



Arboricultural Impact Assessment

Proposed Alterations & Additions at
113 Gondola Road, North Narrabeen

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2 Introduction

2.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Phillip Torrance & Tina Wild in relation to the existing trees and a proposed alterations and additions at 113 Gondola Road, North Narrabeen.

The purpose of this AIA is to assess the likely impacts of the proposed works on the existing site trees and to make recommendations regarding construction methods and tree protection measures to limit adverse impacts on trees recommended for retention.

This AIA has been guided by the principles set out in the Australian Standard 4970-2009, *Protection of trees on development sites*.

2.2 Subject Site/Proposed Works

The subject site is a residential lot, currently occupied by a single storey residential dwelling. The proposed works include construction of a new studio and landscaping works.

2.3 Subject Trees

Seven (7) trees have been assessed due to their proximity to the proposed works. Refer to Figure A for tree locations. These are made up of the following species:

- Flooded Gum, *Eucalyptus grandis* (Trees 1)
- Bangalow Palm, *Archontophoenix cunninghamiana* (Trees 2, 5, 6)
- China Doll, *Radermachera sinica* (Tree 3)
- Cocos Palm, *Syagrus romanzoffianum* (Tree 4)
- Curly Palm, *Howea belmoreana* (Tree 7)

Each of the assessed trees are planted exotics and planted Australian natives. Trees 1 and 3 are protected under Part 3 of SEPP (Vegetation in Non-Rural Areas) 2017.

A detailed description of the subject trees is included in the Tree Assessment Table (Section 4 –page 7).

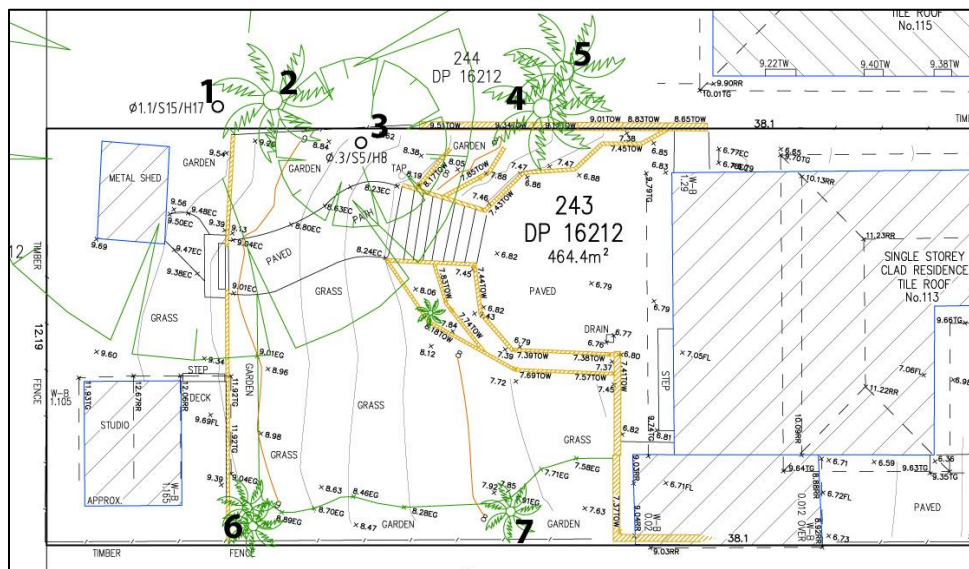


Figure A: Excerpt from the Ground Floor Plan showing tree locations and numbering.

3 Methodology

3.1 Site Inspection/Tree Assessment

Site inspection and tree assessment was undertaken by Alexis Anderson on the 25th of February, 2019. The trees were assessed from ground level using a Tree Assessment Table, as outlined in Section 4. The definitions and explanations of terms used are outlined in the Tree Table Definitions page which is included at Attachment A.

3.2 Plan Review

This report is based upon a review of the set of plans provided by Hot House Studio, S4.55 dated 29/06/20. The plans shown within this report have been derived from the Site Analysis Plan.

