



Arboricultural Impact Assessment

Proposed Sports Field Lighting at Cromer High School

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Client: Northern Beaches Council

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1 Contents

2	Introduction	3
2.1	Background	3
2.2	Subject Site/Proposed Works	3
2.3	Subject Trees	3
3	Methodology	4
3.1	Site Inspection/Tree Assessment.....	4
3.2	Plan Review.....	4
3.3	Tree Protection Zones	4
3.4	Retention Values.....	4
3.5	Consideration for Tree Retention and Removal	5
4	Tree Assessment Details	6
4.1	Tree Assessment Table.....	6
4.2	Tree Protection Zones	8
5	Potential Impacts of Proposed Works	10
5.1	Trees Proposed for Removal	10
5.2	Potential Impacts of Proposed Works on Retained Trees.....	10
6	Recommendations.....	11
6.1	Site Establishment –Prior to Construction	11
6.2	During Construction	12
7	Statement of Impartiality.....	13
8	Limitations.....	13
9	Attachment A -Tree Assessment Definitions	14

2 Introduction

2.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Northern Beaches Council in relation to the existing trees and proposed residential development at Cromer High sports field.

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 currently occupied by a grassed sports field with a vegetated perimeter. The proposed works include installation of four (4) new light poles.

2.3 Subject Trees

Four (4) 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:

- Tallowwood, *Eucalyptus microcorys* (Trees 1 and 2)
- Moreton Bay Fig, *Ficus macrophylla* (Tree 3)
- River Peppermint, *Eucalyptus viminalis* (Tree 4)

All of the assessed trees are protected under Part 3 of SEPP (Vegetation in Non-Rural Areas) 2017.

Each of the assessed trees are planted Australian natives (not locally native).

A detailed description of the subject trees is included in the Tree Assessment Table (Section 4 –page 6).

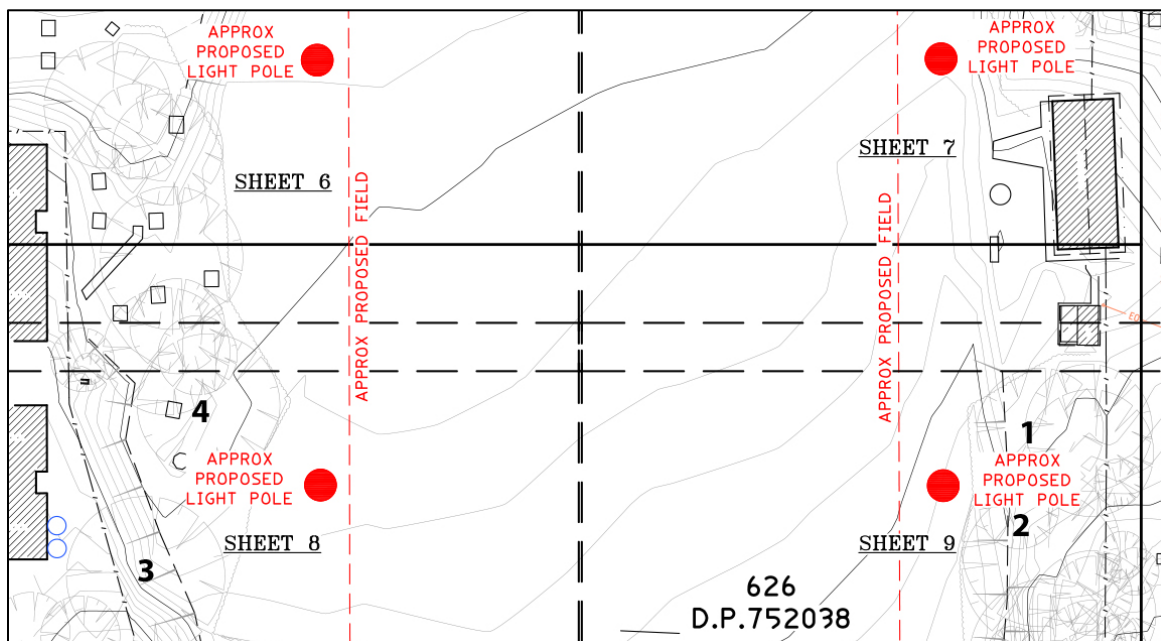


Figure A: Excerpt from the Survey Plan showing the tree locations and numbering.

3 Methodology

3.1 Site Inspection/Tree Assessment

Site inspection and tree assessment was undertaken by Alexis Anderson on the 13th of April, 2022. 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 Boundary Identification & Detail and Level Survey provided by CMS Surveyors Pty Ltd (dated 12/04/2022).

