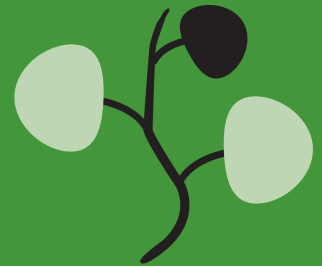


T R E E D I A G N O S T I C S



Arboricultural Assessment and Report for:

120 Russells Road, Mount Duneed

August 2018

Report commissioned by:
Foundation 61

Report prepared by:

Rebecca Ramsden
Tree Diagnostics
MAppSci(Hort) GradDipAppSci(Hort) UniMelb

PRE-DEVELOPMENT TREE ASSESSMENT AND REPORT

CONSULTANTS' BRIEF:

CLIENT: Foundation 61
CLIENT CONTACT: Mr Robert Lytzki
INSPECTION DATE: 10 July 2018
REPORT PREPARED BY: Rebecca Ramsden MAppSc (Hort) BA (Hons). Uni Melb
SITE ADDRESS: 120 Russells Road Mount Duneed

Introduction

This report was commissioned by Mr Rob Lytski of Foundation 61 to assess trees on or immediately adjacent to Russells Road, Mount Duneed. At the time of the assessment development concept plans were available for the evaluation of impact to trees. This report is to be utilised in the design phase for nominated trees, where appropriate, can be retained and protected during construction.

Specifically, the report addresses:

- The health and structural condition of trees,
- The suitability of these trees for retention on site, and
- Recommendations for the protection and care of these trees during and beyond construction where appropriate

Methodology

Trees were inspected on site at ground level on July 10th, 2018. Tree data collected included:

Tree Data	
Botanical and common name	Useful Life Expectancy (ULE)
Tree dimensions	Tree Significance
Diameter at Breast Height (DBH)	Tree Retention Value
Health	Tree Protection Zone Dimensions
Structure	

This report relied on plans/surveys provided by others with regard to tree location and their accuracy is presumed. Any inaccuracies may invalidate part or all of this report.

The location of services within this site was not provided. The location or relocation of services is not included in this report.

Observations & Discussion

The site assessed is a privately owned, two acre rectangular block entirely surrounded by crown land. It is accessed by Russells Road to the east of the Mount Duneed Pony Club. The surrounding crown land may be described as open parkland with a sporting oval, pony club and recreational reserve. Historically, the property was likely owned by the church with the last structure being destroyed by fire more than seventy years ago. Since that time, it is presumed the land has not been utilised for anything other than possibly livestock grazing or agistment (with deteriorating stockyards on site). The absence of fencing to delineate the block suggests it has also been utilised by the public as part of the broader reserve.

The vegetation on site is dominated by large, mostly over-mature Monterey Pines (*Pinus radiata*). The trees line the property boundary on two sides. Other species on site include *Casuarina verticillata* (Drooping She-oak), *Eucalyptus cladocalyx* (Sugar Gum) and *Acacia paradoxa* shrubs (Kangaroo Thorn).

A fenced indigenous tree plantation lies partially on the property. It has been planted in the last ten-fifteen years and appears to have encroached the property boundary by around fifty percent. It is not known why the plantation was planted half on Crown Land and half on private property. It's possible and even likely, planting occurred without knowledge of property boundaries. Alternatively, it may have been as part of a joint initiative with the former property owner.



Fig. 1 Tree plantation lying across the property (50%) and the adjacent recreational reserve (50%)

The ownership of the tree plantation may need to be determined, in terms of rights and responsibilities given the property boundary runs through the plantation in close proximity to trees, if not through actual trunks. Irrespective of tree ownership status, any fencing of the boundary will require protection of trees on crown land during construction works. Trees within this plantation are yet to be included in the assessment of trees on site. This may proceed upon determination of the property boundary, the trees' status and accessibility.