No Landscape Plan, Hydraulics Plans or Engineering Detail was available for review at the time of assessment.

3.3 Tree Protection Zones

Tree assessments in accordance with the Australian Standard 4970-2009, *Protection of trees on development sites*, require calculation of a Tree Protection Zone (TPZ) and Structural Root Zone (SRZ). The following is a brief explanation of these terms:

Tree Protection Zone -TPZ: This is the area that should be isolated from construction disturbance so that the tree remains viable. Some disturbance within the TPZ may be possible following arboricultural assessment.

Structural Root Zone -SRZ: This is the area of undisturbed soil and roots required to maintain tree stability. Excavation within the SRZ can lead to whole tree failure.

3.4 Retention Values

Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings.

- **HIGH Retention Value:** These trees are worthy of retention and design consideration should be made where possible to allow their retention. Removal of these trees will have an impact on the landscape amenity or local environment.
- **MEDIUM Retention Value:** These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures, garden retaining walls, driveway levels). Removal of these trees will not have a significant impact on the landscape amenity or local environment.
- **LOW Retention Value:** These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

The method of determining and defining retention values used in this report has been derived from the ©Retention Index developed by Tree Wise Men® Australia Pty Ltd.

3.5 Consideration for Tree Retention and Removal

Tree removal recommendations have been based on tree Retention Values and construction offsets.

Trees may generally be recommended for removal in the following circumstances:

- Trees located within construction footprints.
- Trees with construction proposed within the SRZ where root loss cannot be avoided through sensitive design.
- Trees with a TPZ loss of more than 25%, may be recommended for removal providing tree sensitive design cannot be implemented to avoid significant root and canopy loss.
- Trees with low Retention Values may be recommended for removal irrespective of proposed development.

4 Tree Assessment Details

4.1 Tree Assessment Table

	Species	Trunk Diameter @ 1.4m	Height	Canopy Spread Radius	Age Class	Health/ Vitality	Structural Condition	Estimated Life Expectancy	Landscape and Environmental Significance	Retention Value
1	Flooded Gum, <i>Eucalyptus grandis</i>	90cm	29m	12m	Mature	Good	Good	Long (30+ yrs)	2	High
	Comments: Prominent tree within the surrounding locality.									
2	Bangalow Palm, <i>Archontophoenix cunninghamiana</i>	20cm	12m	2m	Mature	Good	Good	Long (30+ yrs)	3	Medium
	Comments: Exempt from protection within the Northern Beaches LGA.									
3	China Doll, <i>Radermachera sinica</i>	16cm	7m	3m	Mature	Good	Good	Long (30+ yrs)	3	Medium
	Comments: -									
4	Cocos Palm, <i>Syagrus romanzoffianum</i>	25cm	10m	2m	Mature	Good	Good	Long (30+ yrs)	4	Low
	Comments: Exempt from protection within the Northern Beaches LGA. Root plate pressure is cracking the boundary wall. The root spread is limited by the boundary wall.									
5	Bangalow Palm, <i>Archontophoenix cunninghamiana</i>	18cm	10m	2m	Mature	Good	Good	Long (30+ yrs)	3	Medium
	Comments: Exempt from protection within the Northern Beaches LGA. Root spread is limited by the existing boundary wall.									
6	Bangalow Palm, <i>Archontophoenix cunninghamiana</i>	22cm	9m	2m	Mature	Good	Good	Long (30+ yrs)	3	Medium
	Comments: Exempt from protection within the Northern Beaches LGA.									
7	Curly Palm, <i>Howea belmoreana</i>	20cm	6m	2m	Mature	Fair	Fair	Short (0-10 yrs)	4	Low
	Comments: Exempt from protection within the Northern Beaches LGA. Canopy collapse, possibly due to soil boron deficiency.									



Photo A: Tree 1 viewed from the street frontage.



Photo B: Rear yard.

