Creating Green **Infrastructure**

InfraWeb TRP

Tree Root Protection System

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InfraWeb Tree Root Protection System

Infra Green are focussed on maintaining and improving green infrastructure in the built environment. We have a number of tree root protection systems for the protection of both existing and newly planted trees. InfraWeb TRP has been developed to provide a cost effective solution to the problems associated with providing load support for new hard surfacings above existing tree roots on development sites.

Damage to existing trees on development sites

There are a number of ways trees are damaged during construction:

- Unspecified or poorly implemented treeworks
- Poorly installed Tree Protection fencing / ground protection
- Unauthourised or poorly undertaken excavations for service trenches in close proximity to retained trees
- Storage of materials within retain tree RPAs
- Contamination of tree rooting zones directly or indirectly by; concrete run off / washings, mortar silos, diesel, tarmacadam, chemicals etc
- Compaction of tree rooting zones by temporary construction site access for delivery vehicles, materials storage etc
- Compaction damage by waterlogging of tree rooting zones
- Damage by burning fires on site too close to retained trees

Soil compaction causes the reduction in available air spaces within the structure of the soil, a vital component tree roots require to respire, grow and re-generate.

By compacting the soil around tree roots the trees ability to absorb available ground water is reduced as associated symbiotically growing fungal Micorrizae attached to and around those roots decline.

This in turn affects the trees ability to absorb not only water but also nutrients which detrimentally affects the vigour and growth of the tree causing ‘stress’.

This manifests itself in smaller, yellowing leaves, a reduction in crown vigour and shoot / twig extension, higher crown deadwood in particular of the upper crown which can lead to branch failure or even tree decline if not alleviated.

BS5837 (2012)

Trees on Construction Sites

This document provides guidance for the management of existing trees on construction sites identified for retention as part of the survey and reporting process by a qualified Arboricultural consultant.

Where tree retention or planting is proposed in conjunction with nearby construction, the objective should be to achieve a harmonious relationship between trees and structures that can be sustained in the long term. The good practice recommended in the British Standard is intended to assist in achieving this objective.

BS 5837:2012 is applicable whether or not planning permission is required. BS 5837:2012 follows a logical sequence of events that has tree care at the heart of the process. The full sequence of events might not be applicable in all instances; for example, a planning application for a conservatory might not require the level of detail that needs to accompany a planning application for the development of a site with one or more dwellings.

The 2012 revision of the standard introduces the following principal changes:

- Takes account of current practice regarding planning for the management, protection and planting of trees in the vicinity of structures, and for the protection of structures near trees
- Updates the guidance in relation to building regulations
- Recognises the contribution that trees make to climate change adaptation

Failing root system without InfraWeb

When dealing with incursions into the RPA of existing trees BS5837:2012 the new guidance offers a number of solutions including ' sub base options for new hard surfacing include the use of 3 dimensional cellular confinement systems'.

InfraWeb TRP is a 3 dimensional cellular confinement system used to construct vehicular access roads, parking areas etc around the RPA of existing trees. The system is manufactured in accordance with the original U.S. Army Engineers Corps specification and conforms to the requirements of BS5837 and APN12.

The system is available in five depths: 50mm, 75mm, 100mm, 150mm and 200mm.

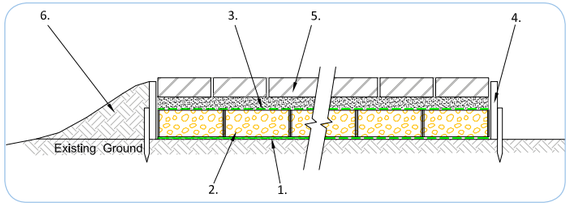
InfraWeb TRP Product Specificaion

Property	Test Method	Unit	Value				
Wall thickness (Textured)	ASTM D5199	mm	min 1.25 ± 0.15 / min 1.25 ± 0.15				
Unit Height		mm	50	75	100	150	200
Cell Walls			Textured and Perforated (11% ± 2%)				
Distance beltween Welds		mm	292				
Expanded Unit Width		m	2.42				
Expanded Unit Length*		m	8.0				
Coverage*		m^2	19.3				

* Other length and coverage available upon request. (Length, width and coverage dimensions are for square cells)

Key

1. ArborTex geotextile
2. InfraWeb Tree Root Protection System infilled with 4/20 or 20/40 Clean angularStone to BS EN 13242/EN 12620*
3. ArborTex separation geotextile
4. Treated Timber Edging (Or other Edging Detail Acceptable)
5. Block Paving with sand bed to Engineers Specification
6. Soil graded to edging (if required)



*InfraWeb height dependent on site specific design requirements

Benefits

1. No dig solution
2. Reduces compaction of subsoil around tree roots
3. Reduces sub-base thickness
4. Allows clean angular stone to be used within the cells
5. Dissipates vertical loads
6. Allows air and moisture transfer

InfraWeb TRP
Typical Section Detail

InfraWeb is guaranteed to be durable for a minimum of 50 years in natural soils with 4<pH<9 and soil temperatures of up to 25 deg C.

