GreenBlue URBAN
Establishing the future urban landscape

RootSpace® Pavement Support System

Product Overview

The Key Benefits of Soil Cells

For over a quarter of a century, GreenBlue Urban has been working to ensure that every tree, wherever planted, has the chance to achieve species potential. Now, we are closer than ever to arriving at this objective, and it is very clear that the provision of uncompacted soil volume provided for the tree is probably the most critical single element in achieving long term establishment.

Urban trees are in an environment that is endemically hostile to where they would like to be, a forest floor, away from the demands and below ground competition of the urban environment. The RootSpace soil cell system replicates the forest floor scenario as closely as possible by providing the tree with the uncompacted, aerated soil that's crucial to it's long term health, whilst working around services and below ground constraints, marrying the needs of the built environment and the arboricultural needs of the tree.

Northumberland Avenue, London (2018) - Victorian era (1800's) example of a suspended pavement support system.

The Benefits of Urban Trees

Particulate levels on tree-lined streets can be up to 60% lower than those without trees.

For every 5% of tree cover, stormwater runoff is reduced by 2%.

A series of international third-party studies have shown that trees increase property prices by between 5% to 18%.

A 10% increase in urban green space can postpone the onset of health problems by up to 5 years.

A single mature tree absorbs carbon at a rate of 47.5 lbs (21.6 kg) per year.

Few things can compare with the visual impact and seasonal interest that trees bring to an urban environment.

Research has indicated that a 10% increase in tree canopy was associated with roughly a 12% decrease in crime.

Students who have a green window view recover from mental fatigue faster and thus pay attention for longer.

Features & Benefits

The GreenBlue Urban RootSpace Pavement Support System is an engineered load-bearing soil cell with over 97% open void space for maximum rooting volume as well as the ability to accommodate services.

RootSpace G2 is manufactured from 100% recycled material, designed to be economic freight and is the culmination of more than 27 years experience in helping establish trees in complex urban environments.

The new generation of RootSpace is launched with a 16" (400mm) high option to suit a greater spread of situations.

A typical RootSpace installation.

Key Benefits

- Optimum conditions for soil biology increasing root growth & tree health.
- Very fast, simple and easy to assemble reducing installation time & costs.
- Designed for easy integration, and re-excavation for maintenance of utilities.
- Minimum excavation depths required.
- Can be used close to roadways due to world leading lateral performance.

Product Specifications

Code	Description	Height	Width	Breadth
GBURAC600A	RootSpace 600 Upright	24" (600mm)	20" (500mm)	4" (90mm)
GBURAC500A	RootSpace Airflow Lid	3" (75mm)	20" (500mm)	20" (500mm)
GBURSP65A	RootSpace 600 Infill	21" (527mm)	13" (334mm)	2" (40mm)

Code	Description	Height	Width	Breadth
GBURAC400B	RootSpace 400 Upright	16" (400mm)	20" (500mm)	3" (75mm)
GBURAC500B	RootSpace Airflow Lid	3" (75mm)	20" (500mm)	20" (500mm)
GBURSP45PB	RootSpace 400 Infill	13" (327mm)	13" (334mm)	2" (40mm)

Material 100% recycled HDPE

Load Bearing Capacity

Load bearing capacity of pavement support systems is a complex science. It is common to interpret the actual breaking point of structural products as the ultimate allowable wheel load. Engineers employed by GreenBlue allow a factor of safety by basing calculations on loadings before undue displacement occurs.

Vertical Capacity

RootSpace Configuration	Vertical Crushing Load	
	kN/m2	tonne/m2
G2 400: 475mm units (single height)	434.0 (63 psi)	44.3
G2 400: 875mm units (double height)	297.7 (43 psi)	30.4
G2 600: 675mm units (single height)	308.0 (45 psi)	31.4
G2 600: 1275mm units (double height)	285.7 (41 psi)	29.1

