Introduction

1. AVOID the tree and its root systems in the first place.
2. MINIMISE damage via consultation with Parks & Open Space department if the tree root zone and construction zone overlap or are in close proximity with each other.
3. OFFSET the loss of tree as a last resort if approval has been given. In regards to tree replacement, parity of vegetation in the landscape is essential.

Key Objectives

- Describe the importance of trees in the landscape
- Describe how trees can be adversely impacted by construction works
- Outline tree protection measures and a process to ensure these are implemented from the planning to post-construction phases of projects.

- Importance of retaining trees in the landscape
- Introduction to trees and their root systems
- Ideal tree protection workflow
- Method of protection
- Maintenance of TPZ during construction
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Trees are important community assets

Category	Particular benefit of street trees
Climate amelioration	• Shade & Temperature modification • Humidifying the air • Shelter from the wind • Reduced runoff
Human health	• Lower peak summer air temperatures • Encourage active forms of transport – walking and cycling • Human psychological health
Landscape values	• A sense of scale • Softening of the built landscape • Linking and unifying landscapes • Variety of colour, form, texture and pattern
Environmental values and amelioration	• Protecting waterways • Links to areas of natural significance (waterways, parklands) • Fixing of carbon dioxide & Production of oxygen • Purifying the air
Conservation values	• Maintain wildlife habitat & Conserve genetic resources
Economic benefits	• Increased property values • Increased shopping activity • Carbon balance benefits

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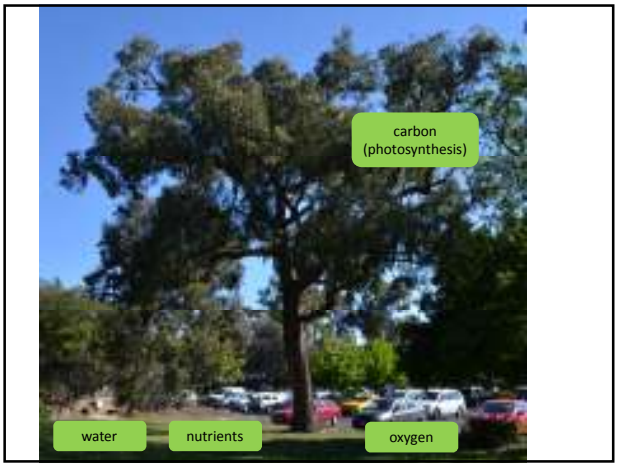

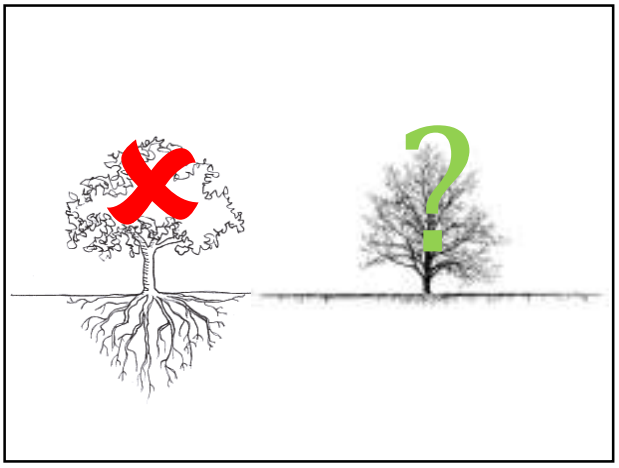

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Ideal Development Timeline

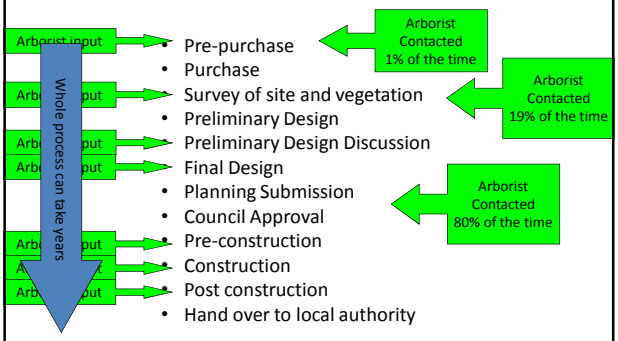

Table 1: Indicative stages in development and the tree management process.

Stage in development	Tree management process	
	Matters for consideration	Arborist actions and certification
Planning		
Site acquisition	Legal constraints	
Detail surveys	Council plans and policies Planning instruments and controls Heritage Threatened species	Existing trees accurately plotted on survey plan (this is a critical requirement that sets the foundation for the whole process)
Preliminary tree assessment	Hazard/risks Tree retention value	Evaluate trees suitable for retention and mark on plan Provide preliminary arboricultural report and indicative TPZs to guide development layout
Preliminary development design	Condition of trees Proximity to buildings Location of services Roads Level changes Building operations space Long-term management	Planning selection of trees for retention Design review by proponent Design modifications to minimize impact to trees
Development submission	Identify trees for retention through comprehensive arboricultural impact assessment of proposed construction. Determine tree protection measures Landscape design	Provide arboricultural impact assessment including tree protection plan (drawing) and specification
Development approval	Development controls Conditions of consent	Review consent conditions relating to trees

