

PENRITH

Street and Park Tree Management Plan



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Street and Park Tree Management Plan

1.0 Introduction

Penrith City Council covers an area of approximately 407 km² with a population of some 180,000 people making it one of Sydney's larger local government authorities.

This large population base and geographic area presents challenges for the management of our trees, with varied public perceptions as to the role and functions of our tree network.

The City's open space network of 1,234ha contains the vast majority of our city's tree stock, although many reside within our roads and streets.

Collectively, these trees contribute significantly to our urban setting and lifestyle. They offer a visual softening of the hard built environment while contributing to the improvement and quality of our atmosphere, along with providing habitat for many of our fauna species.

Our trees are often compromised by the amount of physical area in which they have to grow and by poor soil conditions. This presents many challenges in ensuring these trees grow into healthy specimen trees.

The trees themselves can cause problems for adjoining properties including damage to structures and/or services. More minor issues such as leaf drop, minor twig and branch drop are often frustrating for residents living in proximity to the trees to the point that tree removal is sometimes requested.

These tree maintenance problems can be minimised through effective planning and tree species selection including a professional and programmed approach to tree establishment and care.

Historically, street trees were only planted at the time streets and suburbs were developed. In more recent years large scale tree planting projects have been smaller in number and only linked to major events such as the 2000 Sydney Olympics. Currently subdivision applications are the primary method in delivering new street and park trees as part of the individual projects.

Lopping/pruning works by power company contractors have also reduced the visual amenity of many existing trees. The overall streetscape has declined, and tree canopy has been reduced and become disjointed. Many streets now have few or no trees.

Tree planting in parks has been carried out when the park is under re-development, or a new project is undertaken. Some larger recent plantings have been completed through Council's Bushcare program, volunteer programs, one off special planting events and in some cases planting days driven by charity organisations.

Trees are a long term investment, so they must be suited to the environment in which they are planted. Planting decisions supported in this plan have the potential to impact the City for many years into the future.

Programmed minor maintenance can lead to a reduction in major future issues.

Penrith City Council has responsibility for a large number of trees, many planted and some self-sown, on Council land. Trees may come to the attention of Council for numerous reasons including failure or imminent failure, dropping of branches, obstruction of road sight distances, interference with vehicular traffic, damage to public or private assets through root growth or dropping of limbs, alleged fire hazard, presence of pests, obstruction of solar access or views, and obstruction of access to private property.

While trees may present a number of risks, they are also valued for their contribution to habitat and streetscape character. This plan aims to clarify the responsibilities and set out the extent of Council action in relation to trees on, or affecting, public land.

With the significant investment in street and park trees by Council an integrated system of tree management is required, including the critical aspects planning, selection, planting, removal and care.

1.1 The Benefits of Trees

Tree-lined streets, green spaces and parklands help to soften the urban environment, contributing to a community's charm and "liveability". In addition to the aesthetic benefits provided by a healthy urban forest, trees also;

- Produce oxygen,
- Create beauty and amenity,
- Trap airborne pollutants,
- Absorb carbon dioxide,
- Stabilise the soil,
- Reduce noise,
- Decrease storm water runoff,
- Provide shade to reduce urban "heat island" effects,
- Reduce summer cooling costs in buildings,
- Create habitat and increase biodiversity,
- Reduce wind speed,
- Improve personal health,
- Increase economic stability(attractive to businesses and consumers),
- Create a welcoming environment for pedestrians.

Research indicates street trees can contribute positively to the real estate value of residential properties by as much as 20 per cent. One large tree produces the daily oxygen requirements of 4 people. Trees absorb enough CO₂, on each hectare, over a years time, to equal the amount you produce when you drive your car 100,000 kilometres.

Trees, landscaped reserves and streets, not only improve the appearance and the environmental quality of an area, they have an impact on critical social issues such as health care, education, crime and safety, and economic development.

1.2 Purpose

The purpose of this plan is to inform the community on Council's position in relation to the management of trees and shrub vegetation that is under Council's care and control and management throughout the City. This plan applies to various areas including parks, reserves, natural areas, operational land and roads (road medians and verges).

This plan clarifies and guides the community and staff in the management of public and private trees and shrubs, recognising that the vegetation of the City is one of the key amenities of the area and recognised in Council's Community Strategic Plan 2031.

This Plan states:

- *"It is Penrith's unique qualities that are its strength. The City is distinguished by its natural setting.*
- *Biological biodiversity is necessary to maintain quality of life (air, water, land and energy).*
- *The city's waterways and 'green' corridors also provide important natural landscapes and recreational places for the community.*

It is Council's intention to maintain the tree and shrub vegetation under Council's care, control and management in a manner that enhances the amenity of the vegetation throughout the City whilst at the same time considering issues of public safety, amenity and presentation.

Council recognises that the task of maintaining trees is a considerable service to the community and the optimum desirable outcomes stated in this plan may be restricted due to number of factors, such as:

- Conflicting needs between amenity and public safety
- Limited resources
- Public perception of trees and their value.

The plan should also assist in identifying resource requirements to ensure the broader objectives are achieved.

The Street and Park Tree Management Plan is a part of an overall approach to tree management and should also be read in conjunction with other key relevant policies including Penrith's Local Environment Plan, Development Control Plan, Council's Landscape character Strategy Biodiversity strategy and Tree Preservation Order.

The Street and Park Tree Management Plan recognises the varying situations that are likely to occur in the overall management of trees. The Management of trees on or affecting public land in the Penrith LGA will be guided by the procedures outlined in this document. In cases where a specific situation is not covered by the documented procedures, the matter is to be referred to the City Parks Manager or Council for determination. All other matters within the guidelines will be interpreted by the relevant officer within Council.

A Tree planting specification and species list will be prepared and maintained as a reference document for Council staff, contractors and residents.

The Tree planting specification and species list will help guide staff, contractors, and residents on the procedures for planting and maintaining trees.

1.3 Scope of the Plan

This plan applies to all trees on Council land, both planted and self-sown. It includes all types of land classifications under Council administration including formed and unformed roads, bushland reserves, and parks and sportsgrounds. It does not apply to vegetation on land administered by other public authorities (e.g. National Parks, RMS, Sydney Water), or vegetation subject to management by other public authorities (e.g. the activities of Energy suppliers under the Electricity Supply Act 1995). This plan does not apply to trees or vegetation that is managed under the Noxious Weeds Act 1993. This plan does not apply to trees that are wholly on private property but does refer to trees on private property that are affecting public land in some way. The management of trees on private property is the responsibility of the property owner. Information on the management of trees on private land and Council's Tree Preservation Order is available on Council's website.

2.0 Tree Management

The assessment of issues relating to trees will be based on a whole of lifecycle approach. That is to say - issues relating to encroaching limbs of a newly planted tree will be considered in conjunction with the value to be provided over many years of a mature tree. Issues relating to leaf fall will be assessed against the amenity and other qualities provided by a tree over its entire remaining life.

The proper management of any asset requires a detailed knowledge and understanding of that asset. That knowledge starts with an inventory of the asset.

To properly maintain Council's tree assets a database/ inventory system is required. A tree asset management system is to be adopted to efficiently manage Council's trees.

2.1 General

All requests relating to the removal or pruning of trees on Council land require assessment by an appropriate officer. Depending on the location and nature of the issue, inspection may be by a Park's Department coordinator, Field staff or authorised Council officer or an independent arborist. Subsequent actions will depend on the assessment of the tree with reference to the context and guidance provided by this plan. It is acknowledged that trees are an omnipresent feature of the Penrith LGA that add significantly to the sense of place. It is also acknowledged that certain characteristics, such as seasonal shedding of foliage and shading, are an inherent and unavoidable feature of trees.

Under common law, a private property owner has the right to prune a tree from a neighbouring property that is overhanging their boundary, in line with that boundary and at their own cost (note that the Tree Preservation Order applies and an application by the person proposing the tree work may be required). Similarly, the Council may take action, at its own cost, concerning a tree that is overhanging public

land from private property if any of the circumstances outlined in subsequent sections of this document apply.

Where trees or vegetation are removed without permission from Council, notwithstanding the reason for the removal, the party responsible for the removal may be subject to appropriate enforcement actions.

Where a tree is assessed as being likely to cause an injury or damage due to instability, the tree may be removed. An otherwise healthy tree that has caused previous injury or property damage due to its position and history of dropping limbs etc may also be removed after assessment of the risk. Trees that merely have some potential to cause damage through failure, dropping limbs or root growth but which have not caused any actual damage, and that are assessed as being structurally sound, will not generally be removed.

2.2 Street Trees

A regular inspection/maintenance programme will be established and implemented to ensure that all street trees are inspected and maintained on a regular cycle, subject to the availability of resources. The frequency of this programme shall not be less than one inspection every 2 years.

Systems will be established and maintained to facilitate inspections with necessary intervening action to occur whenever a street tree concern is brought to Council's attention.

The level of height clearance provided along public carriageways will be carried out after due consideration to the traffic speed, traffic environment and nature of the road without guaranteeing full 5.0 m height clearance across the full width of every Council road. Council will ensure that, at the very least, a 5.0 m height clearance can be achieved for all standard vehicle widths subject to the specific nature and characteristics of each road.

Council's objective is for all pedestrian paths to be maintained with a 2.4 m vegetation height clearance.

Roads within the Council area are classified according to various nationally adopted criteria. These criteria enable the significance of specific road verge attributes to be more easily considered for the management of the road reserve. These attributes guide decision-making and assist conflict resolution about the range of expectations for various roles and uses of road verge areas. The system of classification continues to be refined to better meet planning considerations, maintenance requirements and other objectives as outlined in this document.

2.3 Park Trees

A regular inspection/maintenance programme will be established and implemented to ensure that all trees in council parks and reserves are inspected and maintained on a regular cycle subject to the availability of resources. The frequency of this programme shall not be less than one inspection every two years.

Systems have been established and maintained to facilitate inspections with necessary intervening action to occur whenever a tree concern is brought to Council's attention.

Trees in Bushland areas, Natural areas and environmentally sensitive lands will not be assessed on a regular basis. Assessment and maintenance will be carried out on a reactive basis.

The objective of Council's vegetation maintenance programme is to ensure that identified hazardous vegetation including dead limbs are not left in place immediately over recreational facilities including paths, seats, tables and playground equipment etc.

At the time any recreational facility is constructed, installed or upgraded any hazardous vegetation will either be removed or the facility relocated to a more appropriate location as part of the construction/upgrade project.

2.4 Trees and compaction

One of the most common causes of poor tree health is compaction of the soil within the tree root zone. The most common cause of soil compaction is pedestrian or vehicle traffic. Compaction is caused by something heavy pushing down on the soil. This pushes the air out of the soil. One of the main requirements for healthy trees is air (space) in the soil. Compaction reduces the ability of the tree roots to function and grow.

Vehicles must be prohibited from parking or driving on verges and in parks near trees. Vehicles that are directly involved in works within the park are permitted but use must be limited, while driving on root zones avoided. Vehicles must not enter verge or park areas when the soil is wet.

Compaction is extremely difficult to reverse. Mulching root zones increases biological activity in soils, which over time reduces compaction. There are several mechanical methods of reversing soil compaction although these are expensive, can damage roots and could be avoided by eliminating the cause of compaction.

2.5 Trees in Drainage Easements

Drainage easements are generally not Council property (in some circumstances separate drainage reserves, that are the property of Council, have been created. It is necessary to check land ownership details prior to initiating any action). They provide a legal right for the Council to drain water across private land. Council may act to remove vegetation that is interfering with the drainage of water through the easement in accordance with its legal rights and obligations. The management of vegetation on the easement that is not interfering with the drainage of water remains the responsibility of the landowner.

2.6 Tree Roots growing from trees on Council maintained Land

Tree roots will often be identified as the reason for cracking or other damage of nearby infrastructure such as driveways, other similar paved areas on private property and private pipes such as water, sewerage, gas etc.

Council will not automatically accept responsibility for third party losses purely on the evidence that a tree is nearby and is a possible cause of any loss. In these instances the claimant will need to provide Council with some form of evidence of the cause before Council will consider intervening action. Evidence may include the claimant exposing the roots under the damaged infrastructure and requesting Council to inspect.

In cases where the blockage of private stormwater or sewerage pipes is claimed to result from the ingress of tree roots from trees on public land, the general response will not be to remove the tree, but for the pipe owner to engage the services of a plumber at their own cost to clear the faulty pipe of roots or repair/replace the pipe.

The extent of Council's assistance will depend on the findings of any inspection, which could lead to the removal of the tree in certain circumstances.