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	Tallowood, <i>Eucalyptus microcorys</i>	64cm	20m	7m	Mature	Good	Good	Long (30+ yrs)	2	High
	Comments: Dominant canopy tree.									
2	Tallowood, <i>Eucalyptus microcorys</i>	30cm	12m	3m	Mature	Fair	Fair	Medium (10-30 yrs)	3	Medium
	Comments: Suppressed by larger trees.									
3	Moreton Bay Fig, <i>Ficus macrophylla</i>	60cm, 60cm, 50cm, 50cm, 40cm	14m	10m	Mature	Good	Good	Long (30+ yrs)	2	High
	Comments: Large crown spread.									
4	River Peppermint, <i>Eucalyptus elata</i>	96cm	16m	8m	Mature	Fair	Fair	Medium (10-30 yrs)	2	High
	Comments: Crown thinning and dead branches.									



Photo A: Trees 1 and 2 facing south.

Tree 1

Tree 2



Tree 3

Tree 4

Photo B: Trees 2 and 3 facing west.

4.2 Tree Protection Zones

Tree Protection Offsets based on AS4970-2009-Protection of Trees on Development Sites		
Tree Number	Tree Protection Zone radius	Structural Root Zone radius
1	7.7m	2.8m
2	3.6m	2.0m
3	13.3m	5.0m
4	11.5m	3.3m



Figure B: Tree Protection Zones of Trees 1 and 2 relative to the proposed pole location.

