces dramatic yellow-green tulip shaped flowers on mature trees. Excellent honey is derived from bees harvesting its flowers.

Aureomarginatum, another tulip tree variant has bright yellow variegated leaves maturing to yellow-green as summer closes.

PARROTIA persica (Persian Ironwood) - One of the finest small trees for autumn colour, this small tree/large shrub displays a luxurious range of crimson, purple, red and gold colours in the autumn. It also has attractive mottled grey/brown bark. It is a fine adornment to parks and gardens, and copes with most soils including chalk.
PAULOWNIA tomentosa  (Foxglove Tree) - One of the most spectacular flowering trees if afforded a sheltered warm environment, the new growth is susceptible to extended exposure to temperatures lower than 5 degrees C, preventing the formation of the amazing blossom displays. Fast growing in early years and medium to large round in format, the timber is highly valued in Japan for furniture making.

PLATANUS x hispanica / acerifolia  (London Plane) - Credited with significantly contributing to the reduction of the industrial revolution smog so injurious in the metropolis, the London Plane is still highly recommended for street and urban parkland planting. Large, fast growing and with a broadly oval crown the bark flakes to reveal a patchwork of green, white and cream. The strings of round fruit cling on for much of the year.

QUERCUS palustris  (Pin Oak) - Although able to withstand limited periods of water-logging its enormous potential, as a very large avenue tree, is best achieved on freely draining slightly acidic soils. Reaching heights, in USA, well in excess of 30 metres, this oak has slender branches gently drooping at their tips and is further distinguished by the stunning autumn foliage, changing branch by branch from glossy green to flaming scarlet. More robust than the similar coccinea (Scarlet Oak).
SORBUS intermedia (Swedish Whitebeam) - Highly recommended for urban street and avenue plantings because of its tough resistance to most urban and coastal environmental hazards including wind, air pollution and reflected heat and light, it copes well with calcareous, acidic or alkaline soil conditions. It also happens to be a very attractive, well-formed and rounded, medium sized tree with dark green leaves, silver on the underside. White spring flowers yield small bunches of orange coloured fruits.

TILIA cordata (Greenspire) - Justifiably prized as a particularly uniform clonal derivative of Tilia cordata, lending serious status to avenue planting in parks and street locations, it thrives well in most soil conditions and urban environments.

TILIA x europaea (Pallida / Kaiser Linden) - Another outstanding avenue tree because of its uniformity and attractive green/yellow foliage, Pallida is the Lime of ‘Unter den Linden’ in Berlin. Quick to grow and very soil tolerant, it matures to a very large pyramidal form.
Maintenance

The Key Requirements:

Phase 1

The establishment phase – If the tree is to succeed in the longer term, correct care in the first three years is vital. Ensure that your programme of maintenance covers:

- **Watering** – even one instance of drought can have life threatening consequences for the tree. Waiting for leaves to show loss of turgor and drought stress before watering is too late. Ensure watering is proactive and applied deeply enough to be beneficial. The watering should be phased out over three years to encourage the tree to establish its own root system in relation to existing groundwater conditions.

- **Weeding** – competition for scarce water between trees and weeds can be intense. It is good practice to maintain a weed/grass free area around the tree. This will also keep damaging strimmers at a distance if in turf areas.

- **Regular inspection** – check for tree stability, loosen tree ties as the tree grows and remove at the end of three years. Countless trees have been strangled by ties. Check for early signs of disease, stress, chlorosis etc – quick action will be the most beneficial. Damaged limbs should be pruned carefully. Irrigation/aeration inlets should be checked and cleaned annually.

Phase 2

The tree is now semi-mature and establishing well – maintenance requirements should be low and relate mainly to crown raising if required by traffic constraints. Regular inspection by qualified personnel would be a great advantage addressing any needs.

Phase 3

The final phase as the tree approaches the fully mature stage. Maintenance requirements for mature tree stock can be specialist and extremely varied so are not covered by this manual. Again if the tree pit has been carefully designed and the correct species chosen for the location, maintenance will be very low and the tree can be expected to provide wide benefits and pleasure, for a huge number of people, for many years to come.
“I can reduce urban windspeeds”

Trees can reduce windspeeds for a distance of up to six times their height.
6 Project Profiles
Case histories and profiles

- Overview ........................................... 161
- Frinton ............................................. 162
- Aylesbury .......................................... 164
- Blackheath ........................................ 166
- Bromley ............................................ 168
- Cardiff ............................................. 170
- Lambeth .......................................... 172
- Goldhawk Road ................................... 174
- Leonard Circus ................................... 176
Case histories and profiles

Pleasing, beautiful and sustainable landscapes do not happen by accident, or by happenstance of nature. At GreenBlue Urban, this is an article of faith, because landscapes are our business, and the successful integration of trees into challenging and demanding urban environments is our mission.

Since 1992, the focus of our research has been collaboration with architects, designers and other tree-planting professionals. Our work has been to develop excellent tree pit designs that give newly planted urban trees the best chance and advantage for reaching their full maturity and potential.

We like to work with you – from the planning stages and beyond – to ensure you benefit from our ‘tree-literate’ design expertise and the technologies we have developed to provide long-term, urban-tree planting and management solutions. We will assist you in evaluating comprehensive tree pit designs, specifications and installations that are right for your needs, ambitions and budgets.

At GreenBlue Urban, we will also give you best practice guidance on tree pit layouts and tree-planting methods. We offer quality advice on practical and cost-effective products that promote tree establishment and maintenance, their compatibility and adaptability in different locations. Take advantage of both our on-site and telephone technical support service, across the United Kingdom, and in other countries where we have branches and operations.

We are happy to work with your own architects, designers and building contractors to ensure you get the best design, installation advice and assistance. Dedicated to service excellence and product sustainability, GreenBlue Urban goes the extra distance in making sure your trees live – and thrive – in urban settings.
A typical recent project, completed in the spring of 2010 involved the replacement of ageing and failing tree stock along the High Street of an East Coast town. The trees planted previously were creating trip hazards leading to claims on the local authority and were also very diverse and uneven in growth pattern due to the varied ground conditions they were encountering.

The decision was made to replant the High Street in conjunction with other civil engineering upgrade works which were scheduled to take place.

The tree pit design agreed on was based on a GreenBlue Urban standard package incorporating additional RootCells and Castle tree grilles tree pit surface segments instead of the standard tree grille design.

Design flexibility was required for the layout of each individual tree pit due to the unpredictable locations of some of the underground services. The RootCell modules proved ideal for working around obstructions and creating high value rooting volume for the trees’ long term health.

The contractor and client expressed satisfaction with GreenBlue Urban’s on site support service and the speed with which the tree planting packages were assembled.
Installation process

Tree trench excavation

RootCells structure in place

Loading the RootCells with free draining soil

Protection and ventilation layer with vent pipe

Completed project 5 years after planting
Project File: Aylesbury

Placing trees into made up ground or ‘fill’ material is extremely challenging. By its very nature, the requirements for heavy civil construction fill materials are completely opposed to the horticultural root zone requirements for trees.

The installation of RootCells has ensured the trees have the best possible chance of success and the paths and roadways are structurally stable.

The international engineering consultants advising on the project drew on GreenBlue Urban’s experience in the design and construction of structurally stable but root friendly tree pit designs to ensure that the trees had the best possible chance of success.

Continuous sub surface RootCell structures mean that as the trees establish, they have access to a large volume of good quality soil for long term requirements. This soil structure is ventilated using GreenBlue Urban Arborvents and the services running parallel to the rooting corridor are protected by ReRoot 1000 root deflecting barrier.
Project File: Blackheath

This project in south east London, planted in 2001, is one of the first installation sites in the world pioneering the commercial use of structural RootCells for tree root growth.

Proper underground provisions have enabled this tree to reach maturity, bringing with it all the environmental benefits.

The multinational engineering group involved in the design improvements to this major arterial route had identified a planting location but recognised that without proper provision below ground, the tree would become an expensive failure. Recognising GreenBlue Urban’s work in the research of structural soil technology, the consultancy designed a tree pit to utilize the RootCells in this extremely demanding location.

Although the tree pit is of a limited size, allowing 5 cubic metres of structural rooting medium, the first 10 years have served as an excellent demonstration of successful tree planting strategies showing growth from 16-18cm girth to approximately 60cm girth in May 2010.
Opened in November 2014, this £5.5 million scheme was funded by Bromley Council, Transport for London and The Mayor’s London Fund, it involved greatly improving traffic flow accompanied by regenerating the village atmosphere to stimulate and encourage new independent traders.

East Street and Market Street in particular were remodelled with new granite paving, street lighting, additional trees and outdoor seating. A significant increase in the number of shoppers availing themselves of the attractive new facilities and outlets testifies to the clear success of the long-planned improvements.

A key feature of the scheme was the planting of a very large specimen tulip tree (Liriodendron) weighing three and a half tons. Paved urban areas constitute a challenging environment for the growth to potential of such trees with at least one in three failing to survive more than ten years from their planting.

As a contributor to the reduction of carbon dioxide as well as the obvious environmental benefits of a fully developed leafy canopy, tree welfare has become the subject of much research and product development.

GreenBlue Urban, in collaboration with universities, landscape architects and other professionals, has developed systems to enable trees to flourish through the avoidance of soil compaction and provision of adequate irrigation and ventilation. Simultaneously, the problems of pavement heave and service duct disruption through root intrusion are solved with this design engineering.
Project File: Cardiff

The new BBC’s Roath Lock Studios in Cardiff opened in record time. In just 13 months, 175,000 square foot of HD-ready studios have been constructed and fitted out to provide a permanent, purpose-built home to four flagship BBC dramas.

With construction now complete on the new £25m BBC studio, large rooting volumes for the trees were created underneath the hard landscaped areas using the GreenBlue Urban structural RootCell system. Specified for this prestigious development to ensure optimum tree growth and establishment in this demanding coastal location.