In cases where tree roots are lifting assets, the initial response will be to examine whether asset maintenance can alleviate the problem, such as grinding or patching driveway or footpath lips. A tree will not be removed where a problem is merely cosmetic, and does not affect asset functionality, and involves an ancillary asset, such as cracking of driveway slabs, masonry fences or decorative retaining walls. If structural damage is occurring to a dwelling or other significant structure, this may, after a proper assessment, constitute sufficient grounds for the removal of the tree.

If a tree's roots are damaging paths, paving or fencing then repair/ replacement of the structure must be considered before the tree's removal.

Similarly, if a tree has damaged a fence or is in the path of a proposed fence the fence must be built to accommodate the tree and should include space for future growth. If the tree is removed in the future the missing section of the fence can be replaced.

2.7 Trees and Moisture extraction from the ground

Council recognises that trees may, in extreme cases contribute to moisture extraction from the ground. In drier periods the effect of this and other issues may cause soil movement and subsequent cracking of nearby infrastructure.

Council recognises that legislatively imposed water restrictions and other weather factors can increase the potential for infrastructure damage. Either council or private properties reducing their water consumption practices may cause this reduction in soil moisture, which may in turn result in subsequent damage.

Council will not automatically accept responsibility for damages purely on the evidence that a tree is nearby and is a possible cause of damage. In these instances the claimant will need to provide Council with some form of evidence of the cause and negligence by Council before Council will consider some form of intervening

action. Evidence may include a report from a structural engineer or arborist and the claimant exposing the roots under the infrastructure in order for Council to inspect.

Root pruning, soil moisture amelioration and/or the use of root barriers is preferable to tree removal. In times of high rainfall and storms, trees can reduce the severity and duration of flooding events through the uptake of water. Tree root influence on the water table can reduce salinity. In areas where salinity may be a problem tree removal should be a last resort.

2.8 Debris from Council Trees

Council recognises that trees and more generally, vegetation contribute to the amenity and general enjoyment of its community throughout the City. Trees may create some inconvenience or nuisance, which will impact on the community in different ways and to different degrees.

Some of these issues will include:

- Autumn leaf fall of deciduous trees
- Regular leaf fall of “evergreen” Australian native trees
- Berries, nuts, twigs, sticks and bark falling onto pedestrian paths or private gardens during specific times of the year
- Pollen.

Council is mindful that different people in the community will have varying degrees of tolerance to these inconveniences but this plan is based on the “best fit” solution to the community weighing up the level of inconvenience, the amenity value provided through the existence of the vegetation and the cost of implementing solutions to the issues. Any remedial action will be based on a fair and consistent basis throughout the City.

Street sweeping programmes have been developed in such a manner that streets with heavy leaf fall and prominence will be given a higher priority than those with light leaf fall with due consideration to seasonal variations.

Residents that are not satisfied with Council’s level of service in this area will be advised that they may put leaves and similar debris in their Council Green waste bin, or otherwise dispose of it through various disposal options including Council’s free on call clean up service.

The Council green waste bin service provides residents with the ability to dispose of leaves and vegetative debris.

Nuisance issues associated with the dropping of leaves, bark or gumnuts etc where any potential hazards (e.g. slips, trips, blockage of drains etc) may be avoided through vigilance or minor maintenance; and do not constitute grounds for the removal of an otherwise healthy tree.

Ideally leaves should not be swept onto the streets because this may increase the potential for blockage or pollution of stormwater systems.

2.9 Storm Events – Tree Damage

In the event of a declared natural disaster or a storm event that has generated numerous tree damage requests across the City and it is deemed appropriate for Council to assist with clean up operations.

- Council will generally accept requests for a period of up to 5 days after the storm, to clear tree debris caused by the storm in private properties providing all vegetation is stacked appropriately on the Council verge area in front of the relevant property. This may be extended based on the severity of the storm event.
- Council will respond to any tree (public or private) that, due to a natural cause or event, requires removal from a public area creating a safety hazard to pedestrians or traffic. The extent of work will be to make the area safe and clear away debris for this purpose only. It may remain the responsibility of the owner of the tree for all other circumstances.
- Council will consider claims removal costs for any tree that has fallen from any Council controlled land onto private land or building, subject to the owner/occupier providing the required information.

Council is not generally responsible for the damage caused unless there is evidence of negligence by Council.

2.10 Trees and Powerlines

Many street trees and some trees in parks and reserves are growing near overhead powerlines. Energy /service providers maintain clearances around their powerlines by pruning these trees. The lopping of trees near wires can have a significant adverse effect on the amenity and health of the trees. Council has limited control over these activities but will endeavour to work with energy supply companies and their contractors to ensure the damage to trees is minimised.

Council preference is for power cables (and other services) to be placed underground. Underground directional boring is a proven method for laying cables and other services that minimises damage to soil profile and tree roots.

Proposed new powerlines, light poles and realigned powerlines should be located clear of existing trees.

2.11 Trees, sewers and other services

Tree root growth is opportunistic. Tree roots do not seek out water, are not aggressive and do not invade. Sewer lines, stormwater lines, water pipes and other services are located in areas where council managed trees grow.

Sydney Water is responsible for the management of the sewer and water mains systems in Sydney, Blue Mountains and Illawarra. It is the responsibility of the property owner to maintain their underground pipes. Refer to www.sydneywater.com.au

If there is evidence of roots in a sewer there must be an entry point/ hole. The owner of the sewer must replace or repair the damage. If this cannot be done without removing or seriously damaging the tree and there are no alternatives (i.e. moving the pipes, directional boring) consideration will be given to removal of the tree. All plants including grass can enter leaky, old or damaged pipes so removal of a tree may not solve the problem.

Drain clearing devices like electric eels and high pressure water only prune roots and will not eliminate the problem. It is highly likely that soon after clearing a root blocked drain, the root will regrow and block the sewer again. The re-entry will be facilitated because the pipes are faulty.

Cutting roots to repair sewers must only be done as a last resort as the damage caused to the tree and the potential to make the tree unstable are significant problems. In any case, damage to sewers or structures that appear to be caused by a tree may in fact have been caused by other factors, and whilst trees can contribute to damage, they may not be the sole cause of it.

The cutting of a tree's roots requires permission from Council. This is because a significant cause of tree failure (fallen trees) is previous root damage. Cutting the roots of a healthy tree may result in the tree becoming unstable.

2.12 Trees and telecommunications facilities

Telecommunication and internet wires, poles nodes, facilities and other equipment are located in areas where council managed trees are located.

Telecommunication companies are a statutory authority and can do whatever is required to maintain their facilities. There is sometimes conflict between trees and these facilities.

Line of sight for cell phone towers can impact on trees. Towers can be located hundreds of metres apart and a clear line of sight is required for proper operation.

Trees growing between towers may interrupt these lines of sight. The erection of towers or other facilities must be located in areas where there is minimal conflict with existing trees. This also includes potential mature heights of existing or proposed trees.

The installation of services (including wires, cables and pipes) must be located away from existing trees. Proposed installation must be carried out to minimise the impact on trees (including root systems). AS- 4970, 2009 *Australian Standard, Protection of Trees on Development Sites*, must be used to ensure the impacts on trees are minimised.

2.13 Trenching

Trenching may cause damage to trees, resulting in tree death, canopy dieback or a structurally unsound tree vulnerable to collapse.

Trenchless techniques provide an alternative method to open trenching for underground service installation.

Trenchless technologies like under boring is the preferred option for installing utilities in proximity to trees.

2.14 Trees, solar access and views

The installation of solar panels for hot water and electricity generation is increasing. The installation of solar devices is a complying development, but would not be complying if the installation results in the removal of trees.

The efficiency of solar panels can be significantly reduced with a small amount of shade on the system. There are numerous quantifiable benefits of trees, including energy savings from reduction in cooling and heating costs, that may justify their retention over solar panels.

The removal or pruning of trees on public land will not be permitted to install solar panels.

The installation of solar panels on larger roofs that will not be shaded out by trees should be encouraged (e.g. factory / shopping centres).

Council will generally not prune or remove trees on public land for the purposes of enhancing solar access or views for private properties.

2.15 Trees and Proposed Driveways / Developments

The removal of council trees to install or extend a driveway may be permitted. The removal of a council tree to install an additional driveway is undesirable but may be permitted in special circumstances.

Where street trees are notable, an integral part of the streetscape or are in good health and condition approval to remove the tree is likely to be refused.

Trees on public land may be removed, at the sole expense of the property owner, subject to the approval of a development application that demonstrates the need for removal. A fee will be imposed and landscaping/replanting required.

The applicant shall pay compensation for the loss of the council asset (the Tree) and replanting costs. The amount payable is detailed in Councils Fees and Charges Document.

Root removal or pruning for construction must be limited to minor roots < 50mm diameter.

The cutting of a tree's roots requires assessment and permission from Council. This is because a significant cause of tree failure (fallen trees) is previous root damage. Council trees within five (5) metres of any development must be protected. Tree Protection measures include fencing and exclusion zones. Protection measures must be undertaken in accordance with AS4970- 2009 Protection of Trees on Development sites.

2.16 Trees on unformed roads and bushland areas

In general, unformed roads and some natural bushland areas represent land that is not actively managed by Council. Council undertakes active management and maintenance (Bushcare) in some natural areas. Trees in these areas that are reported as presenting a risk will be inspected but any action will depend on the location of the tree, the extent of the risk and the availability of resources.

Trees that collapse in such areas generally will not be removed from the site. Dead trees and hollow trees are important for habitat and biodiversity.

2.17 Trees planted by residents on public land

In some cases, street trees are established by private property owners on Council's road reserve.

Council does not generally support owner initiated street tree plantings. Trees planted by residents may be an inappropriate species, located in a poor position or poorly planted.

Trees planted on council land are the property of the Council and subsequent actions concerning such trees is wholly at the discretion of council. If trees cause an issue the problem may be up to Council to resolve.

It is noted that other government agencies such as Sydney Water and Endeavour Energy have legislated rights in relation to the pruning or removal of trees or vegetation on Council land that override any determination by Penrith City Council.

2.18 Private Trees Encroaching onto Council maintained Land

Where private trees encroach into the required clearance zones for established footpaths, cycleways and roads as stated in this plan or other public safety issues have been identified, the matter will be brought to the adjoining property owners' attention for remedial action.

If the resident fails to comply with a reasonable request under this section Council may issue an order under the Roads Act for the required work to be undertaken.

2.19 Trees presenting a fire hazard

Requests to remove trees or vegetation on the basis that they present a fire hazard will first need to be assessed by appropriate officers from The Rural Fire Service. Trees and vegetation then be removed in accordance with recommendations arising from the assessment.

2.20 10/50 Vegetation Clearing Scheme

The 10/50 Vegetation Clearing Scheme gives people living near the bush an additional way of being better prepared for bush fires.

The scheme allows people in a designated area to:

- Clear trees on their property within 10 metres of a home, without seeking approval; and
- Clear underlying vegetation such as shrubs (but not trees) on their property within 50 metres of a home, without seeking approval.

The scheme is managed and administered by the NSW Rural Fire Service (RFS). Detailed information in relation to the management of this scheme can be found on the RFS website – www.rfs.nsw.gov.au

2.21 Presence of pests

The presence of pest species (such as termites) in a tree on public land will not trigger the removal of a tree unless there is another compelling reason such as structural instability and consequent threat of injury or damage. Termites are a natural agent beyond the control of Council and the removal of a termite affected tree is not held to influence in any way the potential for termite attack on adjacent private property. Birds, bats, spiders, bees and other insects and animals may be considered a nuisance but trees will not be removed or pruned because they live in or use trees.

Council will intervene in pest and disease outbreaks where the immediate or long term survival of the tree or trees is compromised or property is substantially affected. In these circumstances the efficacy and cost effectiveness of available treatments will be assessed and, if justified, the appropriate integrated pest management techniques may be applied as required. Council does not accept responsibility for damage by pests.

3.0 Tree selection

3.1 Soils, climate and History

Soil landscapes in Penrith are categorised in 5 main groups:

- **Residual** – Blacktown, St Marys, Colyton,
- **Erosional** – Luddenham, Cranebrook, Cambridge Park, Penrith, South Penrith, Mulgoa,
- **Fluvial / Alluvial** - Berkshire Park, Upper Castlereagh, South Creek, Richmond, Berkshire Park Londonderry ,Castlereagh, Emu Plains, Cranebrook,
- **Colluvial** - Hawkesbury, Mulgoa ,Leonay, Emu Heights,
- **Aeolian/Alluvial** - Agnes Banks
(Bannerman, Hazelton, 1990)

These soils have traditionally supported a variety of vegetation communities. Some of these vegetation communities are endangered. They include - Cumberland Plain Woodland Complex; Ironbark forest, Grey Box Woodland, Grey Box – Ironbark Forest, Castlereagh Woodlands and Forests; Shale / Gravel Transition Forest, Castlereagh Ironbark Forest, Castlereagh Scribbly Gum Woodland, Swamp Woodland & Agnes Banks Woodland. (Green Web Sydney, 2004).

