



Arboricultural Impact Assessment

**Alterations & Additions at
18-20 Sturdee Lane, Lovett Bay**

Client: F Loader

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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

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2 Summary

This Arboricultural Impact Assessment (AIA) is based on one hundred and twelve (112) trees located at 18-20 Sturdee Lane, Lovett Bay (subject site).

The tree population of the site consists of locally indigenous natives and planted exotics. The proposed works include demolition of the existing cabin and construction of a games room pavilion and a bedroom pavilion.

Refer to the Tree Protection Plan (Attachment C) for tree locations. Refer to the Tree Assessment Table (Attachment A) for the species and a detailed description of the assessed trees.

Four (4) of the Medium Retention Value trees are proposed to be removed. One (1) of these is exempt from council protection as it is less than 5m in height.

All other trees on the site are able to be retained. Ten (10) trees have construction works proposed within their TPZ's. Recommendations have been made regarding tree protection measures to limit the potential for impact on retained trees.

3 Introduction

3.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Fiona Loader in relation to the existing trees and a proposed alterations and additions at 18-20 Sturdee Lane, Lovett Bay (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 is a steeply sloping site with a northerly aspect. The site is occupied by a two storey dwelling, cabana building and one storey cabin.

It is proposed to demolish the existing cabin and construct of a games room pavilion and a bedroom pavilion.

A new wastewater management system has been approved for the site.

3.3 Subject Trees

All trees within the site have been assessed. The tree population of the site is made up of locally indigenous natives and planted exotics.

Part of the site is occupied by species assemblage typical of Pittwater Spotted Gum Forest a critically endangered ecological community.

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

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

4 Methodology

4.1 Site Inspection

Site inspection and tree assessment was undertaken on the 5th of December, 2018. 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

The set of plans provided by James de Soyres & Associates (Rev A) were reviewed as part of this assessment.

The Landscape Plan prepared by Trish Dobson was reviewed.

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 or 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	Reason for Removal
99, 100, 109	Medium	Within the proposed building footprint.
94	Medium	Not protected under Part 3 of SEPP (Vegetation in Non-Rural Areas) 2017 as it is less than 5m in height. Located within the proposed building footprint. Approval is not required for removal of this tree.

5.2 Potential Impacts of Proposal on Retained Trees

Tree Number	Retention Value	Works proposed within the Tree Protection Zone (TPZ)
72, 80	High	The proposed new retaining wall and building is within the TPZ.
75, 78	Medium	The building is to be fully elevated on pier footings with excavation limited to the locations of piers. Some pruning of woody transport roots and fine absorbing roots may be required during excavation for pier footings. It will be possible for the majority of tree roots to exist beneath the new building. The new retaining wall is to replace the existing retaining wall at a similar alignment. No new excavation upslope of the existing wall is proposed. The new retaining wall toe footing will be on the downslope side of the wall.
93	High	The building is to be fully elevated on pier footings with excavation limited to the locations of piers. Some pruning of woody transport roots and fine absorbing roots may be required during excavation for pier footings. It will be possible for the majority of tree roots to exist beneath the new building.
81, 85, 90, 95	Medium	
97	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 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.

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

6 Recommendations

6.1 Site Establishment –Prior to Demolition/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:

- Following installation of tree protection fencing, trunk battening and ground protection.
- During any excavation within the TPZ of retained trees.
- At any time tree protection fencing is required to be altered.
- At project completion to verify tree protection and retention.

Tree Removal: Four (4) trees are proposed to be removed as part of the project. Tree removal contractors should be briefed on the need to protect retained trees during tree removal operations. The mulch collected during the tree removal operation should be retained on-site to be spread within the Tree Protection Zones of retained trees.

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

Tree Protection Fencing: Tree Protection Fencing should be installed prior to any machinery or materials being brought 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 length star pickets linked with web-mesh or shade cloth.

Standard temporary fencing is not recommended for this site due to the steep topography.

Signage should be attached to each section of fencing stating; **Tree Protection Zone** and the contact details of the Project Arborist.