Urban tree planting constituted a major part of the landscape design and GreenBlue Urban worked with the landscape architect to recommend that 154 trees and 5371 plants were planted, all of which were appropriate to the urban and climatic conditions expected on site. The agreed tree pit design was based on a GreenBlue Urban Arborsystem package incorporating long term irrigation and aeration provision and underground guying systems that had to ensure tree stability on this very exposed site.

Design flexibility was required for the layout of each individual tree pit due to the unpredictable locations of some of the underground services. The RootCell modules proved ideal for working around obstructions and creating high value rooting volume for the trees long term health.

The contractor and client expressed satisfaction with GreenBlue Urban’s on site support service and the speed with which the tree planting packages were assembled, which turned out to be one of the more complex projects. The hope of developers, BBC Wales and the Assembly Government is that moving the broadcaster’s biggest productions to Roath Basin will kick-start the development of the last totally undeveloped area of the Bay.
As part of a strategy to improve the gateways into London, tree planting was required at points along the main roads into the capital.

The landscape architect, recognising the difficult nature of these locations, turned to GreenBlue Urban to produce detailed drawings and specifications to assist the trees in some of the most demanding locations in arboricultural terms.

Where possible, tree planting locations were linked below ground to allow trees to share rooting volumes supplied by the structural root cells.

The impact of these successful trees can be gauged from the photograph. Previous tree planting in the area had largely failed, or blighted rather than benefited the streetscape so it was doubly important to get this right.
Project File: Goldhawk

Goldhawk Road is a very busy main thoroughfare in West London – it is the main A402 road into Shepherds Bush. As an existing typical London street, it carries a large volume of traffic – and of course with so much impervious surfacing, contributes to high storm water run-off levels.

London Borough of Hammersmith and Fulham were obviously concerned to reduce loadings on existing storm drains and engaged specialist SUDS consultants Bob Bray associates, and GreenBlue Urban to create a retro fit tree pit design to provide attenuation at the same time as introducing additional trees along this principle road artery.

As is ever the way with existing streets, below ground was a labyrinth of services and utilities, necessitating a modular design which would be flexible enough to accommodate these services and still provide optimum rooting conditions and provision for drainage.

Working closely with the civils contractor, the consultants and the client, GreenBlue Urban assisted both in the design phase, product supply and with site visits during construction to ensure a successful installation.

The design incorporated soil cells, root ventilation, drainage, flow control chambers and overflow provision. The key objective with this type of tree pit design is to remove the likelihood of prolonged water logging which could be detrimental to tree health. Soil type is also critical and GreenBlue Urban were able to provide a one call supply for all the tree pit components, which reduced contractor administration time and cost.
The London Borough of Hackney has established a reputation for proactive and innovative upgrading of its street environment. The advent of the Central London Congestion Charging Zone radically changed the traffic pattern in Leonard Circus, London, EC2. Pedestrian and cycling traffic have dramatically increased following the significant reduction in motor traffic.

The area between the buildings has been laid with unglazed brickwork, broken up by an irregular pattern of panels using contrasting grey granite, York Stone and Italian porphyry. The apparently random planting of eleven trees of various evergreen and deciduous varieties was, in fact, dictated by the need to avoid the very dense network of utility ducting and cabling. The need to protect these services and maintain the load-bearing capacity of the road system was successfully achieved without compromising the spatial and nutritional requirements of the developing tree roots.

The innovative design of the GreenBlue Urban load-bearing StrataCell modular system ensures a greatly enhanced soil environment eliminating compaction and maintaining irrigation and ventilation. The modular aspect of the system enables the fast construction of tree pits of irregular shape and requires no mechanical handling during installation.
“I can change traffic behaviour positively”

Trees are a traffic calming tool
7 | Research Insights

- Re-excavated tree ........................................ 182
- Root radar survey ........................................ 184
- Leaf chlorophyll fluorescence testing ............ 186
Research

In addition to keeping abreast of international developments in the urban tree planting sector, GreenBlue Urban have their own research plantings at UK locations and are actively supporting two leading Arboricultural Universities, in their own trials.

Over the years, an impressive collection of data has been accumulated and continues to grow. The research conducted by GreenBlue Urban is not without its own challenges and live street tree excavation, although to be desired, is rarely an option.

There have been exceptions however, and some of the images shown give a quick insight to product development trials and examples of research plantings.

The RootCell structure underneath this pavement was subjected to 400 passes of an 8.2 tonne axle loading immediately adjacent to the structure and then a further 200 passes immediately above the RootCell. As expected, no adverse movement of the structure was detected.
Tree Roots in soil cells – an investigation

**Background**

In July 2011, GreenBlue Urban planted a Tilia cordata ‘Greenspire’ tree in a hard landscape paved area, as part of a training and research programme. The tree was photographed during the planting process and the exercise was part of a detailed study into tree root morphology in root management products, and new root extension into uncompacted soil in structural cells.

**Tree Pit Construction**

A tree pit was excavated approximately 3m x 3m and 1.2m deep, and the soil cells installed in layers and filled with a sandly loam soil blend. The shallow RootDirector was also installed and filled with the same soil.

Soil was worked on to the structure and finally covered with a proprietary geotextile and hard landscape areas constructed using heavy compaction equipment as would be used on standard construction sites. The trial included the use of soil ventilation systems and irrigation and guying products.

**Tree Growth**

The tree was planted in the system and was watered for the first season after which the roots were sufficiently established to enable the tree to look after itself.

The Tilia showed impressive new shoot extension growth in the second, third and fourth years, however the principle reason for this study was to examine the below ground early root establishment within structural load bearing soil cells, to establish exactly how the roots had grown, and to explore the use of root guidance to deeper uncompacted soil profiles.

Four years is only a small portion of an expected tree life span, but the initial establishment phase of root growth is very critical to a tree’s long term prospects.
The Re-excavation

After the four years had been reached, the hard landscape was deconstructed to allow access to the RootDirector and soil cells, exposing the complete soil profile.

An airspade was then used to carefully remove the soil away from the tree root system to the full depth of the tree pit. This method allows us to see the roots without severing them although some of the finer roots are lost, the structural roots are kept intact.

Conclusion

Further to this study, the following observations and conclusions were made:

There was healthy root growth throughout the tree pit system, and to the full depth of 1.2 meters indicating that if aerated and drained correctly, tree roots will have no difficulty in establishing to deeper profiles than in a forest soil situation.

Tree health was regarded as being at the top end of expectations with no evidence of disease or die back.

Soil in the cells was healthy with no evidence of anaerobic soil conditions normally associated with soil at this depth.

Mechanical root management using ribbed RootDirectors is an effective technique in eliminating root spiralling and managing roots to preferred long term root zones.
Explores root Deflector and Soil Cell Impact on Urban Tree Root Morphology

The A2 at Blackheath in London represents one of the most arboriculturally demanding locations to plant a tree. One of the principle arteries into London, it was also an interesting location for Parkman Consulting and TFL to trial the use of shallow root management products to protect footpath integrity, in conjunction with the first generation of load bearing soil cells (RootCell by GreenBlue Urban Ltd) back in 2001. Too often root barriers are used without sufficient thought given to where the roots will eventually colonize, so this was an interesting trial.

There are two stages of root management on this tree pit. The product specified was a ribbed high density root barrier material (ReRoot600 – GreenBlue Urban) – the ribs being required to divert roots downwards to the preferred optimal root zone provided by the soil in the RootCells. At the perimeter of the RootCells, was a further boundary of root barrier (ReRoot 2000, 0.8m deep – GreenBlue Urban) to ensure that roots reaching the perimeter of the pit were diverted downwards even further from the surface.

The Consultants wanted to provide five cubic meters of load bearing soil volume within the root managed environment, to ensure the tree had an excellent start in life. The tree planted was a 16-18cm girth Platanus hispanica (London Plane).

In summer 2013, the tree (now at 720mm girth and 6m height) health was assessed. As well as visual assessment, leaf chlorophyll fluorescence testing in conjunction with Barcham Trees was utilized, and it was established that the tree health as assessed by this means measured very favorably against nursery stock benchmark readings.
The next stage in May 2014, was to involve DF Clarke Bionomique in the use of the latest root radar technology, to map out where the roots actually were after 12 years in this system. This root radar detects the depth and spread of all root over 20mm in diameter and a grid around the tree was scanned.

The results were very illuminating. From visual assessment of the surface around the tree, there is a complete absence of root heave or paving deflection associated with this type and age of tree so from this measure the root deflectors have achieved their primary objective.

Below ground, the radar showed the roots to be uniformly spread, having been trained downwards by the root deflector means. They had advanced beyond the initial area of RootCells and extended further without returning towards the surface.

A full report is available from GreenBlue Urban Ltd.
Leaf Fluorescence Testing on Urban trees in London

As part of their program of on-going research and development, GreenBlue Urban teamed up with Barcham Trees and Think Tree to visit trees planted between 9 and 12 years ago in what was then ground breaking tree pit designs in GreenBlue Urban products. The purpose was to assess the health of the trees and the effectiveness of those products which had been used, early in the last decade.

Barcham Trees and Think Trees Arboricultural Consultancy, joined forces for a visit to the capital with GreenBlue Urban staff, to assess the health of selected trees planted in GreenBlue Urban’s tree pit products.

The primary purpose of the day was to combine visual assessment of the selected trees condition, with the use of leaf chlorophyll fluorescence testing to ascertain whether the trees were under any latent stress, not visible to the naked eye.

The testing started at Guildhall, London. Barcham trees have been pioneering the use of the Hansatech leaf fluorescence testing equipment and have been building up a large bank of recorded data based on leaf testing on their nursery.

The M-PEA (Multi-Function Plant Efficiency Analyzer) combines high quality fast fluorescence kinetic and P700+ absorbance studies with ground-breaking Delayed Fluorescence (DF) measurements providing one of the most comprehensive systems for the investigation of plant photosynthetic efficiency available. Barcham use a ‘handy’ PEA which gives them the flexibility to conduct leaf sample analysis actually on location – invaluable for this type of investigation.