The tree plantation is shown on the site survey below and may be described as a dense planting of indigenous trees and shrubs. Species include:

Acacia dealbata (Silver Wattle), *Acacia melanoxydon* (Blackwood), *Eucalyptus camaldulensis* (River Red Gum), *Melaleuca lanceolata* (Moonah), *Acacia paradoxa* (Kangaroo Thorn). Most accessible trees may be considered to be in fair to good condition. There are also self-sown Sugar Gums (*Eucalyptus cladocalyx*) within the plantation. These are likely to have spread from Russell's Road where self-sown Sugar Gums line both sides of the road reserve. Trees and shrubs from the plantation have self-sown beyond the fence line. These include (*Acacia dealbata*) Silver Wattle and *Acacia paradoxa* (Kangaroo Thorn).



Fig.2 Self-sown Sugar Gums lining the road reserve.

Within the site there are dense thickets of Kangaroo Thorn (*Acacia paradoxa*). This has served as a haven for rabbits as evidenced by the widespread trails, scratchings and droppings. The rabbit infestation is extensive. Removal of the thickets would facilitate control or eradication of the rabbits. While these shrubs are indigenous to the area, planting at these densities is not recommended where rabbits are present.



Fig. 3. Kangaroo Thorn (*Acacia paradoxa*) thicket providing protection for rabbit burrows

Two of the four property boundaries are lined with large, declining Monterey pines. These trees (*Pinus radiata*) have little or no retention value. They are mostly over-mature with a history of large branch shedding. The species is listed on the Greater Geelong Council's Environmental Weed List (2008), so their removal will not require a permit. All pines, including self-sown saplings are recommended for removal. Should the property owner wish to retain any, I would strongly recommend individual assessment as most have clear structural faults and are likely to be further compromised by construction.



Fig 4. *Pinus radiata* on site

Trees nominated for retention and protection on site include the two Drooping She-oaks (*Allocasuarina verticillata*) The trees are marked on the site plan below (Tree 1 & 2) and their data recorded. The trees are indigenous to the area and are in fair-good condition and health. There is additionally, a self-sown Sugar Gum (*Eucalyptus cladocalyx*). The tree (Tree 3 on the site plan) is native but not indigenous to the area. It is in good condition, however, the number of self-sown Sugar Gums on the property and the road reserve is indicative of the species potential (environmental) weediness. The tree can be retained if desired but there is potential for weediness from this tree and others in the road reserve.

Design Proposal

The design proposal comprises a single story accommodation facility located in the southern half of the block. There is also the proposal for a carpark along the southern boundary, a driveway along the eastern boundary and a large vegetable garden and orchard in the northern half of the block. The remainder of the site is ear-marked for native landscaping including a perimeter boundary fence with native hedging along the outside of the fence to soften or blend the fence with the native parkland. It is anticipated significant excavation will be required to facilitate construction and services. It is therefore critical that any vegetation nominated for retention will require protection from works. This may be achieved through the establishment of Tree Protection Zones (TPZs).

Tree Protection During Construction

The Tree Protection Zone (TPZ) is a calculation of the area required from the base of the trunk, that if protected and undisturbed, should leave the tree unaffected by excavation (Matheny & Clark 1998). It is represented in metres (m) as a radius from the centre of the tree's trunk extending out from the tree in a circular fashion. The TPZ area includes both the above (to the top of the canopy) and below-ground area surrounding the tree. It may be possible to modify this area depending on the nature and extent of works. This can only be determined on a case-by-case basis and is limited to minor encroachments of less than 10% of the TPZ area outside the Structural Root Zone (SRZ). The area lost to this encroachment should be compensated elsewhere and contiguous with the TPZ.

The Structural Root Zone (SRZ)* is an estimate of the tree's root plate (by radius), an area containing vital anchoring roots. Excavation in this area can render the tree susceptible to windthrow (Mattheck & Breloer, 1994). This radius is based on AS 4970-2009.