Tree Protection Fencing should not be moved at any time without consultation with the Project Arborist.

Trunk and Ground Protection (Trees 81, 90, 93): Trunk and ground protection is recommended for Trees 81, 90 and 93 as an alternative to fencing due to allow space for access and movement during construction.

Trunk protection is aimed at preventing accidental injury to the bark and cambium that often occurs on construction sites during transport of materials and movement of machinery. Ground protection is aimed at preventing soil compaction, soil contamination, damage to surface roots and disruption of the natural soil profile. Refer to Figure A below for detail of adequate trunk and ground protection.

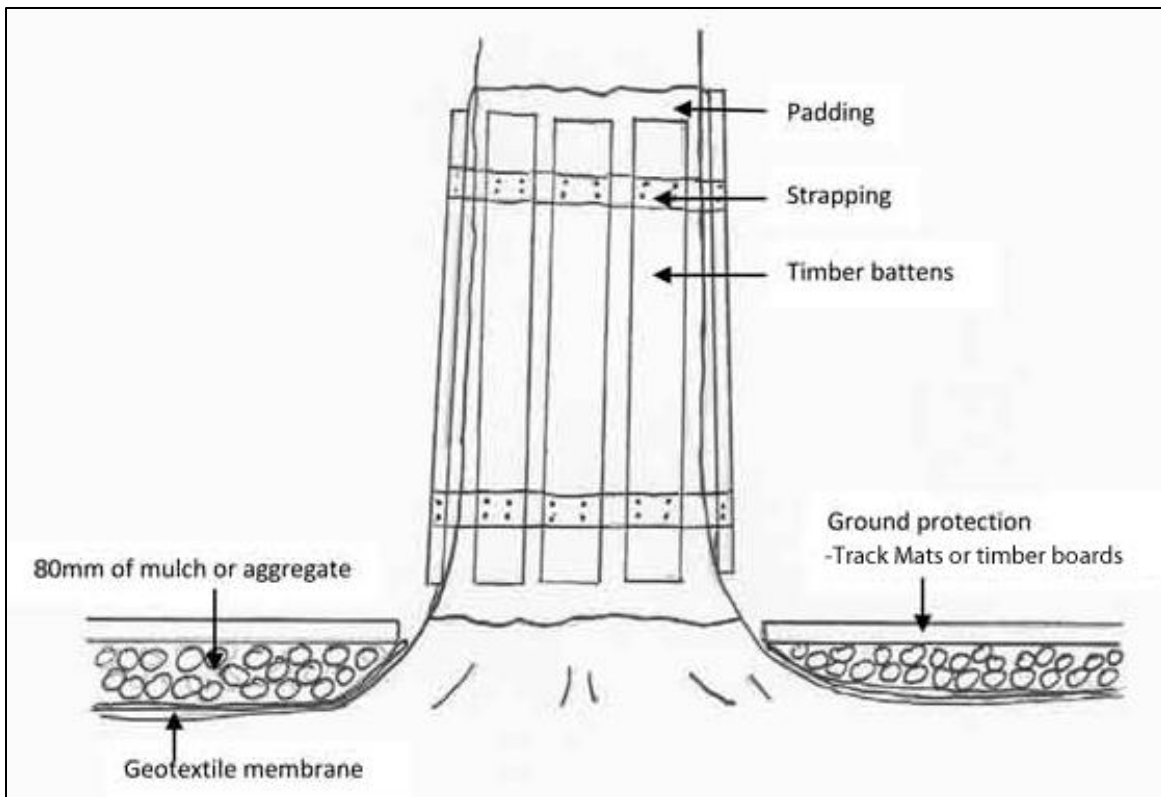


Figure A: Detail of adequate trunk and ground protection

6.2 During Construction

Excavation for building footings: Excavation for pier footings is proposed within the TPZ of Trees 72, 75, 78, 80, 81, 85, 90, 93, 95 and 97. Excavation within the TPZ's of these trees should be undertaken using hand tools within the top 300mm of soil or to the depth of bedrock. All tree roots encountered must be cleanly cut using a hand saw or secateurs. The purpose of this is to avoid additional unnecessary root damage such (tearing/splintering) that typically occurs when roots are pruned using an auger and to minimise the surface area of pruning wounds. Machine excavation may continue beyond this depth.

