

# Arboricultural Impact Assessment Report

**Prepared for:** C/O Andrew Croft – ArcLab Pty Ltd

**Address:** 38 Lagoon St  
Narrabeen  
NSW 2101

**Date:** 26 June 2024

**Prepared by:** *Our Garden Path Pty Ltd – Vicki Beecher*  
Consulting Arborist (AQF 5 & AQF 8), Horticulturalist  
(AQF5), BSc Earth Science Geology/ Climate Science  
(Hons)(AQF9)



<b>Document Title</b>	Arboricultural Impact Assessment
<b>Client</b>	c/o Andrew Croft ArcLab Pty Ltd
<b>Project</b>	Cabanas House
<b>Site Details</b>	38 Lagoon St Narrabeen NSW 2101
<b>Date</b>	26/06/2024
<b>Prepared by</b>	Vicki Beecher
<b>Reviewed by</b>	Owen Tebbutt

Version	Date	Details
1	26/06/2024	Draft

## Disclaimer

Information presented in this report is based on an objective study undertaken in response to the brief provided by the client. Any opinions expressed or otherwise are those of the author or authors and are not intended to advocate any proposal or pre-determined position.

This report is to be used in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions, or recommendations made in this report may only be used where the whole original report (or a copy) is referenced to and directly attached to that submission, report, or presentation. Information contained in the report covers only the trees that were inspected and reflects the trees condition at the time of the inspection. There is no guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

## Statement of Authorship

*This study and report were undertaken by OGP at 38 Lagoon St Narrabeen, NSW 2101. The author of the report is Vicki Beecher with qualifications BSc. majoring in Geology and Climate Science with over 25 years' experience in this field, AQF level 5 Horticulture (Arboriculture), AQF level 8 Horticulture (Arboriculture) and AQF level 6 Landscape Construction, Quantified Tree Risk Assessment (QTRA) and ISA Tree Risk Assessment Qualified.*

## Limitations Statement

Information presented in this report is based on an objective study undertaken in response to the brief provided by the client. Any opinions expressed in this report are the professional, objective opinions of the authors and are not intended to advocate any proposal or pre-determined position.

# Table of Contents

<b>1.0</b>	<b>Summary.....</b>	<b>4</b>
<b>2.0</b>	<b>Introduction.....</b>	<b>4</b>
<b>2.1</b>	<b>Background .....</b>	<b>4</b>
<b>2.2</b>	<b>Inspection Method.....</b>	<b>6</b>
<b>2.3</b>	<b>Trees on Development Sites.....</b>	<b>6</b>
<b>3.0</b>	<b>Impacts of the Proposed Works .....</b>	<b>7</b>
<b>3.1</b>	<b>General .....</b>	<b>7</b>
<b>3.2</b>	<b>Trees to be removed.....</b>	<b>8</b>
<b>3.3</b>	<b>Trees to be retained.....</b>	<b>8</b>
<b>4.0</b>	<b>Conclusion .....</b>	<b>8</b>
	<b>Appendix 1: Tree Assessment Schedule.....</b>	<b>13</b>
	<b>Appendix 2: Development Impacts Schedule.....</b>	<b>14</b>
	<b>Appendix 3: Tree Location Plan.....</b>	<b>17</b>
	<b>Appendix 4: Schedule of works and responsibilities .....</b>	<b>18</b>
	<b>Appendix 5: Tree Inspection Criteria.....</b>	<b>19</b>
	<b>Appendix 6: Tree Significance Assessment Criteria &amp; Retention Value Matrix .....</b>	<b>21</b>

## 1.0 Summary

- 1.1 This report has been prepared at the request of Andrew Croft or Arc Lab Pty Ltd on behalf of the owners of 38 Lagoon St Narrabeen, NSW 2101. It concerns the impacts upon trees due to the proposed addition and alterations of the property known as 38 Lagoon St Narrabeen NSW, 2101 ( the site).
- 1.2 The proposed works involve the establishment of a works compound including, materials storage, site personnel access, sections nominated within supplied structural plans as A First Floor Addition – proposed bedroom and B First Floor Addition – proposed bedroom with ensuite and balcony.

The footprint and general arrangement of these works has been provided by ArcLab Pty Ltd and can be found as **Appendix 3**.

- 1.3 A total of thirteen trees which are protected under the State Environmental Planning Policy - Biodiversity and Conservation 2021 Chapter 2 Vegetation in non-rural areas and within Warringah Development Control Plan 2011Part E The Natural Environment Section E1 Preservation of Trees or Bushland Vegetation, have been identified within the site with 3 being impacted by these works. No trees have been identified for removal. Trees identified as impacted and nominated for retention are shown within table 1.