Soils in Penrith are variable but generally nutrient poor shallow clays (some sandy and gravel soils are also present). The climate in Penrith is variable with temperatures dropping to just below 0°C to over 40°C. Frosts are common and can be severe. Rainfall is approximately 800mm per year.

There have been European settlers in the Penrith area since the late 1700s. Agriculture has been the main industry and resulted in land clearing. The need for wood fuel for cooking, heating, industry and the railways and wood for construction resulted in further tree removal. Increasing residential development over the last 50 years has meant that a significant amount of the remaining vegetation was removed.

European settlement introduced a variety of exotic trees, as well as some Australian species that had not previously been found in the area. Some, such as *Araucaria bidwillii* (Bunya pine) and *Phoenix canariensis* (Canary Island Date Palm) are of cultural significance but others, like the *Olea africana* (African Olive), are now regarded as weeds because of their invasive effect on local indigenous species.

3.2 What is a native tree?

The definition of a native tree species is generally interpreted as one that would have been growing in Penrith at the time of European settlement. However, they could be more specifically be defined as:

- Endemic (in other words, found only in this specific location)
- Locally indigenous (found in Penrith prior to European settlement but can be extended to include much of western Sydney)
- Native (broadly found in Australia).

The first definition technically excludes any species that is found outside the Penrith area, which is plainly not practicable; while the third would include species from such places as tropical and Mediterranean climates that could out-compete locally indigenous species.

The second definition is therefore the most useful since it includes a range of species that are likely to grow and thrive ('survival rate' is often used when planted) in Penrith.

However, it is important to note that many people urge a less purist approach because the local soil conditions and microclimate have been changed by successive years of human intervention.

3.3 What is an Exotic tree?

The definition of an exotic tree species is one that is not native to Australia, Introduced from another place or region.

Some exotic trees come from countries or regions that have very similar climates and environments to areas of Penrith.

Evergreen trees are trees that retain their foliage throughout the year. Deciduous trees and bushes shed their leaves in the autumn. There are very few deciduous native trees.

3.4 Native versus exotic

In Penrith, trees currently selected for public planting are mixtures of natives, exotic evergreen and deciduous trees.

Australian native plants are seen as preferable largely for environmental reasons (habitat, adaptation to the conditions, drought tolerant, often less maintenance, better soil stabilisation) and because of their contribution to developing a local landscape character/identity that is authentically Australian.

Australian natives could include plants from the outback, tropics and a huge variety of soils and climates. Many would not survive in Penrith.

The dominant endemic trees of Penrith are medium to large growing Eucalyptus trees.

The use of endemic species should be encouraged due to the suitability of the species to the local soils and climate; however many of the endemic trees can grow to a size that may be too large for many urban gardens.

Much of Penrith has been urbanised or modified and does not resemble pre-European conditions. The use of endemic vegetation in these areas would be questionable. Just because a plant is indigenous to a site does not necessarily mean that the current site conditions are optimal for its growth. Urban soils and other conditions are often very different to the conditions in which both indigenous and exotic trees are found in the wild.

Many exotic trees grow well in Penrith and their use where suitable, should be encouraged.

It is recognised that exotic trees may be the only suitable choice in particular planting situations and that the planting policy should incorporate a degree of flexibility in relation to planting non indigenous and deciduous species in identified areas.

The focus should be on tree species adapted to a site and with acceptable characteristics relative to the desired purpose.

3.5 Noxious Weeds and Environmental weeds

Some serious weeds are required by law to be controlled by all landholders in an area. These are known as noxious weeds and the law that controls these in NSW is the *Noxious Weeds Act 1993*.

Weeds that are declared noxious are those weeds that have potential to cause harm to the community and individuals, can be controlled by reasonable means and most importantly, have the potential to spread within an area and to other areas.

A weed is declared noxious because its control will provide a benefit to the community over and above the cost of implementing control programs.

Many 'bad' weeds do not meet the criteria for declaration. Noxious weeds will have limited distribution with the potential to become more widespread and will cause impact on agriculture, human health or the environment.

In New South Wales the administration of noxious weed control is the responsibility of the Minister for Primary Industries under the *Noxious Weeds Act 1993*. The Act is implemented and enforced by the Local Control Authority (LCA) for the area, in this area it is Hawkesbury River County Council (HRCC), acting on behalf of Penrith City, Hawkesbury City, Blacktown City and The Hills Shire Councils.

The Act imposes obligations on occupiers of land to control noxious weeds declared for their area.

There are five classes of noxious weeds identified in the Act. Control class requirements range from eradication and formal notification to restrictions on propagation and sales. Check the HRCC or noxious weeds database for details. All Noxious Weeds in NSW are listed in the Noxious Weeds database.

3.6 Encouraging locally indigenous tree stock

Locally indigenous species are environmentally valuable and contribute to an 'authentic' local character. The use of endemic plants in and close to bushcare sites is essential. In all other areas endemic plants could be used if suitable.

Council may consider the following suggestions to promote locally indigenous planting:

- Identify appropriate locally indigenous tree species, as outlined in the attached recommended species list.
- Provide locally indigenous tree species through forward planning and providing tube stock of less common, rare or endangered Western Sydney species
- Investigate whether it is possible to cultivate locally indigenous shrubs/Trees (commonly multi-stemmed and four metres in height) as street and park trees through pruning during early growth,
- Develop an education program for residents and Council staff to promote locally indigenous plants. For example, include in sustainability, Bushcare and biodiversity education programs or create Gardening with Native Plants information sheets or workshops where required.
- Consider other selection factors when choosing locally indigenous tree species such as the value of preserving local identity and character.

3.7 Criteria for tree species selection

The selection of tree species for street and parkland planting's is determined by the specific requirements of the location and the individual planting site. The emphasis is on suitability of size, biological tolerances, character, uniformity and low maintenance

requirements. Councils Species list has been developed to help with the selection process and includes species that are known to grow well in Penrith.

The following is a summary of the criteria to be considered when undertaking selection of tree species.

Good tree management starts with appropriate species selection that takes into account the aesthetic, biological, and functional requirements of a particular site.

3.7.1 Aesthetic Issues

The ability for species to enhance the visual amenity of a streetscape or area is an important consideration. Choose species which maintain and enhance the existing dominant landscape character of any particular area of the City.

Trees that have uniform, formal or notable attributes could be selected for prominent locations. E.g. Norfolk Island pines in a line leading to a building in a park. Trees with informal form could be planted to encourage an existing vegetation type E.g. Gum trees could be planted to promote a bush like vista. The planting of trees that may obscure heritage buildings may not be appropriate.

3.7.2 Biological and Ecological Considerations

The biological requirement for tree selection primarily comprises the species tolerance of stress with regard to general climatic suitability, soil oxygen levels, soil compaction, drought, pest and diseases, high wind and atmospheric pollution.

Achieving high tolerance levels should produce trees capable of establishing and producing aesthetic and other benefits.

Environmental weeds are invasive plants that compete successfully with indigenous plant communities. The use of tree species that are known to be, or have the potential to become, environmental weeds will be avoided throughout the City. These species of plants will not be planted within nominated biodiversity corridors. The use or planting of declared noxious weeds is prohibited.

3.7.3 Tree Diversity

The most beneficial approach for planting is to plant desirable tree types that are adapted and proven to perform in the City. Undesirable diversity can lead to trees that contribute less than their costs.

Species diversity of the overall tree population reduces the incidence of disease and insect outbreak.

Diversity of age is possibly more advantageous in creating a sustainable tree resource. A continual replanting program that staggers the ages of street trees could lessen the denuding of the streetscape during periodic removals.

Relatively new release varieties and untried species should not be tested on particularly difficult sites or sites with high public use.

3.7.4 Functional Issues

Species will be selected that do not require excessive resource input to maintain them in a safe and aesthetically pleasing manner. Tree species known to cause excessive damage to infrastructure via root systems will be avoided.

Species will be selected that can maintain spatial constraints within a street, e.g. Pedestrian and vehicle clearances, overhead powerline clearances, root volume restraints, underground services, etc.

Maintenance solutions may also be considered in species selection, including cyclic crown modification works to maintain the planting in line with design intent, i.e. regular clipping of topiary plantings in commercial areas.

Functional characteristics to be considered in the tree selection process are:

- Matching the trees anticipated size at maturity to the available soil volume, area and zone of upheaval.
- Utilising trees known to have restricted crown widths that fit available above ground space e.g. narrow streets, main roads.
- Matching the trees anticipated size and water usage at maturity to the available soil volume and climate.
- Using species of tree known for their structural integrity and stock that are known to have received appropriate formative treatment whilst in the nursery.
- Selection of deciduous species where solar access is required during the winter months and shade is beneficial during the hotter months.
- Utilising long-lived species to gain the greatest return on the original expenditure.
- Clear trunk /raised canopy for street trees to ensure clear sightlines.

3.7.5 Tree Availability

Council purchases all tree stock from the commercial nursery trade, or private tree farms. These trees are then grown or propagated in Council's nursery. For street planting programs, with proposals for long street runs, it is essential that the proposed trees be readily available. The need for pre-planning is essential. Good quality stock grown in accordance with industry standards and the guidelines and recommendations in Specifying Trees (Ross Clark – 2003) and Australian Standard 2303:2015, Tree Stock for Landscape use.

3.7.6 Health Considerations

Effect on human health should be considered in selection of trees. Some trees are difficult for maintenance workers e.g. *Lagunaria patersonia* (Norfolk Island Hibiscus) or *Gleditsia triacanthos*, (Honeylocust); others may cause allergies or exacerbate respiratory complaints. Thorns, spines, excessive fruit drop can also cause injury. Species selection will utilise trees that have no known highly toxic or allergenic characteristics.

3.7.7 Soils and Climate

Trees that are suitable for the soil type, rainfall and temperatures will be used. These may be native or exotic.

3.8 Species Lists

A list of tree species for use within Penrith City council's streetscapes and reserves is available on Council's Website. An undesirable species list has also been developed. These lists are available on the council website and in the appendix. These lists should not be considered definitive and are intermittently amended.

The species lists should be used as a broad guide and in combination with the selection criteria. Undesirable species may even be appropriate in some locations.

Trees not on the lists that comply with the selection criteria would be considered. New species and developed varieties of trees are regularly introduced into the market, therefore trials with these trees should be considered.

4.0 Tree Planting

4.1 Criteria for selection of tree planting sites

The following criteria will be used for the selection of tree planting sites throughout the City –

- Suitable unrestricted opportunities in high profile sites, e.g. Entrances to the City, commercial precincts, and major roads.
- Identify and utilise suitable tree planting opportunities in relatively treeless areas, such as in under-developed parks, nature strips, median strips, car parks and traffic treatments where space allows.
- Integrate park upgrades and developments, (Capital Works, Asset Renewal), with tree planting in adjacent streets.
- Identify opportunities for tree planting in new subdivisions. Unless otherwise required by a condition of the development approval. Street and reserve trees are to be planted by the developer in accordance with this plan and Councils Tree selection criteria and Tree Planting and establishment Specifications.
- Integrate road and footpath reconstruction with tree replacement and planting programs where possible and appropriate. Explore and incorporate opportunities to change existing road alignment design to provide quality opportunities for tree planting and streetscape improvement.
- Diversity in tree ages in parks. Ensure parks with similar age trees are targeted for tree planting to ensure a spread of tree ages.
- Diversity in species. Parks with a monoculture are susceptible to species specific pests and diseases that could damage or kill all trees in that area. These parks should be planted with a range of species in consideration with other criteria.
- Planting site size.

Removal and replacement works will be undertaken in a staged process. This program will identify unsuitable street trees (e.g. high maintenance trees under powerlines) and prioritise removals and replacement with appropriate species.

Small, Medium and Large Planting Sites

Small, medium and large sites relate to the size of the potential tree planting sites. Note that a smaller site could sustain a larger tree species if the site and soils (planting system) were modified to allow a larger tree size.

Table 1: General guidelines for planting site sizes.				
Planting Site	Total planting area(lawn, island, or soil strip)	Planting strip width	Distance from trunk to wall /pavement	Maximum Tree size at maturity
Small	Less than 9.5m ²	1.0m to 1.3m	0.6m	Small (less than 9m tall)
Medium	9.5m ² to 18.5m ²	1.3m to 2.5m	1.2m	Medium (less than 15m tall)
Large	More than 18.5m ²	> 2.5m	> 1.5m	Large (taller than 15m)

Table 1: Planting site size and dimensions and maximum tree size at maturity (adapted from Gilman, 1997 & City of Melbourne 2011,)

4.2 Tree Planting

The optimal tree planting season is autumn (March – May) and generally between the months of March – September for better planting success.

Council will select species of tree for planting that are suitable for, and perform well within the site, and that have the ability to contribute positively to the City's environment.