Retaining Wall Construction: The new retaining wall at the rear of the games room pavilion is to be built at the same alignment as the existing retaining wall. The toe footing is to be on the downslope side of the wall. There is to be no new excavation upslope of the existing soil cut away.

Water Management Works: All stormwater lines are to be suspended to the underside of the floor entirely above existing levels.

All pipes connecting rainwater and sewer lines running down/upslope from the pavilions are to be installed above the ground surface by following a path between the gaps in surface boulders and burying the pipe with leaf/woodchip mulch. If the pipe is required to be buried, all excavation must be undertaken using hand tools with care to avoid root damage. Piping can be threaded above or below any exposed roots as necessary.

Tree Protection Zones: Refer to the Tree Assessment Table (Attachment A) 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.
- Storage of 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.

If the existing groundcover is stripped within a Tree Protection Zone, it should be replaced with leaf and woodchip mulch to a depth of 80-100mm.

6.3 Post Construction

Native Tree Planting: New planting of locally native species is proposed to replace trees proposed for removal. Refer to the Landscape Plan for details of new native tree planting.

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, 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 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	DBH (mm)	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	Works Proposed Within the Tree Protection Zone	Proposed Action.
5	Forest She Oak, <i>Allocasuarina torulosa</i>	170	12	3	M	F	G	2.0	1.7	Medium (10-30 yrs)	3	Medium		N/A	Retain
6	Forest She Oak, <i>Allocasuarina torulosa</i>	250	14	5	M	G	G	3.0	1.9	Medium (10-30 yrs)	2	High		N/A	Retain
7	Forest She Oak, <i>Allocasuarina torulosa</i>	300	14	5	M	G	G	3.6	2.1	Medium (10-30 yrs)	2	High		N/A	Retain
8	Spotted Gum, <i>Corymbia maculata</i>	180	22	3	M	G	G	2.2	1.7	Long (30+ yrs)	2	High		N/A	Retain
9	Spotted Gum, <i>Corymbia maculata</i>	900	26	12	M	G	G	10.8	3.2	Long (30+ yrs)	1	High		N/A	Retain
10	Forest She Oak, <i>Allocasuarina torulosa</i>	300	13	5	M	G	G	3.6	2.1	Medium (10-30 yrs)	2	High		N/A	Retain
11	Spotted Gum, <i>Corymbia maculata</i>	450	26	12	M	G	G	5.4	2.5	Long (30+ yrs)	2	High		N/A	Retain
12	Spotted Gum, <i>Corymbia maculata</i>	200	12	3	M	F	G	2.4	1.8	Long (30+ yrs)	3	Medium		N/A	Retain
13	Spotted Gum, <i>Corymbia maculata</i>	300	18	4	M	F	G	3.6	2.1	Long (30+ yrs)	2	High		N/A	Retain
14	Forest She Oak, <i>Allocasuarina torulosa</i>	150	7	3	M	G	G	2.0	1.6	Medium (10-30 yrs)	3	Medium		N/A	Retain
15	Spotted Gum, <i>Corymbia maculata</i>	200	15	3	M	F	G	2.4	1.8	Long (30+ yrs)	3	Medium		N/A	Retain
16	Spotted Gum, <i>Corymbia maculata</i>	290	15	4	M	F	G	3.5	2.1	Long (30+ yrs)	3	Medium		N/A	Retain
17	Forest She Oak, <i>Allocasuarina torulosa</i>	250	8	4	M	F	G	3.0	1.9	Medium (10-30 yrs)	3	Medium		N/A	Retain
18	Spotted Gum, <i>Corymbia maculata</i>	660	28	12	M	G	F	7.9	2.9	Long (30+ yrs)	1	High		N/A	Retain
19	Spotted Gum, <i>Corymbia maculata</i>	190	20	3	M	F	G	2.3	1.7	Long (30+ yrs)	2	High		Nil.	Retain