4.2 Tree Protection Zones

Tree Protection Offsets based on <i>AS4970-2009-Protection of Trees on Development Sites</i>		
Tree Number	Tree Protection Zone radius	Structural Root Zone radius
1	10.8m	3.3m
2	3.0m	1.0m
3	2.0m	1.5m
4	3.0m	1.0m
5	3.0m	1.0m
6	3.0m	1.0m
7	3.0m	1.0m

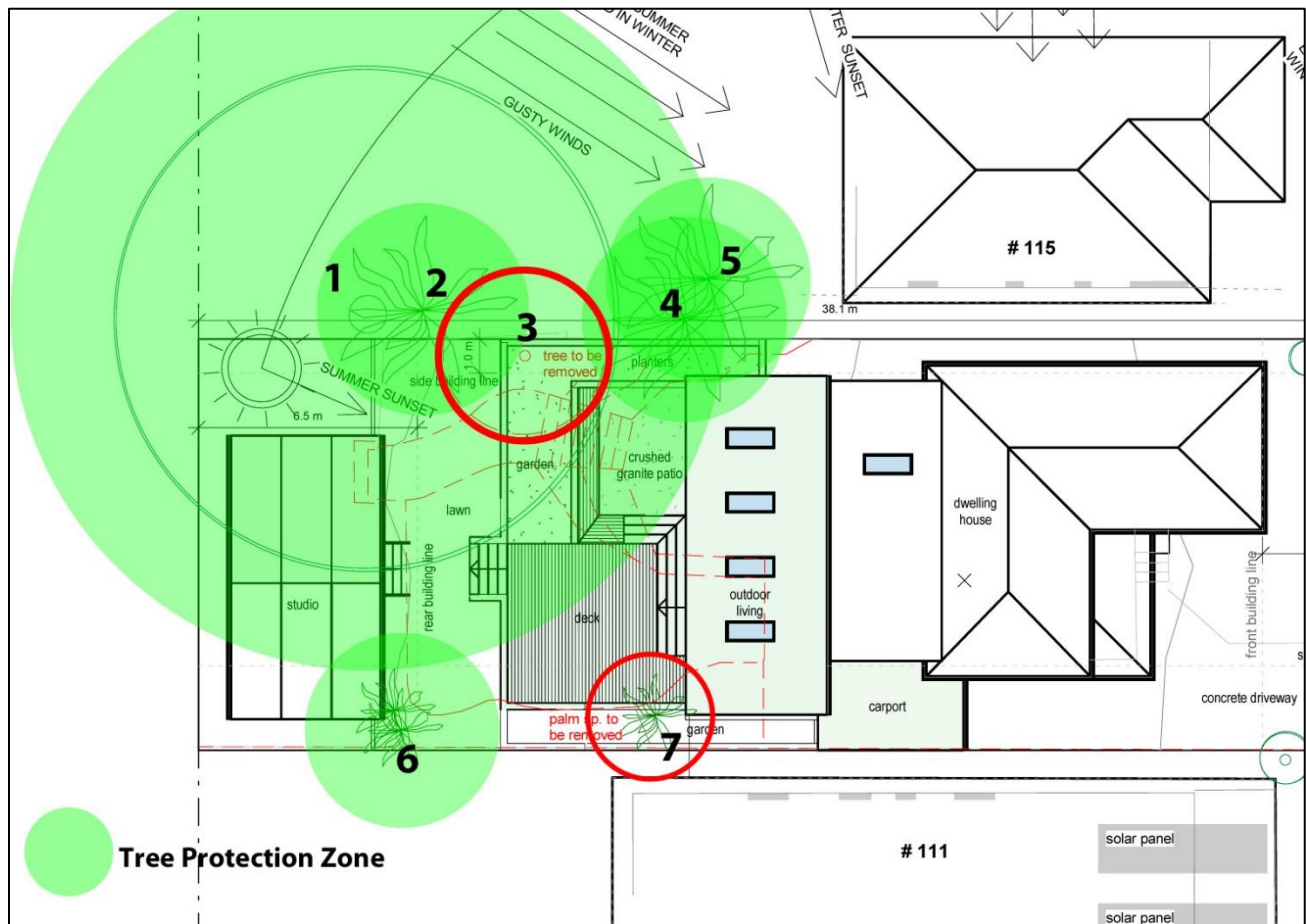


Figure B: Excerpt from the Site Analysis Plan showing the TPZ of retained trees.