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Pre-construction		
Initial site preparation	State based OHS requirements for tree work Approved retention/removal Refer to AS 4373-2007 for the requirements on the pruning of amenity trees Specifications for tree protection measures	Compliance with conditions of consent Tree removal/tree retention/transplanting Tree pruning Certification of tree removal and pruning Establish/delineate TPZ Install protective measures **Certification of tree protection measures**
Construction		
Site establishment	Temporary infrastructure Demolition, bulk earthworks, hydrology	Locate temporary infrastructure to minimize impact on retained trees Maintain protective measures **Certification of tree protection measures**
Construction work	Liaison with site manager, compliance Deviation from approved plan	Maintain or amend protective measures Supervision and monitoring
Implement hard and soft landscape works	Installation of irrigation services Control of compaction work Installation of pavement and retaining walls	Remove selected protective measures as necessary Remedial tree works Supervision and monitoring
Practical completion	Tree vigour and structure	Remove all remaining tree protection measures **Certification of tree protection**
Post construction		
Defects liability/ maintenance period	Tree vigour and structure	Maintenance and monitoring Final remedial tree works **Final certification of tree condition**

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Tree Protection Zone

- Depends on the type of tree
- Whenever staff or contractors are in doubt if the planning scheme provisions apply, they need to contact Council's Environmental Planner.

Tree type	TPZ calculation	Minimum or maximum values
Remnant trees	2 × crown width	Min 2m No maximum value
Palms, other monocots, cycads and tree ferns (AS 4970)	Edge of crown + 1m	
All other trees (AS 4970)	12 × DBH (radius)	Min 2m Max 15m (unless inadequate for crown protection)

Remnant Trees

Protected under a Native Vegetation Precinct Plan or Offset Management Plan

TPZ = 2 x crown width
(no maximum value)

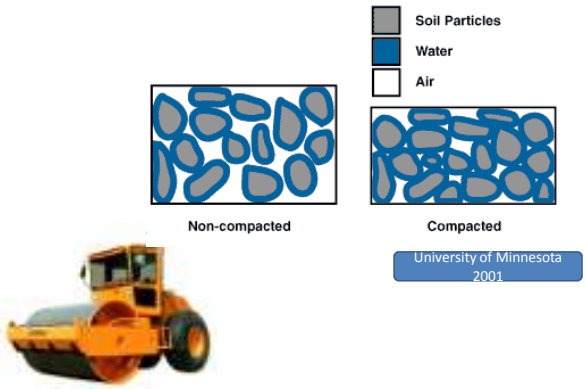
Palms, cycads and tree ferns

TPZ not less than 1m outside the crown protection
(AS 4970)

All other trees

Restricted activities

Image courtesy of Chris Lawry

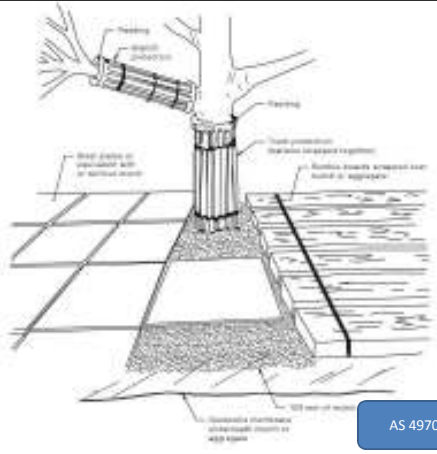


- built structures or hard landscape features (i.e. paving, retaining walls)
- materials storage (i.e. equipment, fuel, building waste or rubble)
- soil disturbance (i.e. stripping, grade changes, placement of fill)
- excavation works including soil cultivation (specifically surface-dug trenches for underground utilities)
- lighting of fires
- preparation of chemicals, including cement products and cleaning of any vehicles or plant
- vehicular or pedestrian access (i.e. pathways or parking of vehicles or plant).

Encroachment into the TPZ

Level of encroachment	Definition	Requirement
Minor	Less than 10% of the TPZ area Outside the SRZ	Area compensated for by an offset area adjoining the TPZ
Major	Greater than 10% of the TPZ area Within the SRZ	Arborist must demonstrate that the tree will remain viable Non-destructive root investigation may be required

Image courtesy of Chris Lawry



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Maintenance of TPZ

- Fencing is secure and located at the edge of the TPZ
- Mulch 50-100mm
- Weed removal
- Watering

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Tree protection activity	Purpose	Arborist to certify or monitor	Comment
Tree Protection Plan	Identifies key stages where monitoring and certification will be required	Certify plan	The arborist to meet with site manager and contractors to discuss Tree Protection Plan TPZs should be shown on all relevant construction plans
Tree removal and pruning		Confirm correct trees are marked for removal. Certify the works on completion	Undertaken prior to TPZ fencing being erected Engage qualified practical arborists. Tree pruning as per AS 4373.
TPZ fencing installation and inspections	Provide physical protection to the trees	Certify the TPZ fencing and other protection measures	Install protection measures as per Tree Protection Plan
Site establishment and construction		Monitor any demolition, earthworks or construction within the TPZ	Discuss construction management plan with project arborist. Notify project arborist prior to works
Landscaping		Monitor any hard landscaping works within the TPZ	
Practical completion		Assess tree condition and certify practical completion	
Post construction		Assess tree condition	

Conclusion

- Trees are important community assets and require protection
- Avoid, minimise, offset
- Tree root systems are typically shallow
- Set up a Tree Protection Zone
- Arborists should be involved from the planning to post-construction phase to ensure trees are protected


Image courtesy of Chris Lawry


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