CI/SfB
(16.2)
Common Arrangement R12

Uniclass
JD40/JD41

CellWeb™

CellWeb™ Confinement Systems

Geosynthetics

CellWeb™

CellWeb™ Confinement Systems

Initially developed by the U.S. Army Corps of Engineers to construct unpaved roads over weak ground, CellWeb™ dramatically improves the performance of infill materials across a range of applications including:

Applications:

- Load support
- Erosion control
- Retaining walls
- Channel protection
- Tree root protection

CellWeb™ is a three-dimensional cellular confinement system manufactured from high-density polyethylene (HDPE) strips that are ultrasonically welded together to create a strong, lightweight expandable panel.

Its unique hoop strength and interconnecting cell walls form a durable composite mattress that can be filled with common materials for the most demanding load support and erosion control applications.

As the distributor for CellWeb™ in the United Kingdom, Geosynthetics Limited can provide next day delivery to site as standard from stock.

Versatile, effective and economical CellWeb™ gives you the following benefits:

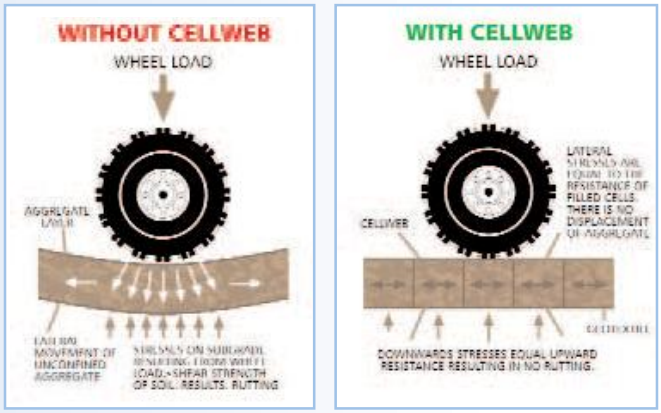
- Savings of up to 50% on infill materials compared to other load support systems.
- Reduces the need for excavation.
- Reduces sub base thickness.
- Simple, speedy installation saving on construction costs.
- Environmentally friendly.
- Protection for germination on vegetated slopes.

Product function

Millions of square meters of CellWeb™ systems have been successfully installed across the globe, answering many of today's challenging technical design problems.

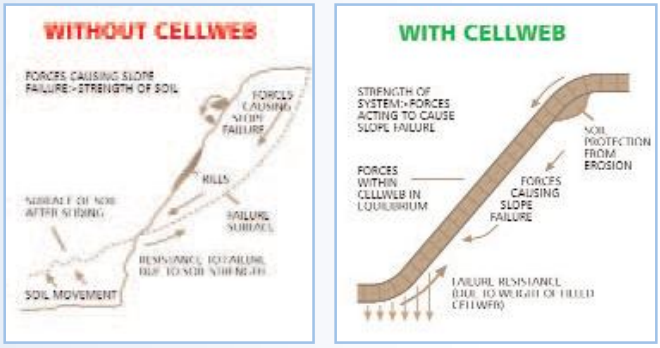
Load support

Providing reinforcement to infill materials, CellWeb™ performs like a semi-rigid slab. This effectively distributes loads laterally reducing sub grade pressures. This means that CellWeb™ can help you to reduce the sub-base thickness by up to 50% saving time and material costs.



Erosion control and slope stabilisation

CellWeb™ confines and reinforces vegetation on steep slopes by increasing the soils natural resistance to erosion and protects the rootzone layer during germination. Similarly on non-vegetated slopes it prevents the down slope migration of granular infill resulting in greater stability. Perforated CellWeb™ panels increase lateral drainage and reduce hydrostatic build up.



Geosynthetics Ltd is a leading dis

Please call
01455 617 139
or email sales@geosyn.co.uk
for further information.

