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Protection of retained trees during development – DEMOLITION PHASE

Trees are often overlooked during development and as a result many are either lost or given inadequate protection that results in their demise within a few years. The British Standard BS 5837 Trees in relation to design, demolition and construction - Recommendations was reviewed and updated in April 2012 and is the benchmark document for how to successfully take account of and retain suitable trees in proximity to development.

Trees have to adapt to their immediate surroundings and any changes will have some effect therefore it is essential that a detailed tree survey that complies with the British Standard is undertaken before a scheme is designed. This will schedule the trees according to their suitability for retention and identify the extent of land required to ensure that they have the best chance of survival. Older trees are more vulnerable and they are often the most desirable to retain for both their amenity and conservation value.

Common damage to trees during development

- abrasion of bark and wounds that leave wood tissue exposed
- crushing of roots be vehicles / plant equipment and / or storage of materials
- severing and removal of roots by excavation
- broken branches leaving wood tissues exposed
- poor pruning
- fire damage
- poisoning of roots from spillage or storage of fuel, oil, chemicals etc
- changes in soil levels around trees resulting in root death
- installation of impermeable surfaces

BSI Standards Publication - BS 5837: 2012 Trees in relation to design, demolition and construction Recommendations

The part of the tree most susceptible to damage is the root system because:

- roots cannot be seen and their extent is not realized
- of a lack of understanding of root function and their importance for the health of the tree

The effects of damage can be serious but often it takes several years for this to become evident and is not always linked back to the actual cause during development work. Often by the time the damage becomes evident the developer may no longer own the site leaving the new owner with the problem and the potential need for costly tree work.

Lack of protection can also result in damage to bark and branches that can disfigure a tree and result in disease and decay that also reduce safe life expectancy.

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Tree Root Systems

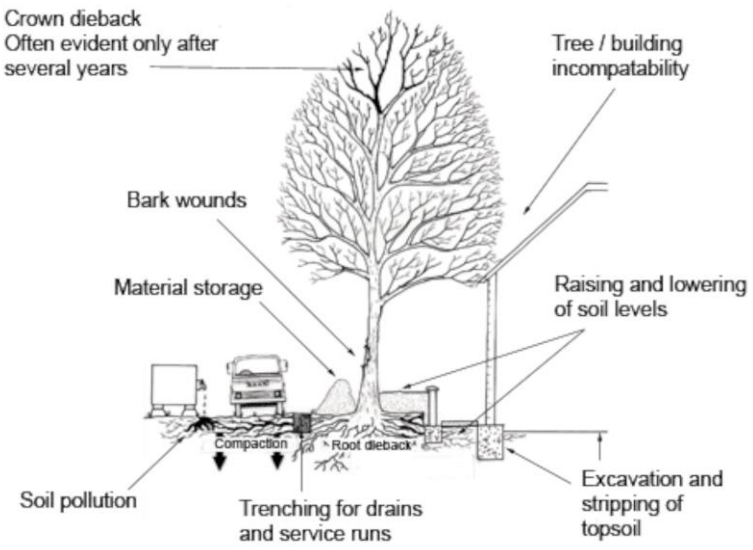
Roots have three main functions:

- absorption of water, oxygen and nutrients
- tree 'food' storage in the form of starch
- structural support

Causes of damage to trees during construction works

The following activities are common causes of damage to trees when construction is carried out within the trees' natural rooting area.

Activity		Damage caused
Excavating trenches	-	To install and maintain services, for foundations, kerbing and so on.
Alterations in soil level	-	Raising or lowering the soil level.
Installing non-porous surfaces	-	Affects soil aeration and drainage.
Compacting the surface	-	By plant, vehicles and storing material.
Soil pollution	-	Storing toxic material (for example, diesel oil and road salt).
Physical damage	-	By plant and machinery to a tree's roots, trunk and branches.
Changes to soil hydrology	-	Caused by changes to drainage which accelerates water run-off or compacts the soil which causes waterlogging.
Fires	-	Burning unwanted material within the tree's root spread can cause significant damage to the tree's roots, trunk and branches.
Exposure	-	Damage caused by increased levels of sunlight and wind when neighbouring trees are removed.



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GOODY DEMOLITION

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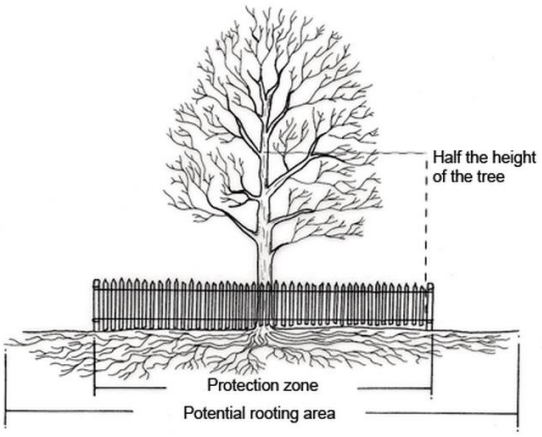
Protection for retained trees on site