Proposed tree planting for new developments and subdivisions must comply with the tree selection criteria. Council's 'Species Lists' contain plants that are known to grow well in Penrith and should be used as a guide. Trees must be planted in accordance with modern industry standards, Council's Tree Planting Specifications and in a pit at least twice as wide and only as deep as the pot size.

Residents are not permitted to plant trees (or shrubs) within the nature strip, other sites within the road reserve or in a Council managed park, unless written Council approval is obtained.

Nature strip trees will be planted by Council, free of charge, at the request of residents, at the discretion of Council and in accordance with the tree selection criteria (matched against either an approved proposed species or Council's list of preferred species).

4.3 Street Tree Planting

Council acknowledges the value of trees as a prominent landscape feature and recognises that they add character to the City and play an important role in screening roads and industrial developments

Experience has shown that planting street trees with all good intention is not sufficient to achieve a high quality streetscape.

To achieve successful streetscapes critical factors such as selection of the most appropriate tree species, quality of the plant stock and planning for and providing adequate soil and water are essential.

The goal of Council is to plant trees on community land in line with the following principles:

- Trees will enhance the visual amenity of the entranceways and other major arterial routes within the City;
- Trees will replace trees that have been removed from existing tree lined streets;
- Parks and streets that do not have existing trees ;
- Trees will significantly contribute to raising areas of low visual amenity value particularly within areas of low tree cover and around areas of industrial development;
- Trees replace ageing street tree populations that are in a state of decline and a phased re-planting program is required to maintain the original street character;
- Community consultation strongly supports the introduction of new street planting; or trees are specifically requested by residents.

When selecting species of trees for street planting the Council will consider the following elements:

- the likely tree size at maturity with larger areas of open space warranting larger tree species;
- Its potential to effect (beneficial or detrimental) neighbouring landowners;
- Its suitability and spacing within the given environment e.g. size of verge in relation to spacing, type of existing planting, level of amenity value;
- Its tolerance to pests, diseases, drought and climate change;
- The preferences of the local community where discretion is available and;
- Any historic tree planting patterns with the use of original species wherever possible.
- Its contribution to urban biodiversity on surrounding open space and its potential to extend natural corridors linking reserves.

The Council will plant trees where the roadside environment does not limit the tree from reaching its maximum potential. Limits on available roadside space from utility providers and existing infrastructure will result in some locations not being suitable for establishing trees.

When selecting locations for street tree planting Council will consider the following:

- Any underground and overhead services and structures;
- Existing crossovers/ driveways, power poles /light poles ,fire hydrants or inspection pit boxes/manholes;

- Traffic and pedestrian lines of sight;
- Areas that have been identified for footpath renewal.
- Private property structures and access requirements.

The location for a tree on the road reserve shall generally be:

- A minimum of three (3) metres from existing crossovers/ driveways, fire hydrants or inspection pit boxes/manholes;
- A minimum fifteen (15) metres from the approach side of a pedestrian crossing and five (5) metres from the departure side;
- Eight (8) metres from the approach side and three (3) metres from the departure side of a Bus stop;
- Centrally in the front of the house block (but not directly in front of the front door;
- Five (5) metres from a light or power pole;
- Two (2) metres from household stormwater pipes;
- Eight (8) to fifteen (15) metres apart in the street, Evenly spaced;
- Ten (10) metres from Traffic lights and Intersections;
- A minimum of ½ (0.5) metre from the kerb;

These distances may be varied depending on the tree species and situations.

At least one street tree should be planted in front of every residential property. Where a tree is removed it shall be replaced.

Residential properties exchange hands on average every 7 years. Council will consider residents reasons for not wanting a street tree at the front of their property, however street trees will be planted for the benefit of the community regardless, unless there are significant mitigating reasons.

4.4 Street Tree Infill Program

The aim of this program is to ensure that Penrith's overall street tree population is sustained through a scheduled street tree replacement program. This tree planting program together with adequate management services is the primary driver for ensuring maximum tree canopy coverage within streets across the municipality into the future. When street trees are removed as a result of age and general decline it is important that new trees are replanted.

The impact of protracted drought, coupled with a declining /aging tree population has resulted in a significant loss of tree canopy cover across the City over the past decade.

To support an 'infill' program is important that Council completes an audit of its total street tree population and puts in place both adequate measures and resources to ensure a systematic approach to the replacement and successful establishment of street trees. A Council commitment to a tree planting and establishment target, together with completion of the street tree asset audit and the establishment of a street tree asset management system are important if the street tree population are to be maintained.

4.5 In-fill planting

Many streets throughout Penrith contain a mix of tree species. In these streets, it will be difficult to achieve the vision of consistent avenues through in-fill planting. In the short term the objectives of maximising tree canopy and achieving consistent street tree plantings may be conflicting in many streets.

The in-fill tree planting program of Penrith's City Parks Department should be restricted to streets where the existing planting is successful and the new trees will reinforce the character of the existing landscape. Otherwise an inconsistent planting theme will be reinforced over time. The importance of, and Councils preference for consistent planting to improve the street landscape context should be effectively communicated to the local community. This will assist in instances where tree removal and new planting is required to achieve consistency and in instances where residents have planted trees in the street.

Block removals and replacements should be considered in streets where the trees are of poor health and have short useful life expectancies. This approach should focus on streets, with wide nature strips and no overhead powerlines, where large trees can be planted.

4.6 Park and open space tree planting

While most street trees can be grown in parks, the reverse is not always possible. Park trees include species of large size that require greater root volumes than those generally achievable in the streetscape environment.

A tree planting and selection specification will be developed that will guide the principles identified within this policy. The ultimate goal of Council is to plant trees on both Council and community land in line with the following principles:

- Trees will enhance the visual amenity of the entranceways and other major arterial routes within the City;
- Trees will replace trees that have been removed from existing areas within parks and open space;
- Parks and open space areas without trees;

- Trees will significantly contribute to raising areas of low visual amenity value particularly within areas of low tree cover and around areas of industrial development;
- Trees replace ageing tree populations that are in a state of decline and a phased re-planting program is required to maintain the original character of the park;
- Trees will provide shade for sporting field spectators and playgrounds;
- When community consultation strongly supports the introduction of new tree planting; or where trees are specifically requested by residents.

When selecting species of trees for open space areas planting Council will consider the following elements:

- Its likely size at maturity with larger areas of open space warranting larger tree species;
- Its potential to effect (beneficial or detrimental) neighbouring landowners;
- Its suitability and spacing within the given environment e.g. size of park in relation to spacing, type of existing planting, level of amenity value;
- Its tolerance to pests, diseases, drought and climate change;
- The preferences of the local community where discretion is available and;
- Any historic tree planting patterns with the use of original species wherever possible.
- Its contribution to urban biodiversity on surrounding open space and its potential to extend natural corridors linking reserves.

The Council will plant trees where the area does not limit the tree from reaching its maximum potential. When selecting locations for tree planting Council will consider the following:

- Any underground and overhead services and structures;
- Traffic and pedestrian lines of sight;

4.7 Tree Establishment

In relation to the establishment of trees, the following procedures shall be adopted:

- The planting will be in accordance with Councils guidelines and specifications;
- Trees shall be watered at least weekly in the first 4 weeks and every 2 weeks for the next 6 weeks and monthly for the first year;
- Trees less than 3 years old shall be watered to maintain adequate soil moisture levels for growth;

- Fertilising shall take place at the time of planting and yearly for the first 3 years (depending on existing measured soil fertility and species);
- Additional protection shall be provided to establish street trees where they may be subject to vandalism;
- Additional maintenance (extra water, weed and litter control) shall be provided to trees in high profile areas like main streets and shopping centres;
- Ensure that the area around the trunk is kept weed free;
- Ensure that as the tree grows stakes are removed. A stake removal programme should be instigated after the first 2-3 years of establishment;
- Sufficient water will be required to thoroughly wet the root system and this should be applied as necessary during both the cooler and hotter months;
- The best time to water is early in the morning and not during the heat of the day;
- Continued watering for the first two summers from planting will generally be necessary in some instances. The co-operation of Residents will be actively encouraged to assist in the establishment of the tree;
- Formative pruning be carried out as required.

5.0 Tree Maintenance

5.1 Trees and compaction

One of the most common causes of poor tree health is compaction of the soil within the tree root zone. The most common cause of soil compaction is pedestrian or vehicle traffic. Tree roots require oxygen in the soil for optimum growth.

Vehicles must be prohibited from parking or driving on verges and in parks near trees.

Vehicles that are directly involved in works within the park are permitted but use must be limited (this includes lawn mowing machinery and equipment). Vehicles must not enter verge or park areas when soil is wet.

Compaction is extremely difficult to reverse. Mulching root zones increases biological activity in soils, which over time reduces compaction. There are several mechanical methods of reversing soil compaction although these are expensive, can damage roots and could be avoided by eliminating the cause of compaction.

The dripline area of all trees should be mulched with clean (no soil, weeds or rubbish) leaf mulch to a depth of 50 -75 mm. Mulch must be kept 100mm clear of trunks.

5.2 Tree Protection

Activities and work near and around trees can cause irreparable damage. This can include physical damage to trunks and branches, driving over root zones (see compaction) and building works. The Australian Standard AS4970 – 2009, Protection

of Trees on Development sites details measures to protect trees from preventable damage.

Development in the standard is defined as:

- The use of land (e.g. festival events, use of park areas and other events) that requires approval.
- The subdivision of land.
- The erection of a building.
- The carrying out of a work.
- The demolition of a building or works.
- Road works.
- The installation of utilities and services.
- Any other act, matter or thing as defined by the relevant legislation.

Damaging activities could also be passive use of parks e.g. large groups congregating under trees, BBQs under trees or erecting temporary gazebos near trees.

Mulching under trees to the extent of the canopy can reduce compaction and the potential of unintended damage.

A general rule is that Tree Protection Zone (TPZ) of 12 times the Diameter at Breast height (DBH) of the tree be isolated from disturbance so the tree remains undamaged and viable.

All development works near and around council managed trees shall comply with the principles and guidelines described in AS 4970 – 2009.

Sections of this plan have requirements in relation to trenching, driveways, sewers and other services.

Council works are not exempt from Tree Protection measures.

5.3 Tree Pruning

Trees do not generally benefit from pruning. It is often done for community benefit and in many instances to the detriment of the tree. The need for pruning must be established prior to the commencement of any works.

Tree pruning by Council shall be in accordance with Australian Standard 4373-2007, Pruning of Amenity trees.

Council will maintain tree clearances in accordance with the current and relevant State Government legislation (i.e. the minimum clearance between trees and services, road signs etc).

Formative pruning is the most beneficial and cost effective type of pruning. Formative pruning is carried out on young trees from the time of planting and throughout the first few years. The aim of formative pruning is to develop a sound structure and direct plant growth. Defects (like codominant stems and crossed branches) should be identified and removed. If this can be done with hand tools it will significantly reduce the potential for branch failures or costly major tree pruning works later. Formative pruning is a skill that is best performed by an AQF 3 arborist.

Council trees should be assessed and formatively pruned as required during the establishment period. This shall be a minimum of once a year for the first 3 years.

Council will endeavour, subject to the availability of resources, to ensure that trees under their management do not prevent street lamps from illuminating roadways. The purpose of street lamps is to illuminate the roadway and where adequate illumination of the roadway is present the Council will not take action to improve the levels of illumination of private property

Pruning to maintain powerline clearances is undertaken by the energy provider. Residents are responsible for maintaining vegetation clearances around service lines (powerlines from the street pole to the house). Council approval is not required for this work; however it is required for pruning works that exceed the energy regulation requirements.

Residents or property owners have the legal right to prune off overhanging foliage into their property from a tree located on a neighbouring property, including one located on public land. All tree pruning work must comply with councils Tree Preservation Order.

The removal of small branches (up to 50mm diameter) can be undertaken without Council consent.

However, if a Council street or reserve tree requires pruning, residents or property owners must request the pruning service be provided by Council's Parks Department.

5.4 Watering and fertilising

In times of drought additional water may be required for immature non endemic and exotic trees.

Fertilising mature trees is not necessary if appropriate soil conditions are provided. If specified, trees should be fertilised when planted and in early autumn or spring.

Slow release complete fertiliser is preferred. Fertiliser should be applied sparingly, according to manufactures recommendations, in moist soils and watered in. In some instances soil testing may be required to determine nutrient deficiencies.

Additional products

Soil conditioners generally combine water holding crystals, fertiliser and growth stimulants. The use of soil conditioners for natural area planting is usually specified. The use of soil conditioners for general street and park planting should be considered.

