Arboricultural Impact Assessment

Proposed Retaining Wall Rectification at

Uniting Wesley Heights - 47 Birkley Road, Manly

Client: Uniting Wesley Heights
Date: March 2024
Author: Alexis Anderson
Qualifications: -Diploma Horticulture (Arboriculture) –AQF Level 5.
-Bachelor of Applied Science (CM)
Membership: -Arboriculture Australia-Member No.2268
-International Society of Arboriculture –Professional Member
A.B.N: 989 613 015 96
Contact: 0431 286 080 info@bluegumarborist.com.au

1 Contents

2 Summary

This Arboricultural Impact Assessment (AIA) is based on nine (9) trees located at 47 Birkley Road, Manly (subject site). Demolition and re-construction of the damaged sections of the stone boundary retaining wall is proposed.

This report aims to describe the likely impacts of the proposed works on the site trees and make recommendations to limit the potential for adverse impacts on retained trees.

The Retention Values of the subject trees were rated as outlined in the following Table. Refer to Figure A and B (following page) and the Tree Protection Plan (Attachment C) for tree locations.

Table A: Retention Values of the Subject Trees.

	High Retention Value (Tree Number)	**Medium Retention Value (Tree Number)**	**Low Retention Value (Tree Number)**
To be Retained	1, 2	4, 5, 6	3, 8, 9
To be Removed	-	7	-

The majority of the High and the majority of the Medium Retention Value trees are able to be retained and remain viable in the long-term.

Tree 7 is proposed to be removed as part of this project. No notable impact on the environmental value or landscape amenity of the site is expected.

There are construction works proposed within the Tree Protection Zones (TPZ) of Trees 1, 4 and 5. The trees are worthy of retention and are expected to tolerate the proposed works with no notable impact.

Recommendations have been made regarding tree protection measures to limit the potential for impact on the retained trees.

3 Introduction

3.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Uniting Wesley Heights in relation to the existing trees and proposed wall rectification works at 47 Birkley Road, Manly (subject site).

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

This AIA has been prepared in accordance with the Australian Standard 4970-2009, *Protection of trees on development sites.*

3.2 Subject Site/Proposed Works

The subject site currently consists of landscaped gardens and the existing sandstone boundary wall.

It is proposed to demolish the damaged sections of the sandstone boundary retaining wall and re-build the wall with a new concrete block bonded to the sandstone wall and drainage aggregate and conduit behind.

3.3 Subject Trees

All trees located within 5m of the proposed works have been assessed. The tree population of the site is made up of planted and self-sown Australian natives and planted exotic street trees. Trees 1 and 4 were not plotted on the site survey. The approximate positions of these trees are plotted on the plans in this report.

Refer to Figure A and B for tree locations and numbers. A detailed description of the subject trees is included in the Tree Assessment Table (Attachment A).

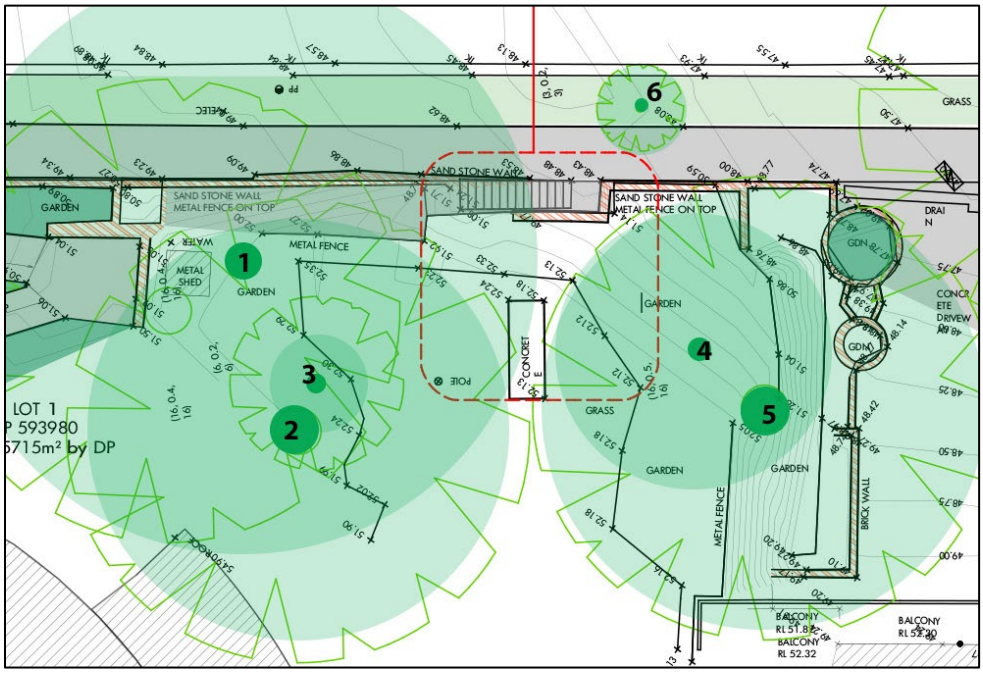


Figure A: Trees 1-6 located near Area B.