Tree Root Damage

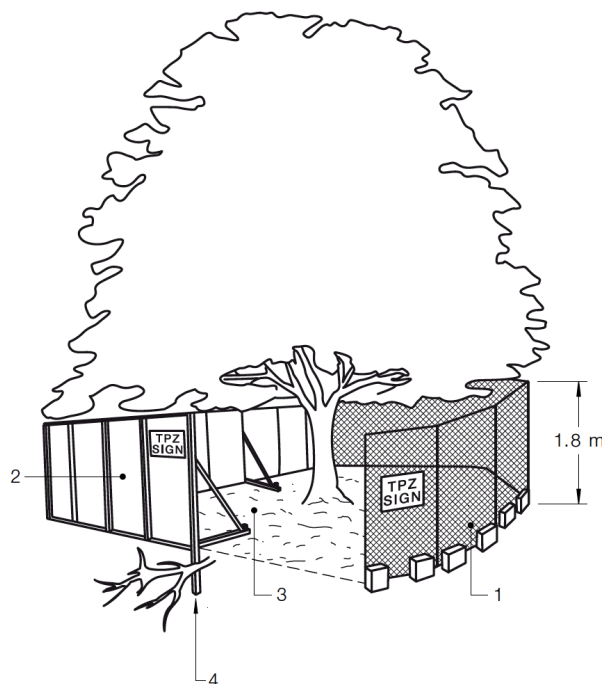
Construction in the vicinity of trees can have several negative impacts on their health, longevity and structural stability. Harris, Matheny and Clark (2004) note that some injury is almost inevitable during the construction process and maintain the goal of tree preservation is to reduce the impacts to a level that will enable the long term preservation of the trees. Negative impacts can include;

- Root severance from trenching and grading activities. Damage to the transport and absorbing root system may deprive the tree of the ability to absorb nutrients and water and damage to the structural scaffold roots that support the tree may result in instability and uprooting. Depending on the percentage of the root plate affected and proximity to the tree, the effects can range from minor degradation of health through to total root plate failure (uprooting).
- Compaction and root injury. Most trees require a well aerated and friable soil to allow normal physiological processes to occur and to allow root growth. Soil compaction from pedestrian or vehicular traffic can result in direct injury to the roots, indirect injury through soil drainage changes, reduced soil aeration or decreased soil penetrability. If severe enough, soil compaction can lead to a rapid decline in many tree species and may eventually result in instability and uprooting.
- Changes in drainage patterns. Changes in drainage patterns may result from hard surfacing, trenching, land shaping and other construction activities. These can result in either drought stress or waterlogging, both of which can cause a rapid decline in trees and may result in instability and uprooting.

Exclusion Zone and Maintenance

Prior to the commencement of any construction works, an exclusion fence shall be erected around nominated trees. Fencing is to be 1.8m high wire mesh or equivalent fence on concrete pads as per AS 4970.

Fig. 5 Tree Protection Fence (AS 4970-2009)



LEGEND:

- 1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
- 2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
- 3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
- 4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

The TPZ requires signage complying with AS1319 (Tree Protection Zone, No Access) as well as ongoing maintenance throughout the construction period, including:

- Mulching to a depth of 50-100mm utilising material compliant with AS 4454
- Monitoring of soil moisture levels and implementation of temporary or supplementary irrigation if required.
- Weed control by manual removal or suitable herbicide.

Restricted Activities within the TPZ

- Machine excavation, including trenching;
- Excavation for silt fencing;
- Cultivation;
- Storage;
- Preparation of Chemicals, including preparation of cement products;
- Parking of vehicles and plant;
- Refuelling;
- Dumping of Waste;
- Wash down and cleaning of equipment;
- Placement of fill;
- Lighting of fires;
- Soil level changes;
- Temporary or permanent installation of utilities and signs; and
- Physical damage to the tree

Complete details of tree protection requirements can be found in *AS 4970-2009 – Protection of Trees on Construction Sites* (Standards Australia).

Conclusion

It is recommended the two indigenous She-oaks (Tree 1 and 2) be retained and accommodated for within the property development. The trees will require protection, maintenance and monitoring in accordance with *Australian Standard 4970-2009 – Protection of Trees During Construction* as outlined above.

All declining Monterey pines are recommended for removal. Most, if not all, are beyond their Safe, Useful Life Expectancy (SULE) and are unlikely to tolerate excavation and construction.

The Kangaroo Thorn thickets are recommended for removal to address the substantial rabbit infestation. The indigenous species (*Acacia paradoxa*) can be successfully incorporated within a landscape design or theme, but is not recommended as as a single species or dense planting.