5 Potential Impacts of Proposed Works

5.1 Trees Proposed for Removal

Tree Number/Species	Retention Value	Works Proposed Within the Tree Protection Zone (TPZ)
3 China Doll	Medium	Within the area of proposed excavation for garden landscaping.
7 Curly Palm	Low	

5.2 Retained Trees

Tree Number/Species	Retention Value	Works Proposed Within the Tree Protection Zone (TPZ)
1 Flooded Gum	High	The elevated studio building and deck is proposed within the TPZ and SRZ (deck only). Excavation shall be limited to the positions of pier footings. Excavation for garden landscaping is proposed within the TPZ. There is some existing landscaped garden terracing in this area that may have limited root spread. Approximately 10-15% of the TPZ area will be affected. Some pruning of woody transport roots and fine absorbing roots may be required. This tree is good health and vitality and is likely to tolerate the proposed works.
2 Bangalow Palm	Medium	Excavation for garden landscaping is proposed within the TPZ. Less than 5% of the TPZ area will be affected. No notable impact is expected.
4 Cocos Palm	Low	The existing boundary wall has restricted root spread into the site. No impact from the proposed works is expected.
5 Bangalow Palm	Medium	
6 Bangalow Palm	Medium	The elevated studio building is proposed within the TPZ and SRZ. Excavation shall be limited to the positions of pier footings. No notable impact is expected.

Incidental Impacts: Trees are commonly impacted on construction sites in the following ways. These impacts can be easily avoided through awareness and basic tree protection measures.

- Stripping of existing ground cover, topsoil and removal of organic material from the soil surface.
- Compaction of the topsoil and damage to surface roots through use of heavy machinery and frequent foot traffic.

- Soil contamination through washing out barrows and disposal or spillage of chemical materials.
- Root loss due to unforeseen excavation for plumbing upgrades and landscape construction.
- Bark/trunk and branch injuries from accidental contact with machinery.

6 Recommendations

6.1 Site Establishment –Prior to Construction

Trunk Battening (Tree 6): Trunk protection is recommended for Tree 6 as detailed in Figure C below. The purpose of trunk protection is to prevent accidental bark and cambium injuries that often occur on construction sites.

