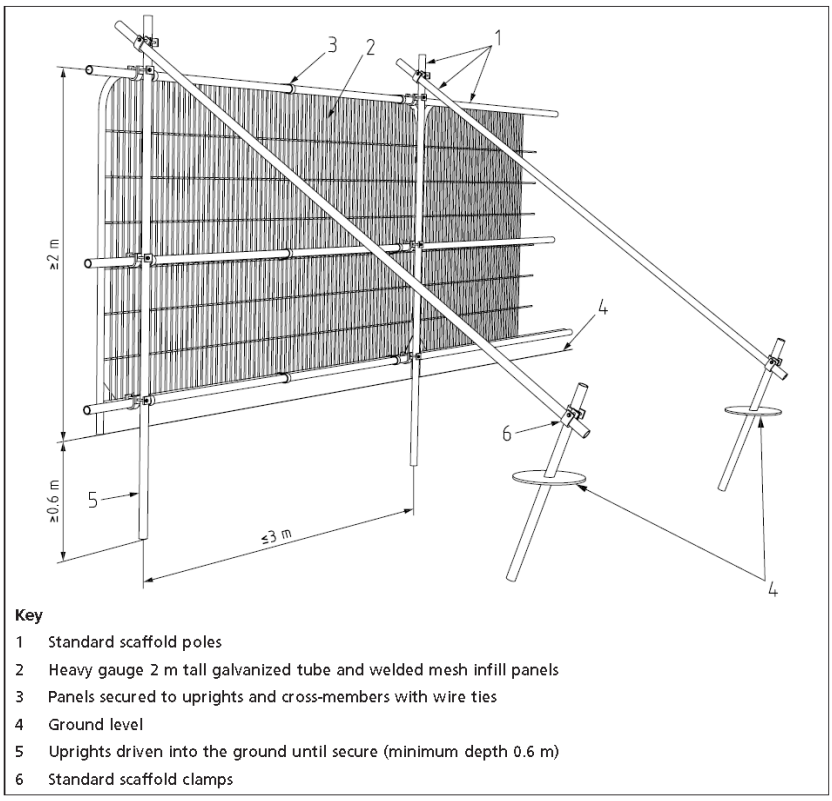
Tree and Root Protection Information for all sites

Rooting areas and how to protect trees from preventable damage

The BS 5837 2012 document provides various diagrams and guidance on how to protect tree rooting areas during development or demolition. The fence needs to be erected prior to construction traffic site occupation and often with the arboriculturist present to ensure correct placing.

Figure 2 **Default specification for protective barrier**



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

The rooting area is calculated by taking a stem measurement of the subject tree. For single stem trees the diameter of the stem is measured at 1.5m above ground level or a point of even stem taper. This measurement in millimetres is then multiplied by twelve and this will then provide a radial measurement from the stem to the edge of the rooting area for the tree.

A circular area is created around the tree at edge of the radial measurement. This is where the fencing must be located. Multi stemmed trees now require average stem size calculations based on 2-5 stems or 5+ stems.

The design of RPA or CEZ fencing should be so that it cannot be moved during works. It must also be robust enough to withstand minor knocks and scrapes from plant equipment. The fence must be in place prior to site occupation by plant equipment and should be removed once the site has been vacated by construction traffic.

Should there be a requirement to place pedestrian walkways across and RPA a suitable method of ground protection should be used. A geo textile layer, compressible material and then boards should suffice as a walkway. This specification will need to be agreed by the arboriculturist prior to installation. It should also be laid in front of the direction of travel during installation. All hedges and trees over 150mm diameter at 1.5m need root protection. If no RPA measurement is provided for a tree or hedge requiring root protection ensure the fence is set 2m from the outer edge of the tree/hedge drip line.

Treecare Consulting
james@treecareconsulting.co.uk www.treecareconsulting.co.uk
01633 882 890 – 07939 150 457

Ground Protection (where required)

Existing soil structure and texture must not be destroyed or altered in the vicinity of trees and their roots. Future planting sites should also have their soil structure preserved by the use of ground protecting plates. This will allow mechanical plant to move around the site and cross areas of high root occupancy or planting sites of high value.

The use of ground protecting boards such as these seen in the adjacent picture should be used. Geo textile and felt may be required beneath these boards to minimize puddling of the soil surface. Should puddling occur a capped layer will form which will reduce the lateral diffusion of soil gasses and cause significant problems for retained trees.

Any ground protection must be capable of withstanding the load placed upon it. An engineer must be consulted to advice on the specification of such protection if required.

Another method of ground protection can be utilized by using the installation of raised platforms mounted onto scaffold legs.