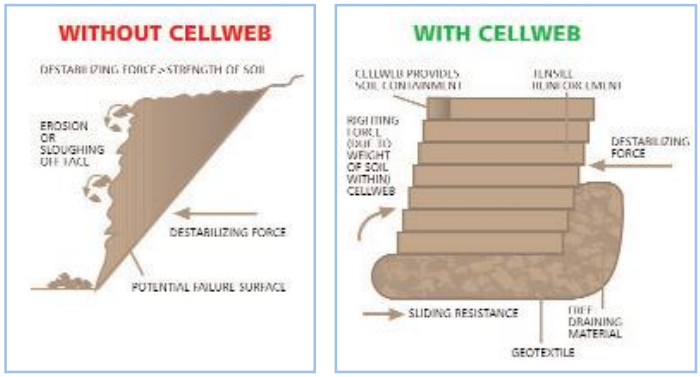
Wide product range

Large stock holding

Next day delivery

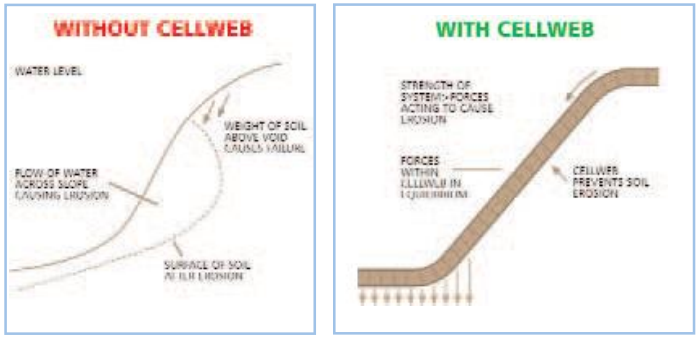
Retaining walls

When used to construct a retaining wall, CellWeb™ functions as both the face protection and the reinforcing element. Its structure confines the soil and prevents it from falling or being eroded, resulting in a longer life and less maintenance. CellWeb™ panels significantly increase the thickness of the wall; which in turn increases the weight of the wall and its retaining ability.



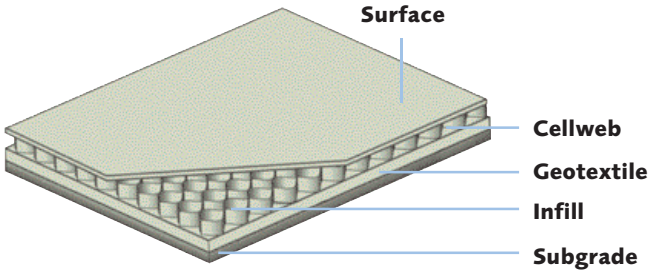
Channel protection

CellWeb™ reinforces and protects channels, riverbeds and swales by increasing the shear strength of the selected infill. Water is directed above the infilled cellular structure, leaving the rootzone undisturbed, providing a more attractive and cost effective solution to concrete lined channels. In watercourses with high velocities a granular or concrete infill can be used to further increase performance.



Tree root protection

Because CellWeb™ reduces the need for excavation, this makes it ideal for stabilising access roads and car parks around tree root systems. What's more it reduces compaction of sub soils above the roots and promotes the migration of water and nutrients, ensuring the long-term preservation of the tree itself.



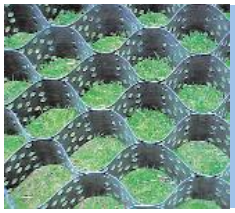
tributor of geosynthetic materials in the UK

Design service

Onsite support

See all products online at geosyn.co.uk

Geosynthetics



Quality assurance

Certified quality

Cellweb™ is manufactured in accordance with an ISO 9001 Quality Management System with perforated walls, and a comprehensive range of cell diameters and depths. The perforated system improves the frictional interlock of infill material giving greater stability and facilitating lateral drainage.

Civil engineering, construction and landfill:	Erosion control:	Landscape architecture:
• Road/rail stabilisation • Pipeline/sewer support • Temporary site access • Structural supports • Foundations • Car parks • Retaining walls • Footpaths • Tree root protection	• Slope protection • Slope stabilisation • Channel lining • River lining • Scour aprons • Revetments • Coastal protection • Slipways • Water crossings • Balancing ponds	• Tree root protection • Driveways • Footpaths • Grass car parks • Maintenance • Cart paths • Slope protection

Geosynthetics Ltd is committed to offering the best solutions for soil stabilisation, erosion control, drainage and environmental protection problems.