It is unclear why a tree plantation was located on private property other than it was assumed to be part of the public recreational reserve. Within the plantation, the trees are generally in fair to good condition however the dense planting may compromise access to sunlight and ultimately growth potential over the longer term. The design concept for the site indicates a boundary fence will extend through the plantation necessitating removal of trees. Should trees require removal to accommodate fencing, it is strongly recommended the boundary be surveyed and marked to enable protection of trees outside the property (on public land). The trees will require protection from construction in accordance with *AS 4970-2009 - Protection of Trees During Construction*. The existing tree plantation fence may be utilised as part of the tree protection zone.

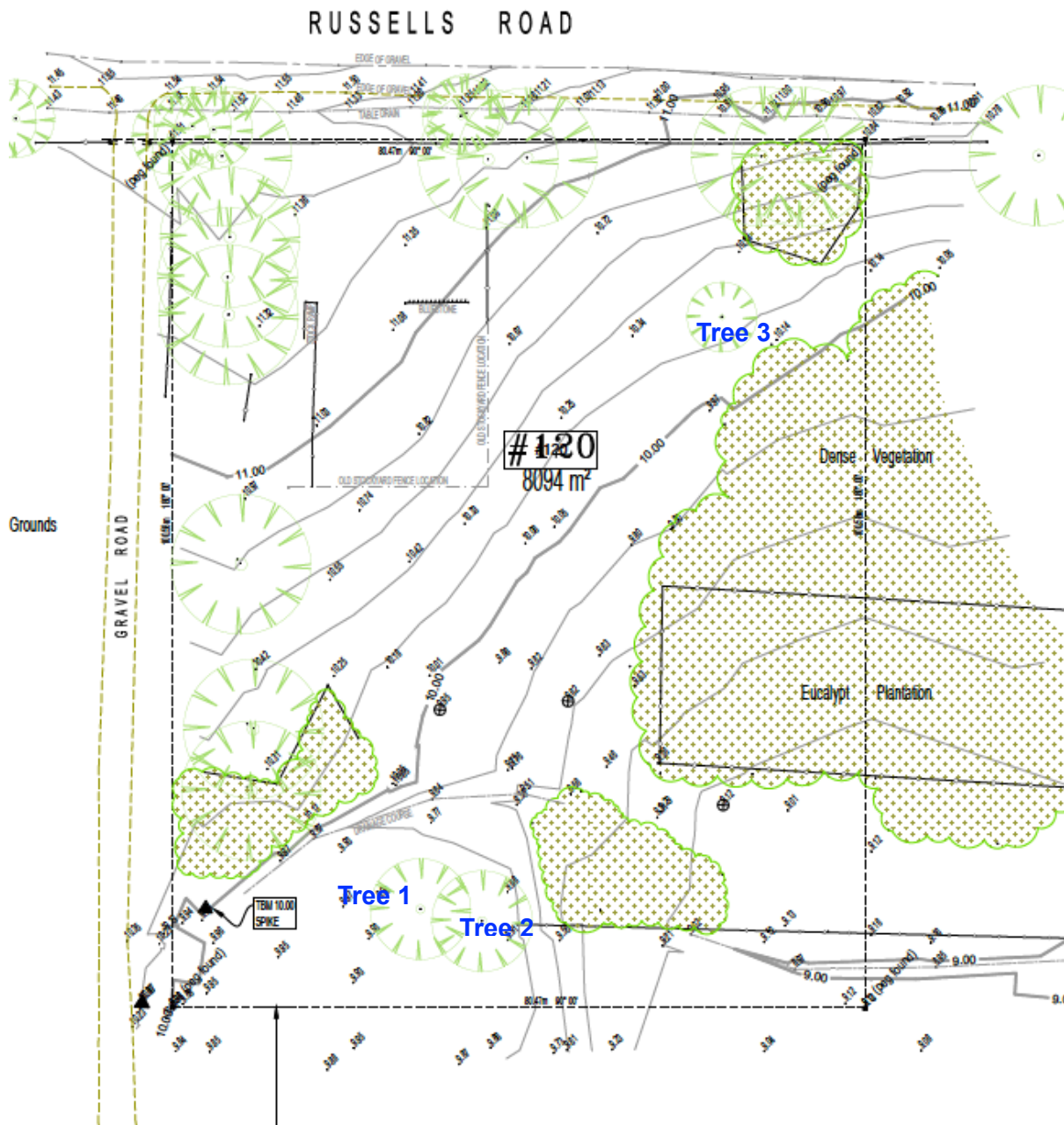




Fig. 6. Site Plan for 220 Russells Road showing trees assessed. All other trees on site (unmarked) are Monterey Pines (*Pinus radiata*)