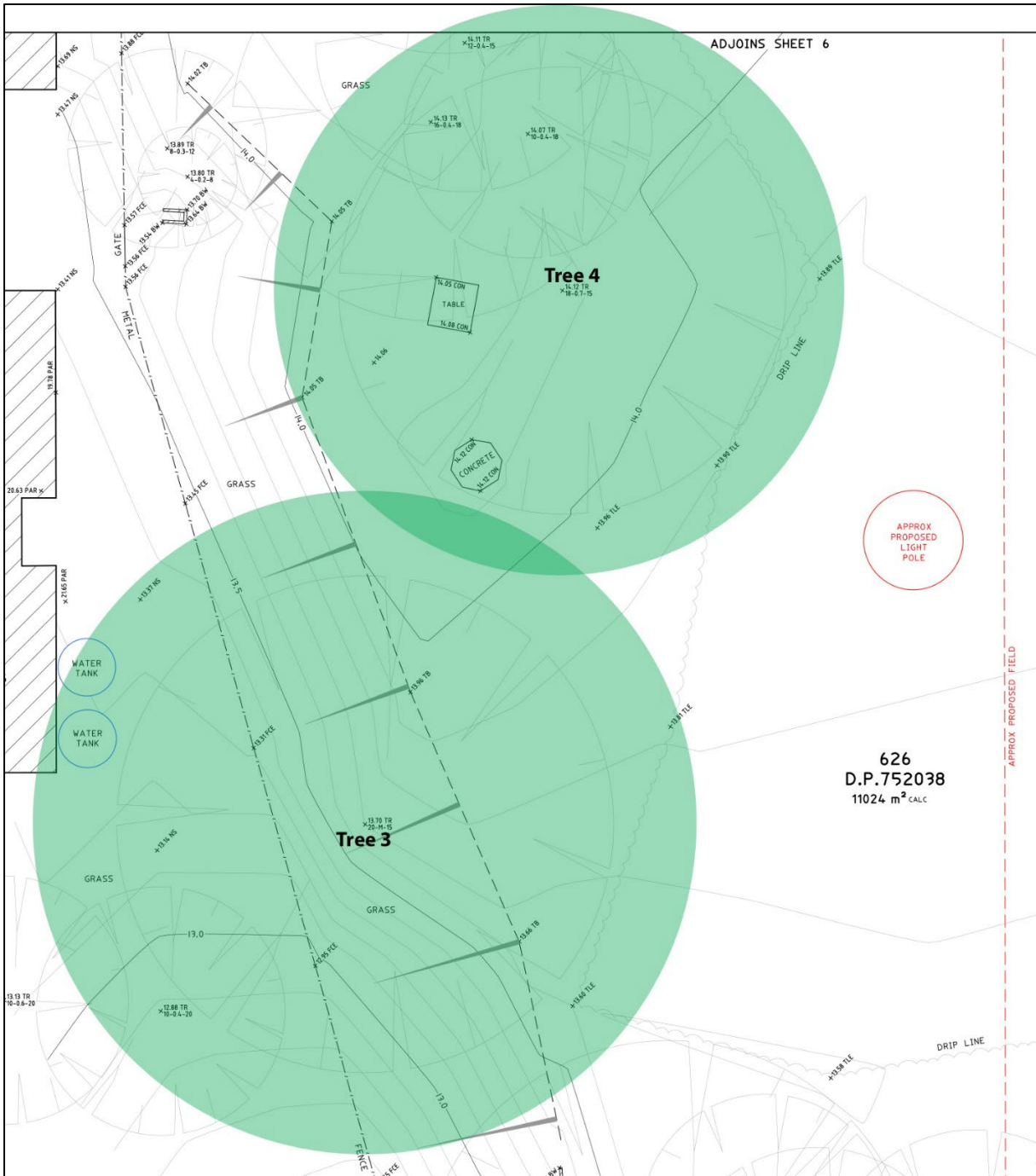


Figure C: Tree Protection Zones of Trees 3 and 4 relative to the proposed pole location.

5 Potential Impacts of Proposed Works

5.1 Trees Proposed for Removal

No trees are proposed to be removed as part of this project.

5.2 Potential Impacts of Proposed Works on Retained Trees

Tree Number/Species	Retention Value	Works Proposed Within the Tree Protection Zone (TPZ)
1 Tallowwood	High	No works are proposed within the TPZ. No direct impact is expected. There is a potential for incidental site impacts during the project.
3 Moreton Bay Fig		
4 River Peppermint		
2 Tallowwood	Medium	

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 electrical conduits installation and landscape changes.
- Bark/trunk and branch injuries from accidental contact with machinery.

6 Recommendations

6.1 Site Establishment –Prior to Construction

Tree Protection Fencing: Tree Protection Fencing should be installed prior to any machinery or materials being bought on site and remain in position throughout the entire project. Tree Protection Fencing should be erected in the position outlined in Figure D and E. Tree Protection Fencing should consist of standard temporary steel mesh fencing (Figure F).

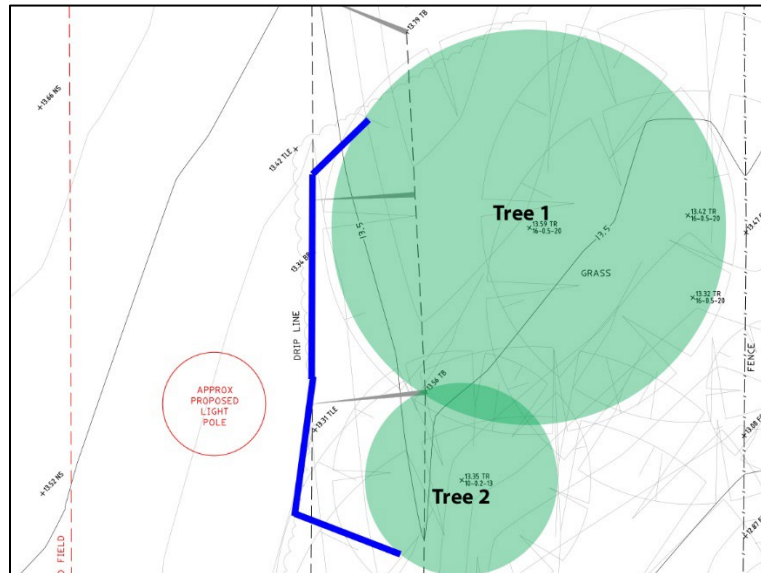


Figure D: Recommended location of tree protection fencing for Trees 1 and 2.