**Table 1:** Trees identified for as impacted by proposed works and nominated for retention.

Tree number	5, 7 and 19
<b>Total</b>	<b>3</b>

- 1.4 Tree 5 has been found to be in decline and as such may require removal irrespective of this DA. A separate Application will be made accordingly pending tissue results.
- 1.5 Information relating to the site's trees can be found as **Appendix 1** Tree Assessment Schedule. Development Impacts and tree protection measures are given within **Appendix 2** Development Impacts Schedule.

## 2.0 Introduction

### 2.1 Background

- 2.1.1 This Arboricultural Impact Assessment (AIA) was prepared for Arc Lab Pty Ltd. It relates to the proposed additions to the property known as 38 lagoon St Narrabeen 2101 including two (2) separate addition areas known as A First Floor Addition – proposed bedroom and B First Floor Addition – proposed bedroom with ensuite and balcony. This report assesses the impacts of construction activities upon adjacent trees and identifies where tree removals

are required. Where trees are identified for retention controls are given to reduce the impacts of construction works.

2.1.2 The proposed works involve:

- Establishment of works compound area
- Establishment of site sheds and amenities
- Storage areas
- Construction of 2 additions to the existing dwelling in 2 separate areas.
- An excavation footprint of 1.5 x 1.5 to land proposed cantilevered steps off Addition B
- Installation of cantilevered stair access to Addition B

2.1.3 The following documentation was reviewed and assists in the preparation of this report:

- Arboricultural Impact Appraisal and Method Statement prepared by Naturally Trees dated 9 April 2022
- Boundary Identification and Detail & Level Survey over Lot 2 in DP430766 No. 38 Lagoon St Narrabeen NSW 2101 prepared by C.M.S Surveyors Pty Limited dated 17/06/2021.
- Architectural Set for Development Application Sheets MOD -01 – MOD 08, MOD – 13 and Mod - 14 REV B and Sheets MOD – 09 – MOD – 12 REV A, prepared by Arc Lab PTY LTD dated 15.05.2024 REV A and 21.06.24 REV B.

2.1.4

Trees within the direct alignment of the works have been identified for removal. Where the works are partially aligned within or through the TPZ and/or SRZ an assessment of the predicted impacts, in accordance with *AS4970(2009) Protection of Trees on Development Sites*, has been undertaken. Tree pruning, retention and removal recommendations are based upon the arborists assessment of the impact of the works with respects to tree health, condition, and stability. Design plans have been provided by Ac Lab Pty Ltd and can be found as **Appendix 3**.

2.1.4 Methodology for determining vigour, structure and age class can be found as Appendix 5

2.1.5 The conclusions drawn within this report are based on the information provided and data collected during an on-site inspection.

## 2.2 Inspection Method

- 2.2.1 The trees were assessed using the principles of a ground based Visual Tree Assessment (VTA)<sup>1</sup> and methods consistent with modern arboriculture. No aerial (climbing) inspection, tissue sampling or diagnostic testing was undertaken as part of the inspection process unless otherwise stated.
- 2.2.2 Full results of the tree inspection and data collection can be found within the Tree Assessment Schedule (**Appendix 1**).
- 2.2.3 The height, radial canopy spread, trunk Diameter at Breast Height (DBH) and trunk diameter above root buttress was collect for each tree assessed. These physical dimensions were estimated.
- 2.2.4 The vigour, condition and age class of each tree has been assessed and reflects the trees at the time of the inspection. The methodology for determining vigour, structure and age class can be found within the Tree Assessment Criteria (**Appendix 5**).
- 2.2.5 Each tree has been given Useful Life Expectancy (ULE) rating. This rating defines the length of time that the arborist feels an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection.
- 2.2.6 Each tree has been assessed against the Institute of Australian Consulting Arborists (IACA) Significance of a Tree Assessment Rating System (STARS). This provides a dual method of objectively rating the viability and retention value of urban trees on development sites. The STARS assessment criteria and retention matrix table can be found within the Tree Significance Assessment Criteria and Retention Value Matrix (**Appendix 6**)

## 2.3 Trees on Development Sites

- 2.3.1 The *Australian Standard 4970-2009 Protection of Trees on Development Sites* defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

---

<sup>1</sup> Mattheck, C. and Breloer, H (2006), *The Body Language of Trees – A Handbook for Failure Analysis*, The Stationary Office. Pages 118-122.