For GreenBlue Urban, the testing was an additional way of assessing the trees health in a variety of tree pit design scenarios. Howard Gray of GreenBlue Urban commented “It’s one thing to be able to tell people that trees in a particular location and tree pit design ‘look healthy’, but its far better if we can use science to demonstrate, with empirical data, that the actual tree is indeed as healthy as it looks!”
Barchams also pointed out that this type of leaf testing, whilst extremely valuable, is only one measure of assessing a tree’s health and whilst it contributes greatly to the assessment process, it may not tell us everything. We are learning all the time, and as new methods and equipment are developed we will gain a greater insight to the differing benchmarks and diagnostic methodologies to assess urban tree health in view of continuous improvement. This applies to tree pit design, appropriate species selection, treatment of different planting locations, product design and planting methodologies.

In addition to examining the health of these trees in continuous paved surrounds, the surfaces around the tree pit within 15 meters was scrutinized for any evidence of sub surface lateral root growth causing pavement heave. All of the trees inspected were planted within either pre formed recycled plastic RootDirectors to 580mm depth or in one case (Blackheath) the linear roll form ribbed ReRoot 600 barrier. Significantly there was a total absence of root damage or trip hazards attributable to root growth on any of the locations. However, on two sites, buttress root formation was beginning to lift the cast iron tree grille segments immediately next to the tree trunk. This kind of root formation often develops as the roots thicken to provide stability and is regarded as a ‘luxury problem’ in as much as it is associated with a successful tree.

Selected sample leaves are ‘clipped’ for 5 minutes to exclude light before the light sensor (black cylinder) is attached and readings taken.

What is this all telling us? These trees are in excellent health. A spokesman for GreenBlue Urban offered the comment, This is another step forward for urban tree pit design in the UK, in as much as we have trees planted using root management, in conjunction with load bearing soil cells, for over 10 years now. This is the longest track record of load bearing soil cells globally, as we pioneered their use in the UK. This means these tests have a special interest for us. Whilst we appreciate 12 years is not a huge percentage of a tree’s predicted life span, it is a good measure of how the trees can establish successfully in arboriculturaly speaking, very difficult conditions – without costly infrastructure damage.

Further tests are being conducted at other early RootCells projects in the UK during the next 12 months.

Results of chlorophyll fluorescence testing of trees at various sites across London

19 September 2013

Figure 1. Fv/Fm values for London plane Platanus x hispanica trees at various sites across London. Results are shown as mean ± standard error of the mean of five samples per tree.

Figure 2. Fv/Fm values for flowering cherry Prunus avium ‘plena’ trees at Tower Bridge Road, London. Results are shown as mean ± standard error of the mean of five samples per tree (except for the last tree which was the mean of only three samples).
“I can bring you peace and tranquility”

Noise reduction - trees form an effective sound absorbing barrier
GreenBlue International

- GGIG overview ........................................... 190
- Partner companies ........................................ 191
- International projects ................................. 192
GGIG Overview

GGI is a global group of companies offering cutting edge solutions to assist Urban Planners and Landscape Designers in implementing ‘green on grey’ – the successful integration of living plants in the built environment.

As one of the founder members, GreenBlue Urban has linked in with a vast wealth of research and knowledge which comes through international links with other business in this highly specialized field.

What does this mean for our clients and customers?

GGIG affiliation means that our client base access the following benefits whenever they contact GreenBlue Urban:

- Peace of mind that the products and services comply with the best practice internationally
- Ability to service overseas projects
- A company that cares genuinely about greening cities and communities for the benefit of all.
- Only companies demonstrating the highest standards of ethical work practice and with a track record of supporting successful green infrastructure are considered for inclusion within the GGIG structure.

Our GGIG affiliate companies:

**Milford Denmark**

GreenBlue Urban have enjoyed a long relationship with Milford in Copenhagen, our Scandinavian partner company. Milford enjoy an excellent reputation in Denmark, Norway and Sweden, and are able to offer product and design support across these countries for specifiers and urban planners.

Tel: (+45) 44 97 10 99
Web: www.milford.dk

**Greenleaf Deutschland KG**

One of our principle European trading partners, Greenleaf Deutschland has supplied many projects across Germany and also into Austria and Switzerland.

Tel: 02261 92028-0
Web: www.greenleaf-deutschland.de
CityGreen Australia
A long standing collaboration partner, CityGreen developed the Stratacell product as a progression of the GreenBlue RootCell. They supply significant projects across Australasia.
Tel: (+61) 02 6578 8250
Tel: (+1) 800 463 9260 Canada
Tel: (+1) 888 999 3990 USA
Web: www.citygreen.com

MetroGreen Urban Solutions, New Zealand
Metrogreen is the New Zealand distributor of urban tree planting products and have supplied some exciting projects across that country.
Tel: +64 3 688 7317
Web: www.metrogreen.co.nz

GreenBlue Infrastructure Solutions
Based in Woodstock, Canada, GBIS operate across that huge continent supplying a wide range of urban tree and streetscape products.
Tel: (+1) 866 282 2743 Canada
Web: www.greenblue.com

Greenleaf España S.L.
GreenBlue maintain a direct presence in Spain, and supply root management and tree planting products to a wide variety of projects.
Tel: +34 605 927 435
Web: www.greenleafespana.com

Greenleaf Ireland
Greenleaf Ireland have worked closely with GreenBlue Urban for many years. Their office and warehouse are based in Londonderry, and they have supplied many projects across Ireland.
Tel: 028 71345620
Web: www.greenleafireland.com

Green City Life
Green City Life have been distributing GreenBlue Urban products throughout Poland and some of the neighbouring east European counties for several years.
Tel: +48(022) 616 41 70
Web: www.gcl.com.pl
International projects

Australia

Spain

Germany

USA

Australia
9 Information

- Environmental policy ........................................ 197
- Eco-Schools programme .................................. 198
- ArborAdvance ............................................... 200
- Green infrastructure valuation .......................... 201
- FAQ’s ...................................................... 202
- How to order ............................................... 207
- Datasheets .................................................. 211
- Useful organizations ....................................... 243
Environmental policy

GreenBlue Urban is wholly committed to achieving the highest standards of environmental performance throughout its operations. The use of energy saving systems installed within our manufacturing facilities results in minimal impact to the environment.

Sustainability is at the forefront of our activities. The majority of our products are manufactured from 100% post consumer waste and consequently are fully recyclable in the future. The aim of our business is to increase the chances of newly planted urban trees reaching their full potential. Consider the environmental benefits of this!

GreenBlue Urban will continue to raise environmental awareness within the company through the development and training of its employees and will openly communicate with all its contacts on relevant environmental issues.

GreenBlue Urban adopts responsible standards as an integral part of its business strategy and studies the environmental impact associated with its products throughout their life-cycle.

The seamless link provided by GreenBlue Urban from continual professional development seminars to the overseeing of actual installations ensures maximum efficiency in all areas. This indeed, contributes significantly towards emission reduction.
What is the Eco-Schools programme?

The Eco-Schools programme is the largest sustainable schools programme in the world. Keep Britain Tidy manages the programme in England, with over 17,000 schools registered representing over 70% of all schools in the country. They work with children from key stage 1 through to key stage 4 and beyond into further education.

The Eco-Schools programme enables children to learn about sustainability across the curriculum using a range of themes and activities and supporting them to develop the skills, knowledge and values required to support more sustainable lifestyles.

Why are we doing this?

Here at GreenBlue Urban, we are all about investing in the future of the urban landscape...

What better way to show our passion for this than by working with the future generation to protect that urban landscape!

We want to give something back to the communities in which we work and to ensure that our children feel as passionately about the importance of trees as we do.

We hope you agree that this is a fantastic activity for GreenBlue Urban to be involved in – one that will make it easier for us to highlight the importance of proper tree and water management systems, while at the same time ensuring a healthy future for our urban environments.

What does the partnership mean to us?

- We will be developing unique lesson plans accessible to 17,000 schools that can be used throughout the autumn term for Years 4 and 5.
- Linked to the new 2014 national curriculum
- Supports active learning – especially learning outdoors
- Rooted in the importance of trees to the urban environment
- Bespoke GreenBlue Urban illustrations
- We will be running a national competition to win trees planted by GreenBlue Urban, nominated by children and communities and voted for by a panel of specialists, including representatives from Keep Britain Tidy and GreenBlue Urban
ArborAdvance

Long Term Urban Tree warranty
As a mark of our confidence in the Arborsystem tree pit package, GreenBlue Urban can offer a 15 year tree health warranty for every tree planted in accordance with our ArborAdvance tree planting methodology.

What does this mean?
If a tree is planted within the approved system, and in certified accordance with our structured tree planting methods, and maintained as per our guidance, we will guarantee that this tree will be alive and healthy at the end of the 15 year guarantee period.

Why 15 years?
Our research has indicated bands of mortality for newly planted trees – the first three years see the biggest losses, principally through lack of watering and vandalism. Years 8-12 show another band of failure as trees typically exhaust inadequate soil volumes or suffer from compaction and anaerobic soil conditions.

A tree growing well at 15 years has a very high chance of staying healthy for many further decades.

And if it fails?
We will supply a new tree of the same species to replace the tree, and replace any defective product used from our range with the equivalent current product.

How will it work for clients?
The client will specify and submit their drawings to GreenBlue Urban at the design stage, to verify that the tree pit design is in accordance with best practice. GreenBlue Urban will revise the drawings to ensure adequate soil volumes and drainage aeration and other details are correct.

GreenBlue Urban will then visit site to take account of the environment and open up a project record file for the tree.

During installation, GreenBlue Urban will have a site engineer available to inspect key stages of the construction – these will be photographed and stored.

At planting completion, a GreenBlue Urban ArborAdvance 15yr warranty certificate will be issued to the client verifying that the tree has been planted in accordance with the drawings.

