

Retaining trees during development

Mature trees are valuable assets that add amenity and livability to new developments. Trees can be damaged during development without the right consideration and planning. Use this simple guide to learn the basic principles around protecting and retaining trees during development.

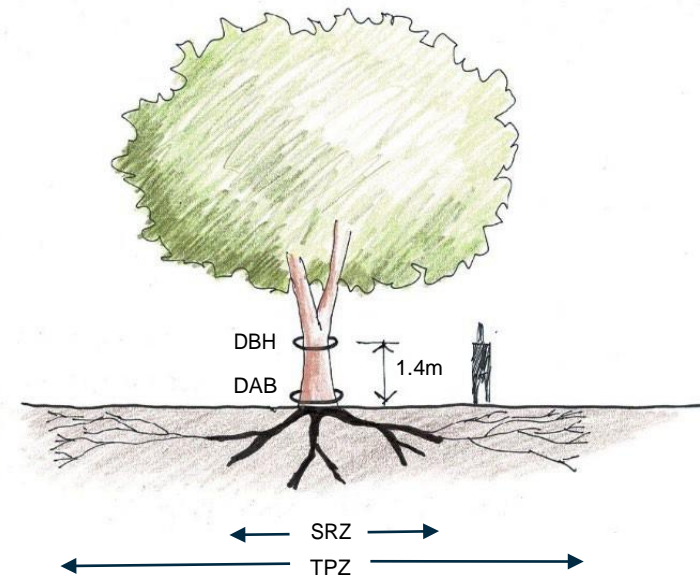
1. Start with tree retention in mind

Why?

A 'business as usual' design and development may mean it is impossible to retain your tree no matter how much you want to. Amending existing plans to accommodate trees can be expensive and time-consuming, so considering your trees early on can save you time and money.

How?

Undertake a Tree Root Survey before you start planning your development and use this information to inform your development design. A 'do it yourself' assessment is sufficient to start, but you may need assistance from an arborist later.



Your Tree Root Survey should identify the Structural Root Zone and Tree Protection Zone (TPZ) for your tree.

- Use the Diameter at Breast Height (DBH) to calculate the Tree Protection Zone
- Use the Diameter Above the Buttress (DAB) to calculate the Structural Root Zone (SRZ).

[Learn how to calculate your Structural Root Zone and Tree Protection Zone here.](#)

2. Keep away from Structural Root Zones and Tree Protection Zones

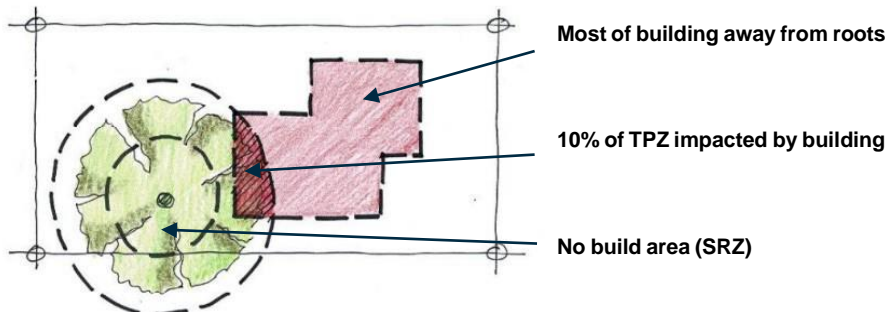
Why?

Structural roots (located in the Structural Root Zone) keep your tree upright and stable. Cutting these during the construction of foundations and walls, or to install utilities, increases risk to the tree becoming unstable and falling in strong winds. Feeder roots (located in the Tree Protection Zone) provide your tree with food and water and damaging these can lead to your tree gradually dying.

How?

Use the information from your Tree Root Survey to:

- Establish set-backs or 'no build areas' to protect structural roots
- Establish '10% only' zones as most trees can tolerate damage to 10% of their feeder roots (the TPZ)
- locate and design your new dwellings in the remaining space.