- 2.3.2 Tree Protection Zone – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree’s roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- 2.3.3 Structural Root Zone – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the centre of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken.
- 2.3.4 Tree protection and structural root zone calculations have been made in accordance with *AS4970-(2009)* and can be found within the Tree Assessment Schedule (**Appendix 1**).
- 2.3.5 Under AS4970 development encroachments into the tree protection zone are defined as either minor or major.
- A minor encroachment is less than 10% of the area of the TPZ and is outside of the SRZ. Where this occurs detailed root investigation works should not be required, and the loss of root zone compensated for elsewhere and contiguous with the TPZ.
  - A major encroachment is greater than 10% of the area of the TPZ or is inside the SRZ. Where a major encroachment exists the project arborist must demonstrate that the tree will remain viable. The area lost should be compensated for elsewhere and contiguous with the TPZ. Major encroachments may require detailed root investigation works to be undertaken.
- 2.3.6 The tree protection and structural root zone are indicative and do not consider the physical constraints of a site which may influence the architecture, development and spread of a tree’s root system. The establishment of tree protection zones to their fullest extent may not be possible due to environmental or site constraints. Where this occurs, their establishment is to be undertaken under the guidance of the project arborist.

## 3.0 Impacts of the Proposed Works

---

### 3.1 General

- 3.1.1 A development Impact’s schedule can be found as **Appendix 2**. This schedule identifies the specific development impacts and protection zone encroachments (where required) for each individual tree.

### **3.2 Trees to be removed.**

3.2.1 No trees have been identified for removal as part of these works.

### **3.3 Trees to be retained.**

3.3.1 Trees 1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, 16 and 19 are to be retained and protected throughout the construction process.

### **3.4 Tree pruning works.**

3.4.1 No trees have been identified for pruning as part of these works.

## **4.0 Conclusion**

---

4.1 A total of thirteen trees were assessed as part of the proposed site works. Of these, three trees 5, 7 and 19 have been found to have an encroachment greater than 10% into the protection area of the trees, however given the nature of the existing hardstand area and construction methodology the proposed encroachment is academic and not thought likely to add to any existing stressors acting upon the trees given the extensive hardstand areas within the site. One of these three trees, Tree 5 was found to have reduced health and condition with an extensive decay column on the eastern aspect and pinhole borer damage. Whilst this tree does not require removal for the purposes of this development application, given the outcome of further testing and continued monitoring the tree may require removal. An exaction footprint of no more than 1.2 x 1.2 into the Structural Root Zone of tree 5 will be required to land the cantilevered steps, the poses an encroachment of  $\geq 5\%$ . The remaining ten trees are to be retained and protected throughout the construction works.

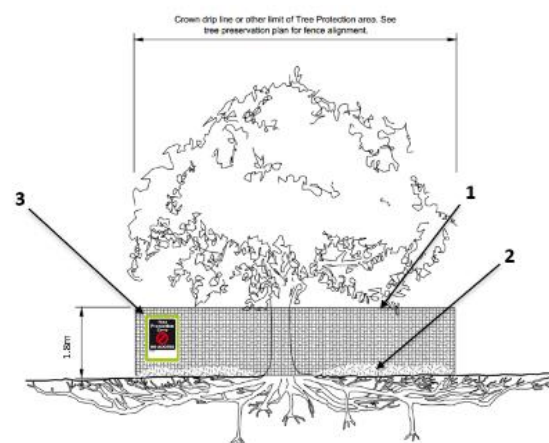
4.2 Prior to the commencement of any construction works a project arborist is to be appointed. The role and responsibility of the project arborist is to provide on-going advice for works within identified sensitive areas and is to include at a minimum:

- Participation in the pre-clearing site walk-through, including confirmation of trees to be retained and the setup of tree protection measures.
- Inspect the setup of tree protection zones prior to the commencement of construction works.
- Ensure tree protection measures meet the requirements of *AS4970(2007) Protection of Trees on Development Sites*.



- Provide advice on methods to minimise the extent of encroachment within the protection zones of trees.
- Provide advice for long-term tree health such as watering regimes, fertiliser application and mulching.
- Provide advice on non-destructive digging technics within tree protection zones.
- Provide advice on when to stop works within a tree protection zone and make recommendations on refinements to the work method.
- Review adequacy of site training and induction material regarding tree protection zones
- Assess and report on any significant roots that require removal prior to their removal. If structural roots are encountered and need to be cut, they shall provide advice on the position and method of removal to minimise potential impacts.
- Assess and report on the need for any further tree removals required within the project area.
- Undertake regular monitoring / site inspections during construction to monitor tree health and recommend additional tree care if there are signs of stress.

4.3 Tree protection fencing is to be installed at the limits of the TPZ or as determined by the project arborist. Fencing shall consist of 1.8m high interlocking chain link or plywood fencing panels. The fencing shall be erected in such a way as to prevent building materials, soil and unauthorised personnel entering the TPZ. The use of temporary fencing panels is considered to be an acceptable form of tree protection fencing. Further details regarding tree erection of tree protection fencing can be found as Figure 1.