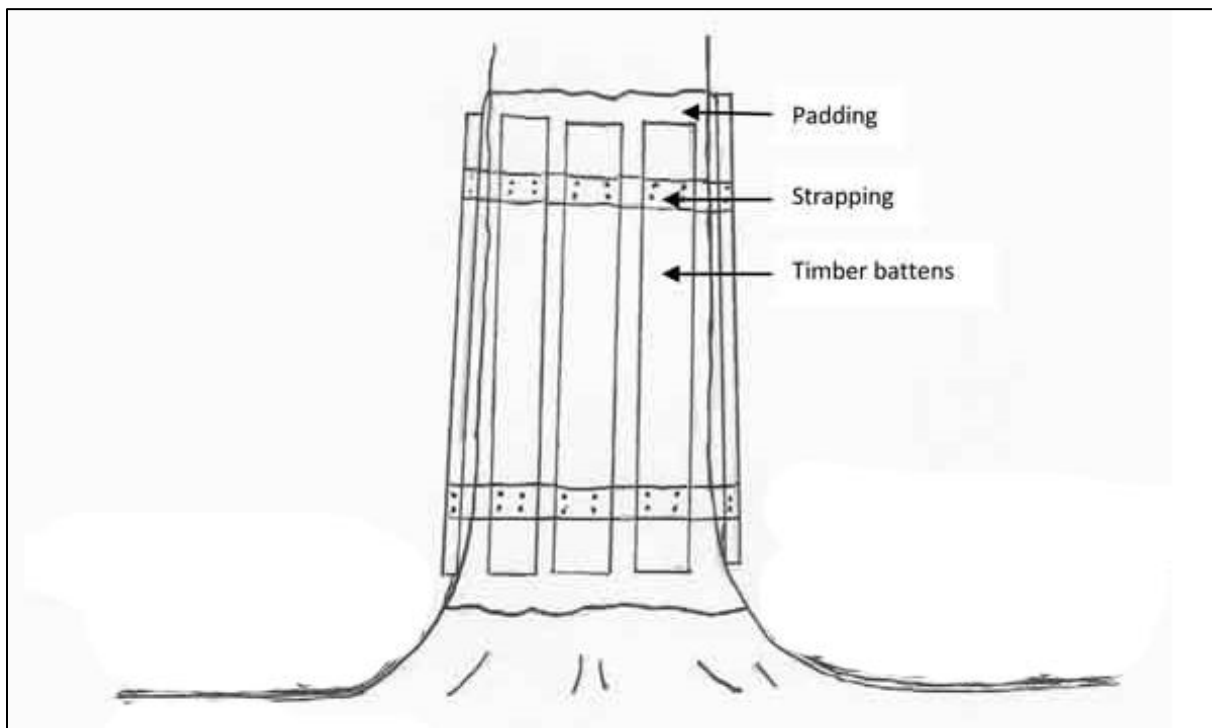


Figure C: Detail of adequate trunk protection for Tree 6.

6.2 During Construction

Studio and deck footings: The pier footings for the studio and deck should be excavated using hand tools within a 10m radius of Tree 1. Pier footings should be adjusted as necessary to avoid contact with any roots greater than 50mm diameter. Any smaller tree roots encountered may be cleanly pruned using a sharp saw or secateurs.

Landscaping Excavation: All tree roots encountered during landscape excavation within a 10m radius of Tree 1 should be cleanly cut using a sharp saw or secateurs. Refer to Figure D for the area that this is recommended. The purpose of this is to limit the surface area of pruning wounds and prevent additional root injury (tearing/splintering) that typically occurs when roots are pruned using an excavator.

