Arboricultural Impact Assessment

Proposed Alterations & Additions at

16 Powderworks Road, North Narrabeen

Date: August 2019
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 Introduction

2.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Daniel Payne in relation to the existing trees and a proposed alterations and additions at 16 Powderworks 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 and granny flat located at the rear of the site. The proposed works include alterations and additions to the granny flat at the rear.

2.3 Subject Trees

Six (6) trees have been assessed due to their proximity to the proposed works. Refer to Figure A (following page) for tree locations. These are made up of the following species:

- Weeping Bottlebrush, *Callistemon viminalis* (Trees 1-5)
- Macadamia Tree, *Macadamia tetraphylla* (Tree 6)

Each of the assessed trees is protected within the Northern Beaches LGA. Each of the assessed trees is a planted Australian native. These trees are not locally native or from remnant bushland seed stock.

None of the trees were assessed as having major significance including heritage significance and no tree is listed on a register of significant trees. None of the assessed trees are protected under the Threatened Species Conservation Act (1995) or Biodiversity Conservation Act (1999).

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

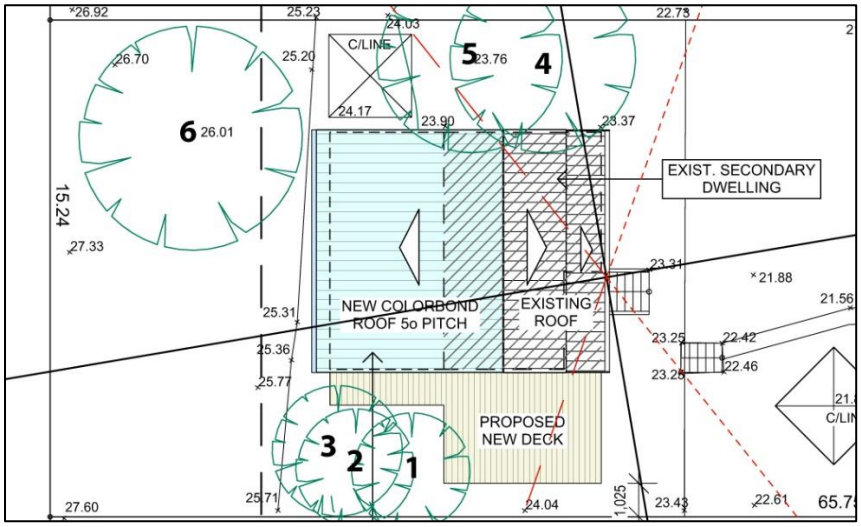

Figure A: Excerpt from the Site Analysis Plan showing tree locations and

3 Methodology

3.1 Site Inspection/Tree Assessment

Site inspection and tree assessment was undertaken by Alexis Anderson on the 14th of August, 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 Plans and Diagrams

This report is based upon a review of the set of plans provided by JJ Drafting (dated August 2019). The plans shown within this report have been derived from the Site Analysis Plan (DA 01).

No undergound services plans, hydraulics plans, landscaping plans or engineering detail were available for review at the time of this 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.

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	Weeping Bottlebrush, *Callistemon viminalis*	180mm, 150mm	10m	3m	Mature	Good	Good	Long (30+ yrs)	3	Medium
		Comments: Planted Australian native. Forms part of a group of 3 trees.								
2	Weeping Bottlebrush, *Callistemon viminalis*	170mm, 120mm, 120mm	10m	2m	Mature	Good	Good	Long (30+ yrs)	3	Medium
		Comments: Planted Australian native. Forms part of a group of 3 trees.								
3	Weeping Bottlebrush, *Callistemon viminalis*	150mm, 130mm, 120mm	10m	3m	Mature	Good	Good	Long (30+ yrs)	3	Medium
		Comments: Planted Australian native. Forms part of a group of 3 trees.								
4	Weeping Bottlebrush, *Callistemon viminalis*	180mm, 180mm, 180mm, 180mm	10m	3m	Mature	Good	Good	Long (30+ yrs)	3	Medium
		Comments: Planted Australian native. Forms part of a group of 2 trees.								
5	Weeping Bottlebrush, *Callistemon viminalis*	220mm, 190mm, 160mm	10m	3m	Mature	Good	Good	Long (30+ yrs)	3	Medium
		Comments: Planted Australian native. Forms part of a group of 2 trees.								
6	Macadamia Tree, *Macadamia tetraphylla*	190mm, 180mm	11m	4m	Mature	Good	Good	Long (30+ yrs)	3	Medium
		Comments: Planted Australian native.								