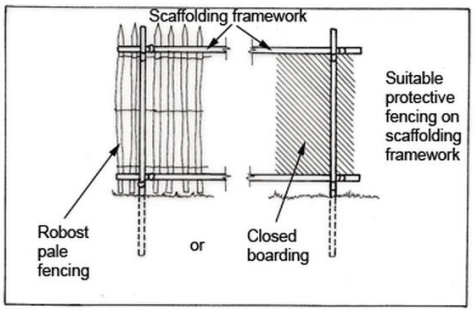
Tree root development is entirely opportunistic and spreads horizontally to a distance and depth entirely dependent upon the ground conditions encountered. Very few trees have a 'tap root' after the first few years. Roots require oxygen and water to function and therefore most will remain close to the surface, research has shown that 90% of tree roots are to be found in the top 600mm of soil. Roots may extend horizontally for considerable distances and where conditions are suitable this distance may be equivalent to two or even three times the tree height.

The majority of roots are the easily overlooked fine, fibrous roots that absorb water, oxygen and nutrients from the soil; these are easily damaged by crushing and removal during soil stripping operations. The main structural support roots are usually found within a few metres of the tree stem and these are linked to the fibrous roots by a network of cable like roots that also provide additional anchorage.

All tree roots are important.

A tree's root system can extend radially (outwards) to a distance much greater than the tree's height. Ideally the whole of this area should be protected and remain undisturbed during construction work. If works are necessary within the tree's potential rooting area, we will identify the projection zone from the base of the tree's trunk. This should equal the full extent of the branch spread or be equivalent to half the tree's height, whichever is greater. This area will be protected with substantial fencing (see below) and be excluded from the construction site.





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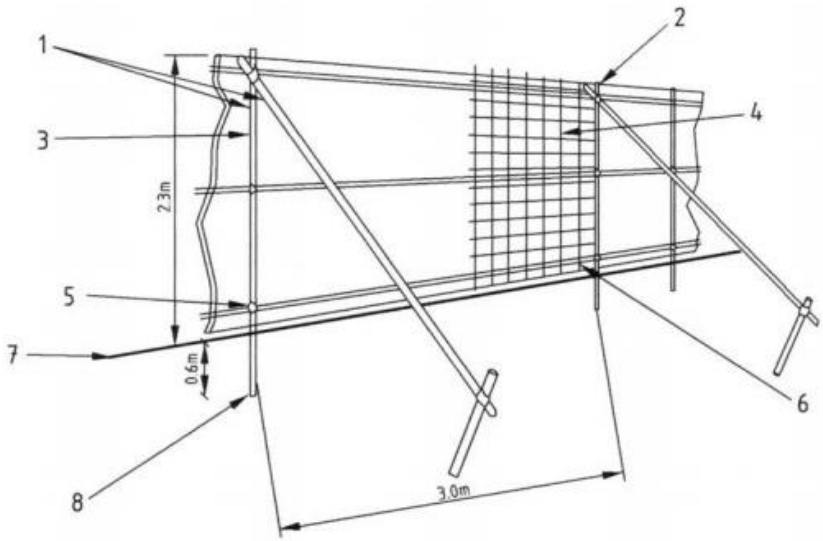
We will supply all the equipment necessary to ensure that conformity with BS 5837 is achieved. There is a simple formula which you can use as a guide to calculate the approximate quantities of equipment required to protect trees

Length of run in meters equals (m) = a

Formula:
" a " x 5.13m of Tube (16.83ft)
" a " x 0.66 Swivel Couplers
" a " x 1.00 Double Couplers
" a " x 0.45 Sleeve Couplers

We will install a mesh panel, this will be standard site panels, each panel being approx 3.6m long

BS5837 2005 - FIG 2 TREE PROTECTION ZONE
BARRIER FENCE



1 Scaffold poles
2 Uprights, to be driven into ground
3 Panels, secured to uprights with wire tires and where necessary scaffold clamps
4 Weldmesh, wired to the uprights and horizontals
5 Clamp
6 Wire, twisted and secured
7 Ground level
8 Approx 0.6 m driven into the ground

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Demolition nearby to protected trees

Once all required Tree Protection measures have been installed / erected, the team will then carry out the duties in line with the scope and programme to carry out the demolition on site.

When the works progress, the mechanical demolition will then eventually commence. During the demolition of the garages on the western side, the plant operator will express extra care and caution due to the presence of protected trees. During the demolition works, an area will be marked for where the excavator will work from and the operator will not move closer to the garages from this point. This will be done as this will prevent the arm of the machine from extending too far and catching the trees. This method is used commonly for where trees, adjacent areas or protected assets are present (such as Network Rail assets which are present on the Eastern side). In addition to this zone being created, there will also be watchers in place nearby to the demolition and the trees (but in-line with staying in safe areas and following the Safe Plant practices for working around plant. you should identify a protection zone

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