Maintenance watering as required must be carried out by the client or a chosen contractor, digitally photographed on each visit, and emailed to GreenBlue Urban for the record, for the first 2 years.

Additional watering may be requested in the event of exceptional drought conditions.

GreenBlue Urban will visit the tree location on an annual basis until the 15 year period expires.

Warranty Exceptions
GreenBlue Urban will not be held liable for tree losses due to vandalism, vehicular damage or acts of God. In the event of a species specific disease we may reserve the right to replace the species with a more tolerant variety.
Green Infrastructure Valuation

Not infrequently, we are asked questions related to the valuation of green infrastructure in projects. In this current economic climate, value for, and return on investment is of key importance.

No one will argue with the long term value of established tree planting – the principle difficulty however is that a building developer will be expected to invest in an asset which his company may not see significant financial return on, if they are selling the property immediately.

In our experience, developers are happy to invest in green infrastructure if it is a planning requirement and it does not put them at a commercial disadvantage. This highlights the importance of consistency in approach and insistence on standards such as minimum uncompacted soil volumes for trees by local planners.

The immediate gain for such development companies is in the increase of real estate values with well-designed quality landscape features and tree planting. On a phased housing development, poor planting detail will begin to manifest itself with stunted and dying trees even before the final phases are built. This will actually make properties more challenging to sell, as prospective purchasers will be negatively impacted by poor tree health in the estate.

The attention paid to tree pit design and the provision of an adequate tree root environment, in both volume and soil quality, is the true measure of a company’s green credentials.

More recently we have seen new tools being developed to assess the value of green infrastructure, the best known being the ’I-Tree’ software system. This tool can be used to value trees in terms of a wide spectrum of benefit – actually allowing land owners and local authorities to place an actual currency value on their tree stock.

This site can be accessed at www.itreetools.org and includes a wealth of information to assist in making a strong commercial case for investing planting trees as an investment.

Another system is the green infrastructure valuation toolkit, which has been developed in the North West of England – this can be accessed and downloaded from their website www.greeninfrastructurenw.co.uk
## Frequently asked questions

### Root Barriers

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How deep should I install the root barrier?</strong></td>
<td>This will depend on what you are trying to protect or achieve. As a general rule, don’t direct roots deeper than you need to. For example, don’t go 1m deep to protect a pedestrian kerb structure where a 300mm deep barrier would be sufficient.</td>
</tr>
<tr>
<td><strong>How close to the tree can I install root barriers?</strong></td>
<td>Always give the tree as much space as possible. For smaller species we can use small RootDirectors to manage roots downwards. If we are installing a barrier deeper than a RootDirector all around the tree then we need to take into consideration the tree’s need for anchorage and access to soil nutrients.</td>
</tr>
<tr>
<td><strong>If I’m protecting a service/utility, how deep in relation to that should I go with a root barrier?</strong></td>
<td>We would normally suggest that a barrier extends to a depth of 2-300mm below the invert level of the service or utility.</td>
</tr>
<tr>
<td><strong>How close to the utility can I place the barrier?</strong></td>
<td>The recommended distance is again about 300mm away from the utility. This will ensure that any pressure against the root barrier is not transmitted directly to the service utility. The 300mm is effectively a buffer zone.</td>
</tr>
<tr>
<td><strong>Do you have any difficulty in getting utility companies to accept these products as a means of protecting their infrastructure?</strong></td>
<td>Generally we find that if you can show that you have planned the tree planting design to incorporate protection for their utility, they have no difficulty. What they do not like is indiscriminate planting without regard to their investment. We do have on file some copies of letters from utilities approving the use of ReRoot 2000 for protection of their installations.</td>
</tr>
<tr>
<td><strong>What about NHBC and house builders, do they allow use of root barriers?</strong></td>
<td>At present NHBC do not allow root barriers as a substitute for deep foundations for houses near trees although many house builders do incorporate these products.</td>
</tr>
</tbody>
</table>
## Frequently asked questions - Root Barriers

<table>
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<tr>
<th>Question</th>
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<tr>
<td><strong>How should I finish the top of the root barrier installation?</strong></td>
<td>Any root barrier used must finish at least 10mm above any planting medium (i.e. topsoil) on the tree side otherwise roots could grow over the top. This top edge can be incorporated in a pedestrian kerb detail or disguised by groundcover plants or suitable edging material. It does need protecting from traffic or mowers which could damage it.</td>
</tr>
<tr>
<td><strong>Will the barrier rot or break down over time?</strong></td>
<td>No, our barriers are resistant to biodegradation and photo degradation (light).</td>
</tr>
<tr>
<td><strong>Do you use recycled plastic in your root barriers?</strong></td>
<td>Yes, RootDirectors and ReRoot are made from recycled plastic and are in turn recyclable at the end of their life.</td>
</tr>
<tr>
<td><strong>Can you use root barrier horizontally over service runs?</strong></td>
<td>Yes, in some cases this is the only way trees can be planted near pipes. We recommend that the barrier forms a shallow arch over the service to ensure that it does not collect standing water but drains off both sides.</td>
</tr>
<tr>
<td><strong>Can we then plant trees directly over the top of the service?</strong></td>
<td>This would be for the utility company to decide if they would allow, but technically, providing there is sufficient depth of soil (Minimum 800mm) over the root barrier there is no reason why not.</td>
</tr>
<tr>
<td><strong>What will happen to a RootDirector when the tree within it outgrows its size?</strong></td>
<td>Eventually the barrier could split but by then its purpose will be fulfilled as the root plate pattern will be established at a safe level.</td>
</tr>
<tr>
<td><strong>When would you use the flexible linear ribbed root barrier instead of RootDirectors?</strong></td>
<td>ReRoot 300/600/1000 are extremely versatile products and can be used in different ways. They allow the flexibility of working around underground obstacles and protrusions when trying to create tree pits in congested urban situations. They are also useful for grouping trees together in clusters rather than individual pits - giving the advantage of root space sharing for trees.</td>
</tr>
</tbody>
</table>
# Frequently asked questions

**RootCells, RootSpace, StrataCell - (generic rootcells)**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What do RootCells do?</strong></td>
<td>RootCells provide a load bearing structure beneath hard landscape areas, which we can load with quality topsoil for tree root systems without the fear of settlement leading to surface subsidence.</td>
</tr>
<tr>
<td><strong>How do they work?</strong></td>
<td>By protecting the soil from over compaction, RootCells are high strength, interlocking modules keeping weight off the soil, rather like a soil skeleton.</td>
</tr>
<tr>
<td><strong>Have they got enough space for roots to develop within?</strong></td>
<td>Yes – the void space ratio in RootCells is 92% and in StrataCells 94.63%. The space between the support columns is large enough to allow roots to develop and thicken for long term stability and transport of moisture, nutrients and movement of plant sugars around the tree.</td>
</tr>
<tr>
<td><strong>How do roots react to growing in these structures?</strong></td>
<td>As the roots grow into the structure, they meet the support columns and either follow them around or divide. This produces a multiple rooting pattern which is very beneficial, particularly for trees in confined spaces. Graft unions may occur as roots rejoin around columns and proceed through the structure.</td>
</tr>
<tr>
<td><strong>How do we know this occurs?</strong></td>
<td>RootCells were developed following research into the use of rock soil mixes which showed that even with a soil void ratio of only 18%, roots could proceed through the structure. What RootCells do, is take the advantages of this system and further improve it by increasing the soil content dramatically. This removes the long term disadvantage of rock soil mixes which was the lack of void space for secondary thickening of the root system.</td>
</tr>
<tr>
<td><strong>How do you assemble the structure?</strong></td>
<td>Simple interlocking modules are linked together and assembled in the pit. The modules interlock both horizontally and vertically. The soil is then poured into the structure and lightly compacted either by treading or using a small plate compactor. The plate compactor simply rides across the RootCells, vibrating the structure and allowing the soil to settle, eliminating large unwanted voids.</td>
</tr>
<tr>
<td><strong>How long have RootCells been in use?</strong></td>
<td>The first installations were successfully completed in 2001. The current RootCell has built on the experience gained and is a further improvement.</td>
</tr>
</tbody>
</table>
Frequently asked questions

**RootCells**

<table>
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<tr>
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<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>You are burying topsoil – isn’t this a bit unnatural?</td>
<td>Yes, but to a degree, planting a tree in a city is unnatural for the tree which is still essentially a living forest plant. What we are doing here is creating a forest floor environment for the trees’ benefit, but at a slightly lower level within the ground.</td>
</tr>
<tr>
<td>But how will the soil stay alive?</td>
<td>RootCells should always be installed with adequate drainage and equally importantly with a root ventilation system such as the GreenBlue Urban Arborvent with two inlets. This will allow some air movement over the RootCells to allow gaseous exchange to take place. This will allow the soil to breathe and live in the longer term.</td>
</tr>
<tr>
<td>Will the Roots push the Cells apart?</td>
<td>In practice this doesn’t happen due to the fact that a RootCell structure is normally installed at a depth of 300mm below finished levels and the weight of granular sub base material above prevents surface heave occurring.</td>
</tr>
<tr>
<td>Can I use RootCells right against the root ball?</td>
<td>Best practice would be to allow the tree the maximum possible volume of unsupported topsoil against the root ball in the circumstances. The RootCells only need to start where their load bearing capability is required. This will allow for the tree’s zone of rapid taper within the tree pit before entering the RootCell soil structure.</td>
</tr>
<tr>
<td>Do I need to load the cells with Amsterdam tree soil or similar load-bearing soil mixes?</td>
<td>No – the RootCells need no additional strength from the soil so it is much better to load with premium sandy loam topsoil to BS3882.</td>
</tr>
</tbody>
</table>
### Frequently asked questions