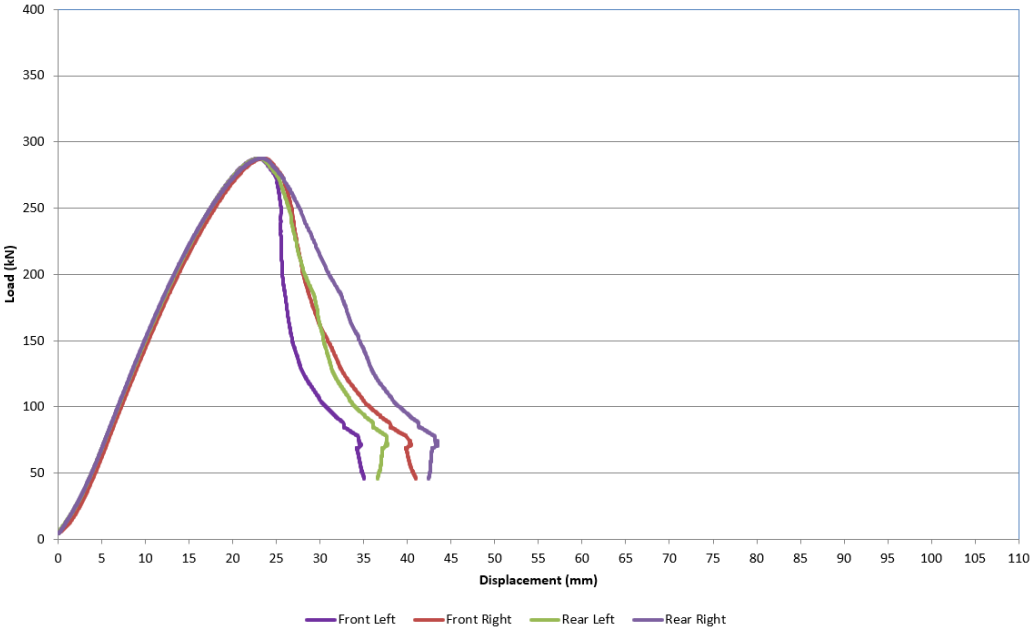
Horizontal Capacity (with side panels)

RootSpace Configuration	Horizontal Crushing Load		
	kN/ m2	tonne/ m2	Psi/ m2
G2 400: 875mm units (double height) Loaded on side - with side panels	139.4	14.2	20
G2 600: 1275mm units (double height) Loaded on side - with side panels	56.5	5.8	8

Load Testing

Extensive compression testing of RootSpace units has been carried out at highly reputable independent testing laboratories. The complete test of each size and configuration is repeated several times to ensure reliability of data and confirm consistency of the unit's structural performance.

Test 39 - 4 ft (1275mm) Standard 2x2x2 - no side panels - 3¼ ft (1000mm) plate



Graph showing test results of test number 39

Photograph of RootSpace 600 (double height) being tested.

Road / Pavement Build-up Design

Guidelines given in the DMRB HD24 HD26: Pavement Design and Construction, require the design of road surfacing and layer works to be based principally on a traffic assessment figures. These are expressed in terms of million standard (80kN) axle loads (msa) to be carried during the design life of the construction. This traffic loading together with the quality of the subgrade dictates the selection of the surfacing and depth of a road pavement required.

The dispersal of wheel loads carried by buried structures depends on the type and depth of road layer works selected. Subbase layers are normally made up of compacted gravel. Surfacing layers are typically bituminous macadam, reinforced concrete or block pavers. The wheel load "footprint" on the road surface may be assumed to disperse further through the materials as shown in the table:

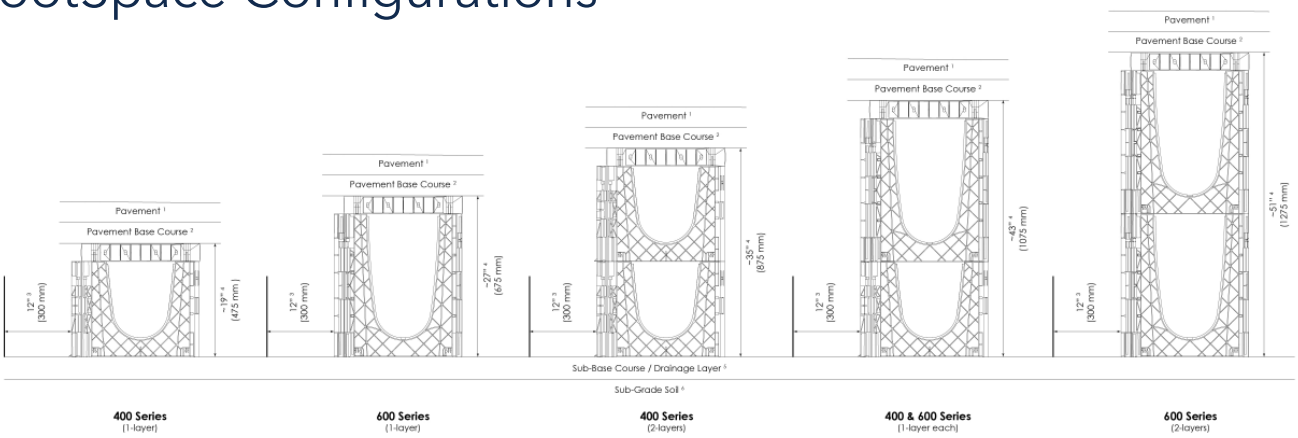
Material	Angle of load spread
Reinforced concrete	1.5 horz. to 1 vertical
Bituminous macadam	1.0 horz. to 1 vertical
Unreinforced concrete	1.0 horz. to 1 vertical
Compacted DTp Type 1 Gravel	0.5 horz. to 1 vertical
Interlocking block paving	1.0 horz. to 1 vertical

The following table gives the minimum allowable paving construction depths required to disperse a 4.5 tonne wheel load (as an example) on different RootSpace configurations (this is based on a typical macadam type road construction and the standard tree pit detail of GBU specification as shown overleaf):

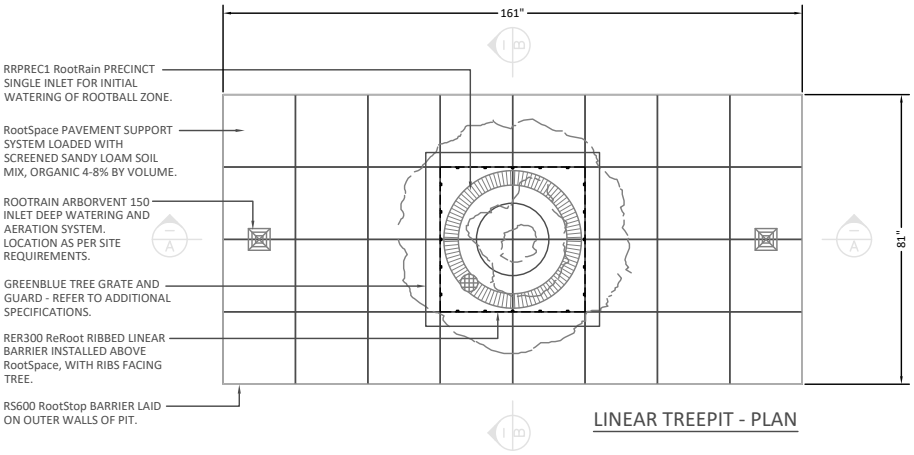
RootSpace configuration	Height	Subbase DTp Type 1 depth	Macadam depth *	Total depth
400 single	19" (475mm)	6" (150mm)	6" (150mm)	12" (300mm)
600 single	27" (675mm)	12" (300mm)	6" (150mm)	18" (450mm)
400 + 400	35" (875mm)	12" (300mm)	6" (150mm)	18" (450mm)
400 + 600	43" (1075mm)	13" (325mm)	6" (150mm)	19" (475mm)
600 + 600	51" (1275mm)	13" (325mm)	6" (150mm)	19" (475mm)

* Total depth of bound bituminous layers
(Minimum construction depths for a full range of wheel loads are available separately)