Tree No.	Common Name/ Genus Species	DBH (mm)	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	Works Proposed Within the Tree Protection Zone	Proposed Action.
20	Spotted Gum, <i>Corymbia maculata</i>	250	17	2	M	F	F	3.0	1.9	Short (0-10 yrs)	3	Low	Canopy decline.	N/A	Retain
21	Spotted Gum, <i>Corymbia maculata</i>	150	13	2	EM	F	G	2.0	1.6	Long (30+ yrs)	3	Medium		Nil.	Retain
22	Spotted Gum, <i>Corymbia maculata</i>	150	13	2	EM	F	G	2.0	1.6	Long (30+ yrs)	3	Medium		Nil.	Retain
23	Spotted Gum, <i>Corymbia maculata</i>	430	25	5	M	F	G	5.2	2.4	Long (30+ yrs)	2	High		Nil.	Retain
24	Spotted Gum, <i>Corymbia maculata</i>	200, 100	13	2	EM	F	G	3.0	1.9	Long (30+ yrs)	3	Medium		Nil.	Retain
25	Spotted Gum, <i>Corymbia maculata</i>	300	13	4	M	F	G	3.6	2.1	Long (30+ yrs)	2	High		N/A	Retain
26	Spotted Gum, <i>Corymbia maculata</i>	100	7	1	EM	P	F	2.0	1.5	Short (0-10 yrs)	4	Low	Almost dead.	N/A	Retain
27	Spotted Gum, <i>Corymbia maculata</i>	150	12	1	EM	F	G	2.0	1.5	Long (30+ yrs)	3	Medium		Nil.	Retain
28	Spotted Gum, <i>Corymbia maculata</i>	300	23	4	M	F	G	3.6	2.1	Medium (10-30 yrs)	2	High		Nil.	Retain
29	Dead Tree	200	18	-	-	-	-	-	-	-	5	Low		Nil.	Retain as habitat
29A	Cheese Tree, <i>Glochidion ferdinandi</i>	200	8	5	M	G	G	2.4	1.8	Long (30+ yrs)	2	High		Nil.	Retain
30	Dead Tree	600	25	-	-	-	-	-	-	-	5	Low		Nil.	Retain as habitat
31	Spotted Gum, <i>Corymbia maculata</i>	850	30	10	M	G	G	10.2	3.1	Long (30+ yrs)	2	High		N/A	Retain
32	Spotted Gum, <i>Corymbia maculata</i>	400	19	6	M	F	G	4.8	2.3	Long (30+ yrs)	2	High		N/A	Retain
33	Spotted Gum, <i>Corymbia maculata</i>	220	16	3	M	F	G	2.6	1.9	Medium (10-30 yrs)	3	Medium		N/A	Retain