**RootCells**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How do I protect the top of the RootCells from subsequent road base layers above?</td>
<td><strong>GreenBlue Urban</strong> supply a twin wall geonet textile fabric to protect the top of the structure.</td>
</tr>
<tr>
<td>What about protecting the sides from sideways ground movement?</td>
<td>The sides of the <strong>RootCell</strong> structure are faced with multiple columns giving good lateral support. Void spaces between the <strong>RootCell</strong> structure and surrounding sub base should be filled with either further <strong>RootCells</strong> and soil or the edge of the structure should be lined with geotextile and the reverse side be filled with a suitable compactable base material.</td>
</tr>
<tr>
<td>My tree pits are smaller than I would like to see – is it still worthwhile installing some <strong>RootCells</strong>?</td>
<td>Yes. Many tree pits are smaller than we would like but the idea of the <strong>RootCells</strong> is to maximise the value of the volume that you have got to the tree. Thus by providing optimum rooting conditions within your small tree pit you are giving the tree an excellent start in life and the vigour to grow out further in the long term.</td>
</tr>
<tr>
<td>What volume of <strong>RootCells</strong> do you recommend?</td>
<td>The greater the volume you provide for the tree, the more the tree will succeed. Please consult our standard tree pit details for a good starting point. Obviously the answer to this will be species dependant. Three cubic meters of rootable volume should be regarded as a minimum start although a mature tree root system will frequently occupy more than ten times this volume.</td>
</tr>
<tr>
<td>Do any species not tolerate this kind of tree pit?</td>
<td>We are not currently aware of any species which will not tolerate this kind of tree pit system.</td>
</tr>
</tbody>
</table>
How to order

When ordering please remember that we need the following:
1. Invoice address
2. Delivery address including POSTCODE
3. Name of person placing order
4. Order number if you use them
5. Telephone number for order queries
6. Site contact and number if applicable
7. Full payment unless established account holder

You can send your order by:
POST to Northpoint, Compass Park, Bodiam, TN32 5BS
E-MAIL – enquiries@greenblueurban.co.uk
PHONE our sales staff on 01580 830 800.

FIRST ORDERS & NEW ACCOUNTS
Payment is required with all first orders. A pro-forma invoice can be issued and faxed or e-mailed. The order will be released on receipt of payment.

LOCAL AUTHORITIES
An order number is usually sufficient to commence trading with payment of accounts due 30 days nett as per our normal conditions of sale.

DELIVERY
Schedules of delivery are estimates only. We will use our best efforts to deliver at times stated but shall not be liable for any delays due to causes beyond our control. Goods shall be deemed to be delivered once handed over to the carrier.

PAYMENT
Full payment is due 30 days after the date of the invoice. We reserve the right to charge interest on overdue accounts at the monthly rate of 6% above the base lending rate of Lloyds Bank plc, as detailed in our Terms & Conditions of Sale.

DISCLAIMER
Trees are living organisms whose growth cannot always be predicted. Accordingly, GreenBlue Urban makes no warranties on its products either expressed or implied concerning the effects of the products on tree root growth, their merchantability or fitness for a particular purpose. GreenBlue Urban recommends that an arborist with knowledge of local conditions be consulted.
9  Product data sheets

**RootDirectors**
- Ribbed Root Barrier .......................... 211
- High Strength Root Barrier ................. 212
- High Strength Root Barrier ................. 213
- RD510A RootDirector ....................... 214
- RD640A RootDirector ....................... 215
- RD1050A RootDirector ..................... 216
- RD1400A RootDirector ..................... 217

**Tree pit irrigation**
- RootRain Metro ............................. 218
- RootRain Metro with plastic cap on chain ........................................ 219
- RootRain Metro with metal cap on chain .......................................... 220
- RootRain Urban .............................. 221
- RootRain Civic .............................. 222
- RootRain Hydrogrille ....................... 223
- RootRain Arborvent ....................... 224

**Root Cells**
- RootCell ........................................ 225
- StrataCell ..................................... 226

**DTS tree grilles**
- Adur ............................................ 227
- Avon ............................................ 228
- Clyde .......................................... 229
- Clyde stainless steel ....................... 230
- Tay ............................................. 231
- Yare ........................................... 232
- Castle ......................................... 233

**DTS tree guards**
- Coniston ...................................... 234
- Derwent ...................................... 235
- Ennerdale ..................................... 236
- Thirlmere ..................................... 237
- Ullswater ..................................... 238
- Windermere .................................. 239

**Precast Arboresin**
- Precast Arboresin DTS tree grille ........ 240
# ReRoot 300/600/1000 ribbed root barrier

## MATERIAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>PROPERTIES</th>
<th>ISO</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHYSICAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>g/cc</td>
<td>0.97</td>
</tr>
<tr>
<td>Shrinkage</td>
<td>%</td>
<td>2.5 – 3.0</td>
</tr>
<tr>
<td>Melt Flow (190°C/Sqg)</td>
<td>g/10min</td>
<td>&lt; 0.6</td>
</tr>
<tr>
<td><strong>MECHANICAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Izod Impact, notched,</td>
<td>kJ/m²</td>
<td>13</td>
</tr>
<tr>
<td>Stress at yield</td>
<td>MPa</td>
<td>23-26</td>
</tr>
<tr>
<td>Stress at break</td>
<td>MPa</td>
<td>28-30</td>
</tr>
<tr>
<td>Strain at break</td>
<td>%</td>
<td>&gt; 600</td>
</tr>
<tr>
<td>Flexural Modulus</td>
<td>MPa</td>
<td>950 – 1100</td>
</tr>
<tr>
<td>Shore D hardness</td>
<td></td>
<td>60-63</td>
</tr>
<tr>
<td><strong>THERMAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VST@10N (VST/A)</td>
<td>%</td>
<td>115-130</td>
</tr>
<tr>
<td><a href="mailto:HDT@0.45MPa">HDT@0.45MPa</a> (HDT/B)</td>
<td>°C</td>
<td>73-80</td>
</tr>
</tbody>
</table>

## TYPE
- Ribbed

## CODE
- RER300A, RER600A & RER1000A

## SIZE
- **Thickness:** 1mm
- **Width:**
  - RER300A: 300mm
  - RER600A: 600mm
  - RER1000A: 1000mm

## ROLL SIZE
- 30m

## MATERIAL
- HDPE

## FINISH
- Natural

## COLOUR
- Black

## WEIGHT
- RER300A: 0.3 kg per linear metre
- RER600A: 0.6 kg per linear metre
- RER1000A: 1.0 kg per linear metre
Product data sheet

ReRoot 2000 (1mm thick) high strength root barrier

**TYPE**
- Flat

**CODE**
- RER210X0.3A
- RER210X0.6A
- RER210X1.0A
- RER210X1.5A

**SIZE**
- Thickness: 1mm
- Width:  
  - RER210X0.3A 300mm
  - RER210X0.6A 600mm
  - RER210X1.0A 1000mm
  - RER210X1.5A 1500mm

**ROLL SIZE**
- 100LM

**MATERIAL**
- Recycled HDPE

**FINISH**
- Natural

**COLOUR**
- Black

**WEIGHT**
- 1.0kg per m²

**MATERIAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th>PROPERTIES</th>
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<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density g/cc</td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td>Shrinkage %</td>
<td>2.5 – 3.0</td>
<td></td>
</tr>
<tr>
<td>Melt Flow (190°C/5kg) g/10min</td>
<td>&lt; 0.8</td>
<td></td>
</tr>
</tbody>
</table>

**PHYSICAL**
- Izod Impact, notched kj/m²: > 13
- Stress at yield MPa: 23-26
- Stress at break MPa: 26-30
- Strain at break %: > 600
- Flexural Modulus MPa: 950 – 1100
- Shore D hardness: 60-63

**MECHANICAL**
- VST@10N (VST/A) %: 115-130
- HDT@0.45MPa (HDT/B) °C: 73-80
# ReRoot 2000 (2mm thick) high strength root barrier

## MATERIAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Flat</th>
</tr>
</thead>
</table>
| **CODE**         | RER220X1.0A  
|                  | RER220X1.5A  
|                  | RER220X2.0A  |
| **SIZE**         | Thickness: 2mm |
|                  | Width: RER220X1.0A 1000mm |
|                  | RER220X1.5A 1500mm |
|                  | RER220X2.0A 2000mm |
| **ROLL SIZE**    | 100LM |
| **MATERIAL**     | Recycled HDPE |
| **FINISH**       | Natural |
| **COLOUR**       | Black |
| **WEIGHT**       | 2.0kg per m² |

### PHYSICAL

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<thead>
<tr>
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<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Shrinkage (%)</td>
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<td>2.5 – 3.0</td>
</tr>
<tr>
<td>Melt Flow (190°C/5kg) g/10min</td>
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</tr>
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</table>

### MECHANICAL

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<td>23-26</td>
</tr>
<tr>
<td>Stress at break MPa</td>
<td></td>
<td>28-30</td>
</tr>
<tr>
<td>Strain at break %</td>
<td></td>
<td>&gt; 600</td>
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<tr>
<td>Flexural Modulus MPa</td>
<td></td>
<td>950 – 1100</td>
</tr>
<tr>
<td>Shore D hardness</td>
<td></td>
<td>60-63</td>
</tr>
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### THERMAL

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<td>115-130</td>
</tr>
<tr>
<td><a href="mailto:HDT@0.45MPa">HDT@0.45MPa</a> (HDT/B) °C</td>
<td></td>
<td>73-80</td>
</tr>
</tbody>
</table>
RD510A RootDirector

<table>
<thead>
<tr>
<th><strong>TYPE</strong></th>
<th>Tapered and ribbed to suit rootball up to 375mm diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CODE</strong></td>
<td>RD510A</td>
</tr>
<tr>
<td><strong>MATERIAL</strong></td>
<td>Recycled MDPE</td>
</tr>
<tr>
<td><strong>MATERIAL CHARACTERISTICS</strong></td>
<td>Density: 0.935</td>
</tr>
<tr>
<td><strong>FINISH</strong></td>
<td>Natural</td>
</tr>
<tr>
<td><strong>COLOUR</strong></td>
<td>Black</td>
</tr>
<tr>
<td><strong>WEIGHT</strong></td>
<td>3.4kg</td>
</tr>
</tbody>
</table>