5.5 Damage to Council trees

If a resident or property owner damages a Council street or reserve tree, makes the tree structurally unsound or reduces the aesthetics through inappropriate pruning, Council will seek reimbursement of the damage and the lost amenity value of the tree

under Council Local Law, insurance claim or criminal damage through the court system. Citizens that damage to council trees may be fined.

Damage to the tree includes vehicle collisions, inserting screws or nails into the tree, installing lights or signs, changing soil levels or excavation within drip line and impacts to woody parts.

The cost of replacement of or repair to the damaged tree will be based on commercial rates.

5.6 Clearance Zones in Roadways

All legal dimensioned vehicles should be able to travel along roads without obstruction from overhanging vegetation.

Council's maintenance programmes will incorporate this objective and pruning / removal will be undertaken as resources permit

Vegetation clearance on these roads will be assessed on an individual basis after due consideration to the nature of the road and the type and volume of traffic that can be anticipated along these roads.

Trees will be pruned to ensure motorists sight lines are maintained, road signs are visible and street lighting is unobstructed.

Service providers and other authorities may carry out this work.

Trees or vegetation that are obstructing a formed footpath may be pruned or removed by Council. Trees or vegetation that are obstructing the road reserve where no formed footpath is present, and which do not present any other risks, will not be pruned or removed by Council.

5.7 Council Trees Encroaching onto Private Land

As a principle Council will not automatically ensure that Council trees do not encroach onto private land. The following minimum vegetation clearances will be maintained unless the adjoining resident has specifically requested a lesser clearance:

- a. 500 mm clearance above any boundary fence with adjoining Council maintained land.
- b. 2.0 metre clearance from any roof on private property.

Council staff will consider other applications on merit but intervention will only occur when it is identified that there is a significant risk to the safety of persons or property.

If the tree is listed on the Council's Significant Tree Register and Council's Arborist/s is supportive of maintenance work on the tree in line with the intent this plan then Council will undertake the required work.

6.0 Tree Removal

This plan addresses Council's position on maintaining trees on Council land with pruning the preferred option. There are circumstances when removal of the tree is the appropriate option.

The removal of Council trees may be granted in instances when the views of the Council's Arborist's or authorised person support the removal as the preferred treatment providing one or more of the following criteria are met:

- The tree is dead, dying, diseased or structurally compromised and is in a location that has the potential to cause significant harm or damage to persons or property.
- Poses a severe safety hazard that cannot be corrected by pruning, transplanting or other treatments.
- Severely interferes with a neighbouring tree or tree group to the extent that neither tree can develop to its full potential. The more desirable tree will be preserved.
- The aesthetic values are so low or negative that the site is visually enhanced by the tree removal.
- Work improvements or infrastructure repair or maintenance required to be made around the tree or tree group will kill or render the tree a hazard or significantly impact on the trees condition and useful life expectancy.
- The tree is significantly contributing to damages or nuisance to public or private property and no other viable means are available to rectify the situation.
- Infected with a disease where the recommended control is not applicable and removal is the recommended practice to prevent transmission.
- The tree is a species that is a declared Noxious Weed.
- The tree is a species that has been identified as an Environmental weed and it is in poor condition and/or health.
- The tree is a species that has been identified as an Environmental weed and it is in an area where the weed potential is likely to be a significant problem.
- The tree(s) has /have been identified for removal in a project or Program approved by Council.
- Where the criteria listed above do not apply and the tree impinges on the development of the adjacent property(s) with no reasonable design alternatives existing. A 'reasonable design alternative' should involve but not be limited to:
 - Deletion of second / additional crossovers to development sites and the requirement for shared access;
 - The altering of development design to relocate crossovers out of the way of street trees;
 - Alteration to the design to minimise the impact on neighbouring council trees.
 - The reduction in the number of allotments/properties.
 - Relocation of proposed services to minimise impact on existing trees.

The tree removal criterion is used to prevent indiscriminate removal. Safety is the priority, however, aesthetic and ecological factors, including wildlife habitat will be considered when making all tree management and removal decisions.

The tree or group of trees needs to be inspected and assessed for the above criteria by a qualified arborist. Tree health (vigour), structure, Useful Life Expectancy (ULE), and hazard potential must be assessed.

Trees that are to be handed over to Council from developers must have a ULE of greater than ten years otherwise the trees should be removed prior to hand over to Council management. The exception is in areas of high conservation where the trees contribute to the habitat values of a site.

In these cases, public safety will be addressed through the use of appropriate pruning works, advisory signage and design of open spaces to discourage / prevent public access.

Council acknowledges that some residents have concerns with the leaf litter, fruit, bark or other debris that a tree may shed over the seasons. However, tree removals will not be authorised based on this reason.

Street trees are not to be removed to construct additional driveways. Where street tree removal is approved as part of a Development Application approval, this will be noted as a condition of consent on the approval. The approval will be contingent on the applicant paying a fee for the loss of an asset, implementing and meeting the cost of removal, replacement planting and establishment.

Replacement plantings will be in accordance with Council's Fees and Charges register and based on the purchase of a 35L tree of a species acceptable to the Council, and include a 3-year maintenance cost to ensure successful establishment.

6.1 Tree Removal procedure

Council will only remove trees if one or more of the criteria set out in its 'Tree Removal Criteria' are met, i.e. pose a danger to the public, is dead, poor performing or is an inappropriate species.

If a tree is found to present an immediate danger to the public the tree will be removed immediately and a notice will be left in the resident's mailbox explaining the reason for removal.

Trees known to sucker (liquidambar, Robinia, Some Eucalyptus sp) should be poisoned prior to removal or immediately after being cut to stump level.

Trees to be removed are to be cut to a stump height of not less than 1.4 metre. A higher stump is more visible and presents less of a trip hazard. Two yellow 'X' marks are to be painted on either side of the stump. Prior to stump grinding the tree and root system must be dead (no sucker or water-shoot growth evident).

When the stump is to be ground out the remainder of can be cut and removed. It is preferable to remove stump grinding debris and fill hole with soil. The area is to be left level with the existing soil level.

6.2 Fauna

Prior to the removal of any trees/vegetation, an assessment must be carried out to ascertain whether wildlife is present or likely to be present in the tree. If animals appear evident an aerial inspection should be carried out. If wildlife is present an

Ecologist/WIRES should be engaged to safely remove all fauna. The assessment should take into account the need to remove the tree and timing in relation to nesting and habitation. E.g. does the tree need to be removed and if so can it wait until the young birds have fledged and left the nest.

6.3 Infectious material

Chipped material, logwood, stump grinding and other debris from trees infected with or that may be infected with a pathogenic organism shall be disposed of in a manner to prevent spreading the infection.

All equipment, vehicles and personal items that come in contact with infected or potentially infected material must be disinfected by approved methods before being returned to service.

Trees removed that have been affected by pests or insects shall remain on site (mulch) or removed in a manner to prevent spreading the pest. Tools should be disinfected before and after pruning all Phoenix and Washingtonia palms.

6.4 Trees planted by residents on public land

In some cases, street trees are established by private property owners on Council's road reserve or in parks. These trees may be an inappropriate species and could cause damage or injury. Once planted these trees are deemed to become the property of the Council. Council may be liable for any issues that arise from the tree.

All subsequent actions concerning such trees are wholly at the discretion of Council. If removal of the tree is deemed necessary and the tree appears not to have been planted by Council, the resident of the adjoining property will be consulted prior to any works commencing.

No compensation will be available to residents for the removal of trees and shrubs. Council staff or contractors will remove the planted material and replacement trees may be planted in accordance with selection criteria, if appropriate.

6.5 Trees and Proposed Driveways / Developments

The removal of council trees to install or extend a driveway may be permitted. Trees on public land may be removed, at the sole expense of the property owner, subject to the approval of a development application that demonstrates the need for removal. A fee will be imposed and landscaping/replanting required. The applicant shall pay compensation for the loss of the council asset (the Tree) and replanting costs. The current amount payable is detailed in Council's Fees and Charges Document.

6.6 Jointly owned trees

A Tree is considered to be jointly owned if the trunk of the tree at ground level is bisected by the property boundary. A tree that is jointly owned on the boundary of Council land and private property is the responsibility of both owners.

Procedure to remove or prune jointly owned trees;

A request to remove or prune the tree may be received from the property owner or raised as an issue during council inspections. An application and assessment in accordance with Councils Tree Preservation Order may be required. The tree is assessed in accordance with the guidelines outlined in the Tree Preservation Order and industry standards.

A determination in regard to the tree is made. If the decision is to remove the tree three quotes from Councils preferred contractors are acquired. The joint owner is required to contribute half of the agreed quote. Once the fee has been received and paid in full the tree work is completed. A standard letter details this approach.

7.0 Staff

The Australian Qualifications framework (AQF) levels and indicative employment levels for the Australian Arboricultural Industry are

- Level 2 Tree Worker
- Level 3 Trade Arborist
- Level 4 Supervising Arborist/ Coordinator
- Level 5 Consulting Arborist/Municipal Tree Manager

Persons with a minimum of AQF3 and preferably AQF 5 qualifications in Arboriculture and preferably with extra tertiary qualifications in Horticulture and having suitable experience in the tree care industry shall carry out all assessments of trees under this plan.

All planning done for new planting, tree replacement programs and other tree related programs or works which impact on Council trees shall be done by or in consultation with a person or persons qualified in Arboriculture.

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Street & Park Tree Management Plan

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1.0 DEFINITIONS

For the purposes of this manual and the interpretation of standards and procedures, the following definitions shall apply: The definitions listed below include specialised terms that appear in the text or may be relevant to the Tree Management Plan as well as terms that may have multiple meanings.

Amenity Trees

Trees with recreational, functional, environmental, ecological, social, health or aesthetic value rather than for production purposes.

AQF

The Australian Qualifications Framework is a national framework for education and training qualifications. It provides national recognition of competency based training on endorsed competency standards, assessed in accordance with assessment guidelines.

Arborist

A person who holds the Australian Qualification Framework (AQF) Certificate IV (5) in Horticulture (Arboriculture).

Arboricultural management

Australian Standard means Australian Standard AS 4373 – 2007 – Pruning of Amenity Trees.

Asset

A thing of value, in this instance a council or privately owned construction/ building, object, tree or other vegetation.

AS4373- 2007

Australian Standard® Pruning of Amenity Trees. (AS4373-2007).

Bark

All tissues outside the vascular cambium.

Biological Diversity

Means the variety of life forms, the different plants, animals and microorganisms, the genes they contain and the ecosystem of which they form part.

Branch

A lateral shoot on a main axis such as a trunk or another branch. A branch arising off a trunk is a first order branch. A branch arising off a first order branch is a second order branch and so on. Second and successive orders of branches may be referred to as lateral branches.

Branch bark ridge

Raised or furrowed bark in the branch crotch or junction that indicates where the branch wood and trunk wood meet.

Branch collar

Trunk tissue that forms around the base of a branch between the stem and the branch.

Buffer zone

Relates to vegetation planted for the express purpose of providing protection for identified core habitats and remnant bushland strips.

Bushcare

Bushland restoration work on Council land involving staff and volunteers.

Bushcare Group

A group of volunteers undertaking bush regeneration and/or associated works on Council owned or managed land.

Bushcare Officer

A Council member of staff or a contractor appointed by Council, with appropriate qualifications, to facilitate a Bushcare group. The Bushcare Officer develops and implements the Bushcare program.

Bushland

Land on which there is vegetation which is either a remainder of the natural vegetation of the land or, if altered, is still representative of the structure and/or floristics of the natural vegetation as defined in State Environmental Planning Policy No 19 – Bushland in Urban Areas.

Clearing – Native vegetation

Means any one or more of the following:

- (a) Cutting down, felling, thinning, logging or removing native vegetation
- (b) Killing, destroying, poisoning, ringbarking, uprooting or burning of native vegetation
- (c) Severing, topping or lopping branches, limbs, stems, or trunks of native vegetation
- (d) Substantially damaging or injuring native vegetation in any other way.

Codominant Stems

Stems or trunks of about the same size originating from the same position from the main stem.

Compartmentalisation

Dynamic tree defence process involving protection features that resist the spread of pathogens.

Consultant Arborist

A specialist (Tree survey, assessment and report writing) in the care of trees with relevant qualifications and training. Minimum AQF Level 5 or equivalent.

Council

Means the Penrith City Council (PCC) or any Officer authorised to act on behalf of council.

Council Land

Land either owned by, or under the care, control and management of Penrith City Council.

Council's satisfaction

Documented evidence in the form of photographs, statutory declarations and witness statements supporting the justification for work undertaken.

Crown

Portion of the tree consisting of branches and leaves and any part of the trunk from which branches arise.

Crown Lifting

The removal of the lower branches.

Crown Maintenance

Pruning that does not reduce the volume of the crown and retains the structure and size of the tree.

Crown Modification

Pruning that changes the form and habitat of the tree.

Crown Thinning

The selective removal of branches that does not alter the overall size of the tree.