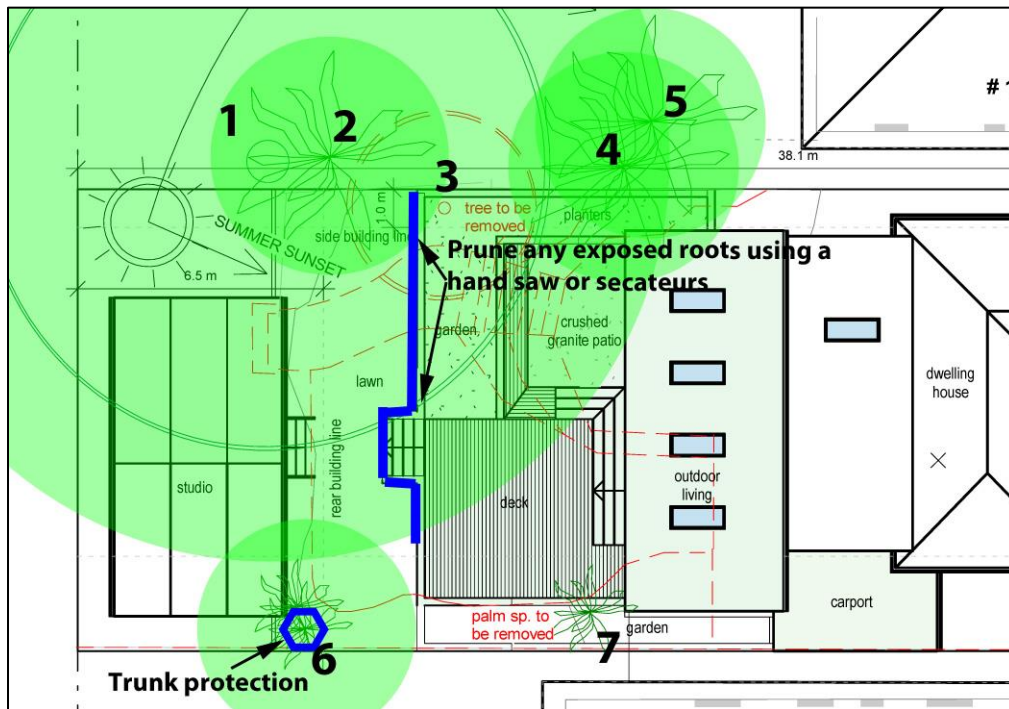


Figure D: Tree protection plan.

Tree Protection Zones: The following should be prohibited within Tree Protection Zones of retained trees:

- Removal or stripping of topsoil / organic surface material.
- Disposal of solid, liquid or chemical waste.
- Any excavation, fill or other construction activity other than that discussed in this report.

7 Statement of Impartiality

- This report prepared by Bluegum Tree Care & Consultancy (BTCC) reflects the impartial and expert opinion of Alexis Anderson.
- BTCC is acting independently of and not as the advocate for the owners of the subject trees.
- BTCC does not undertake tree pruning and removal works and will not have any involvement with pruning or removing trees which are the subject of this report.

8 Limitations

- The tree assessment was undertaken for the purpose of pre-development planning. Detailed tree risk assessment was not requested or included in the scope of works.
- The findings of this report are based upon and limited to visual examination of trees from ground level without any climbing, internal testing or exploratory excavation.
- This report reflects the health and structure of trees at the time of inspection. Bluegum cannot guarantee that a tree will be healthy and safe under all circumstances or for a specified period of time. There is no guarantee that problems or defects with assessed trees, will not arise in the future. Liability will not be accepted for damage to person or property as a result of failure of assessed trees.
- This report must be read in its entirety. No part of this report may be referred to, verbally or in writing, unless taken in full context of the whole report.

Attachment A: TREE ASSESSMENT DEFINITIONS

Height. Tree height is estimated from ground level. This assessment is made independently of data plotted on survey plan. These measurements have not been confirmed with clinometer or other surveying instrument.

Diameter at Breast Height (DBH). Trunk diameter is measured at 1.4 metres above ground level. A diameter tape is used which calculates the diameter from a measurement of the circumference. DBH is primarily used for the calculation of the TPZ. The trunk diameter above the root buttress is measured to calculate the Structural Root Zone. If a tree has more than 4 trunks, the diameter of the four largest trunks is recorded. For irregular trunk formations the DBH is calculated as outlined in Appendix A of AS4970-2009 -*Protection of Trees on Development Sites*.

Canopy Spread Radius. Average canopy spread radius is estimated from the centre of trunk to the outer edge of canopy. Refer to Comments column for detail of heavily skewed canopy spread.

Age Class - This is an estimation of the tree's current age class based on size, growth habit, local environmental conditions and comparison with surrounding trees.

- **Immature (IM):** This is a juvenile specimen that is likely to have germinated within the previous 5 years.
- **Early Mature (EM):** This is a tree that is established within its growing environment, though has not reached an age of reproductive maturity or the natural growth habit of a mature individual.
- **Mature (M):** This is a tree has reached both reproductive maturity and a physical form and shape typical for the species. Trees can have a Mature Age Class for the majority of their life span.
- **Late-Mature (LM):** These trees show early signs of senescence with symptoms such as reduced canopy density and an accumulation of dead branches.
- **Over-mature (OM):** These trees show symptoms of irreversible decline such as canopy dieback with dead branches concentrated in the upper canopy.

Health/Vitality - Good (G), Fair (F) or Poor (P). This is primarily based on the extent of vigorous new foliage growth at branch tips and the colour, size and density of foliage generally. The percentage of live branches to dead branches is considered. The location of any dead branches is also considered. The presence of any pest or disease is considered as part of this assessment. Health can vary with climatic conditions.