3. Consider the surrounding trees

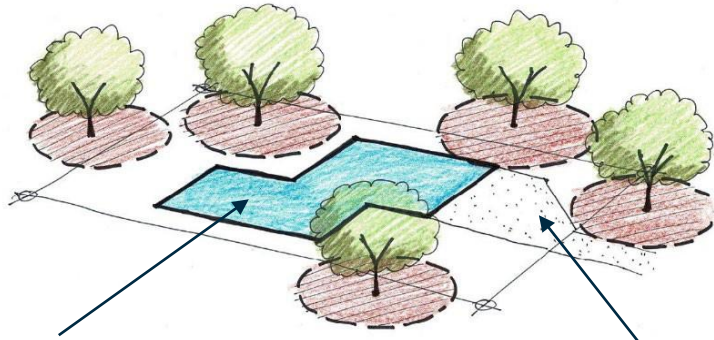
Why?

It's not only your tree that can be damaged during development. Street trees and trees located on neighbouring land can have roots and branches which extend into your land which could be damaged by your development. A tree-friendly development should protect trees belonging to others as well as your own.

How?

Map the Structural Root Zones and Tree Protection Zones for neighbouring trees, street trees as well as your own trees, and factor protection of these areas into your draft design.

- Maximise the benefits other people's trees provide for your development. For example, street trees can provide shady parking areas for your car and neighbouring trees can provide shade and amenity to a courtyard within your boundary.
- Design your driveway and crossover to achieve required setbacks from street trees
- Talk to your neighbours about your plans and any concerns they may have, they will greatly appreciate your consideration of their tree as well as your own.



Building footprint avoids root zones
Single crossover tapering to double driveway protects street tree roots

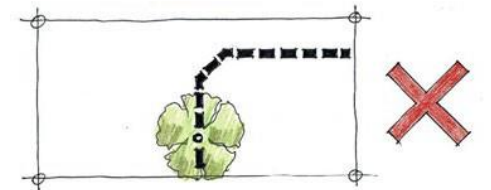
4. Consider utility services and lot boundaries

Why?

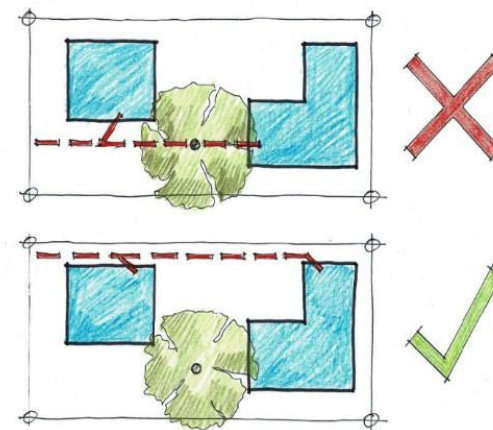
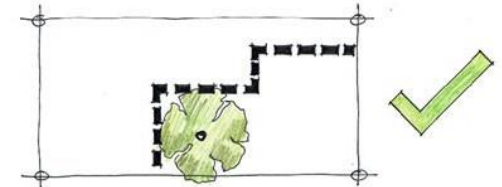
Excavation to install sewer lines, pipes and cables can fatally damage tree roots even if your buildings have been planned and located to protect it. Creating new lot boundaries too close to existing trees means that roots and branches will be in your neighbours' land making them vulnerable to poor pruning or damage which can lead to death. Installation of boundary fencing between the new lots can also damage tree roots and impact branches.

How?

Lot boundaries don't have to be straight and land parcels don't have to be rectangular! Designing before subdividing, rather than the other way around, allows for a more interesting home, garden design and tree-responsive lot shape.