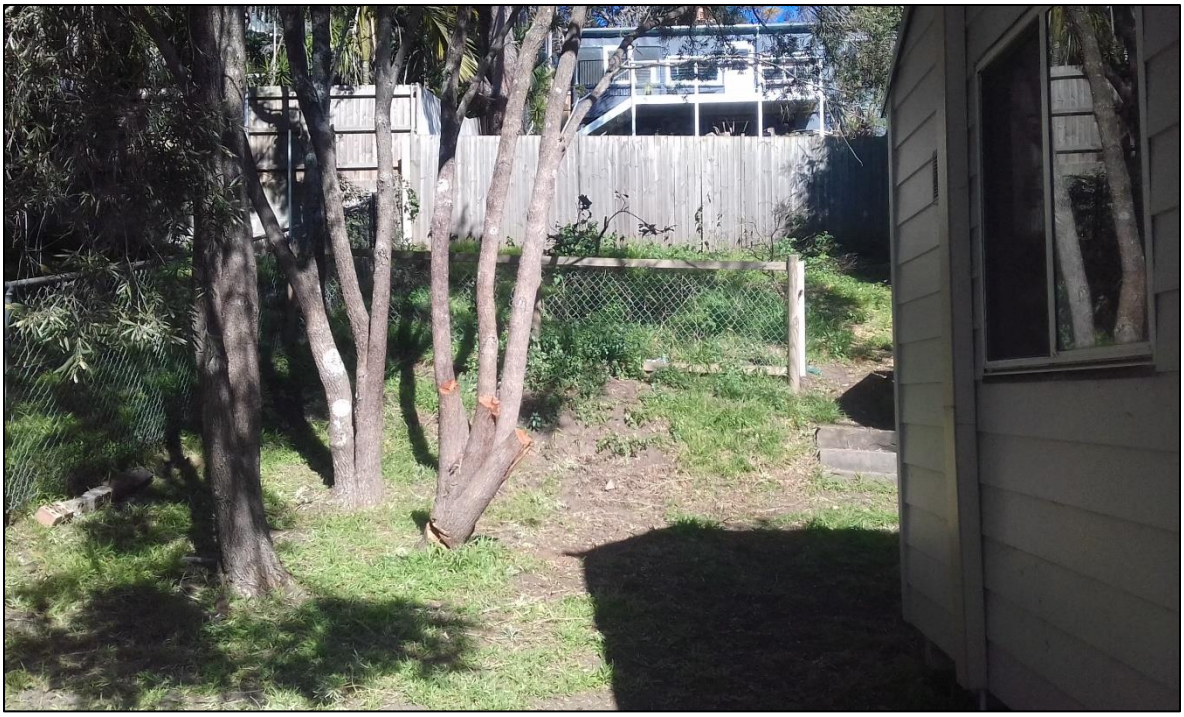

Photo A: Trees 1, 2 and 3 taken facing south.

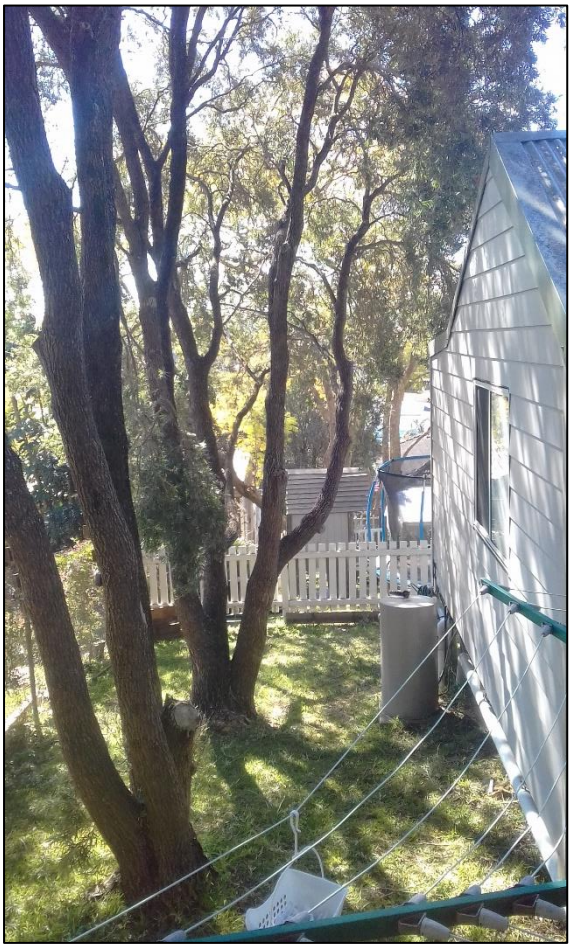

Photo B: Trees 4 and 5 taken facing north.