Tree No.	Common Name/ Genus Species	DBH (mm)	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	Works Proposed Within the Tree Protection Zone	Proposed Action.
34	Spotted Gum, <i>Corymbia maculata</i>	160	17	2	M	F	G	2.0	1.6	Medium (10-30 yrs)	3	Medium		N/A	Retain
35	Spotted Gum, <i>Corymbia maculata</i>	190	18	3	M	F	G	2.3	1.7	Medium (10-30 yrs)	3	Medium		N/A	Retain
36	Spotted Gum, <i>Corymbia maculata</i>	180	19	2	M	P	F	2.2	1.6	Short (0-10 yrs)	3	Low	In an advanced state of decline.	Nil.	Retain
37	Spotted Gum, <i>Corymbia maculata</i>	800	27	9	M	G	G	9.6	3.1	Long (30+ yrs)	2	High		Nil.	Retain
38	Forest She Oak, <i>Allocasuarina torulosa</i>	300, 200	8	-	-	-	-	-	-	-	-	Low	Dead.	Nil.	Retain
38A	Spotted Gum, <i>Corymbia maculata</i>	500, 150	28	9	M	G	G	6.5	2.7	Long (30+ yrs)	2	High		Nil.	Retain
39	Spotted Gum, <i>Corymbia maculata</i>	800	27	11	M	F	F	9.6	3.1	Medium (10-30 yrs)	2	High		N/A	Retain
40	Spotted Gum, <i>Corymbia maculata</i>	450, 200	25	5	M	P	G	7.0	2.6	Medium (10-30 yrs)	2	High	Thinning of the canopy.	Nil.	Retain
41	Spotted Gum, <i>Corymbia maculata</i>	300	22	4	M	F	G	3.6	2.1	Long (30+ yrs)	2	High		Nil.	Retain
42	Spotted Gum, <i>Corymbia maculata</i>	190	11	2	EM	F	G	2.3	1.7	Long (30+ yrs)	3	Medium		Nil.	Retain
43	Spotted Gum, <i>Corymbia maculata</i>	200	12	1	EM	P	P	2.4	1.8	Short (0-10 yrs)	4	Low	Almost dead.	Nil.	Retain
44	Spotted Gum, <i>Corymbia maculata</i>	120	12	1	EM	F	F	2.0	1.5	Long (30+ yrs)	3	Medium		Nil.	Retain
45	Spotted Gum, <i>Corymbia maculata</i>	150	16	1	EM	F	G	2.0	1.5	Medium (10-30 yrs)	3	Medium	Supressed.	Nil.	Retain
46	Spotted Gum, <i>Corymbia maculata</i>	200	22	2	M	P	F	2.4	1.8	Short (0-10 yrs)	3	Low	Canopy thinning. Supressed.	Nil.	Retain
47	Spotted Gum, <i>Corymbia maculata</i>	280	25	3	M	F	G	3.4	2.0	Medium (10-30 yrs)	2	High	Canopy thinning.	Nil.	Retain

Tree No.	Common Name/ Genus Species	DBH (mm)	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	Works Proposed Within the Tree Protection Zone	Proposed Action.
48	Spotted Gum, <i>Corymbia maculata</i>	340	25	4	M	F	G	4.1	2.2	Medium (10-30 yrs)	2	High	Canopy thinning.	Nil.	Retain
49	Spotted Gum, <i>Corymbia maculata</i>	340	25	6	M	F	G	4.1	2.2	Medium (10-30 yrs)	2	High	Canopy thinning.	Nil.	Retain
50	Cheese Tree, <i>Glochidion ferdinandi</i>	200	9	5	M	G	G	2.4	1.8	Long (30+ yrs)	2	High		Nil.	Retain
51	Spotted Gum, <i>Corymbia maculata</i>	500	24	7	M	G	G	6.0	2.6	Long (30+ yrs)	2	High		Nil.	Retain
52	Forest She Oak, <i>Allocasuarina torulosa</i>	600	13	5	M	F	F	7.2	2.8	Medium (10-30 yrs)	2	High		Nil.	Retain
53	Forest She Oak, <i>Allocasuarina torulosa</i>	410	12	5	M	F	F	4.9	2.4	Medium (10-30 yrs)	2	High		Nil.	Retain
54	Forest She Oak, <i>Allocasuarina torulosa</i>	310	12	4	M	F	F	3.7	2.1	Medium (10-30 yrs)	2	High		Nil.	Retain
55	Dead Tree	300	22	-	-	-	-	-	-	-	5	Low	Dead.	Nil.	Retain
56	Spotted Gum, <i>Corymbia maculata</i>	440	20	6	LM	P	P	5.3	2.4	Short (0-10 yrs)	3	Low	In an advanced state of decline. Severe trunk wound from 0-2 metres.	Nil.	Remove. Retain trunk and lower branching structure for wildlife habitat.
57	Red Bloodwood, <i>Corymbia gummifera</i>	500	18	6	M	F	F	6.0	2.6	Medium (10-30 yrs)	2	High	Cavity at the base. Good buttress root support.	N/A	Retain
58	Spotted Gum, <i>Corymbia maculata</i>	200	18	2	M	P	F	2.4	1.8	Medium (10-30 yrs)	3	Medium	Suppressed. In decline.	Nil.	Retain
59	Forest She Oak, <i>Allocasuarina torulosa</i>	550	13	5	LM	P	F	6.6	2.7	Short (0-10 yrs)	3	Low	Declining health. Dieback of the upper canopy. Severe trunk cavity at the base.	N/A	Retain
60	Blueberry Ash, <i>Eleoacarpus reticulatis</i>	120	8	3	M	G	G	2.0	1.5	Medium (10-30 yrs)	3	Medium		Nil.	Retain
61	Spotted Gum, <i>Corymbia maculata</i>	540	25	7	M	F	G	6.5	2.7	Long (30+ yrs)	2	High	Dead branches.	Nil.	Retain
62	Red Bloodwood, <i>Corymbia gummifera</i>	300	12	3	M	F	F	3.6	2.1	Medium (10-30 yrs)	3	Medium	Suppressed.	Nil.	Retain