Culturally significant Trees

Culturally significant tree/s means trees which are significant features of the cultural landscape and which are listed in Council's Register of Significant Trees.

Cut down

Remove, destroy, kill, reduce live canopy.

Dangerous Tree

A tree that has structural defects (i.e., fallen branches, split trunk, advanced decay) that could result in the tree collapsing or falling without warning. An imminent and immediate threat.

Dead tree

A tree with no living vascular tissue. No longer alive, permanent leaf loss / wilting. A tree no longer capable of performing any of the following processes:

- Photosynthesis:
- Take up of water through the root system;
- Hold moisture in its cells;
- Produce new shoots.

Deadwooding

The removal of dead branches.

Deep Soil zone

Natural permeable ground with relatively natural soil

Destroy

Demolish, injure beyond repair, remove, poison, kill, cut down.

Determining authority

Those bodies responsible for issuing approvals.

Development

Includes the following:

- (a) The use of land (e.g. festival events, use of park areas and other events) that requires approval.
- (b) The subdivision of land.
- (c) The erection of a building.
- (d) The carrying out of a work.
- (e) The demolition of a building or works.
- (f) Road works.
- (g) The installation of utilities and services.
- (h) Any other act, matter or thing as defined by the relevant legislation.

Diameter at breast height (DBH)

At breast height (DBH) means the diameter of the trunk of a tree measured at breast height (1.4m or 54 inches above ground level).

Directional pruning

Pruning of a branch back to a branch collar of a lateral branch or the main stem.

Drip line / Root plate

The ground area directly under the branches above. See also TPZ.

Dying

Declining health, loss of vigour, irreversible decline.

Endemic

Peculiar to a particular geographic region (in this instance The Penrith city council area)

Environmental Weed

A plant that has the potential to become a nuisance. Environmental weeds usually have the ability to grow and/or spread rapidly and compete with desirable plants. They can overtake an area. Environmental weeds are not listed/ declared noxious weeds.

Epicormic shoots

Shoots produced by buds within the bark of trunks or branches as a result of stress, lopping or increased light.

Exotic

A tree/s that is not locally indigenous.

Exotic Vegetation

Foreign, Not native, introduced from another country

Extension growth

The amount of vegetative growth that a shoot produces during each growing season. With deciduous trees this is usually annual growth and is marked by a circular terminal bud scar. Evergreen trees may show changes in stem diameter or noticeably nodal growth.

Final cut

The final cut in the process of the reduction or removal of a branch. The purpose of this cut is to reduce the risk of micro-organism infection according to the principles of compartmentalisation and to encourage even wound closure.

Flush cut

An incorrect cut that removes or damages the branch collar and or branch bark ridge and which damages the trunk tissue.

Formative pruning

The selective removal of specific branches to enhance form, improve structure or to directionally shape a young or establishing tree.

Habitat

Means an area or areas occupied or periodically or occasionally occupied, by a native species, population or ecological community and includes any biotic or abiotic component.

Habitat Tree

Any tree which is a nectar feeding tree, roost and nest tree or a hollow-bearing tree which is suitable for nesting birds, arboreal marsupials(possums),micro-bats or other animals and insects.

Hazardous

Refer to 'dangerous tree' above. An unavoidable danger or risk, even though often foreseeable. A tree-failure hazard is present when a tree has potential to cause harm to people or property.

Height

The distance measured vertically between the horizontal plane of the lowest point of the base of the tree/s which is immediately above ground level and the horizontal plane of the uppermost point of the tree/s.

Imminent

About to happen soon, within 12 months

Indigenous

A tree/s or other vegetation being of a species that existed in, or on land in the vicinity of, the Penrith Local Government Area (LGA) before European settlement.

Infrastructure

The fundamental facilities and systems serving a country, city, or area, as transportation and communication systems, power plants, and schools. Green Infrastructure is a network providing the "ingredients" for solving urban and climatic challenges by building with nature.

Injury

Damage to a tree and includes:

- a) Lopping and topping;
- b) poisoning, including applying herbicides and other plant toxic chemicals to a tree or spilling (including washing off or directing water contaminated by) oil, petroleum, paint, cement, mortar and the like onto the root zone;
- c) cutting and tearing of branches and roots that is not carried out in accordance with accepted arboricultural practices, does not qualify as 'pruning' (as defined within AS 4373 – 2007 – Pruning of Amenity Trees) or which is done for invalid reasons;
- d) ringbarking, scarring the bark when operating machinery, fixing objects (e.g., signs) by nails, staples or wire, using tree climbing spikes in healthy trees marked for retention (except for access to an injured tree worker) or fastening materials that circle and significantly restrict the normal vascular function of the trunk or branches;
- e) Damaging a tree's root zone by compaction, excavation or asphyxiation (including unauthorised filling or stockpiling of materials);
- f) Under scrubbing, particularly carried out by mechanical tools such as brushcutters and the like.

Joint ownership

Means a tree is considered to be owned by more than one property owner. This is the case where the base of the tree is growing on the boundary of more than one property. All owners must sign applications for work on trees in joint ownership.

Landcare

Bushland restoration work on private land involving volunteers and / or landowners.

Lateral

A branch arising from another branch or stem.

Lopping (Lop)

The cutting of branches or stems between branch unions or at internodes on trees. Usually carried out to achieve a clearance or height reduction without regard for branch collars. Sometimes known as topping, this is an unacceptable pruning practice as it may create hazardous trees.

Monoculture

One type of plant/species in an area. E.g. all trees in the area are the same species.

Native vegetation

The same meaning as in the Native Vegetation Act 2003 (NV Act), and means any of the following types of indigenous vegetation:

- a) Trees;
- b) Understorey plants;

- c) Groundcovers;
- d) Plants occurring in a wetland
- e) A shrub or shrubs.

Notable

i.e. 'a notable tree'. Significant, Important, a dominant feature, worthy of note.

Noxious weed

A plant that is controlled by state government legislation because of social, environmental or cultural issues. A plant declared noxious under the Noxious Weeds Act 1993.

Owner

Means the owner of the property that the trunk of the tree is growing in.

Penrith City Bushcare

Run by Penrith City Council, the program facilitates volunteers and their involvement in managing natural areas under the care and control of Council.

Person suitably experienced and competent in arboriculture

See Arborist

Preservation

The retention and management of trees.

Project arborist

The person responsible for carrying out the tree assessment, report preparation, consultation with designers, specifying tree protection measures, monitoring and certification. The project arborist will be suitably experienced and competent in arboriculture, having acquired through training, qualification (minimum Australian Qualification Framework (AQF) Level 5, Diploma of Horticulture (Arboriculture)) and/or equivalent experience, the knowledge and skills enabling that person to perform the tasks required by this Standard.

Provenance

An endemic / native plant or seed originating from a specific location or area. (In this instance The Penrith City Council area or immediate surrounds).

Prune or pruning

Cutting branches from a tree/s in a planned and systematic manner that is carried out in accordance with the provisions of Australian Standard AS 4373 - 2007 - Pruning of Amenity Trees, and which consists of the following pruning types:

Crown maintenance* pruning involving:

- a) General pruning
- b) Thinning
- c) Deadwooding
- d) Selective pruning
- e) Formative pruning

*Crown maintenance pruning relates to pruning according to the growth habit of the tree/s

Without reducing the area of the crown, while retaining the structure and size of the tree/s.

Crown modification* pruning involving:

- f) Reduction pruning
- g) Crown lifting
- h) Pollarding
- i) Remedial pruning
- j) Power line clearance

*Crown modification pruning relates to pruning that changes the structural appearance and habit of the tree/s.

Public land

The same meaning as in the Local Government Act 1993.

Qualified arborist

An Australian Qualification Framework level 5 (Diploma) arborist (AQF5). This is the minimum qualification accepted by Council for the purposes of the preparation of an arborist's report involving culturally significant tree/s.

Reactive

An assessment carried out at the request of staff or residents or after an incident.

Reduction pruning

Pruning which reduces the size of the crown either in height or spread. The ends of branches are removed to internal lateral branches or stems.

Remedial (restorative) pruning

Pruning carried out to prolong the useful life expectancy of trees which have lost their natural form and structure through storms, lopping, etc. Usually only used when all other avenues have failed and replacement is difficult, in this type of pruning, the final cut may not necessarily be at the branch collar.

Remnant tree or remnant vegetation

A native tree or any patch of native vegetation which remains in the landscape on the original soil profile, after removal of most or all of the native vegetation in the immediate vicinity.

Remove or removal

To cut down, fell, destroy, kill, take away, uproot or transplant a tree from its place of origin.

Retain

To keep a hold of in position or condition, to maintain.

Ringbark

A form of girdling, involving physical damage to the bark or cambium.

Risk

Is the probability of injury, loss or damage happening to property, a person, organisation or the community measured in terms of consequences and likelihood.

Selective pruning

The removal of identified branches that are causing a specific problem.

Significant tree and Register

Significant trees display cultural, historic, scientific and/or aesthetic value. A tree or trees which are significant features in the City's heritage or cultural landscape and which are listed in Council's Register of Significant Trees. They may be historic, unique, rare, large or have community support for their retention.

Site

The property to which an application to prune or remove trees applies.

Site strategy

A work plan developed between Council and the Bushcare group. The strategy sets out work requirements and how and when to implement the strategy.

Stem

Organ which supports branches, leaves, flowers and fruit: may also be referred to as the trunk.

Structural root zone (SRZ)

The area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres.

This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area.

Sucker

Adventitious shoots developing from a plant's roots or from below the union in grafted plants.

Survival Rate

The ability of a plant to thrive in the location it has been planted given regular maintenance.

The Act

Means the Environmental Planning and Assessment Act 1979, The Local Government Act 1993 or as described.

Topping/Top

Cutting away part or the entire tree canopy, leaving a trunk and stubbed main branches. Reducing the height of a tree through the practice of lopping.

Tree Surgeon

Similar to an Arborist. Usually a practicing tree worker.

Trade arborist

A tradesperson who holds the Australian Qualification Framework (AQF) Certificate III in Horticulture (Arboriculture) or other national or international qualification considered equivalent by Council.

Tree or trees

Long lived woody perennial plant greater than (or usually greater than) 4m in height with one or relatively few main stems or trunks.

A perennial plant with at least one self-supporting woody or fibrous stem, being of any species whether indigenous, exotic or introduced which:

a) Is four (4) metres or more in height; and/or

- b) Is four (4) metres or more in canopy width, and/or
- c) has a trunk diameter of one (1) metre or more measured at one (1) metre above ground level (or its equivalent in the case of multi-trunked trees); or
- d) Is a palm tree (except *Syagrus romanzoffianum* - Cocos palm), cycad or tree fern of any species growing within the City of Randwick, irrespective of its size, or
- e) Is any tree on public land of any size, or
- f) Is any tree in bushland of any size.

Tree Protection Zone (TPZ)

A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.

Tree worker

A tradesperson who holds the Australian Qualification Framework (AQF) Certificate II in Horticulture (Arboriculture) or other national or international qualification considered equivalent by Council has demonstrated competence in pruning according to AS4373-2007.

Trunk

The single main stem of the tree, as distinguished from the branches and roots.

Undesirable species

Plants that are listed in Schedule 1 of Council's Tree Preservation Order 2005 which are deemed undesirable due to their location or as having characteristics which may lead to poisoning, weed infestation, brittle and dangerous wood, excessive spread of roots or bushland invasion.

Urban Forest

In its *2003 Urban Forest Policy* the NSW Local Government Association defines urban forest as "the totality of trees and shrubs on all public and private land in and around urban areas, including bushland, parkland, garden and street trees, and is measured as a canopy cover percentage of the total area" (Local Government Association of NSW, 2003).

It is a primary component of the urban ecosystem. Trees in the city are part of the Urban Forest.

Vigour

Ability of a tree to sustain its life processes. The term 'vigour' in this document is synonymous with commonly used terms such as 'health' and 'vitality'.

Visual Tree Assessment (VTA)

A biomechanically based system introduced by Claus Mattheck which uses the reactive nature of tree growth to evaluate the condition of trees.

Volunteering

Volunteering is the practice of people working on behalf of others without being motivated by financial or material gain.

Water-shoot

A sprig or shoot from the root or stock of a tree. An erect, strong growing or epicormic shoot developing from near the base of a shrub or tree, but distinct from 'sucker'.

Width

The distance measured horizontally (in metres) between the two (2) widest points of a tree's canopy.

Wildlife

Corridors are vegetative corridors that link habitat which is suitable for animals (fauna) to travel along in relative safety.

Work

Any physical activity in relation to land that is specified by the determining authority.

Wound

An opening that is created when the bark is cut, removed or injured. NOTE: Pruning a live branch always creates a wound, even when the cut is properly made.