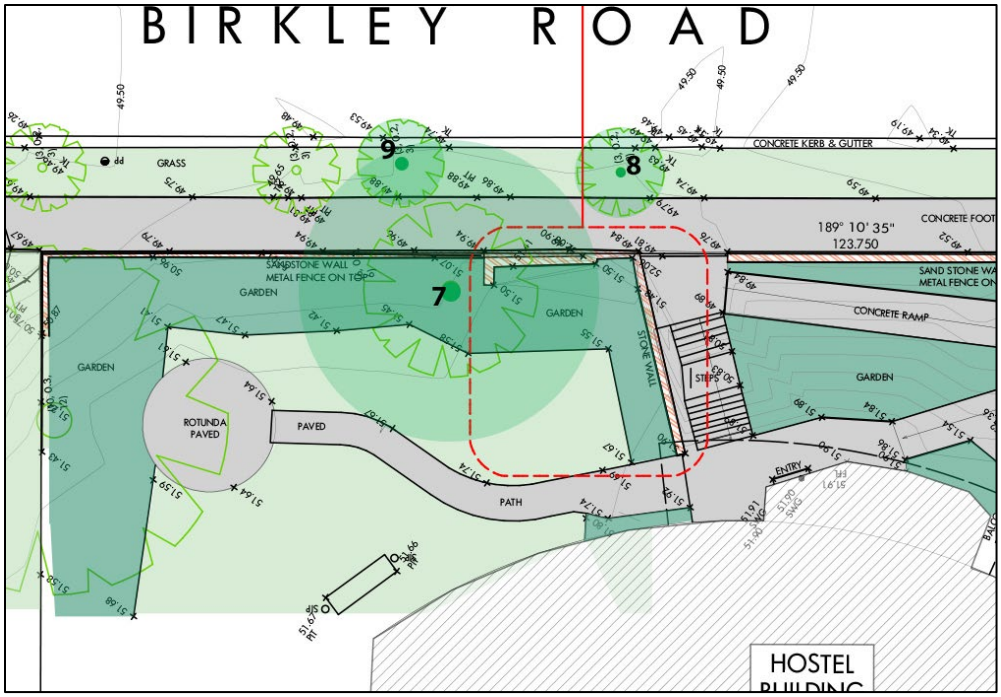


Figure B: Trees 7, 8, 9 located near Area A.

4 Methodology

4.1 Site Inspection

Site inspection and tree assessment was undertaken by Alexis Anderson on the 29th of February, 2024. The trees were assessed from ground level using a Tree Assessment Table, which is included as Attachment A. The definitions and explanations of terms used are outlined in the Tree Table Definitions page which is included at Attachment B.

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.

4.2 Plan Review

This report is based on a review of the Proposed Site, Proposed Plans, Section & Elevation prepared by Architectem dated 08/02/24.

4.3 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.

Refer to the Tree Assessment Table (Attachment A) for the Tree Protection Zones of the assessed trees.

4.4 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.
- **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, stormwater pipes, 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.

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.

4.5 Consideration for Tree Retention and Removal

Where demolition of existing structures, excavation or fill is proposed within the Tree Protection Zone (TPZ), arboricultural assessment and sensitive construction methods will be required. Where works are proposed outside of the TPZ, no sensitive construction methods are required.

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 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.