Photo C: Tree 6 taken 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	2.8m	1.9m
2	2.9m	1.9m
3	2.8m	1.9m
4	4.3m	2.2m
5	4.0m	2.1m
6	3.1m	2.0m

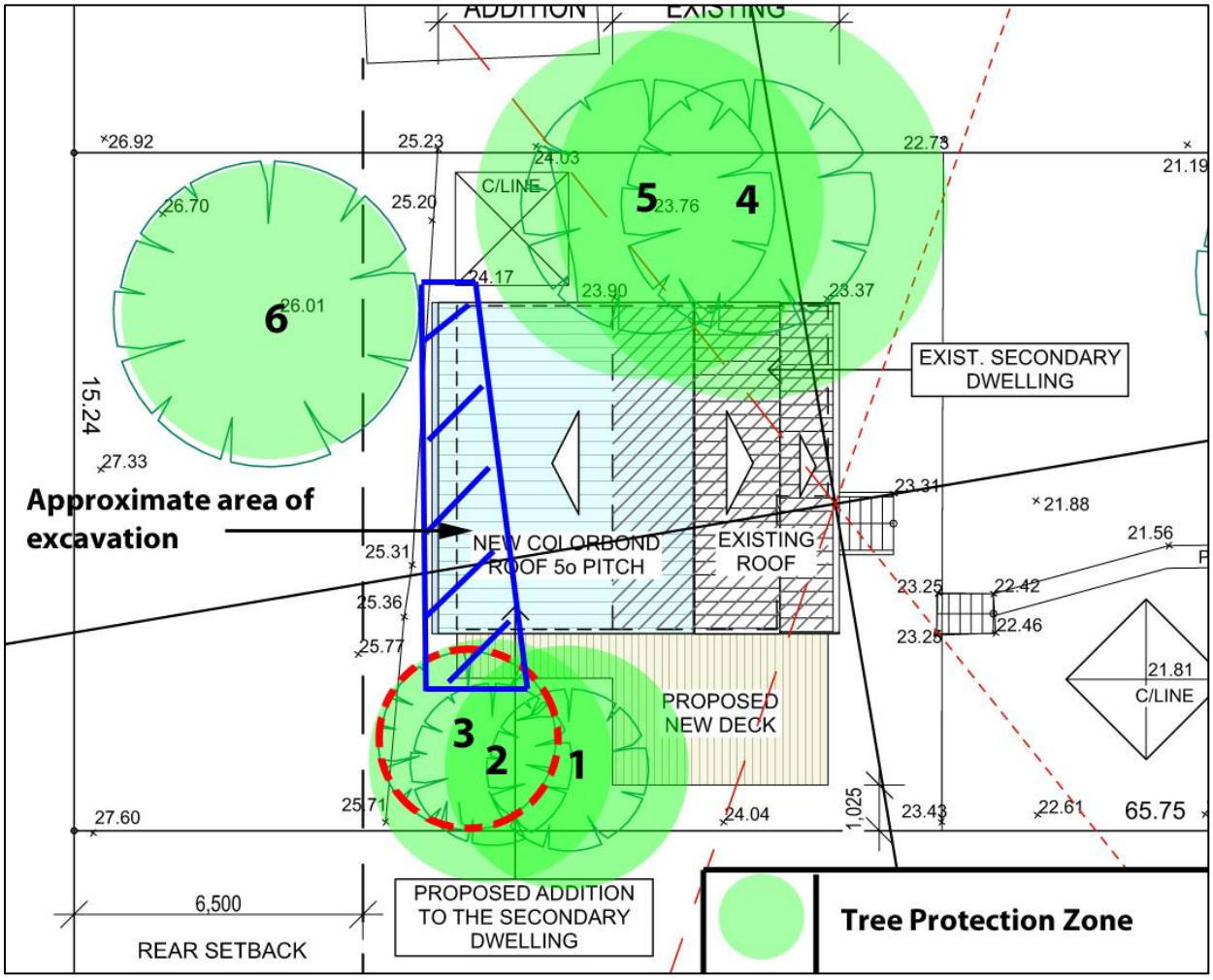

Figure B: Excerpt from the Site Analysis Plan showing the TPZ of retained trees.