Tree No.	Common Name/ Genus Species	DBH (mm)	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	Works Proposed Within the Tree Protection Zone	Proposed Action.
63	Spotted Gum, <i>Corymbia maculata</i>	500	26	7	M	F	F	6.0	2.6	Medium (10-30 yrs)	2	High	Upper canopy thinning.	Nil.	Retain
64	Spotted Gum, <i>Corymbia maculata</i>	420	25	6	M	F	G	5.0	2.4	Long (30+ yrs)	2	High		Nil.	Retain
65	Red Bloodwood, <i>Corymbia gummifera</i>	300	12	3	M	P	P	3.6	2.1	Short (0-10 yrs)	3	Low	Almost dead.	Nil.	Retain
66	Forest She Oak, <i>Allocasuarina torulosa</i>	350	12	3	LM	P	G	4.2	2.2	Short (0-10 yrs)	3	Low		Nil.	Retain
67	Spotted Gum, <i>Corymbia maculata</i>	250, 250, 200	20	6	M	G	G	4.9	2.3	Long (30+ yrs)	2	High		N/A	Retain
68	Spotted Gum, <i>Corymbia maculata</i>	450	27	8	M	G	G	5.4	2.4	Long (30+ yrs)	2	High		N/A	Retain
69	Forest She Oak, <i>Allocasuarina torulosa</i>	200	11	3	M	F	G	2.4	1.8	Medium (10-30 yrs)	3	Medium		N/A	Retain
70	Spotted Gum, <i>Corymbia maculata</i>	550	22	8	M	G	G	6.6	2.6	Long (30+ yrs)	2	High		N/A	Retain
71	Cheese Tree, <i>Glochidion ferdinandi</i>	400	10	4	LM	P	G	4.8	2.3	Short (0-10 yrs)	3	Low	Covered with vine. Almost dead.	Nil.	Retain
72	Forest She Oak, <i>Allocasuarina torulosa</i>	450, 200	16	6	M	F	G	5.9	2.5	Long (30+ yrs)	2	High	Vine is starting to smother the canopy.	New retaining wall and building construction proposed within the TPZ.	Retain
73	Spotted Gum, <i>Corymbia maculata</i>	100	7	1	EM	P	G	2.0	1.5	Short (0-10 yrs)	4	Low	Almost dead.	Nil.	Retain
74	Spotted Gum, <i>Corymbia maculata</i>	100	8	1	EM	F	G	2.0	1.5	Medium (10-30 yrs)	3	Medium	Supressed.	Nil.	Retain
75	Narrow-leaved Geebung, <i>Persoonia linearis</i>	150	5	2	M	F	G	2.0	1.5	Medium (10-30 yrs)	3	Medium	Supressed.	New retaining wall and building construction proposed within the TPZ.	Retain
76	Umbrella Tree, <i>Schefflera actinophylla</i>	90, 90, 90	7	2	M	G	G	2.0	1.5	Long (30+ yrs)	4	Low	Weed species. Exempt from protection under the LEP.	Nil.	Retain