![Diagram of RD510A RootDirector](image-url)
Product data sheet

RD640A RootDirector

**TYPE**
Tapered and ribbed to suit rootball up to 525mm diameter

**CODE**
RD640A

**MATERIAL**
Recycled MDPE

**MATERIAL CHARACTERISTICS**
Density: 0.935

**FINISH**
Natural

**COLOUR**
Black

**WEIGHT**
7.2kg
Product data sheet

RD1050A RootDirector

**TYPE**
Tapered and ribbed to suit rootball up to 810mm diameter

**CODE**
RD1050A

**MATERIAL**
Recycled MDPE

**MATERIAL CHARACTERISTICS**
Density: 0.935

**FINISH**
Natural

**COLOUR**
Black

**WEIGHT**
13.1kg
### RD1400A RootDirector

<table>
<thead>
<tr>
<th><strong>TYPE</strong></th>
<th>Tapered and ribbed to suit rootball up to 1150mm diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CODE</strong></td>
<td>RD1400A</td>
</tr>
<tr>
<td><strong>MATERIAL</strong></td>
<td>Recycled MDPE</td>
</tr>
<tr>
<td><strong>MATERIAL CHARACTERISTICS</strong></td>
<td>Density: 0.935</td>
</tr>
<tr>
<td><strong>FINISH</strong></td>
<td>Natural</td>
</tr>
<tr>
<td><strong>COLOUR</strong></td>
<td>Black</td>
</tr>
<tr>
<td><strong>WEIGHT</strong></td>
<td>16.5kg</td>
</tr>
</tbody>
</table>

![RootDirector diagram]
Product data sheet

RootRain Metro with plastic cap

**TYPE**
35mm diameter irrigation system

**CODE** | **SIZE (LENGTH)**
---|---
RR1A  | 1.25m
RR2A  | 1.75m
RR3A  | 2.50m

**MATERIAL**
Bracket recycled HDPE, pipe polypropylene

**FLOW**
60 litres a minute in porous soils

**FINISH**
Natural

**COLOUR**
Bracket green, pipe black

**WEIGHT**
RR1A  | 0.20kg
RR2A  | 0.25kg
RR3A  | 0.31kg
### RootRain Metro with plastic cap on chain

**TYPE**
35mm irrigation system with plastic cap attached by chain

<table>
<thead>
<tr>
<th>CODE</th>
<th>SIZE (LENGTH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRPC1A</td>
<td>1.25m</td>
</tr>
<tr>
<td>RRPC2A</td>
<td>1.75m</td>
</tr>
<tr>
<td>RRPC3A</td>
<td>2.50m</td>
</tr>
</tbody>
</table>

**MATERIAL**
Bracket and cap HDPE, pipe polypropylene, chain stainless steel.

**FLOW**
60 litres a minute in porous soils

**FINISH**
Natural

**COLOUR**
Bracket and cap green, pipe black

<table>
<thead>
<tr>
<th>CODE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRPC1A</td>
<td>0.20kg</td>
</tr>
<tr>
<td>RRPC2A</td>
<td>0.23kg</td>
</tr>
<tr>
<td>RRPC3A</td>
<td>0.30kg</td>
</tr>
</tbody>
</table>

---

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Sales and Service: +44 (0) 1580 830 800
E-mail: enquiries@greenblueurban.com
Website: greenblueurban.com
RootRain Metro with metal cap on chain

<table>
<thead>
<tr>
<th>TYPE</th>
<th>35mm irrigation system with metal cap attached by chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>CODE</td>
<td>SIZE (LENGTH)</td>
</tr>
<tr>
<td>RRMC1A</td>
<td>1.25m</td>
</tr>
<tr>
<td>RRMC2A</td>
<td>1.75m</td>
</tr>
<tr>
<td>RRMC3A</td>
<td>2.50m</td>
</tr>
<tr>
<td>MATERIAL</td>
<td>Bracket HDPE, pipe polypropylene, chain stainless steel and cap aluminium.</td>
</tr>
<tr>
<td>FINISH</td>
<td>Natural</td>
</tr>
<tr>
<td>COLOUR</td>
<td>Bracket green, cap grey and pipe black.</td>
</tr>
<tr>
<td>WEIGHT</td>
<td></td>
</tr>
<tr>
<td>RRMC1A</td>
<td>0.20kg</td>
</tr>
<tr>
<td>RRMC2A</td>
<td>0.23kg</td>
</tr>
<tr>
<td>RRMC3A</td>
<td>0.30kg</td>
</tr>
</tbody>
</table>
# Product data sheet

## RootRain Urban

<table>
<thead>
<tr>
<th>TYPE</th>
<th>60mm diameter irrigation system with 80mm diameter fixed plastic grid inlet.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CODE</td>
<td>SIZE (LENGTH)</td>
</tr>
<tr>
<td>RRURB1A</td>
<td>3m</td>
</tr>
<tr>
<td>RRURB2A</td>
<td>5m</td>
</tr>
<tr>
<td>RRURB3A</td>
<td>8m</td>
</tr>
<tr>
<td>MATERIAL</td>
<td>Recycled HDPE inlet and tee, polypropylene pipe.</td>
</tr>
<tr>
<td>FINISH</td>
<td>Natural</td>
</tr>
<tr>
<td>COLOUR</td>
<td>Black</td>
</tr>
<tr>
<td>WEIGHT</td>
<td>RRURB1A 0.9kg</td>
</tr>
<tr>
<td></td>
<td>RRURB2A 1.3kg</td>
</tr>
<tr>
<td></td>
<td>RRURB3A 1.9kg</td>
</tr>
</tbody>
</table>
Product data sheet

RootRain Civic

**TYPE**
Irrigation/aeration system with 60mm diameter perforated pipe and 95mm diameter aluminium cap, with retainer chain.

<table>
<thead>
<tr>
<th>CODE</th>
<th>SIZE (LENGTH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRCIVIC1A</td>
<td>3m</td>
</tr>
<tr>
<td>RRCIVIC2A</td>
<td>5m</td>
</tr>
<tr>
<td>RRCIVIC3A</td>
<td>8m</td>
</tr>
</tbody>
</table>

**MATERIAL**
Aluminium cap, inlet pipe and tee HDPE

**FINISH**
Polyester powder coated cap remainder natural

**COLOUR**
Black

**WEIGHT**
- RRCIVIC1A: 1.0kg
- RRCIVIC2A: 1.4kg
- RRCIVIC3A: 2.0kg
# RootRain Hydrogrille

**TYPE**
Irrigation/aeration system with 60mm diameter perforated pipe and 120mm diameter aluminium inlet

<table>
<thead>
<tr>
<th>CODE</th>
<th>SIZE (LENGTH)</th>
<th>INLET</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRHYDR1A</td>
<td>3m</td>
<td>Single</td>
</tr>
<tr>
<td>RRHYDR2A</td>
<td>5m</td>
<td>Single</td>
</tr>
<tr>
<td>RRHYDR3A</td>
<td>8m</td>
<td>Single</td>
</tr>
<tr>
<td>RRHYDR2X3A</td>
<td>8m</td>
<td>Double</td>
</tr>
</tbody>
</table>

**MATERIAL**
Body LM6 aluminium, lid 5086 aluminium, pipe polypropylene, tee recycled HDPE

**FINISH**
Body cast with finished top edge, lid anodised

**COLOUR**
Body and lid natural aluminium, pipe and tee black

**WEIGHT**
<table>
<thead>
<tr>
<th>CODE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRHYDR1A</td>
<td>1.18kg</td>
</tr>
<tr>
<td>RRHYDR2A</td>
<td>1.56kg</td>
</tr>
<tr>
<td>RRHYDR3A</td>
<td>2.13kg</td>
</tr>
<tr>
<td>RRHYDR2X3A</td>
<td>2.73kg</td>
</tr>
</tbody>
</table>
Product data sheet

RootRain Arborvent

**TYPE**
Irrigation/aeration system with 60mm diameter perforated pipe and 100mm x 100mm aluminium inlet.

<table>
<thead>
<tr>
<th>CODE</th>
<th>SIZE (LENGTH)</th>
<th>INLET</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRARBV1D</td>
<td>3m</td>
<td>Single</td>
</tr>
<tr>
<td>RRARBV2D</td>
<td>5m</td>
<td>Single</td>
</tr>
<tr>
<td>RRARBV3D</td>
<td>8m</td>
<td>Single</td>
</tr>
<tr>
<td>RRARBVD13D</td>
<td>8m</td>
<td>Double</td>
</tr>
</tbody>
</table>

**MATERIAL**
Body LM6 aluminium, lid 5086 aluminium, pipe polypropylene, tee recycled HDPE

**FINISH**
Body cast with finished top edge, lid anodised

**COLOUR**
Body and lid natural aluminium, pipe and tee black

**WEIGHT**
<table>
<thead>
<tr>
<th>CODE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRARBV1D</td>
<td>1.08kg</td>
</tr>
<tr>
<td>RRARBV2D</td>
<td>1.46kg</td>
</tr>
<tr>
<td>RRARBV3D</td>
<td>2.03kg</td>
</tr>
<tr>
<td>RRARBVD13D</td>
<td>4.06kg</td>
</tr>
</tbody>
</table>
Product data sheet

RootCell

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Structural soil support module</th>
</tr>
</thead>
<tbody>
<tr>
<td>CODE</td>
<td>GLRCMA</td>
</tr>
<tr>
<td>SIZE</td>
<td>250mm x 250mm x 90mm</td>
</tr>
<tr>
<td>MATERIAL</td>
<td>Recycled HDPE</td>
</tr>
<tr>
<td>LOAD BEARING CAPACITY</td>
<td>up to 80 tonnes per m²</td>
</tr>
<tr>
<td>FINISH</td>
<td>Natural</td>
</tr>
<tr>
<td>COLOUR</td>
<td>Black</td>
</tr>
<tr>
<td>WEIGHT</td>
<td>0.38kg</td>
</tr>
<tr>
<td>VOID/SOIL</td>
<td>92%</td>
</tr>
</tbody>
</table>
## StrataCell