5 Potential Impacts of Proposed Works

5.1 Trees Proposed for Removal

Tree Number/Species	Retention Value	Reason for Removal
3 Weeping Bottlebrush	Medium	Excavation for the deck sub-structure is proposed within the Structural Root Zone. Major root loss and tree destabilisation is likely. The canopies of the remaining two (2) trees in the group will be able to spread into the space occupied by Tree 3. There is unlikely to be a long-term reduction in canopy cover.

5.2 Potential Impacts of Proposed Works on Retained Trees

Tree Number/Species	Retention Value	Works Proposed Within the Tree Protection Zone (TPZ)
1 Weeping Bottlebrush	Medium	Excavation for the deck sub-structure is proposed within the TPZ. Less than 10% of the TPZ area will be affected. Some pruning of fine absorbing roots and woody transport roots may be required. These trees are likely to tolerate this impact and remain viable in the long-term.
2 Weeping Bottlebrush	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 plumbing upgrades and landscape construction.
- Bark/trunk and branch injuries from accidental contact with machinery.

6 Recommendations

6.1 Site Establishment –Prior to Construction

Appointment of a Project Arborist: An Arborist with an AQF Level 5 qualification should be engaged prior to the commencement of work on the site. The Project Arborist may be required at the following times:

- Following installation of trunk protection.
- During earthworks within the TPZ of retained trees.
- At project completion to verify tree protection and retention.

Tree Removal: Tree 3 is proposed to be removed. Tree removal works should be undertaken in accordance with the WorkSafe Australia *Guide to Managing Risks of Tree Trimming & Removal Work.*

Trunk and Ground Protection (Trees 1, 2, 4, 5): Trunk battening and ground protection is recommended for Trees 1, 2, 4, 5. The purpose of trunk battening is to prevent accidental injury to bark that often occurs on construction sites. The purpose of ground protection is to prevent soil compaction and soil compaction. This should be installed prior to commencement of works. Detail of adequate trunk and soil protection is outlined in Figure C below.