2.0 TREE PLANTING SPECIFICATION

KEY NOTES:

The Contractor to verify the location of all services prior to commencement of works.
DIAL 1100 BEFORE YOU DIG;

Contractor must seek approval from PCC Landscape Architect at the following hold points prior to proceeding:

- Plant material and root pruning prior to planting (carry out root pruning as directed by PCC Tree Officer);
- Pit excavation prior to planting and back-filling;
- Soil Type A and excavated site soil for use in Soil Type B mix prior to backfilling.

Plant Material:

All plant material to be approved by PCC Landscape Architect prior to purchase.

Refer to Key Notes on Drawing LDt 01 Sheet 1 of 2 for notes specific to tree planting.

Ground cover planting (150mm pots):

- Do not plant in unsuitable weather conditions such as extremes of heat, cold, wind or rain;
- Before planting treat all plants with Seasol or an equivalent Australian produced seaweed extract from Durvillea Potatorum. All plants in their pots are to be immersed into a tub deep enough to fully saturate each plant. The tub is to contain Seasol at manufacturers recommended rates and method.
- Thoroughly water the planting area prior to watering. Keep the area and plants moist during planting;
- Excavate planting holes 1.5 times deeper and 2 times wider than plant container;
- Roughen the sides and base of the planting hole to a further 150mm to prevent confinement of root growth;
- When the hole appears to be the correct size, and not before, remove plant from the container with minimal disturbance to the root system and place in its final position, backfill with topsoil, Terracottem and fertilizer as specified;
- Lightly tamp backfill mix and thoroughly water plant to eliminate air pockets. Ensure top of root ball is level with soil surface and centred in the planting hole;

- Water the plants immediately after planting.

Materials:

SOIL TYPE A: Benedict's Sand & Gravel premium 'Organic Garden Mix - BS133'

(Ph.: 9986 3500) or equivalent & tested to AS4419.

SOIL TYPE B: 50% (max) excavated site soil & 50% fine washed sand with less than 1% organic matter by weight and tested to AS4419. If insufficient quantities of excavated site soil are available fine washed sand equivalent to Benedict's fine washed sand may be used in its place.

FERTILIZER:

At time of planting -

TREE PITS: Incorporate Sierrablen Flora 8-9 month controlled release fertilizer 21 + 1.8 + 9 + TE (or equal approved) as supplied by Scott's Horticultural Solutions into Soil Mix Type A at rates recommended by Manufacturer (ph.: 1800 789 338; www.scottsaustralia.com.au;

MASS PLANTED AREAS: Incorporate Agriform planting tablets 20 + 4.3 + 4.1 + TE(or equal approved)as supplied by Scott's Horticultural Solutions into Soil Mix Type A at rates recommended by Manufacturer (ph.: 1800 789 338; www.scottsaustralia.com.au;

Terracottem - Incorporate into Soil Mix Type A at rates specified by supplier:
Terracottem Australasia Pty Ltd

Ph.: 0247514200

STAKES: 50 X 50 X 1800mm hardwood stakes (3 no. per tree) driven securely into the subgrade and clear of the root ball;

TIES: 50mm Hessian webbing stapled to outside of stakes approximately two thirds height of stake above ground level.

NOTE: STAKE FOR PROTECTION - NOT SUPPORT. REFER STAKING DETAIL.

Maintenance:

- Plant establishment Period - 13 weeks. Replace failed and vandalised plants with the same until the end of the 13 week maintenance period;
- Regularly remove by hand rubbish and weed growth throughout planted areas throughout the course of the works and for the duration of the planting establishment period.

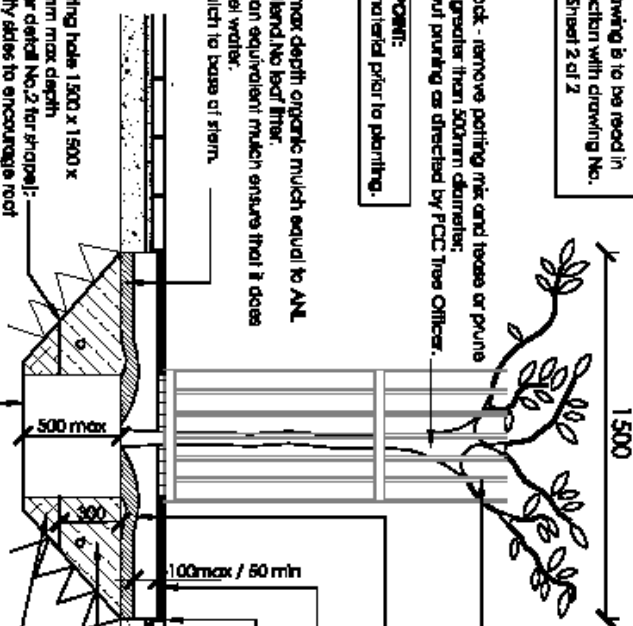
NOTE:

The drawing is to be used in conjunction with drawing No. LDI 01 Street 2 of 2

Tree stock - remove potting mix and loose or prune root if greater than 500mm diameter. Carry out pruning as directed by PCC Tree Officer.

HOLD POINT:
Plant material prior to planting.

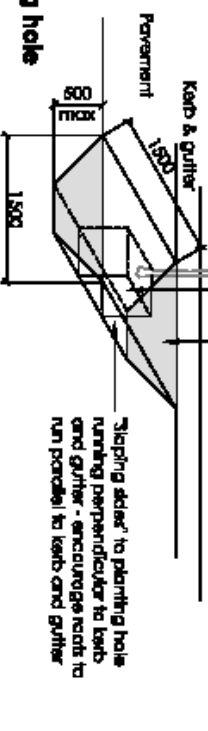
Screen max depth organic mulch equal to ANL Forest Blend No leaf litter. If using an equivalent mulch ensure that it does not reject water.
Dish mulch to base of stem.



Planting hole 1500 x 1500 x 500mm max depth
[Refer detail No.2 for slope]
Soil Type A as specified to encourage root penetration.
Ensure base of hole is compacted so that tree does not sink after planting

HOLD POINT:
Fill excavated & scaffold, prior to planting and backfilling

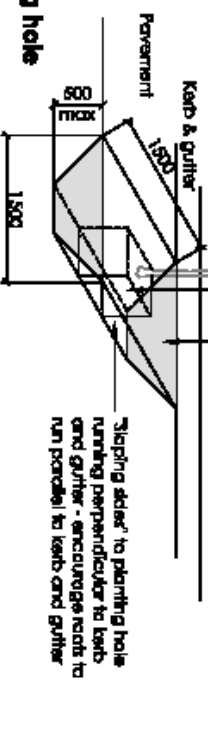
DETAIL 1 - Typical Section Scale 1:20



Root ball - position centred to hole and plumb.
"Vertical" ends to planting hole running parallel to kerb and gutter - act as a root barrier delaying root penetration into road and footpath.

Slipping skirt to planting hole running perpendicular to kerb and gutter - encourage roots to run parallel to kerb and gutter

DETAIL 2 - Isometric of planting hole Scale 1:50



KEY NOTES:

Contractor to verify the location of all services prior to commencement of work. BAA 11980 LANCERS TOWN SHED.

- Contractor must seek approval from PCC Landscapes Aesthet prior to purchasing plant material and root planting prior to planting. Seek advice from PCC Tree Officer regarding root planting methods.
- If excavation prior to planting and backfilling.
- Soil Type A and excavated site and / or excavated area for use in Soil Type A mix prior to backfilling.

Plant Material:

- All plant material to be approved by PCC Landscapes Aesthet prior to purchase and it to be true to species & size (refer Plant Schedule - Day No.1 of Sheet 2 of 2), while no plant species substitutions.
- Healthy, of good form, not soft or stressed, free from diseases and insect pests.
- With large, robust root systems that are not root bound.
- TREE AGE TO HAVE A MAXIMUM ROOT BALL DEPTH OF 500mm.
- Tree size to have a single heading shoot and conform to Not Spec Guide (October 2008) Pruning Landscapes Trees - A guide to Assessing tree quality.

Planting:

- Do not plant in undesirable weather conditions eg. extremes of heat, cold, wind or rain.
- Plant all plants with 'Second or an equivalent' Australian produced sawwood cuttings from Durified production prior to planting.
- Thoroughly water planting area prior to planting. Keep the area and plants moist during planting.
- Excavate planting hole minimum 3 times wider than root ball of the plant (up to a max of 1500 x 1500mm) and equal to depth of soil ball. Shape of planting hole to be per Detail 1 in paved areas.
- Ensure base of planting hole is firm.
- Keep excavated site and to one side for use in Soil Type B (DO NOT include any clay subsoil in the excavated site soil).
- Place fine gravel in the hole ensuring it sits on level and plumb and back fill to within 50mm of top of root ball using Soil Type B.
- Using Soil Type A backfill the hole to level with the top of the root ball.
- Water immediately after planting - to add establishment water the root ball, not the ground around the tree.

Materials:

- SOIL TYPE A: Specially Sifted & Gravel Premium Organic Garden Mix - 50/150 (10/20/5/20/5) or equivalent A, tested to AS4419.
- SOIL TYPE B: 50% (by volume) of soil A, 50% fine washed sand with less than 1% organic matter by weight and tested to AS4419. If insufficient quantities of excavated site and one available from the excavated area equivalent to 50% of the excavated site may be used in its place.
- PERMANENT: Refer Key Notes on Drawing LDI 01 Sheet 2 of 2.
- TREE QUALITY: Tree line trees should have 42% black phenolwood as supplied by the Supply Roundly. Phone: 02 9599 7246, www.supplyroundly.com.au, email: per.manufacture@supplyroundly.com.au.
- TREE QUALITY: 1500 x 1500mm soil column, tree grade GOV S&B supplied by the Supply Roundly. Phone: 02 9599 7246, www.supplyroundly.com.au, email: per.manufacture@supplyroundly.com.au.

Maintenance:

- Plant establishment period - 12 weeks. Replace failed and undersized plants with the same until the end of the 12 week maintenance period.
- Regularly mowed by hand roller and weed growth throughout planted areas throughout the course of the works and for the duration of the planting establishment period.

PENRITH CITY COUNCIL

Penrith CBD 40km/hr zones

75LTR/4SLTR TREE PLANTING IN PAVED AREAS
(APPLIES TO THRESHOLD NUMBERS: 2, 8, 10, 11 & 12)

<p>PENRITH CITY COUNCIL Serving Our Community</p>	DESIGN APPROVED	DESIGNED	DATE	PROJECT TITLE	SHEET TITLE
	KS / MA	VP	February 2010		
<p>APPROVED FOR CONSTRUCTION</p> <p>CONSTRUCTION</p>	DRAWN	VP	SCALE	75LTR/4SLTR TREE PLANTING IN PAVED AREAS (APPLIES TO THRESHOLD NUMBERS: 2, 8, 10, 11 & 12)	PLAN No. LDI 01
	KS / MA	VP	1:20 / 1:50 @ A3		

TYPICAL SECTION: Scale 1:20

TREES

Remove planting mix and weeds or plant roots if greater than 500mm diameter.
Carry out planting as directed by PCC Tree Officer.

HOLD POINT:
Plant material prior to planting.

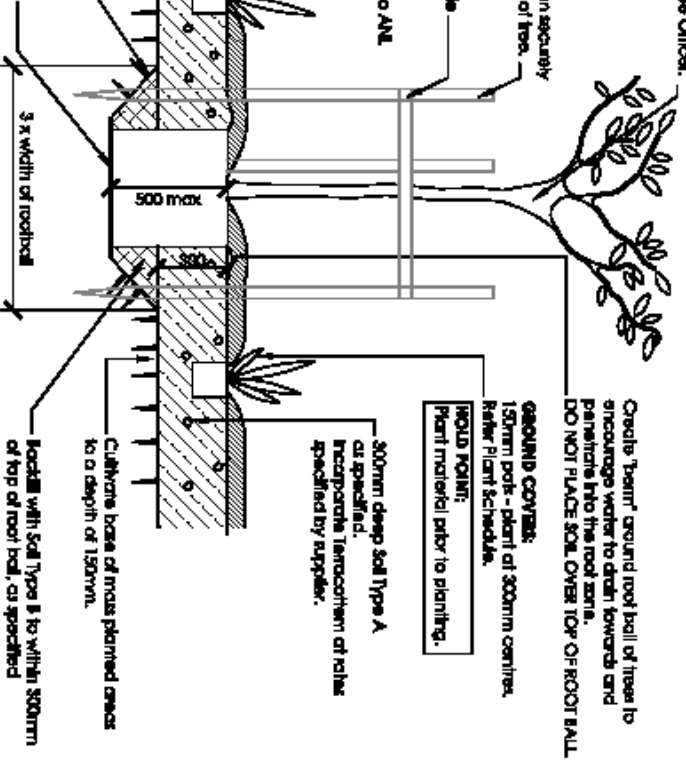
3 No. 50 x 50 x 1000mm HWD stakes driven vertically into the subgrade and clear of root ball of tree.
Refer Plant Schedule.