Platforms such as these could be used for light storage, walkways or as an area for construction workers to stand whilst carrying out operations such as block laying and pointing. Water proof sheeting on top of the boarding should be used to catch any material that could leach into soils where tree roots are present or run off could reach.

Particular attention should always be made when using ground protection to surface run off. Fuel oils, cement and water with high fines content are all very damaging to trees. Provision must be made to ensure that run off does not leach into soils.

Temporary track ways can also be constructed by using geo textile onto top of the ground and washed/clean stone with no fines be used as the supporting layer. This method must only be used at the outer limits of an RPA.

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Methods and specifications of paths using cellular confinement systems

Damage to tree roots occurs during the use of vehicular access and parking on rooting areas. The risk to tree roots is oxygen depletion caused by compaction of soil's and site clearance work damaging the soil structure and roots below ground.

This damage leads to tree decline & failure and can be traced back to the contractor responsible for liability claims.

Risk factors include

Creating an impermeable surface
Causing a rise in the water table due to construction
Increasing ground level
Contamination of subsoil's

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:

Californian Bearing ratio (CBR) – Standard test method for measuring soil strength
Soil types
Water table
Maximum load (vehicles)
Acceptable rut depth
Reinforcement type- Cellular confinement
Type and Depth of engineered infill material- Clean, angular. Usually 40mm to 20mm.

Digging surfaces (site strip)

Site stripping damages root structures in soils, however, the use of no-dig construction allows an access road or surface to be created across roots.

No dig

1. Remove surface vegetation	Use a suitable herbicide suitable for the specific vegetation and not harmful to the tree root system.
2. Place geo textile separation filtration layer	Use a Fibretex F4M non-woven Geo textile over the prepared sub-grade. Overlap dry joints by 300mm.
3. Cellular Confinement System	The three dimensional cell structure, is formed by ultrasonically welding polyethylene (perforated) strips / panels together to create a three dimensional network of interconnecting cells. A high degree of frictional interaction is developed between infill and the cell wall, increasing the stiffness of the system.
4. Edge restraint	A treated timber edging is usually acceptable.

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Cellular Confinement and Backfill Material.

Expand the confinement systems 2.56m wide panels to the full 8.1 metre length. Pin the panels with staking pins to anchor open the cells and staple adjacent panels together to create a continuous mattress. Infill the cells with a no fines angular granular fill (typically 40-20mm) within each open cell. The use of cellular confinement reduces the bearing pressure on the subsoil by stabilising aggregate surfaces against rutting under wheel loads. Comparisons between cellular confinement and traditional aggregate and geo grid-reinforced structures demonstrate a 50% reduction in construction thickness of the granular material.

Surfacing Options

Block Paving:
1. Lay second layer of Fibretex F4M Geo textile separation fabric over the filled confinement sections.
2. Lay sharp sand bedding layer compacted with a compaction plate to recommended depth to consolidate but not compact.
3. Lay block pavers as per manufacturer's instructions.

Tarmac:
Place 25mm layer of the granular material above the confinement system and lay the bitumen base and wearing courses.

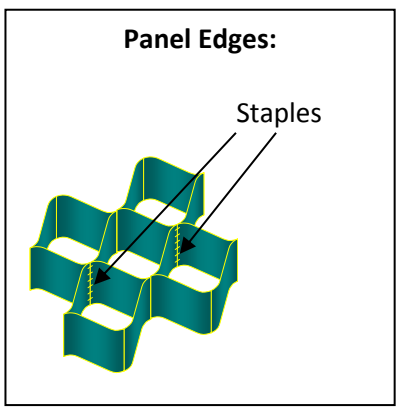
Loose Gravel:
4. Place second layer of Fibretex F4M Geo textile separation fabric over the filled confinement sections.
5. Place decorative aggregate to required depth.

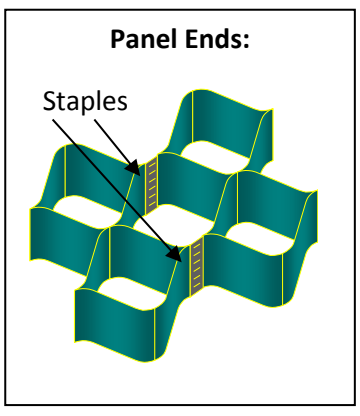
NOTE: A treated timber edge should be provided to restrict gravel movement.

Grass Blocks:
6. Place second layer of Fibretex F4M Geo textile separation fabric over the filled confinement sections.
7. Place 50/50 rootzone bedding layer to the required depth.
8. Lay recycled Duo Block 500 Grass Protection System filled with 50/50 rootzone mix.
9. Seed as per architects instructions.

(Alternatively the Grass Blocks may be filled with gravel.)

Below are illustrations of the correct stapling procedure for joining both edges and ends of panels together;





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