Structural Condition - Good (G), Fair (F) or Poor (P). This is an assessment of tree structure and stability. Root anchorage, trunk lean, structural defects, canopy skew and any hazardous features are considered. Dead branches can be considered as part of Structural Condition if they are of a size and location that could cause injury or property damage.

Tree Protection Zone (TPZ). This is a radial distance of (12X) the DBH measured from centre of trunk. TPZ is rounded to the nearest 0.1 metre. A TPZ should not be less than 2m or greater than 15m. The TPZ for palms and other monocots should not be less than 1m outside of the crown projection. Existing constraints to root spread can vary the TPZ. For a tree to remain viable, construction activity should be excluded or undertaken with care within the TPZ. Disturbance within up to 10% of the TPZ area is considered to be a minor encroachment. Disturbance to more than 10% of the TPZ area is considered a major encroachment. Major encroachment into the TPZ is possible depending on the type of disturbance, and species tolerance to disturbance. Exploratory excavation may be required to quantify the presence of roots at the alignment of proposed ground disturbance. This is based upon the Australian Standard AS 4970, 2009, *Protection of trees on development sites* and the Matheney & Clarke "Guidelines for adequate tree preservation zones for healthy, structurally stable trees".

Structural Root Zone (SRZ). This is a radial distance based on the following formula- $SRZ = (D \times 50)^{0.42} \times 0.64$ (for trees less than 150mm Diameter, a minimum SRZ of 1.5 metres). The **D** in the formula is the trunk diameter measured above the root buttress. This was recorded in the field notes. SRZ measurements are rounded to the nearest 0.1m. The Structural Root Zone is the area of soil and roots required to maintain tree stability. Excavation within the SRZ can result in whole tree failure. Fully elevated construction is possible within SRZ with specific rootzone assessment. Existing constraints to root spread can vary the SRZ. This method of determining SRZ is outlined at Section 3.3.5 of Australian Standard AS 4970, 2009, *Protection of trees on development sites*.

Estimated Remaining Life Expectancy: This gives a length of time that the Arborist believes a particular tree can be retained from the time of assessment with an acceptable level of risk based on the information available at the time of the inspection. This system of rating does not take into consideration the likely impacts of any proposed development. Ratings are **Long** (retainable for 30 years or more with an acceptable level of risk), **Medium** (retainable for 10-30 years), **Short** (retainable for 0-10 years) and **Removal** (tree requiring removal due to risk/hazard or absolute unsuitability).

Landscape & Environmental Significance*. This is an assessment of the impact of the tree on the surrounding landscape amenity and natural environment. Rarity, habitat value, physical prominence, historical and cultural significance of the tree are considered in this rating system. The Landscape & Environmental Value ratings used in this report are:

1. Very High Value: This is an outstanding specimen that holds irreplaceable environmental, landscape or cultural value.

2. High Value: An excellent specimen that holds environmental, landscape or cultural value that is present in other site trees or that could be replaced.

3. Moderate Value: Can be a good to fair specimen with environmental, landscape or cultural value that is common within other trees in the locality.

4. Low Value: Removal would not result in any loss of site amenity or environmental value. Can include undesirable or weed species or trees growing in unsuitable locations.

5. Very Low Value: Dead or hazardous with no other environmental or cultural value. Could also include weed species. These trees should be removed or pruned in a way to make safe irrespective of any development.

***Note:** The concept of using a five (5) point scale to assess tree significance was derived from the Tree Wise Men® Australia Pty Ltd ©Significance Rating Scale.

Retention Value*. Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings.

Landscape & Environmental Significance		Estimated Life Expectancy			
		Long	Medium	Short	Removal
	Very High (1)	HIGH		MEDIUM	
	High (2)				
	Medium (3)	MEDIUM		LOW	
	Low (4)				
	Very Low (5)				

HIGH Retention Value: These trees are worthy of retention and major design consideration should be made where feasible to allow this.

MEDIUM Retention Value: These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures, garden retaining walls, driveway levels).

LOW Retention Value: These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

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