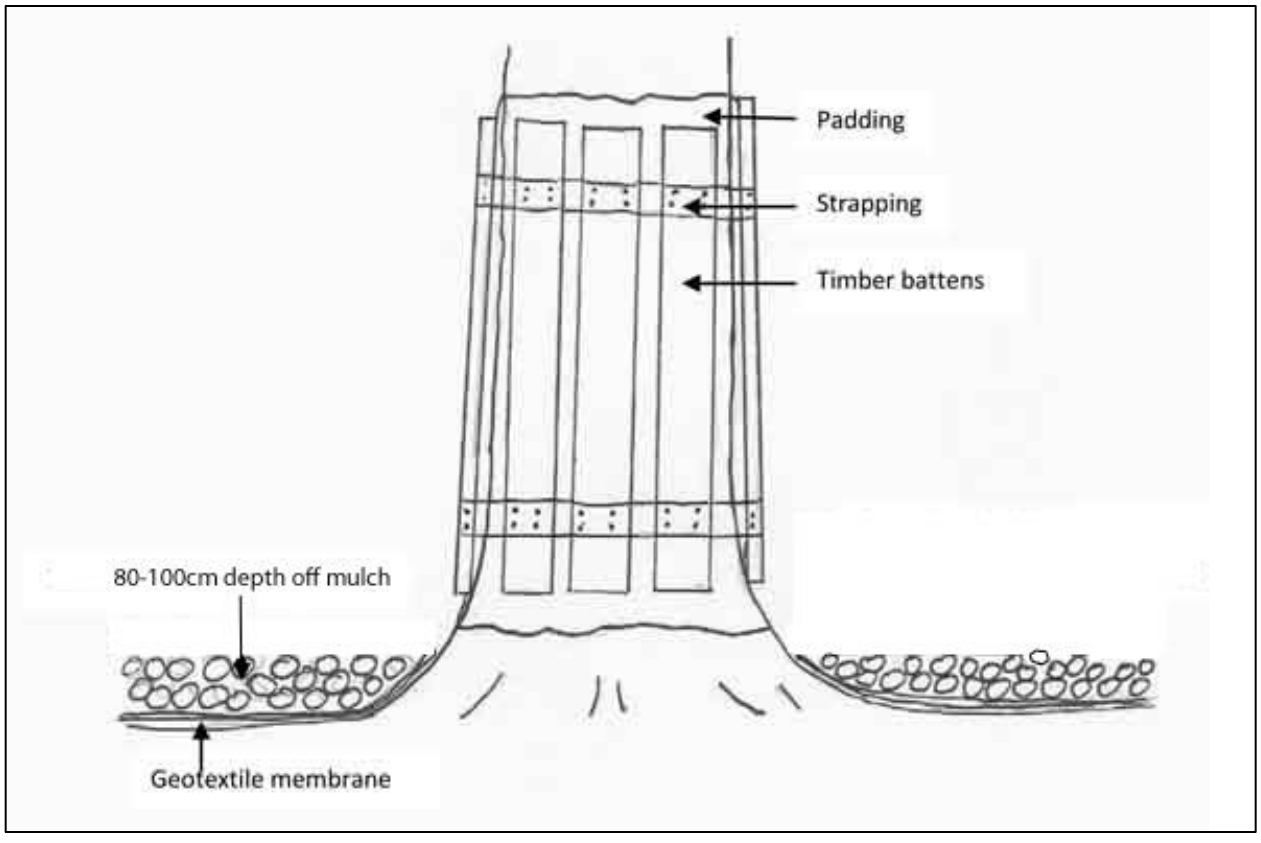

Figure C: Detail of trunk and ground protection.

6.2 During Construction

Excavation for the Deck Sub-Structure: Excavation for the eastern edge of the proposed deck should be undertaken with care using hand tools (Figure D). Any exposed tree roots should be cleanly cut using a hand saw or secateurs. The purpose of this is to prevent additional root injury (cracking/tearing) that typically occurs when roots are pruned using an excavator. This process should be photographed and documented for tree protection certification purposes.

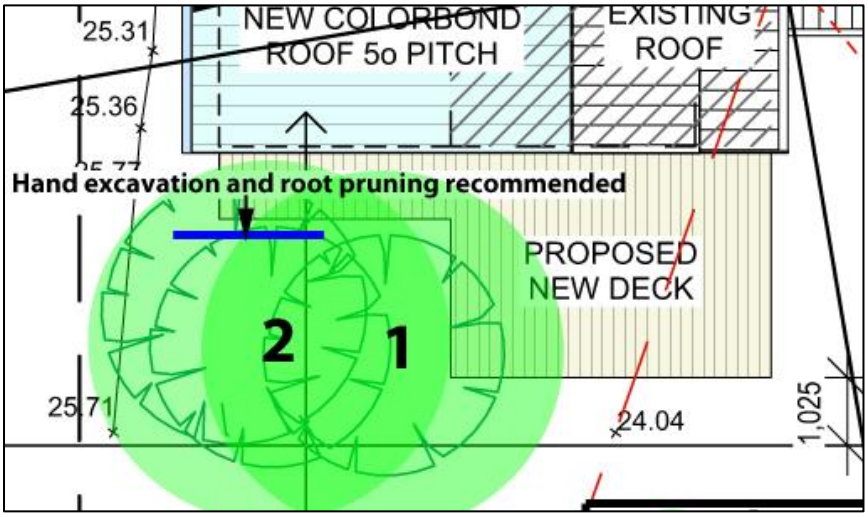

Figure D: Area where hand excavation and root pruning is recommended.

Sewer and Stormwater Connection: The existing underground services alignments and connection points should be continued with the new plumbing. The purpose of this is to avoid additional trenching and associated root loss.

Tree Protection Zones: The following should be prohibited within the Tree Protection Zone 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.

6.3 Post Construction

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, fertiliser 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 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

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. 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*.

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.

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 and 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. 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). The **D** in the formula is the trunk diameter measured above the root buttress. This is 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.

<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="3"></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="3" 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. Loss of these trees would have an impact the landscape amenity or environmental value of the site. High Retention Value trees can be considered for removal if it can be demonstrated that retention is not feasible due to site constraints.

MEDIUM Retention Value: These trees are worthy of retention and 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 are not considered to be a constraint to design layout. Some of these trees could 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.

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