5 Potential Impacts of Proposed Works

5.1 Trees to be Removed

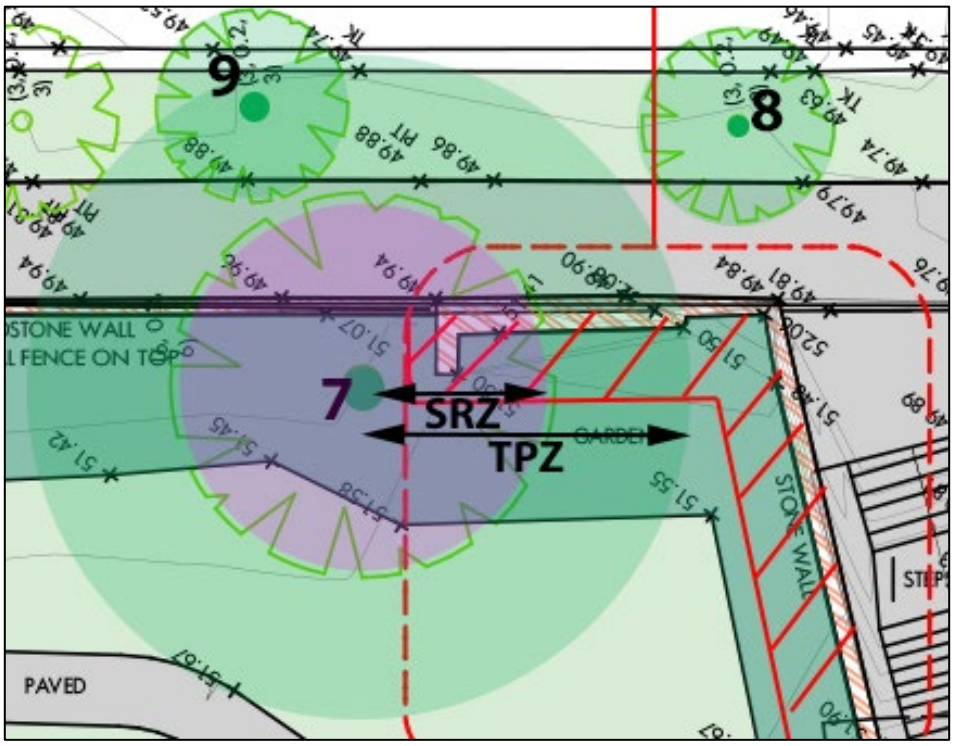
Tree Number	Retention Value	Species / Reason for Removal
7	Medium	Weeping Bottlebrush, *Callistemon viminalis.* The excavation required for new concrete block wall construction and to create space for drainage aggregate and conduits will extend into the Structural Root Zone (Figure C and Photo A). Major root loss is likely and tree destabilisation is possible. The tree should be retained until the time of excavation. The extent of root damage should be assessed by the Project Arborist during excavation. The Project Arborist should determine if tree removal is required based on the extent of root loss. The option of tree retention should be available if major root loss is avoidable.  **Figure C:** Plan mark up showing the SRZ spread of Tree 7 and likely extent of excavation (red hatching).

Photo A: Area where excavation may be required in the proximity of Tree 7.

5.2 Potential Impacts of Proposal on Retained Trees

Tree Number	Retention Value	Works proposed within the Tree Protection Zone (TPZ)
1	High	Excavation for new wall construction and drainage is proposed within the TPZ. Less than 5% of the TPZ area will be affected. Some minor root pruning may be required. The tree is likely to tolerate this with no notable impact.
4	Medium	Excavation for new wall construction and drainage is proposed within the TPZ. Less than 5% of the TPZ area will be affected. Some minor root pruning may be required. The tree is likely to tolerate this with no notable impact.
5	Medium	Excavation for new wall construction and drainage is proposed within the TPZ. Less than 5% of the TPZ area will be affected. Some minor root pruning may be required. The tree is likely to tolerate this with no notable impact.
2	High	No works are proposed within the TPZ. No impact is expected.
6	Medium	
3, 8, 9	Low	

Incidental Impacts: There is the potential for incidental/accidental damage to the trunk, canopy and shallow roots of all retained trees throughout the construction process. Trees are commonly impacted on construction sites in the following ways.

- Stripping of topsoil and removal of organic material form 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.

These impacts can be easily avoided through communication with building contractors and basic tree protection measures.

6 Recommendations

6.1 Site Establishment –Prior to Construction

Appointment of a Project Arborist: An Arborist with an AQF Level 5 qualification in Arboriculture and experience in tree protection within construction sites should be engaged prior to the commencement of work on the site. The Project Arborist should be present at the following times:

- Project Commencement to meet with the Site Foreman and discuss tree protection requirements.
- Following installation of tree protection fencing.
- During excavation within a 2m radius of Tree 7.
- At any time that tree roots greater than 40mm diameter are exposed with the TPZ of any retained tree.
- At project completion to verify tree protection and retention.

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 around the Tree Protection Zones as defined in the Tree Protection Plan (Attachment C). Tree Protection Fencing should consist of 1.8 metre high chainlink panels on moveable concrete pads. Tree Protection Fencing should be clamped at each panel junction.