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Large structural soil support module</th>
</tr>
</thead>
</table>
| CODE SIZE | GLSCM60A 500mm x 500mm x 250mm  
GLSCM30A 500mm x 500mm x 250mm |
| MATERIAL | GLSCM60A - Recycled glass reinforced polypropylene  
GLSCM30A recycled polypropylene |
| LOAD BEARING CAPACITY | GLSCM60A 550kPa vertical load  
GLSCM30A 260kPa vertical load |
| FINISH | Natural |
| COLOUR | Black |
| WEIGHT | 3.86kgs |
| VOID/SOIL | 94% |
## Product data sheet

**Adur DTS Tree Grille**

### TYPE:
- Adur

### CODE & SIZE

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADUR10A</td>
<td>1000 x 1000mm</td>
</tr>
<tr>
<td>ADUR12B</td>
<td>1200 x 1200mm</td>
</tr>
<tr>
<td>ADUR15A</td>
<td>1500 x 1500mm</td>
</tr>
</tbody>
</table>

### MATERIAL:
- Segments: Ductile iron
- Frame: Mild steel
- Fixings: Stainless steel

### LOAD BEARING CAPACITY:
- Maximum 5 tonne wheel load

### FINISH:
- Segments: Zinc rich primer with polyester powder top coat to DIN EN ISO 12944-2
- Frame: Galvanized to BS EN 146 1999

### COLOUR:
- Segments: RAL 9005 Satin
- Other RAL colours available to special order

### WEIGHT:
- ADUR12B: 105kg
- Other sizes: TBA

*Note: 1000 grille has a centre radius of 250
Product data sheet

Avon DTS Tree Grille

**TYPE**
Avon

**CODE SIZE**
- AVON10B  1000 x 1000mm
- AVON12B  1200 x 1200mm
- AVON15A  1500 x 1500mm

**MATERIAL**
- Segments: Ductile iron
- Frame: Mild steel
- Fixings: Stainless steel

**LOAD BEARING CAPACITY**
Maximum 5 tonne wheel load

**FINISH**
- Segments: Zinc rich primer with polyester powder top coat to DIN EN ISO 12944-2
- Frame: Galvanized to BS EN 146 1999

**COLOUR**
- Segments: RAL 9005 Satin
  - Other RAL colours available to special order

**WEIGHT**
- AVON10B  82kg
- AVON12B  123kg
- AVON15A  181kg

*Note: 1000 grille has a centre radius of 250*
Clyde Steel Tree Grille

**TYPE**
Clyde

**CODE**
- CLYDE10GB  1000 x 1000mm
- CLYDE12GB  1200 x 1200mm
- CLYDE15GA  1500 x 1500mm

**MATERIAL**
- Segments:  Mild steel
- Frame:  Mild steel
- Fixings:  Stainless steel

**LOAD BEARING CAPACITY**
Light vehicle overrun only

**FINISH**
Segments and frame galvanised to BS EN 146 1999

**COLOUR**
Galvanized, powder coated to DIN EN ISO 12944-2 in any RAL colour to special order

**WEIGHT**
TBA

Note: Centre radius varies depending on outside dimensions
Clyde Stainless Steel Tree Grille

**TYPE:**
Clyde Stainless Steel

**CODE** | **SIZE**
---|---
CLYDESS10A | 1000 x 1000mm
CLYDESS12A | 1200 x 1200mm
CLYDESS15A | 1500 x 1500mm

Larger sizes also available

**MATERIAL**
Segments: Stainless steel
Frame: Stainless steel
Fixings: Stainless steel

**LOAD BEARING CAPACITY**
Light vehicle overrun only

**FINISH**
Segments and Frame: Natural stainless steel

**WEIGHT**
TBA

Note: Centre radius varies depending on outside dimensions
### Tay Tree Grille

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Tay</th>
</tr>
</thead>
<tbody>
<tr>
<td>CODE</td>
<td>TAY12C</td>
</tr>
<tr>
<td>SIZE</td>
<td>1200 x 1200mm</td>
</tr>
</tbody>
</table>
| MATERIAL | Segments: Cast iron  
|          | Frame: Mild steel  
|          | Fixings: Galvanised |
| LOAD BEARING CAPACITY | Light vehicular overrun |
| FINISH   | Segments: 2 pack epoxy paint  
|          | Frame: 2 pack epoxy paint |
| COLOUR   | Segments: RAL 9005 Black |
Product data sheet

Yare DTS Tree Grille

<p>| TYPE  | Yare |</p>
<table>
<thead>
<tr>
<th>CODE</th>
<th>SIZE (DIAMETER)</th>
</tr>
</thead>
<tbody>
<tr>
<td>YARE10A</td>
<td>1000mm</td>
</tr>
<tr>
<td>YARE12A</td>
<td>1200mm</td>
</tr>
</tbody>
</table>

MATERIAL
Segments: Ductile iron
Frame: Mild steel
Fixings: Stainless steel

LOAD BEARING CAPACITY
Maximum 5 tonne wheel load

FINISH
Segments: Zinc rich primer with polyester powder top coat to DIN EN ISO 12944-2
Frame: Galvanized to BS EN 146 1999

COLOUR
Segments: RAL 9005 Satin, other RAL colours available to special order

WEIGHT
<table>
<thead>
<tr>
<th>CODE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>YARE10A</td>
<td>74kg</td>
</tr>
<tr>
<td>YARE12A</td>
<td>84kg</td>
</tr>
</tbody>
</table>

*Note: 1000 grille has a centre radius of 250
Product data sheet

 Castle Recessed Tree Grille

**TYPE**
- Castle

**CODE** | **SIZE**
--- | ---
CASTLE12A | 1200 x 1200mm single tray
CASTLE12B | 1200 x 1200mm twin tray
CASTLE15A | 1500 x 1500mm twin tray
CASTLE15B | 1500 x 1500mm twin tray
CASTLE18A | 1800 x 1800mm twin tray
CASTLE20A | 2000 x 2000mm twin tray
CASTLE24A | 2400 x 2400mm twin tray

**MATERIAL**
- Segments: Mild steel
- Frame: Mild steel
- Fixings: Stainless steel

**LOAD BEARING CAPACITY**
Manufactured to meet required wheel loadings.

**FINISH**
- Segments and Frame: Galvanized to BSEN 146 1999

**COLOUR**
- Galvanized

**WEIGHT**
- Depends on exact specification

---

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E-mail: enquiries@greenblueurban.com
Website: greenblueurban.com
### Coniston Tree Guard

**Type**  
Coniston

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONIS185A</td>
<td>1800 x 500mm Diameter</td>
</tr>
<tr>
<td>CONIS186A</td>
<td>1800 x 600mm Diameter</td>
</tr>
</tbody>
</table>

**Material**  
Mild steel

**Finish**  
Zinc rich primer with polyester powder top coat to DIN EN ISO 12944-2

**Colour**  
RAL 9005 Satin. Other RAL colours available to special order

**Weight**  
- CONIS185A: 55kg
- CONIS186A: 63kg

*Note: Also available with centre radius of 250*
### Derwent Tree Guard

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Derwent</th>
</tr>
</thead>
<tbody>
<tr>
<td>CODE</td>
<td>SIZE</td>
</tr>
<tr>
<td>DERW185A</td>
<td>1800 x 500mm Diameter</td>
</tr>
<tr>
<td>DERW186A</td>
<td>1800 x 600mm Diameter</td>
</tr>
<tr>
<td>MATERIAL</td>
<td>Mild steel</td>
</tr>
<tr>
<td>FINISH</td>
<td>Zinc rich primer with polyester powder top coat to DIN EN ISO 12944-2</td>
</tr>
<tr>
<td>COLOUR</td>
<td>RAL 9005 Satin. Other RAL colours available to special order</td>
</tr>
<tr>
<td>WEIGHT</td>
<td>DERW185A 55kg</td>
</tr>
<tr>
<td></td>
<td>DERW186A 63kg</td>
</tr>
</tbody>
</table>

*Note: Also available with centre radius of 250*
Product data sheet

Ennerdale Tree Guard

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Ennerdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>CODE</td>
<td>SIZE</td>
</tr>
<tr>
<td>ENNER185A</td>
<td>1800 x 500mm Diameter</td>
</tr>
<tr>
<td>ENNER186A</td>
<td>1800 x 600mm Diameter</td>
</tr>
<tr>
<td>MATERIAL</td>
<td>Mild Steel</td>
</tr>
<tr>
<td>FINISH</td>
<td>Zinc rich primer with polyester powder top coat to DIN EN ISO 12944-2</td>
</tr>
<tr>
<td>COLOUR</td>
<td>RAL 9005 Satin. Other RAL colours available to special order</td>
</tr>
<tr>
<td>WEIGHT</td>
<td></td>
</tr>
<tr>
<td>ENNER185A</td>
<td>59kg</td>
</tr>
<tr>
<td>ENNER186A</td>
<td>63kg</td>
</tr>
</tbody>
</table>

*Note: Also available with centre radius of 250
Thirlmere Tree Guard

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Thirlmere</th>
</tr>
</thead>
<tbody>
<tr>
<td>CODE</td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td></td>
</tr>
<tr>
<td>THURL185A</td>
<td>1800 x 500mm Diameter</td>
</tr>
<tr>
<td>THURL186A</td>
<td>1800 x 600mm Diameter</td>
</tr>
<tr>
<td>MATERIAL</td>
<td>Mild Steel</td>
</tr>
<tr>
<td>FINISH</td>
<td>Zinc rich primer with polyester powder top coat to DIN EN ISO 12944-2</td>
</tr>
<tr>
<td>COLOUR</td>
<td>RAL 9005 Satin. Other RAL colours available to special order</td>
</tr>
<tr>
<td>WEIGHT</td>
<td></td>
</tr>
<tr>
<td>THURL185A</td>
<td>55kg</td>
</tr>
<tr>
<td>THURL186A</td>
<td>63kg</td>
</tr>
</tbody>
</table>