Tree No.	Common Name/ Genus Species	DBH (mm)	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	Works Proposed Within the Tree Protection Zone	Proposed Action.
77	Spotted Gum, <i>Corymbia maculata</i>	530	26	8	M	F	G	6.4	2.6	Long (30+ yrs)	2	High	Dead branches in the lower canopy.	Nil.	Retain
78	Fiddle Leaf Fig, <i>Ficus lyrata</i>	80, 80	8	3	M	G	G	2.0	1.5	Long (30+ yrs)	3	Medium		New retaining wall and building construction proposed within the TPZ.	Retain
79	Spotted Gum, <i>Corymbia maculata</i>	230	13	3	EM	F	G	2.8	1.9	Long (30+ yrs)	3	Medium		Nil.	Retain
80	Red Bloodwood, <i>Corymbia gummifera</i>	630	24	10	M	F	G	7.6	2.8	Long (30+ yrs)	2	High	Large dead limb in the lower canopy.	New retaining wall and building construction proposed within the TPZ.	Retain
81	Blueberry Ash, <i>Eleoacarpus reticulatis</i>	200, 150	10	4	M	F	G	3.0	1.8	Long (30+ yrs)	3	Medium	Canopy smothered by vine.	Fully elevated building construction is proposed within the TPZ.	Retain
82	Sweet Pittosporum, <i>Pittosporum undulatum</i>	120, 80	7	2	M	G	G	2.0	1.5	Long (30+ yrs)	3	Medium		Nil.	Retain
83	Spotted Gum, <i>Corymbia maculata</i>	180	4	3	EM	G	G	2.2	1.6	Long (30+ yrs)	3	Medium		N/A	Retain
84	Sweet Pittosporum, <i>Pittosporum undulatum</i>	90	4	1	EM	P	G	2.0	1.5	Short (0-10 yrs)	4	Low	Poor health.	Nil.	Retain
85	Ginkgo Tree, <i>Ginkgo biloba</i>	50	4	1	EM	F	G	2.0	1.5	Long (30+ yrs)	3	Medium		Fully elevated building construction is proposed within the TPZ.	Retain
86	Blueberry Ash, <i>Eleoacarpus reticulatis</i>	190	9	3	M	F	G	2.3	1.7	Medium (10-30 yrs)	3	Medium	Pockets of decay at the base.	Nil.	Retain
87	Blueberry Ash, <i>Eleoacarpus reticulatis</i>	120	7	3	M	F	G	2.0	1.5	Medium (10-30 yrs)	3	Medium		Nil.	Retain
88	Spotted Gum, <i>Corymbia maculata</i>	500	25	7	M	G	G	6.0	2.5	Long (30+ yrs)	2	High		Nil.	Retain
89	Spotted Gum, <i>Corymbia maculata</i>	350, 280	23	7	M	G	G	5.4	2.4	Long (30+ yrs)	2	High		Nil.	Retain
90	Kentia Palm, <i>Howea forsteriana</i>	100	8	2	M	G	G	2.0	1.5	Long (30+ yrs)	3	Medium	Part of a group of 6 Palm Trees -(mostly Bangalow Palms).	Fully elevated building construction is proposed within the TPZ.	Retain
91	Golden Robinia, <i>Robinia pseudoacacia</i> 'Frisia'	200	8	5	M	G	G	2.4	1.7	Long (30+ yrs)	3	Medium		Nil.	Retain
92	Cypress Pine, <i>Cupressus sp.</i>	530	17	3	M	G	G	6.4	2.6	Long (30+ yrs)	2	High		Nil.	Retain
93	Spotted Gum, <i>Corymbia maculata</i>	930	28	10	M	F	G	11.2	3.2	Long (30+ yrs)	2	High	Dead branches in the lower and central canopy.	Fully elevated building construction is proposed within the TPZ.	Retain