References

- Australian Standard. 2007 *Pruning of Amenity Trees* AS4373-2007. Standards Australia.
- Australian Standard 2009 Protection of trees on development sites. AS 4970-2009
- Harris R. Clark J. & Matheny N. 1999. *Arboriculture* Third Edition. Prentice Hall.
- Matheny N. & Clark J. 1998 *Trees and Development* International Society of Arboriculture.

Tree Assessments (see Explanation of Terms):


Tree No. 1		
Botanical Name	<i>Casuarina verticilata</i>	
Common Name	Drooping She-oak	
Tree Origin	Native (indigenous)	
Height (m)	6.8	
Spread (m)	7.2	
DBH (cm)	56	
Health	Good	
Structure	Poor-Fair	
Useful Life Expectancy (ULE)	5-10 years	
Tree Significance	Moderate	
Tree Retention Value		
TPZ (m)	6.7	
SRZ (m)	2.7	
Comments	Bifurcated at 1.6m with included bark, mistletoe, asphalt around base. Light deadwood and crown lift. Remove asphalt.	

Tree No. 2		
Botanical Name	<i>Casuarina verticilata</i>	
Common Name	Drooping She-oak	
Origin	Native (indigenous)	
Height (m)	6.2	
Spread (m)	7.2	
DBH (cm)	33	
Health	Good	
Structure	Good	
Useful Life Expectancy (ULE)	10-20 years	
Tree Significance	Moderate	
	Medium	
TPZ (m)	4	
SRZ (m)	2.2	

Tree No. 2

Comments	Light deadwood removal and crown lift.
----------	--

Tree No. 3

Botanical Name	<i>Eucalyptus cladocalyx</i>	
Common Name	Sugar Gum	
Origin	Native	
Height (m)	9.2	
Spread (m)	5	
DBH (cm)	22	
Health	Good	
Structure	Good	
Useful Life Expectancy (ULE)	20+ years	
Tree Significance	Low-Moderate	
Tree Retention Value	Low	
TPZ (m)	2.6	
SRZ (m)	1.9	
Comments	Healthy young self-sown specimen. Minor exudate	

EXPLANATION OF TERMS

The assessment of Health, Structure, Condition, U.L.E (Useful Life Expectancy), Origin, Maturity, Significance and Retention value are based on the following definitions. In the case of health and structure these definitions encompass only the more common indicators for these assessments.

Botanical name - The genus, species and common name

1. Tree Origin

Term	Definition - Tree Origin
Indigenous	The tree originates from the local environs
Native	The tree species originates within Australia
Exotic	The species originates from a country outside Australia
Weed	The tree from native or exotic origins that may be declared locally, statewide or nationally as a weed species. The species will be identified as an environmental (native) or exotic weed

2. **Spread** - Tree canopy width in metres.

3. **DBH** - Tree diameter at breast height (measured at 1.4 metres above ground level)

4. **Health** - refers to the general health and growth potential of the tree:

Term	Definition - Health
Very Good	The tree exhibits excellent growth with a full canopy and no apparent pathogens.
Good	Crown full, with good foliage density and growth. Good growth indicators, little or no canopy die-back or deadwood. Good wound wood development. Minimal or no pathogen damage.
Fair	Tree may have some dead wood or minor canopy dieback but is in reasonable condition. Foliage density, colour and size may be slightly below average for the species. Average wound development. Pathogen or stress indicators may be present. The tree exhibits average health and remedial works may be required to improve health.
Poor	Tree may have significant dead wood or canopy dieback. Growth indicators poor - foliage discoloured and/or distorted, often small and excessive epicormic growth may be present. Pathogens and/or stress indicators potentially leading to tree decline. Poor wound wood development. The tree exhibits low health and remedial works or removal may be required.