*Note: Also available with centre radius of 250
Product data sheet

Ullswater Tree Guard

**TYPE**
Ullswater

**CODE**  **SIZE**
ULLSSP5A  1800 x 500mm Dia
ULLSSP6A  1800 x 600mm Dia

**MATERIAL**
Mild Steel

**FINISH**
Zinc rich primer with polyester powder top coat to DIN EN ISO 12944-2

**COLOUR**
RAL 9005 Satin. Other RAL colours available to special order

**WEIGHT**
ULLSSP5A  55kg
ULLSSP6A  63kg

*Note: Also available with centre radius of 250*
Windermere Tree Guard

**TYPE**
Windermere

**CODE** | **SIZE**
--- | ---
WIND185A | 1800 x 500mm Diameter
WIND186A | 1800 x 600mm Diameter

**MATERIAL**
Mild Steel

**FINISH**
Zinc rich primer with polyester powder top coat to DIN EN ISO 12944-2

**COLOUR**
RAL 9005 Satin. Other RAL colours available to special order

**WEIGHT**
WIND185A | 55kg
WIND186A | 63kg

*Note: Also available with centre radius of 250
Product data sheet

Precast Arboresin DTS Tree Grille

**TYPE**
Precast Arboresin

**CODE**  **SIZE**
ARBPC12  1200 x 1200mm

**MATERIAL**
Segments: Steel reinforced Arboresin

**LOAD BEARING**
Light vehicle overrun only

**FINISH**
Segments: Various stones available
Frame: Galvanized

**COLOUR**
A large selection of colours available

**WEIGHT**
TBA
Useful Organisations

Arboricultural Association - Tel: 01242 522152 | Malthouse, Stonehouse, GL10 3DL, Gloucestershire

Barcham Trees plc - Tel: 01353 720748 | Eye Hill Drove, Ely, CB7 5XF, Cambridgeshire

Bat Conservation Trust - Tel: 0845 1300228 | 15, Cloisters House, 8 Battersea Park Rd, London, SW8 4BG

CIRIA - Tel: 020 7549 3300 | Classic House, 174-180 Old Street, London EC1V 9BP

Forestry Commission / Forest Research - www.forestry.gov.uk

Horticultural Trades Association - Tel: 0118 930 3132 | 19 High St, Reading, RG7 5AH

Institute of Chartered Foresters - Tel: 0131 240 1425 | 59 George St, Edinburgh, EH2 2JG

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Woodland Trust - 01476 581111 | Kempton Way, Dysart Rd, Grantham, NG31 6LL
“I will improve the environment”

Planting trees remains one of the cheapest, most cost effective mean of drawing excess CO2 from the atmosphere
Index

A
ArborAdvance ........................................ 200
Arboresin – Porous tree pit surface ............... 90
Benefits ................................................... 90
Compatible ‘Arborsystem’ Products ................. 90
Product specification ............................... 91
Standard Tree pit details ............................ 91
Arborflow – Trees and sustainable urban drainage systems ........................................... 95
Benefits ................................................... 96
How it works ........................................... 96
Arborflow 100 series – SUD ......................... 98
Benefits ................................................... 98
How it works ........................................... 99
Arborguy – Securing large root balled trees ....... 72
Arborguy deadman guying system ................... 73
Benefits ................................................... 72
Product specification and codes ..................... 73
Arborsoil – Compactible root zone material ....... 55
Arborsystem approved contractors scheme ......... 145
Background .............................................. 145
Knowlegeable installers leads to quality installations ........................................ 146
Review Procedures .................................... 147
Arborsystem – The definitive urban tree pit package ..................................................... 29
B
Benefits of urban trees .................................. 16
Aesthetics .................................................. 16
Biodiversity ............................................... 16
Carbon reduction ....................................... 16
Cooling effect ............................................ 17
Crime reduction ......................................... 17
Health ....................................................... 16
Noise reduction .......................................... 16
Storm water management and buffering .......... 16
Wind speed reduction .................................. 17
C
Case studies ............................................. 161
Overview ............................................... 161
Frinton ...................................................... 162
Aylesbury ................................................. 164
Blackheath ............................................... 166
Bromley .................................................... 168
Cardiff ..................................................... 170
Lambeth ................................................... 172
Goldhawk ............................................... 174
Leonard Circus .......................................... 176
Company profile ....................................... 9
CPD Service ............................................ 143
Overview ............................................... 143
D
Data Sheets ............................................. 209
Adur DTS Tree Grille .................................... 227
Avon DTS Tree Grille .................................... 228
Castle DTS Tree Grille ................................. 233
Clyde DTS Tree Grille ................................... 229
Clyde SS DTS Tree Grille ............................. 230
Coniston Tree Guard ................................. 234
Derwent Tree Guard ..................................... 235
Ennerdale Tree Guard .................................. 236
Precast Arboresin DTS Tree Grille ................. 240
RD510A RootDirector .................................. 214
RD640A RootDirector .................................. 215
Process of successful tree pit design ........ 22
  Above ground ........................................ 23
  Aeration ..................................................... 23
  Available root space ............................... 22
  Drainage ............................................. 23
  Engineering requirements ....................... 22
  Irrigation ............................................. 23
  Root management .................................. 23
  Support ............................................ 23

ReRoot 300 –
Linear pavement protection ............... 32
  Benefits ............................................. 32
  Compatible ‘Arborsystem’ products ........ 33
  Product specification and codes ............ 33
  Standard tree pit details ....................... 33
  Typical installation specification ............ 33

ReRoot 600/1000 –
Linear pavement protection ............... 34
  Benefits ............................................. 34
  Compatible ‘Arborsystem’ products ........ 35
  Product specification and codes ............ 35
  Standard tree pit details ....................... 35
  Typical installation specification ............ 34

ReRoot 2000 –
Deep application root barrier ............ 36
  Benefits ............................................. 36
  Product specification and codes ............ 37
  Typical installation specification ............ 37

Research insights ....................... 181
  Leaf fluorescence testing .................... 186
  Root radar ......................................... 184
  Tree roots in soil cells ....................... 182

RootCell – Soil structure system .......... 52
  Benefits ............................................. 52
  Compatible ‘Arborsystem’ products ........ 53
  RootCell Module specification ............... 53
  Standard tree Pit Details ....................... 53
  Typical installation specification ............ 52

RootDirector –
Preformed root protection system ....... 38
  Benefits ............................................. 38
  Compatible ‘Arborsystem’ products ........ 39
  Product specification and codes ............ 39
  Standard tree pit details ....................... 39
  Typical installation specification ............ 39

Rootform – High strength root director for
structural tree pits ....................... 40
  Benefits ............................................. 40
  Compatible ‘Arborsystem’ products ........ 40
  Product specification and codes ............ 40
  Typical installation specification ............ 40

Root management products ............... 30
  Root management selector chart ............. 31

RootRain Arborvent –
For heavily trafficked areas ............ 68
  Benefits ............................................. 68
  Compatible ‘Arborsystem’ products ........ 69
  Product specification and codes ............ 69
  Standard tree pit details ....................... 69
  Typical Installation Specification ............. 68

RootRain Civic –
Large capacity irrigation system .......... 64
  Benefits ............................................. 64
  Compatible ‘Arborsystem’ Products ........ 65
  Product specification and codes ............ 65
  Typical installation Specification ............. 64
INDEX

Tree grilles – Fully integrated grille systems .................................................. 84
Bespoke ........................................................................................................ 85
Boulevard .................................................................................................... 85
Castle .......................................................................................................... 84
Medway/Mersey .......................................................................................... 85
Zeta ............................................................................................................. 84

Tree Grilles – Fully integrated grille systems .............................................. 80
Benefits ....................................................................................................... 80
Built for strength ...................................................................................... 81
Design ........................................................................................................ 81
Inner ring design ....................................................................................... 81
Integral features ....................................................................................... 81
Irrigation inlet fitting .......................................................... 81
Support frames ........................................................................................ 81

Tree guard tie .................................................................................................. 77
Benefits ....................................................................................................... 77
Product codes .......................................................................................... 77

Tree pit irrigation .......................................................................................... 59
The principles of tree root watering .......................................................... 59
Tree watering requirements ...................................................................... 59

Tree Product Packages .................................................................................. 105
GBU1001 ................................................................. 106
GBU1002 ................................................................. 108
GBU1003 ................................................................. 110
GBU1004 ................................................................. 112
GBU1005 ................................................................. 114
GBU1006 ................................................................. 116
GBU1007 ................................................................. 118
GBU1008 ................................................................. 120
GBU1009 ................................................................. 122
GBU1010 ................................................................. 124
GBU1011 ................................................................. 126
GBU1012 ................................................................. 128

GBU1013 ................................................................. 130
GBU1014 ................................................................. 132
GBU1015 ................................................................. 134
GBU1016 ................................................................. 136

Trees and climate change ........................................................................... 19

Tree species list .......................................................................................... 150

Tree ties ....................................................................................................... 74
Pads, blocks, collars and sleeves .............................................................. 75
Types of belt .............................................................................................. 75

Vertical tree guards ..................................................................................... 88
Benefits ....................................................................................................... 88
Bespoke ....................................................................................................... 88
Coniston ..................................................................................................... 89
Derwent ...................................................................................................... 89
Ennerdale ................................................................................................... 89
Thirlmere ................................................................................................... 89
Ullswater .................................................................................................... 89
Windermere ............................................................................................... 89
Greencoat tree guards .............................................................................. 89
Weldmesh tree guards .............................................................................. 89
Product specification and order codes ...................................................... 89
Standard tree pit details .......................................................................... 89

WSUDs package .......................................................................................... 100

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