Battle-axe subdivision: lot boundary planned around existing tree



Relocating the sewer connection enables retention of existing tree

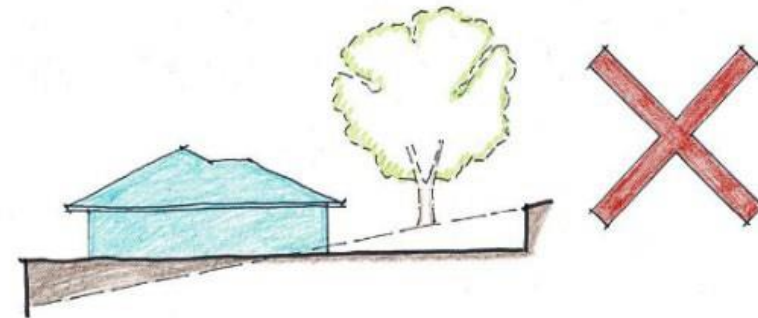
5. Minimise alterations to natural ground level

Why?

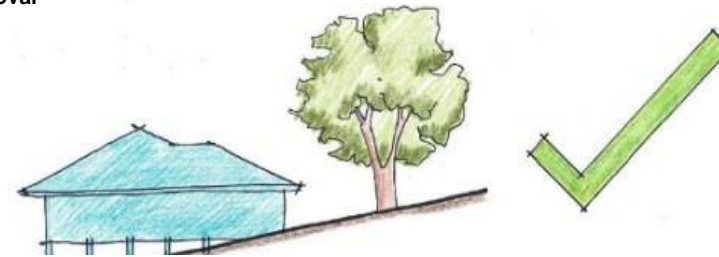
Increasing the depth of soil over tree roots can reduce water and air infiltration and cause collar rot in some species. Removing soil around tree roots can damage roots and lead to dehydration.

How?

- Adjust ground levels to the same soil level as the retained trees
- Retaining walls to create sunken or raised garden beds can preserve ground levels in root zones while allowing level changes on the rest of the block. (Make sure walls are far enough from roots to avoid damage)
- Don't change ground levels – consider constructing your home on poles/ piers to build on a sloped site as often occurs in the Perth Hills.



Lowering the ground level around tree roots to create a level block results in tree removal



Keeping existing ground level enables the tree to be retained and creates a more interesting design

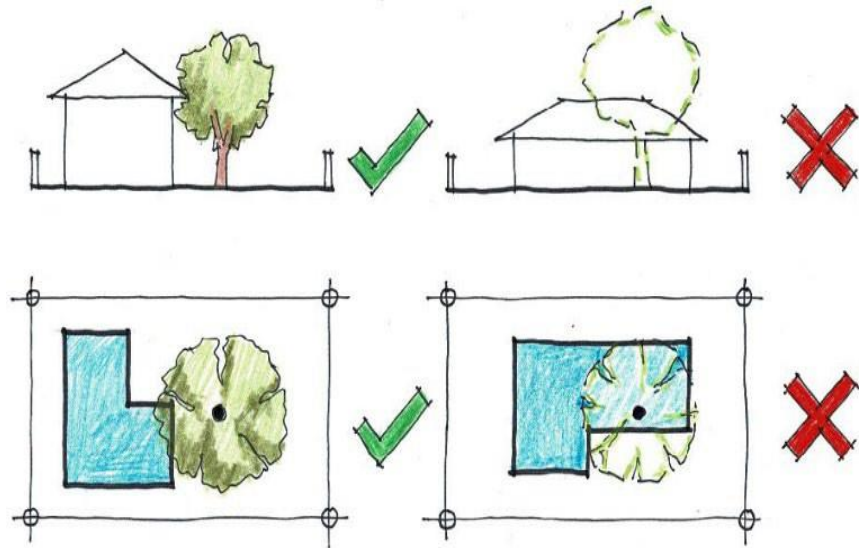
6. Reduce your building footprint - build up, not out

Why?

Single storey buildings take up a large percentage of each block making it more difficult to design around existing trees and leaving less space for gardens and outdoor spaces. A house with the same interior space but designed over two floors provides more options to retain trees and more *functional* outdoor space to enjoy.

How?

Two-storey double brick construction can be expensive and slow, so consider alternative construction techniques which can be much quicker. Options include structural panels, building cassettes, timber framing, and luxury prefabricated modules which are craned into place.