Well trained staff are always available to discuss which materials are best suited to any particular application.

Technical specification

Product Specifications

Properties	Standard Cell	Large cell
Material	Virgin HDPE	Virgin HDPE
Wall thickness	1.25mm	1.25mm
Seam welding	Ultrasonic to 100% of seam length	Ultrasonic to 100% of seam length
Cell depth	75, 100, 150, 200 and 300mm	75, 100, 150, 200 and 300mm
Width of expanded panel	2.56m	2.56m
Length of expanded panel	8.1m	13.72m
Cell diameter (expanded)	259 x 224mm	508 x 475mm

Please call - **01455 617 139**
or email sales@geosyn.co.uk for more technical advice and further information.

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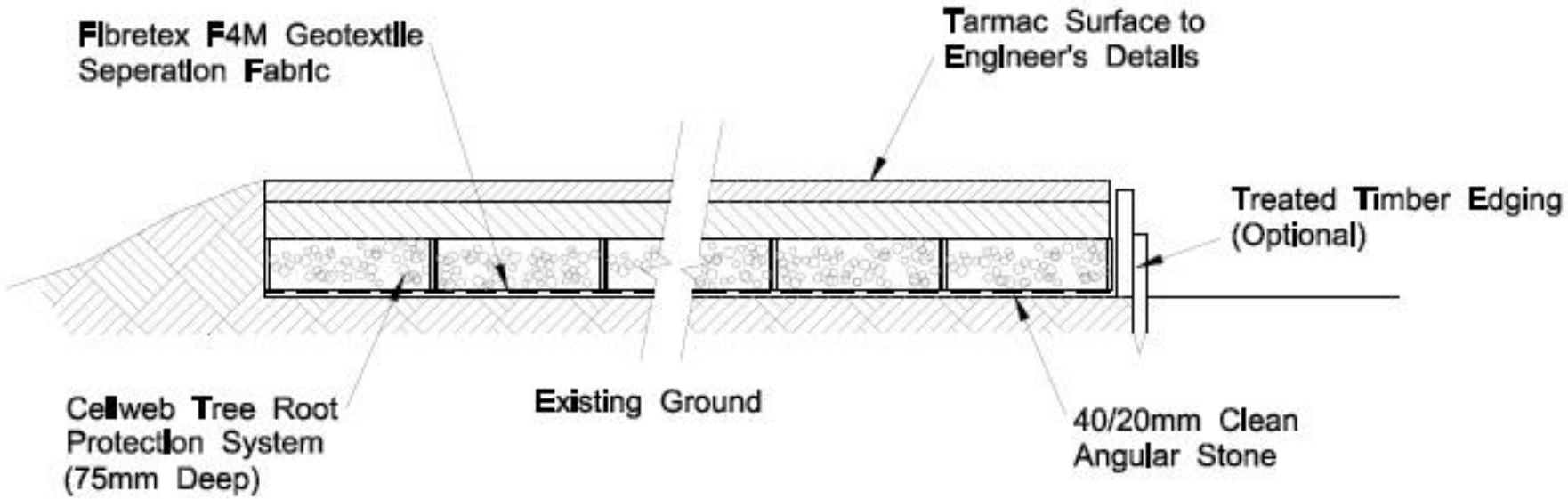