Term	Definition - Health
Very Poor	The tree has significant dead wood and extensive canopy dieback is present. Canopy is very sparse. Pathogens and/or stress indicators are significant, leading to the decline of the tree. Very poor wound wood development. The tree exhibits very low health and remedial works or removal works are required.
Dead	The tree is dead

5. **Structure** - relates to the components of the tree that collectively give the tree structural integrity or viability. These include the trunk, major scaffold branches and roots.

Term	Definition - Structure
Good	There are no obvious structural defects apparent in the tree. It's form would be considered consistent or typical of the species and under normal conditions would be expected to persist in the ground.
Fair	Minor structural defects may be apparent within the tree. These may require rectification through tree works or monitoring over time. Such defects may include minor branch attachment faults and / or a slight trunk lean.
Poor	The tree has at least one significant defect that may or may not be rectified through pruning. The fault may destabilise or cause failure of the trunk or major branch(s). This may include codominant stems, trunk damage and / or root damage amongst other defects.
Very Poor	This may include gaps in the crown, lop-sided canopy, poor branch union and attachment defects. There may be a substantial lean and / or substantial trunk wounds or root damage. It is unlikely the faults can be rectified with removal likely in the short term.
Dead	The tree has major defects with failure likely. Immediate removal is warranted.

6. **Useful Life Expectancy (ULE)** - An estimate of the years the tree is expected to provide useful amenity value and a degree of safety with appropriate management. Beyond this period tree management may be required or removal considered.

Term	Definition - Useful Life Expectancy
20+ years	A healthy specimen in good condition
10-20 years	A reasonably healthy specimen in fair or good condition
5-10 years	A tree in fair condition or short-lived specimen
1-5 years	A tree in poor condition and in decline

Term	Definition - Useful Life Expectancy
0 years	Removal required in the short term as the tree is either dead, hazardous or an advanced state of decline.

7. Tree Significance

This refers to the tree's significance to the immediate or local area. The tree may be considered locally or, in some cases, nationally significant according to one or more of the following criteria:

- Exceptional size
- Rarity
- Very old
- Unusual shape or form
- Aboriginal cultural value
- Historic value
- Exceptional example of species
- Economic, genetic value
- Outstanding contribution to the landscape
- Habitat value
- Erosion control

Term	Definition - Tree Significance
Very significant	The tree may warrant inclusion on the significant tree register at local or state level. A substantial effort should be made to retain the tree.
Significant	The loss of the tree may have a significant impact to the surrounding landscape.
Moderately significant	The tree is contributes well to the landscape and it's loss would be noticed or detract from the landscape.
Low	A tree who's size, form, age or condition does not contribute to the landscape. It's loss would have minimal or no impact
None	An insignificant tree who's loss would go unnoticed

8. Tree Retention Value

The Retention Value of a tree is comprised of both the amenity of the tree, it's significance and Useful Life Expectancy (ULE). This is then modified by it's overall health and structure. The tree's retention value will rise with a long life expectancy and fall with a short life expectancy.

Term	Definition - Tree Retention Value
Very High	A healthy and outstanding specimen. The tree is significant and all efforts should be extended to the retention and preservation of the tree.
High	The tree is healthy specimen in fair to good condition with medium to long term longevity. (ULE) The tree contributes to the landscape has high amenity and should be retained as part of any development proposal.
Moderate	The tree is suitable for retention and is in fair to good condition in terms of health, structure and longevity (ULE). While retention of the tree may be preferred or reasonable, loss of the tree would not have a significant impact on the landscape.
Low	The tree may be retained where suitable and appropriate in terms of health, structure and longevity (ULE). It's removal may either improve the landscape or not negatively impact the landscape. The value of the tree does not exceed the expense of design alterations to accomodate the tree.
Nil	The health, structure and longevity of the tree are such that the tree requires removal, irrespective of development considerations.
Off site	The tree is located in an adjacent property and is owned by a third party. The tree will be retained and protected under any development proposal.