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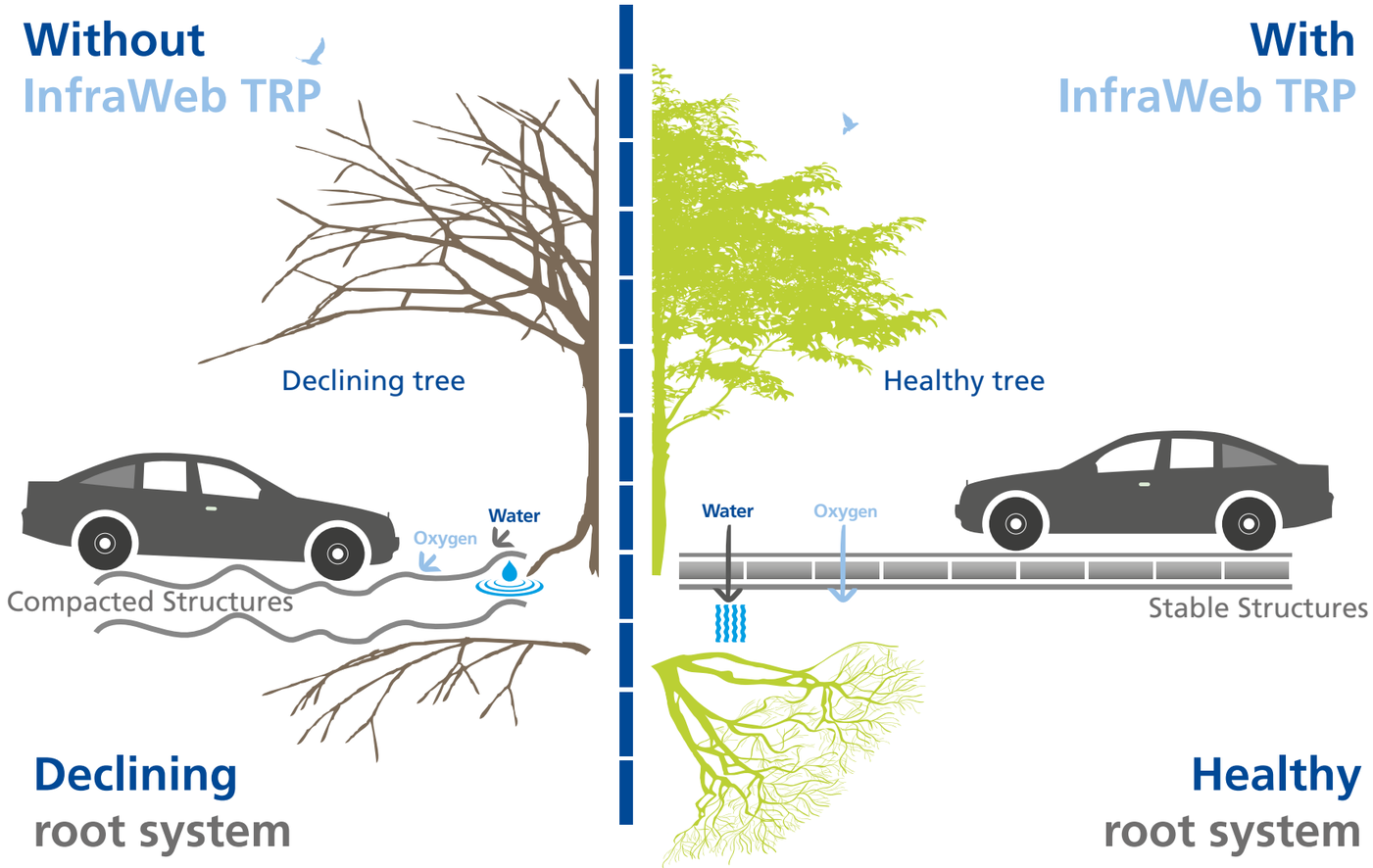
System Benefits

Vehicular traffic over unprotected areas within the tree root protection zones of existing trees causes compaction of sub soils leading to reduced voids within the soil structure.

This causes major problems with aeration and water transfer to the roots themselves which ultimately can lead to the root structure declining and eventual tree loss.