50mm heather wadding stapled to outside of stakes. Refer Plant Schedule.

75mm max depth organic mulch equal to AML Forest Blend. No leaf litter.
Dish mulch to base of stem.

Secure base of tree pit is firm to prevent tree sinking after planting.

HOLD POINT:
Pit excavated & scaffolded prior to planting and backfilling.



NOTE

This drawing is to be read in conjunction with drawing No. LDT 01 Sheet 1 of 2

KEY NOTES:

The Contractor to verify the location of all services prior to commencement of works. SHALL 1100mm MINIMUM FROM SERVICES.

- Contractor must seek approval from PCC Landscape Architect at the following lead points prior to proceeding:
 - Plant material and root planting prior to planting (carry out root pruning as directed by PCC Tree Officer);
 - Plant material prior to planting and backfilling;
 - Soil Type A and seconded soil / Site washed sand for use in Soil Type B pits prior to backfilling.

Plant Material:
All plant material to be approved by PCC Landscape Architect prior to purchase.
Refer to Key Notes on Drawing LDT 01 Sheet 1 of 2 for notes specific to tree planting.

General notes relating to planting:

- Do not plant in unsuitable weather conditions such as extremes of heat, cold, wind or rain.
- Before planting root of plants with burlap or an equivalent Australian produced approved extract from Durbania Polytarum. All plants in final pits can be in a hole deep enough to allow water to reach plant. The hole is to contain burlap or mulch (not recommended) and method.
- Thoroughly water the planting area prior to watering. Keep the area and plant material during planting.
- Backfill planting holes 1.5 times deeper and 2 times wider than plant container.
- Realign the sides and base of the planting hole to a further 150mm to prevent confinement of root growth.
- When the hole appears to be the correct size, and not before, remove plant from the container with minimal disturbance to the root system and place it in final position, backfill with topsoil, Tamocotom and leaf litter as specified.
- Lightly tamp backfill mix and thoroughly water plant to eliminate air pockets. Ensure top of root ball is level with soil surface and contained in the planting hole.
- Water the plant immediately after planting.

Materials:

- SOIL TYPE A:** Benedict's Sand & Gravel (medium) Organic Garden Mix - 55137 (MPS785 3000) or equivalent. A, listed to AS4419.
- SOIL TYPE B:** (Inod seconded soil) 4, 40% fine washed sand with less than 1% organic matter by weight and tested to AS4419. If insufficient quantities of seconded soil are available the washed sand requirement is to be used and may be used in its place.

Planting:

- ALL TYPE OF PLANTING:**
TREES: The Contractor to ensure that trees are planted in accordance with the following: 21 x 1.8 x 9 + 10 (or equal approved) as supplied by South Horticultural Solutions (into Soil Mix Type A or notes recommended by Manufacturer) (p/c: 1800 769 538; www.southhorticultural.com.au);
- MASS PLANTED AREAS:** Incorporate Agriform planting tables 20 x 4.5 x 4.1 + Teller equal approximately supplied by South Horticultural Solutions into Soil Mix Type A or notes recommended by Manufacturer (p/c: 1800 769 538; www.southhorticultural.com.au);

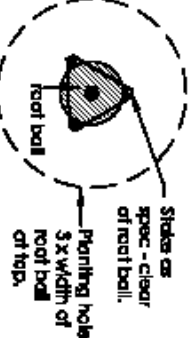
Tamocotom - Incorporate into Soil Mix Type A or notes specified by supplier: Tamocotom Australia Pty Ltd Ph: 02 9751 4200

STAKES: 50 x 50 x 1000mm hardwood stakes (2 no. per tree) driven vertically into the subgrade and clear of the root ball. Stakes should be secured with a suitable fastener to the outside of the stake approximately two thirds height of stake above ground level.

NOTE: STAKE FOR PROTECTION - NOT SUPPORT. REFER STAKING PLAN.

Methodology:

- Plant establishment period - 12 weeks. Backfill tabled and planted plants with the same until the end of the 12 week establishment period.
- Regularly remove any hard rubbish and weed growth throughout planted areas throughout the course of the works and for the duration of the planting establishment period.



TREE STAKING PLAN (n.i.s):
Stakes for protection, NOT support.

PLANT SCHEDULE					
TREES	BOTANICAL NAME	Pot size	Qty	Spacing (mm)	Tree
Lophosolen confertus	75L	3	As shown	Yes	11, Henry St
Pyraea Glens Forest Chanticleer	45L	4	As shown	No	5, Station St
Pyraea Capital	75L	17	As shown	Yes	2, 8, 10, High St
Festuca graminea	75L	2	As shown	No	8, Castleside St
Lophosolen confertus	75L	4	As shown	Yes	12, Lawton St
GROUND COVERS					
Buxus microphylla x microphylla	200mm				6, 9, 10, 12
Liriodendron European Giant	150mm				6, 9, 10, 12

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DATE

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5.0 Street trees and Driveways

Procedure for Removal of street trees to install driveways or other development.

A resident /property owner may propose the removal of a street or park tree to construct a driveway or otherwise develop a property.

The removal of street trees is undesirable but may be the most appropriate means to undertake the work. Generally all other options should be considered other than tree removal. A driveway crossover application is required to be submitted and approved in conjunction with approval to remove a street tree.

Consideration will be given to a request to allow the removal of a street tree using the following criteria;

- The health and condition of the tree,
- Alternatives to removal,
- The effect on the streetscape,
- If the tree is notable /significant,
- The size and age of the tree,
- Existing driveways,
- The number of existing trees in the area.

All trees on Council property are considered an asset. If approved a fee will be imposed and the procedure must be followed.

Procedure

- Owner /resident requests, in writing, the removal of the tree/s,
- Tree/s are assessed by Council officer,
- Applicant advised of the determination of assessment,
- If approved a letter will be sent to the applicant advising them of the process.
- The owner /applicant pays the required fee (in accordance with Council's fees and charges),
- Council's driveway engineer is notified, crossover application can be approved,
- The applicant then carries out the work including the replacement planting,
- Council is notified of completion.

Refusal

If the trees are deemed worthy of retention and the request is refused the owner and Council's driveway engineer are notified. Any fees paid are refunded.

Notes on Procedure

- The work must be carried out by an authorised contractor.
- The Parks Department has a list of contractors who are authorised by Council to carry out work on street trees in the Penrith City Council area.
- Should you wish to use a contractor other than those authorised a copy of the contractors WH&S Management System must include Safe Work Method Statements for the type of work. In addition a copy of the contractors Certificate of Currency for Public Liability Insurance, minimum of \$10 million, will be required.
- The tree may need to be poisoned prior to removal/grinding to prevent root sucking/regrowth,
- The stump of the tree is removed by grinding.
- Council must be notified at least 48 hours prior to removal of the tree with the contractor's details and date of work.
- Replacement tree species must be in accordance with the Council approved species list and specifications.

6.0 Tree Species Commonly Used or Recommended for Street Plantings

Botanical Name	Common Name	Height Metres	Width Metres	Description	Tolerates	Sensitive To
<i>Banksia integrifolia</i>	Coast Banksia	8 - 10	3 - 8	Evergreen Australian native, dark green silver – backed leaves.	Most soil types, salt spray, wind resistant.	Lime
<i>Bauhinia variegata</i>	Butterfly Tree	5 - 8	5 - 8	Small tree with twin lobed leaves and purplish fragrant flowers, semi deciduous, warm positions.		Frost
<i>Bauhinia variegata</i> 'Alba'	Butterfly Tree	5 - 8	5 - 8	Small tree with twin lobed leaves and white fragrant flowers, semi deciduous, warm positions.		Frost
<i>Buckinghamia celsissima</i>	Ivory Curl Flower	4 - 10	1.5 - 8	Evergreen Australian native, creamy white long flower heads. Performs best in warm frost - free areas, may be slow growing.	A variety of soil types	Heavy frosts
<i>Callistemon salignus</i>	Willow Bottlebrush	4 - 10	2 - 7	Evergreen Australian native, white bottlebrush flowers, good small street tree,	Drought, heavy frost	
<i>Callistemon viminalis</i> 'Dawson River'	Weeping Bottlebrush	5 - 10	3 - 5	Evergreen Australian native, crimson brush flowers, weeping habit, hardy.	Most soils	
<i>Callistemon viminalis</i> 'Kings Park Special'	Weeping Bottlebrush	5 - 6	3 - 5	Evergreen Australian native, bright crimson brush flowers, weeping habit, hardy.	Most soils	
<i>Cupaniopsis anacardioides</i>	Tuckeroo	6 - 8	4 - 8	Evergreen Australian native, short spreading habit.	Sandy soils.	

Botanical Name	Common Name	Height Metres	Width Metres	Description	Tolerates	Sensitive To
<i>Elaeocarpus reticulatus</i>	Blueberry Ash	8 - 10	3 - 4	Upright habit, suitable for narrow streets. Pink or white flowers followed by small bright blue berries.	Light frost	
<i>Fraxinus griffithi</i>	Evergreen Ash	8 - 12	5 - 10	Small tree, evergreen with compact habit. Copes well with pollution.		
<i>Koelreutaria paniculata</i>	Golden Rain Tree	8 - 10	6 - 10	Deciduous, single trunk with broadly conical crown. Hardy, tolerant of a wide range of climates and soils, bright yellow flowers followed by inflated fruit capsules.	Drought, alkaline soils	
<i>Largerstroemia indica</i>	Crepe Myrtle	6 - 8	5 - 6	Small deciduous tree, summer flowering, shades of pink and mauve as well as white, beautiful bark.	Most soils, paved areas.	
<i>Melaleuca linariifolia</i>	Snow in Summer	6 - 8	4 - 6	Dense foliage, masses of white fluffy bottlebrush flowers in summer, very hardy, small tree, not to be planted near water service pipes.	Wet soils	
<i>Pittosporum rhombifolium</i>	Queensland Pittosporum	10 - 15	6 - 8	Evergreen Australian native, retains showy bunches of orange berries.		
<i>Tristanopsis laurina</i>	Water Gum	8 - 12	6 - 8	Evergreen Australian Native prefers soils with free drainage.	A variety of soils	
<i>Waterhouea floribunda</i> & vars.	Weeping Lilly Pilly	8 - 15	3 - 12	Evergreen Australian native, small – medium tree depending on soil type,	Light frost	

7.0 TREE SPECIES RECOMMENDED NOT TO PLANT

Botanical Name	Common Name	Reason
<i>Casuarina & Allocasuarina species</i>	She - oak	Mass of fibrous roots, damage to drains and sewers, woody capsules.
<i>Cinnamomom camphora</i>	Camphor Laurel	Major damage to drains and sewers
<i>Corymbia citriodora</i>	Lemon Scented Gum	Large Eucalypt with long, lateral branches that are prone to sudden failure.
<i>Erithrina species</i>	Coral Trees	Major damage to drains and sewers
<i>Eucalyptus globulus</i>	Maidens Gum	Large tree
<i>Eucalyptus microcorys</i>	Tallowwood	Extensive woody root system, but can be used effectively as an avenue planting on wide verges free from below and above ground services.
<i>Eucalyptus nicholi</i>	New England Peppermint	Short useful life span in Sydney region.
<i>Eucalyptus species</i>	Eucalyptus	Most Eucalypts cannot be used for urban street plantings due to their size, however, there are applications for their use; ie mass plantings on wide verges, set back from roadways and services..
<i>Ficus species</i>	Figs	Major damage to drains and sewers but can be used as avenue plantings on wide verges free from below and above ground services.
<i>Gleditsia triacanthos</i>	Honey Locust	Long, sharp woody thorns on trunk and branches, classed as a weed species.
<i>Lagunaria patersonii</i>	Norfolk Island Hibiscus or Cow Itch Tree	Seed capsule contain fine, sharp hairs that cause extreme skin irritation.
<i>Liquidambar styraciflua</i>	Liquidambar	Woody roots close to soil surface, spiky capsules (trip hazard), prone to limb failures in high winds.
<i>Melaleuca species</i>	Paperbarks	Major damage to drains and sewers. Can be used
<i>Melia azederach</i>	White Cedar	Deciduous, berry drop, White Cedar moth caterpillar.
<i>Platanus species</i>	Plane Tree	Large wide crowned deciduous, overused, hardy in most situations, best in parks and wide avenues, pollen can cause allergic reactions.
<i>Populus species</i>	Poplars	Major damage to drains and sewers
<i>Robinia pseudoacacia</i>	False Acacia	Has been used for street tree plantings, suckers prolifically if roots are disturbed, woody spines.