Tree No.	Common Name/ Genus Species	DBH (mm)	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	Works Proposed Within the Tree Protection Zone	Proposed Action.
94	Sweet Viburnum, <i>Viburnum odoratissimum</i>	250	4	5	M	G	G	3.0	1.9	Long (30+ yrs)	3	Medium	Exempt from protection under Part 3 SEPP (Vegetation in non-rural areas) 2017.	Within the proposed building footprint.	Remove. Council approval is not required for the removal of this tree.
95	Forest She Oak, <i>Allocasuarina torulosa</i>	180	9	3	M	G	G	2.2	1.7	Medium (10-30 yrs)	3	Medium		Fully elevated building construction is proposed within the TPZ.	Retain
96	Fiddle Leaf Fig, <i>Ficus lyrata</i>	100	7	4	M	G	G	2.0	1.5	Long (30+ yrs)	3	Medium		Nil.	Retain
97	Umbrella Tree, <i>Schefflera actinophylla</i>	70, 60	7	3	M	G	G	2.0	1.5	Long (30+ yrs)	4	Low		Fully elevated building construction is proposed within the TPZ.	Retain
99	Blueberry Ash, <i>Eleoacarpus reticulatis</i>	90	7	1	EM	F	F	2.0	1.5	Medium (10-30 yrs)	3	Medium	Trunk decay at the base.	Within the proposed building footprint.	Remove.
100	Blueberry Ash, <i>Eleoacarpus reticulatis</i>	90	7	1	EM	G	G	2.0	1.5	Medium (10-30 yrs)	3	Medium		Within the proposed building footprint.	Remove.
101	Fiddle Leaf Fig, <i>Ficus lyrata</i>	100	8	3	M	G	G	2.0	1.5	Long (30+ yrs)	3	Medium		Nil.	Retain
102	Spotted Gum, <i>Corymbia maculata</i>	340	23	8	M	G	G	4.1	2.2	Long (30+ yrs)	2	High		Nil.	Retain
103	Spotted Gum, <i>Corymbia maculata</i>	180	10	2	EM	P	F	2.2	1.7	Medium (10-30 yrs)	3	Medium		Nil.	Retain
104	Spotted Gum, <i>Corymbia maculata</i>	160	8	2	EM	F	F	2.0	1.6	Medium (10-30 yrs)	3	Medium	Suppressed. Canopy skew to the N.	Nil.	Retain
105	Sweet Pittosporum, <i>Pittosporum undulatum</i>	300	8	3	M	F	G	3.6	2.1	Medium (10-30 yrs)	3	Medium		Nil.	Retain
106	Spotted Gum, <i>Corymbia maculata</i>	300	16	4	M	F	G	3.6	2.1	Long (30+ yrs)	3	Medium		Nil.	Retain
107	Magnolia, <i>Magnolia grandiflora</i>	200	7	4	M	G	G	2.4	1.8	Long (30+ yrs)	3	Medium		Nil.	Retain
108	Spotted Gum, <i>Corymbia maculata</i>	50	7	1	IM	F	G	2.0	1.5	Medium (10-30 yrs)	3	Medium	Suppressed. Canopy skew to the NW.	Nil.	Retain
109	Spotted Gum, <i>Corymbia maculata</i>	310	20	5	M	F	G	3.7	2.1	Long (30+ yrs)	3	Medium		Within the proposed building footprint.	Remove.
110	Cypress Pine, <i>Cupressus sp.</i>	350	16	4	M	G	G	4.2	2.2	Long (30+ yrs)	2	High		Nil.	Retain
111	Norfolk Island Pine, <i>Araucaria heterophylla</i>	640	23	7	M	G	G	7.7	2.8	Long (30+ yrs)	2	High		Nil.	Retain
112	Spotted Gum, <i>Corymbia maculata</i>	400	12	6	M	F	G	4.8	2.3	Long (30+ yrs)	2	High		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 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 that 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 Matheny & 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.

		Estimated Life Expectancy			
		Long	Medium	Short	Removal
Significance Environmental Landscape & Significance	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.

***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.