Water and Oxygen transfer through the InfraWeb TRP System



BS5837 (2012) recommends the use of a 3 dimensional cellular confinement system for use as appropriate subbases for new hard surfacing over the RPA of existing trees.

The hard wearing, stable and free draining structure created using the InfraWeb TRP system prevents soil compaction whilst maintaining water and air flow to the roots by using 4/20 or 20/40 clean, angular stone for infill. This material will always be more permeable than existing soils ensuring free flow of air and water to the trees is achieved.

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The InfraWeb TRP Solution

How the system works....

Step 1 - ArborTex

ArborTex is a non-woven geotextile specifically chosen for use with the system. The **ArborTex** acts as a separation and filter fabric, trapping hydrocarbons and heavy metals on the surface of the geotextile whilst allowing water to filter through to the soils below. The high puncture resistance of the **ArborTex** means that the clean stone infill will not penetrate the fabric.

Step 2 - InfraWeb TRP

InfraWeb TRP is a 3 dimensional cellular confinement system created by welding strips of 1.25mm high density polyethylene sheets together to create a flexible mattress. When filled with granular material the mattress acts as a structural raft spreading vertical loads across the raft thereby reducing the impact of wheel loads on the existing sub soils. The dissipation of these loads means that the soils bulk density is maintained and compaction is limited to levels that are suitable for continued healthy root growth. The perforated and textured cell walls create a frictional interlock with the granular infill making the final system extremely strong and stable. Infraweb is available in 5 depths 50mm, 75mm, 100mm, 150mm and 200mm. The system can be placed in layers to create deeper structures to accommodate all vehicle loadings, or to raise existing ground levels to tie in required new finished levels.

InfraWeb is a 3 dimensional cellular confinement system manufactured in accordance with the original specification by the U.S army corps of engineering. The system comprises of InfraWeb and Permatex 300 geotextile.

The InfraWeb is filled with a specific grade of 4/20mm or 20/40mm granular material to allow for aeration and moisture transfer tree roots. The filled system may then be surfaced with any permeable or impermeable pavements. The system complies fully with BS5837 and APN 12.

Step 3 - Granular Infill

The selection of the correct stone infill is key to the performance of the system. If the correct stone is not used then the system will fail. The specification should be a 4/20 or 20/40mm stone clean angular stone in accordance with BS EN 1235. The clean stone infill allows water to infiltrate into the sub soil and allows aeration, the key components to maintaining a healthy root structure. An InfraWeb installation will always be more porous than the existing sub soils meaning the system does not change the porosity of the existing ground.

Step 4 - Surfacing

Ideally the system should be topped with a permeable surfacing such as porous asphalt, porous block paving, grass/gravel pavers, loose and bonded gravels, however, we understand this is not always viable therefore standard pavement constructions are also acceptable.

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Design Guidance

InfraWeb TRP is available in 5 panel depths: 50mm, 75mm, 100mm, 150mm and 200mm. The depth of InfraWeb required for providing protection to existing tree roots is project specific. Each design should take into account the bulk density or CBR (California Bearing Ratio) value of the existing soil and the type of vehicular loadings which will be exposed to the InfraWeb area. All structural designs are carried out in accordance with the design parameters detailed by Webber 1991 and are based on unpaved roads. The structural designs do not take into account any surfacing materials applied to the InfraWeb.

Infra Green's technical team have extensive experience in providing solutions for Tree Root Protection wand offer:

- Site visits to assess product suitability
- Standard cad details
- Project specific structural designs and site specific drawings
- Full installation method statements
- On site installation support to ensure the successful integration of the InfraWeb TRP system into the project
- Installation sign off certification

Introducing the new generation of Tree Root Protection Systems... **ArborRaft TRP**

For more information contact
civils@polypipe.com

Other products by Infra Green

Infra Green offer plastic permeable paving systems to cover a wide range of applications from simple footpaths and temporary car parking to fully engineered grass and gravel paving systems for heavy goods vehicle parking areas.

Infra Green's full product range includes:

- Plastic paving grids for grass and gravel infill
- ArborRaft tree planting systems
- TreeBox HP tree planting systems
- InfraWeb Ground Stabilisation
- Tree soils and rootzones
- Turf protection
- Geotechnical products
- Drainage systems for sports fields
- Lightweight base systems for rooftop sports and play areas

For further information on any of our products, please contact our office on 01509 615100 or email civils@polypipe.com

Infra Green can offer:

- Design services
- Onsite support
- Stock holding
- Next day delivery

Plastic Paving

ArborRaft

TreeBox HP

Sports Pitch Drainage

Rooftop Sports and Play areas

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