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TITLE

Cellweb Section - Tree Root Protection c/w Tarmac Surface

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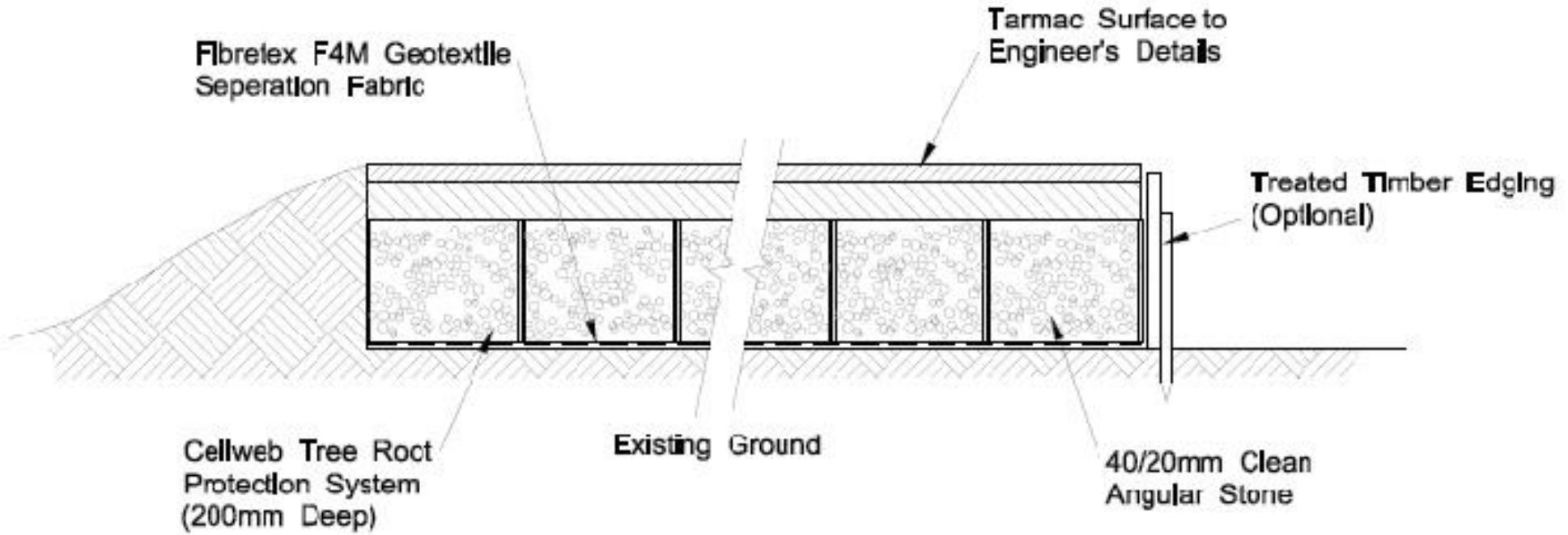

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c/w Tarmac Surface

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Tree Root Protection
Using Geoweb Cellular Confinement

This paper looks at protecting 'Tree Roots' from damage due to the increasing demand for constructing access roads and parking adjacent to Trees and root structures. We also explore other areas of protection of root structure caused by natural erosion.

CONSTRUCTING ACCESS ROADS / CAR PARKS ADJACENT TO TREES

Current guidance available:
BS5837: 1991 Trees in Relation to Construction – *Provides Guidance to those concerned with the protection of Trees*
APN 1: 1996 Driveways Close to Trees – *Guidance offered, however expert arbicultural advise should be sought*

When considering damage to tree roots, the risk of oxygen depletion caused by compaction of subsoil's, site clearance damaging the root source and type of reinforcement are areas where current guidance is limited.

Other risk factors are:

- creating an impermeable surface
- causing a rise in the water table due to construction
- increasing ground level
- contamination of subsoil's

1. Compaction

When looking at site conditions and use, the following information should be considered to enable a load bearing structure capable of supporting traffic to be proposed:

a) Californian Bearing ratio (CBR) – Standard test method for measuring soil strength
b) Soil types
c) Water table
d) Maximum load (vehicles)
e) Acceptable rut depth
f) Reinforcement type
g) Depth of engineered infill material

2. Dig (site strip) / No Dig

Site stripping does damage some root structure prior to construction; however, the use of no-dig construction elevates the access road requiring edge protection:
Dig (site strip)

a) Nominal strip of 100mm in most cases can be accepted and reduces the elevated thickness of construction material
b) Removal of un-reinforced soils and re-instatement with a reinforcement system (cellular confinement = typically 100mm) reduced surcharge load
c) Edge restraint (Optional)