7. Used raised floor construction in root zones

Why?

The raking and compaction required to install an on-ground concrete slab can result in structural roots being cut, damaged or crushed, and the slab deprives feeder roots of water and oxygen.

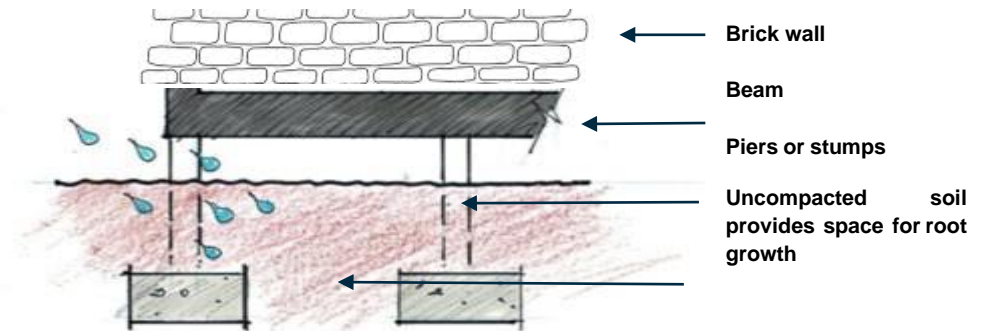


Raised-floor alfresco protects root zone

On-ground concrete slab outside the root zone

How?

- Design your development so areas with minimal foundations are located in root zones, such as outdoor areas, decks and gardens
- Use raised floor construction for the parts of your home that *must* be constructed in root zones: the supporting piers, posts or stumps can be located around roots to avoid damage to trees
- Use pier-and-beam construction rather than using in-ground concrete foundations: this prevents damage to your wall from growing roots as well as preventing damage to roots during construction.



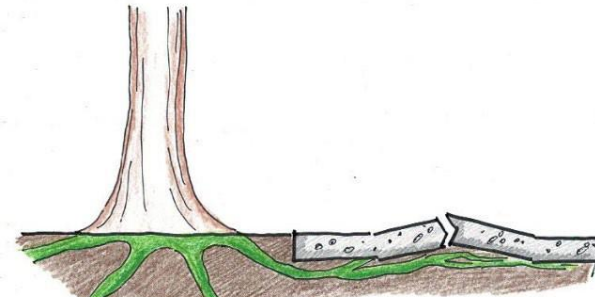
8. Use permeable surfaces where possible

Why?

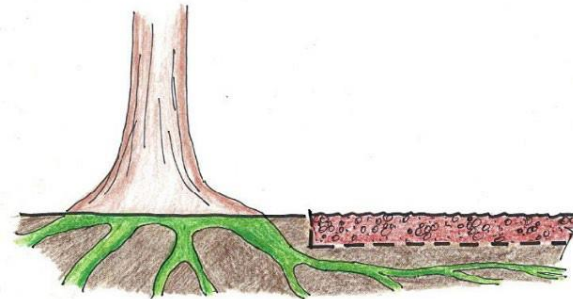
Tree roots need oxygen and water. Impermeable surfaces such as concrete (and to some extent standard paving) prevent water and oxygen from entering the soil and encourages trees to grow shallow roots which crack and lift hard surfaces. Permeable surfaces allow water and oxygen through, keeping trees healthy and encouraging them to grow deeper roots.

How?