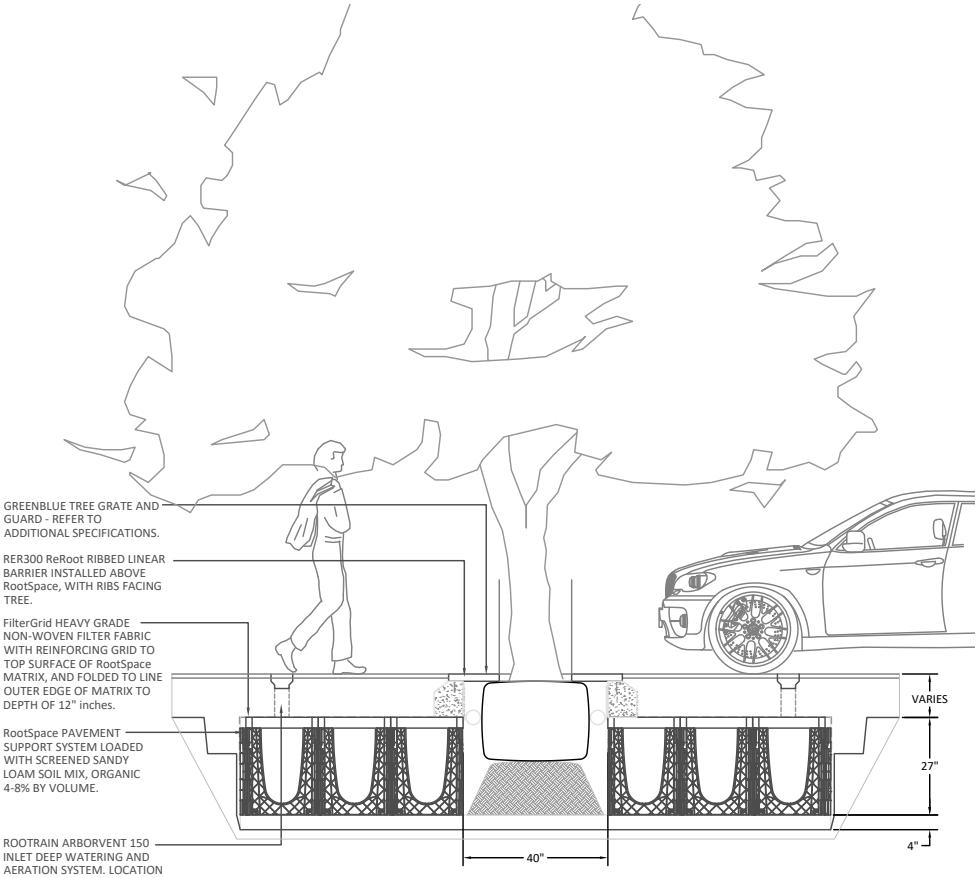
RootSpace Configurations



Typical Tree Pit & Ancillary Components



LINEAR TREEPIT - PLAN



LINEAR TREEPIT - SECTION AA

COMPONENT LIST	
PRODUCT	QTY
RootSpace STRUCTURAL SOIL CELL/AIR DECK	72/28
FG3030 FilterGrid BI-AXIAL FILTER LAYER	18yd²
RRPREC1 RootRain PRECINCT SINGLE INLET	1
RRARB2 RootRain ARBORVENT DUAL INLET	1
RER300 ReRoot LINEAR RIBBED R/BARRIER	18'
RS600 RootStop BARRIER	41'

SOIL VOLUME GUIDE: APPROX 204ft³ OF SOIL (±5%), DEPENDING ON SOIL TYPE AND EXCAVATION VARIATIONS

Supporting Documents & Resources

Design

Tree Species Soil Volume Guide

Our tree species soil volume guide can be used as a refrence point when designing tree pits with adequate soil volume prevision.

Assembly Instructions

RootSpace Assembly Instructions

A step by step guide to installing the RootSpace system including further information on excavation depths.

Tree Pits and Services Guide

A comprehensive guide to installing RootSpace in and around services and utilities with real world case studies.

Installation & Maintenance

ArborSystem Installation & Maintenance Manual

Comprehensive, detailed instructions on how to install and maintain the complete ArborSystem® tree pit package.

DOWNLOAD

Scan the QR codes to download each resource or head to: greenblue.com/resources

GreenBlue Urban Ltd - USA
4405 Anderson Road
Knoxville, TN 37918
United States

www.greenblue.com
inquiries@greenblue.com
Sales and Service: 1 866 282 2743

GreenBlue Urban Ltd - Canada
71 Bysham Park Drive
Woodstock, ON N4T 1P1
Canada

www.greenblue.com
inquiries@greenblue.com
Sales and Service: 1 866 282 2743