3. No Dig

a) Remove surface vegetation
b) Place reinforcement system (reinforcement and soil type sensitive)
c) Edge restraint
d) Infill material (drainage capability)

4. Reinforcement type

Geotextile

a) Type of fabric reinforcement prevents migration of fine particle sub-soils into the reinforced infill (separation)
b) Minimum 300mm lift thickness requiring rolling and compaction
c) Granular infill with fines (Type1) required (compaction should produce a minimum state of compaction equal to 10% air voids)[1]
d) Compaction of infill causes elongation and rutting prior to tensile strength gain
e) Excellent lock effect between infill and sub-grade preventing bridging effect
f) Wearing surface is project specific

Geogrid

a) Open aperture grid not suitable with fine particle sub-soils due to migration of fines (requires additional separation geotextile)
b) Minimum 200mm lift thickness requiring rolling and compaction
c) Granular infill with fines (Type1) required (compaction should produce a minimum state of compaction equal to 10% air voids)[1]
d) Compaction of infill creates elongation (pre-rutting) to initialise high tensile strength
e) Wearing surface is project specific

Cellular Confinement

a) Three dimensional cell structure, formed by ultrasonically welding polyethylene (perforated) strips / panels together to create a three dimensional network of interconnecting cells
b) A high degree of frictional interaction is developed between infill and the cell wall, increasing the stiffness of the system
c) Frictional increase reduces shear plane developing between infill and the cell wall.
d) Minimum 100mm thickness of reinforcement beneath project specific wearing surface.
e) No fines angular fill (typically 40-20mm) within open cell
f) Geotextile separation layer to prevent migration of fines into the clean no fines aggregate.

The use of cellular confinement reduces the bearing pressure on subsoil's by stabilising aggregate surfaces against rutting under wheel loads. Comparisons between cellular confinement and traditional aggregate and grid-reinforced structures demonstrates a 50% reduction in construction thickness.

[1] Vol 2 Notes for Guidance on the Specification for Highway Works. NG612 Compaction of Fills

PROJECT REQUIREMENTS

Looking at the site layout, requirements and making assumptions as to the soil conditions we would suggest the following as a reinforced structure providing load support while preventing undue stress on the sub grade and tree root.

1. Prepare formation by removing existing grass or vegetative cover, some site scrape may be possible (seek confirmation from the local Tree Officer as to acceptable depth).
2. Geotextile Type G4 laid over the prepared sub grade, all dry laps min 300mm. The geotextile acts as a separation layer preventing the mixing of formation fines with the granular infill.
3. Expand the 'standard cell' Geoweb panel to the required width to accommodate driveway construction
4. Infill with a no fines angular fill as drainage medium max 50mm particle size.
5. Place preferred wearing surface.

Wearing surface options:

Gravel:

1. The Geoweb Infill granular material should be surcharged by Min 25mm and a suitable wearing surface applied. Un-confined gravel's will displace during traffic movement. Using a clear resin binder applied to the wearing surface may limit erosive forces during tyre movement

Block Paving:

1. Place a second layer of geotextile separation fabric over the infilled Geoweb
2. Lay a sand bedding layer to the minimum specification of the block paving manufacture (typically 20/30mm)
3. Apply the finished block paving wearing surface

Ecoblock:

1. Place a second layer of geotextile separation fabric over the infilled Geoweb
2. Lay a bedding layer 20mm
3. Lay and mechanically interlock the Ecoblock units so preventing distortion and slough during traffic movements
4. Infill with decorative gravel (maximum 20mm particle size)

This simplistic method statement in conjunction with the clipart section should help to identify the sequence and installation requirements.

Edge restraint options of timber, kerb edging or pre-fabricated polymer angles are available.

The above is to be considered as a recommendation only and does not constitute a Method Statement. All applications shall be assessed on an individual basis and site specific instructions should be sought from Cooper Clarke Group Ltd.