- Consider use of permeable paving as an alternative to traditional hardstand treatments and driveways such as synthetic turf, decorative concrete and non-permeable paving
- Use raised decking rather than paving or concrete for outdoor and alfresco areas



Shallow roots crack and lift concrete as they gr



Permeable surfaces allow roots to grow normally

9. Protect your tree from damage during demolition

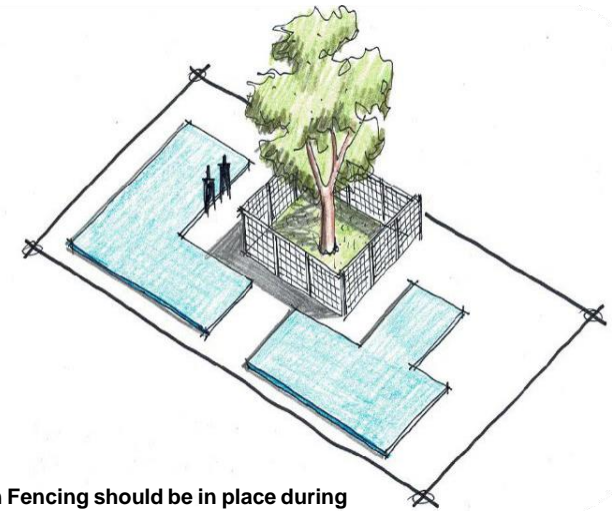
Why?

Damage to existing trees can easily occur during demolition. Branches can be snapped off, bark rubbed off, roots crushed by heavy vehicle movement, trees driven into, and roots snapped as soil is raked and sifted to remove rubble. It has also become so common to remove all vegetation that demolition companies can accidentally do this even if the client wants to retain the trees.

How?

Demolition is often organised by your builder, ensure the following:

- Your builder develops a Tree Management Plan (TMP - see point 10 below) **before** demolition occurs
- The TMP covers how your tree will be protected during demolition as well as during construction
- A copy of the TMP is provided to the demolition company and they confirm in writing they have received it, and it will be implemented
- The contract with the demolition company includes financial penalties if your tree is damaged during demolition
- If you are organising the demolition yourself, the above points should be used to select a suitable demolition company and built into your contract with them.



Tree Protection Fencing should be in place during demolition and construction

10. Manage the building site to protect and care for your tree during construction

Why?

Construction sites are hazardous places for trees and without a plan trees can suffer injury stress and health decline. As well as the physical damage that can occur, other hazards that trees face during the construction phase include:

- Poisoning from paint, solvents, fuel and wastewater such as concrete ‘rinsings’
- Crushing and suffocation of roots due to building materials stored over them
- Dehydration due to reticulation being turned off or removed.

How?

Your builder should have a Tree Management Plan describing how the building site will be managed to keep your tree safe and healthy.

The Tree Management Plan should include actions such as:

- Tree Protection Fencing (TPF) to be installed around the tree before work begins which should remain in place until all works are completed
- No storage of materials or equipment and no vehicle movement inside the Tree Protection Fencing
- Details around management of waste materials to ensure soil is not contaminated, for example not washing equipment onsite
- How and when trees will be watered, and care measures if your trees look stressed
- Assigning responsibility to ensure tree protection and care measures are implemented and monitored.
- Full details of best practice tree protection and retention can be found in Australian Standard 4970 – Protection of trees on development sites.

Disclaimer: The content in this document is intended for information purposes only. It is not intended to address all circumstances or replace the advice of a qualified professional.

If in doubt, seek and follow arborist advice

Why?

Architects and builders are not tree experts. Just as you would consult a doctor for advice about how to protect your own health, consult a qualified arborist for advice on how to protect your tree when planning and building your development.

How?

A qualified Consulting Arborist can provide a range of advice and information to help you retain your trees during development. These include:

- Your trees’ health, structural integrity and recommended works or treatments to prepare your tree for development
- The size of your trees’ Structural Root Zone and Tree Protection Zone to inform your design
- The specific location of your trees’ roots within the SRZ / TPZ so that you can position posts and piers around them
- The likely impacts of your **draft** development plans on your tree, and recommendations for how to reduce these impacts. Don’t wait until your development plans are finalised to seek this advice, it may be too late.
- Measures to take during demolition and construction to protect and care for your tree (Tree Management Plan).

When seeking the services of a Consulting Arborist, look for someone who holds at least a Diploma in Arboriculture (sometimes stated as AQF Level 5 in Arboriculture) and ask to see previous Tree Management Plans that have previously been approved by Local Government.