Tree Protection Fencing should not be moved at any time without consultation with the Project Arborist. An example of adequate tree protection fencing is detailed below.

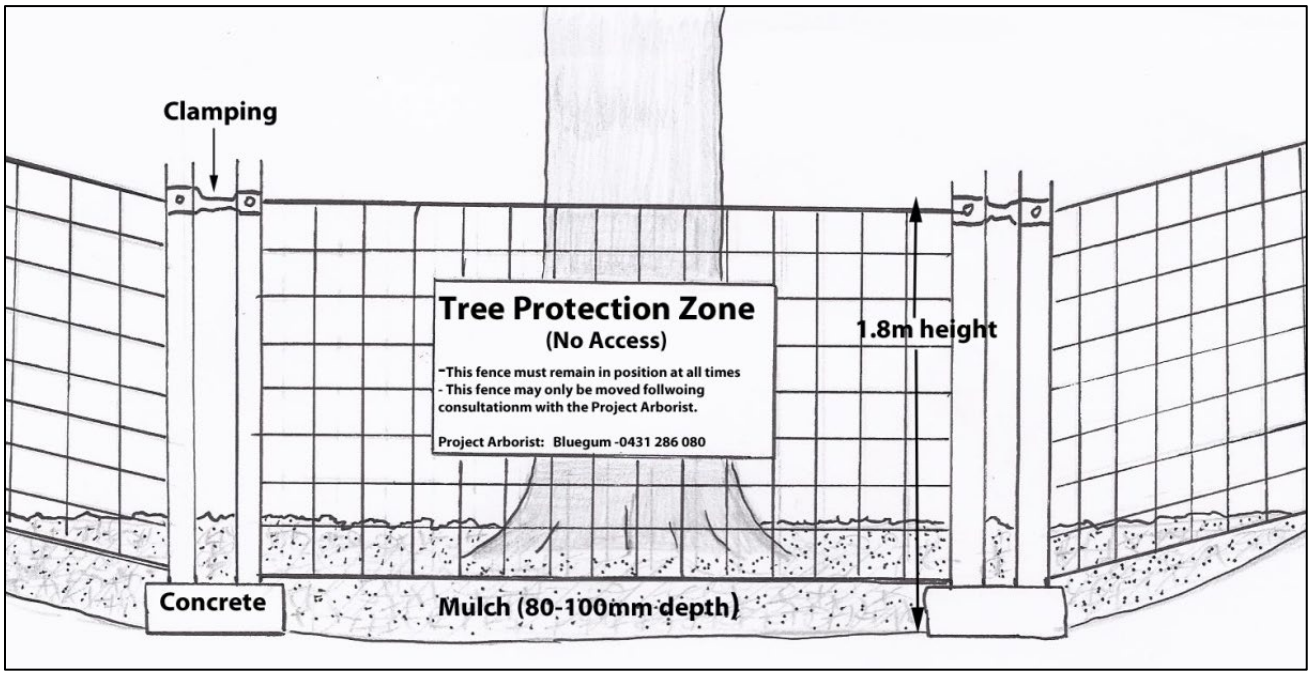


Figure D: Example of adequate tree protection fencing

Site Clearing and Grading: There must no soil scraping or grading within the Tree Protection Zones of retained trees. The existing ground cover vegetation and topsoil within the Tree Protection Zones must be retained throughout the project.

6.2 During Wall Demolition / Excavation

Tree Protection Zones: Refer to the Tree Assessment Table (Attachment A) and Tree Protection Plan (Attachment C) for the spread of TPZ's of trees nominated for retention. The following should be prohibited within the Tree Protection Zones:

- Stripping of topsoil or organic surface material.
- Stockpiling of spoil or fill
- Storage of building material, vehicles and machinery.
- Disposal of solid, liquid or chemical waste.
- Any excavation, fill or other construction activity other than that discussed in this report.

6.3 Removal of Tree 7

Removal of Tree 7 is proposed by the design team due to the possibility of root damage during the excavation works.

6.4 Replacement Tree Planting

Replacement planting with a new *Callsitemon viminalis* should be undertaken if Tree 7 is removed. This should be supplied as advanced stock in minimum container size of 45L. Planting should be undertaken by a horticulturalist during the final landscaping stage of the project.

6.5 Post Construction Tree Care

At the completion of the project, the retained trees should be inspected by the Project Arborist. Depending on the health and vitality of retained trees, the Project Arborist may prescribe some remedial tree care. This may include installation of temporary or permanent irrigation, application of soil conditioners, compost application and installation of mulch.