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Geoweb Cellular Confinement System			**The Load Support System Component Guideline Mattresses and Raft over Soft Foundation Soils**	
			Material Types	**Application, Functions, benefits and Design Considerations**
The Geoweb Section	Section Size		Standard Cell	Standard Cell 6.1m (30 cells) x 2.4m (10 Cells). Custom sections are available and minimise waste
	Cell Size		Standard Cell	Standard Cell 203mm x 244mm to match tire-print
	Cell Depth		100mm, 150mm & 200mm	Depth of cell is a function of applied loads and subgrade strength.
	Cell Type		Textured Perforated wall	Maximise the interaction between infill and cellular structure. Perforated cells providing lateral drainage and prevent cell ponding
	Cell Colour		Black	As the Geoweb cell is buried no UV degradation is anticipated; however, carbon black content is provided to support UV protection as standard.
The Infill	Topsoil & Vegetation		Soil and aggregate mixtures	Reinforcement of vegetated access and parking areas
	Aggregate		Sand, gravel, crusher run	Broad application range allowing use of on site aggregates. Tree Root protection, use of no fines angular gravel to accommodate free drainage, compacted and covered with suitable wearing surface.
	Concrete		Ready-mix	Special design situations, high stress applications including industrial and boat - launch ramps or with asphalt overlay.
Other Components	Geosynthetics	Geotextiles	Woven or Non-Woven	Standard separation and subgrade reinforcement functions and selected drainage. Non-Wovens used where high subgrade deformations are involved.
		Geogrids	Generally N/A	Special applications of composite pavement structures
		Geomembranes	Polypropylene or any welded impermeable membrane	Special applications can include: landfill structures and expansive soils and pollution containment
		Geocomposites	Geofin Fin Drains	Provide in-plane drainage capacity
	Retaining Pins		12mm Mild Steel bar or Rebar Optional galvanised coating	Temporary holding open of the Geoweb structure prior to infilling, removable on completion of infill prior to compaction..
	Atra Clips		N.A	
	Tendons			Polymer type and design tensile strength depends design and chemical environment

	Stapler & Staples	Hand Held Stapler	Used as a construction aid and not permanent structural jointing method. Use the Stanley Bostitch P6C with STCR 5019 10mm staples			
	Surface Treatments	Sand, gravel, crusher run	Overfill cells with a 50mm surcharge			
		Ashphaltic or polymeric emulsions	Overfill cells with 12-25mm aggregates surcharge			
		Block paving	Compact the infill flush with the cell wall cover with a non woven geotextile to accommodate sand bedding layer			
		Ecoblock Grass Protection	Compact the infill flush with the cell wall cover with a non woven geotextile to accommodate bedding layer			
		Porous Paving	Compact the infill flush with the cell wall cover with a non woven geotextile to accommodate the gravel bedding layer beneath the Ecoblock			
	Edge Restraint	Timber	Tanalised timber batten with square timber pegs driven through the end cells			
		Square Top Edging	Concrete bedding in outer cells haunched to support edging			
	For budget estimates only total thickness requirements The wheel loads are from single or double wheels, for axles multiply by 2.	Standard Cell Geoweb Assumptions: 200mm Geoweb Crushed stone 38o friction angle 690kPa (11psi) tyre pressure 25mm cover over the Geoweb 2.8 bearing capacity coefficient	Subgrade CBR %	Wheel Load kN	Perforated Cell mm	Unconfined Stone mm
			0.5	27	218	546
				53	287	772
				111	384	1113
			1	27	203	376
				53	254	531
				111	340	767
			2	27	203	251
				53	206	353
				111	279	536
	Tree Root Protection	Standard Cell	Domestic traffic 100mm Occasional heavy access (bin wagons, delivery vans etc) 150mm Site construction followed by standard traffic 200mm			
Special Construction Note:		Overall system performance is critically dependent on the achievement of optimum compaction and density				

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3. Expand the 'standard cell' Geoweb panel to the required width to accommodate driveway construction
4. Infill with a no fines angular sandstone or gritstone aggregate as drainage medium max 50mm particle size.

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