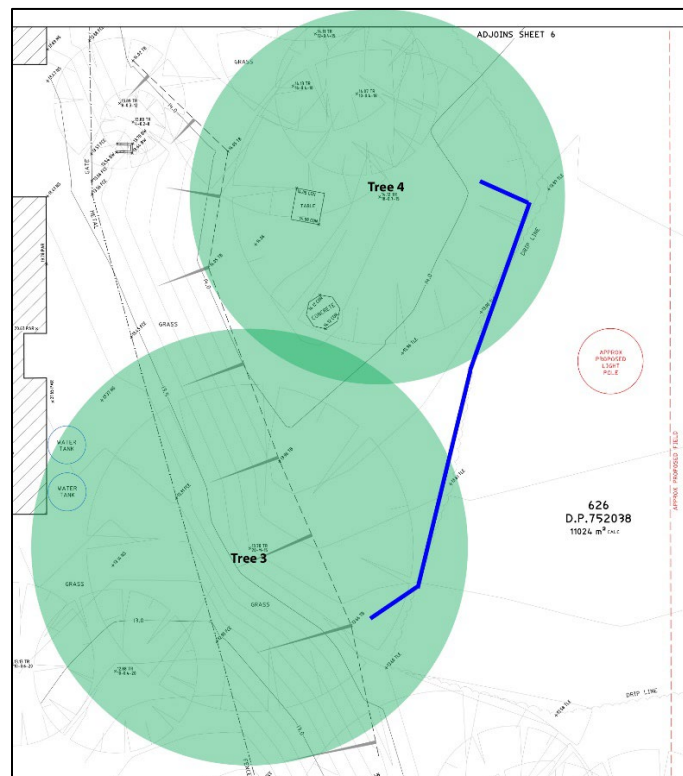


Figure E: Recommended location of tree protection fencing for Trees 3 and 4.

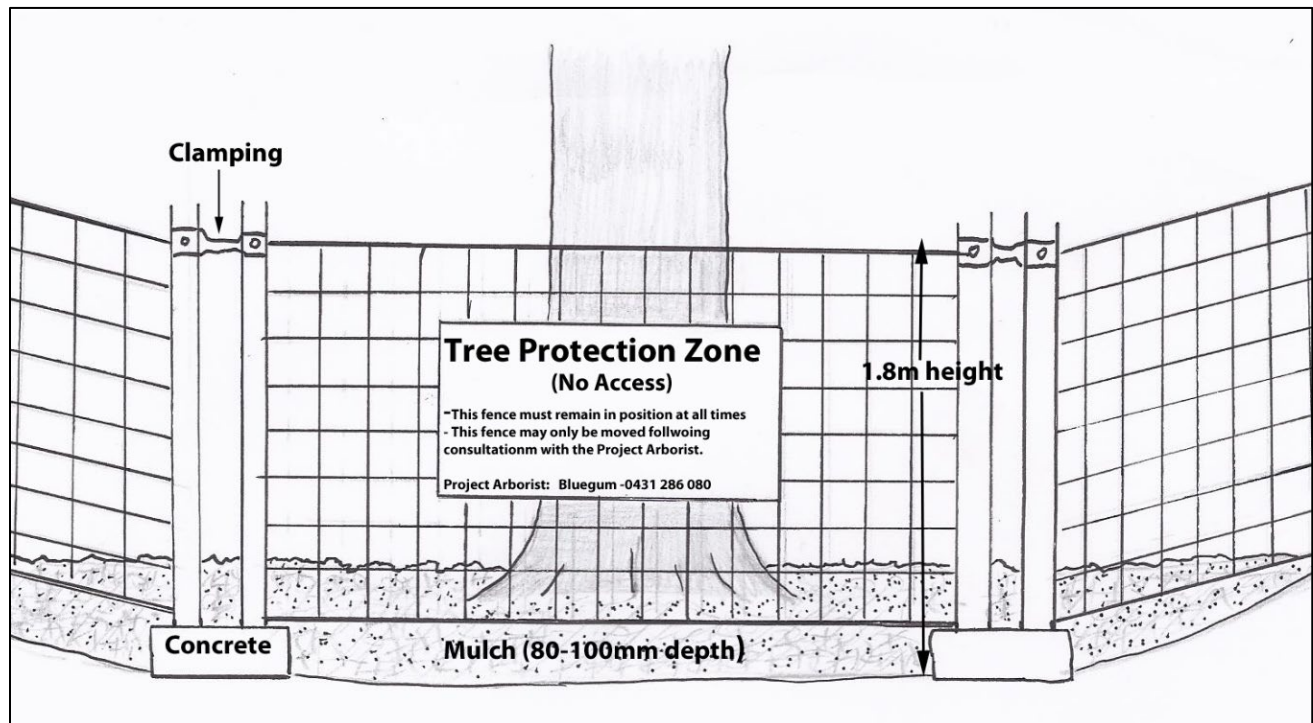


Figure F: Detail of adequate tree protection fencing

6.2 During Construction

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

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

Excavation for light pole footings: The light poles are sufficiently set-back from the site trees and it is unlikely that tree roots will be encountered during excavation for the footings. Any small roots encountered during footing excavation may be cleanly pruned with secateurs or a hand saw.

Electrical Conduit Routes: The electrical conduit routes must be set-out to clear the Tree Protection Zones (outlined in Section 4.2).

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.

Attachment B: 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.

Trunk Diameter. 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 and SRZ.

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). 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	LOW
	High (2)				
	Medium (3)	MEDIUM			
	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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