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 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.
- 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.
- 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.

Tree No.	Common Name/ Genus Species	Trunk Diameter (cm)	Height (m)	Canopy Spread Radius (m)	Age Class	Health / Vitality	Structural Condition	Tree Protection Zone (m)	Structural Root Zone (m)	Estimated Life Expectancy (ELE)	Landscape and Environmental Significance	Retention Value	Comments	Likely Construction Impacts	Proposed Action.
1	Wallangarra White Gum, *Eucalyptus scoparia*	55	13	5	M	G	G	6.6	2.6	Long (30+ yrs)	2	High	Not plotted on the survey.	Excavation for new wall construction and draiange is proposed within the TPZ. Less than 5% of the TPZ area will be affected.	Retain.
2	Swamp Mahogany, *Eucalyptus robusta*	41	12	5	M	F	G	4.9	2.3	Long (30+ yrs)	2	High		Nil.	Retain.
3	Coastal Tea Tree, *Leptospermum lavaegatum*	25, 25, 10, 10	3	2	LM	P	P	2.0	1.5	Short (0-10 yrs)	4	Low	The two largest stems are dead. Foliage only remains on the smaller stems.	Nil.	Retain.
4	Golden Wreath Wattle, *Acacia saligna*	15, 7, 4	6	3	M	G	G	3.0	1.8	Medium (10-30 yrs)	3	Medium	Not plotted on the survey. Potential environmental weed species.	Excavation for new wall construction and draiange is proposed within the TPZ. Less than 5% of the TPZ area will be affected.	Retain.
5	Golden Wreath Wattle, *Acacia saligna*	43	7	6	M	G	G	5.2	2.3	Medium (10-30 yrs)	3	Medium	Potential environmental weed species.	Excavation for new wall construction and draiange is proposed within the TPZ. Less than 5% of the TPZ area will be affected.	Retain.
6	Claret Ash, *Fraxinus oxycarpa 'Raywood'*	17	7	3	M	F	G	2.0	1.0	Medium (10-30 yrs)	3	Medium	Street tree. Upper crown thinning indicates declining health.	Nil.	Retain.
7	Weeping Bottlebrush, *Callistemon viminalis*	28	5	3	M	G	G	3.4	1.9	Long (30+ yrs)	3	Medium		Excavation for new wall construction and draiange is proposed within the TPZ and Structural Root Zone. There is a potential for major root loss and tree destabilisation.	Remove.
8	Claret Ash, *Fraxinus oxycarpa 'Raywood'*	13, 12	3	1	M	P	F	2.0	1.0	Short (0-10 yrs)	3	Low	Street tree. Upper crown dieback indicates poor health.	Nil.	Retain.
9	Claret Ash, *Fraxinus oxycarpa 'Raywood'*	13	3	1	M	P	F	2.0	1.0	Short (0-10 yrs)	3	Low	Street tree. Upper crown dieback indicates poor health.	Nil.	Retain.

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.

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 circumfrence. 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)**: There 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 x 50) $^{0.42}$ x 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.

<table>
<tr><td rowspan="6">Landscape & Environmental Significance</td><td></td><td colspan="4">Estimated Life Expectancy</td></tr>
<tr><td></td><td>Long</td><td>Medium</td><td>Short</td><td>Removal</td></tr>
<tr><td>Very High (1)</td><td colspan="2" rowspan="2">HIGH</td><td rowspan="2">MEDIUM</td><td rowspan="2"></td></tr>
<tr><td>High (2)</td></tr>
<tr><td>Medium (3)</td><td colspan="2">MEDIUM</td><td rowspan="3" colspan="2">LOW</td></tr>
<tr><td>Low (4)</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>Very Low (5)</td></tr>
</table>

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.

***Note:** 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.

.

Bluegum
Tree Care and Consultancy
Alexis Anderson - 0431 286 080
info@bluegumarborist.com.au
AQF Level 5 -Consulting Arborist

Tree Protection Plan

Uniting Wesley Heights

LEGEND			
Tree Protection Zone		Tree Protection Fencing	
Structural Root Zone		Tree 7 to be removed if major root loss is unavoidable.	

-This plan must be read in conjunction with the Arboricultural Impact Assessment report dated March 2024.

-This Tree Protection Plan was prepared with the Site Plan, Architectem as a base.

-Tree protection requirements should be reviewed and finalised following the start-up meeting between the Project Arborist and Site Foreman.