**Figure 1:** Tree protection zone detail. **1.** Tree Protection Fencing- To consist of chain wire mesh panels with shade cloth (if required) held in place with concrete feet or plywood or wooden fence panels. Fence to be a minimum height of 1.8m and to be established to the extent of the TPZ as directed by the project arborist. AS4687 specifies applicable fencing requirements. **2.** Mulching – If deemed applicable by the project arborist the area within the TPZ is to be mulched. Mulch is to comply with AS4454 and maintained to a depth of 100-150mm. **3.** Signage –

Signs identifying the TPZ should be placed around the edge of the TPZ and identifiable from within the development site. Lettering on the sign should comply with AS1319.

- 4.4 Signs identifying the TPZ shall be attached to the tree protection fencing and clearly visible from within the development site. The contact details of either the site manager or project arborist shall be displayed on the sign.

Figure 2 below illustrates indicative tree protection zone signage.

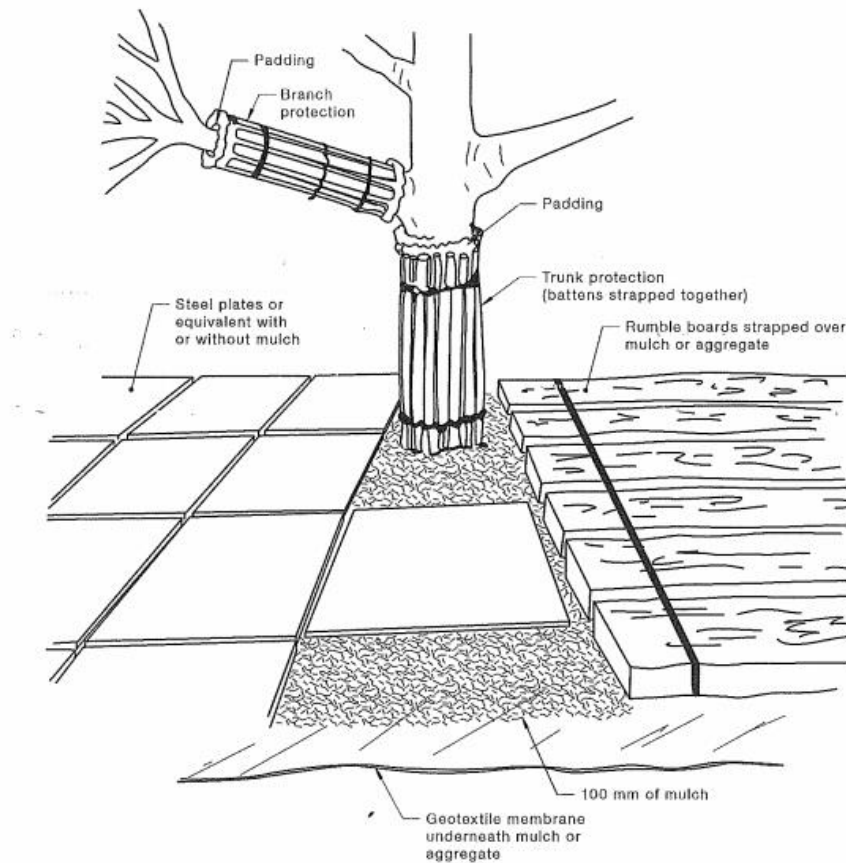


**Figure 2:** Example of TPZ signage.

- 4.5 Where the establishment of a TPZ is deemed not possible trunk and ground protection measures are to be employed. Trunk protection is installed by first wrapping the stem of the tree in hessian or like material then strapping timber battens over the top. It is recommended that timber battens with the dimensions of length 2000mm, width 75mm and depth 50mm are used. The battens are not to be directly screwed or nailed into the tree.

Where necessary branch protection may be required. Branch protection is installed in the same fashion as the trunk protection mentioned above but cut to suit the shape of the branch. Refer figure 3.

Further details regarding trunk and branch protection can be found as Figure 3.



**Figure 3:** Trunk and branch protection shall be installed as shown in the attached diagram. The materials and positioning of protection are to be specified by the project arborist. A minimum height of 2m is recommended. No temporary power lines, stays, guys and the like are to be attached to any part of the tree. Do not drive nails into the trunks or branches. If temporary access for machinery is required within the TPZ ground protection measures will be required. Measures may include a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards.

4.6 Where temporary access or encroachment into or through a TPZ is required ground protection measures are to be implemented. The purpose of ground protection measures is to avoid damage to tree roots and compaction of the soils within the TPZ. Suitable ground protection measures for pedestrian and/or vehicle and machinery include:

<b>Pedestrian access</b>	Heavy duty plywood boards or truck/bog mats over 75mm mulch layer. The plywood boards or truck/bog mats are to be secured in place to avoid movement. Raised scaffolding walkways or ply boards fixed to wooden pallets to suspend footpath over existing grade
<b>Light vehicle and/or machinery traffic &lt;3T</b>	Geo-textile fabric covered with a 150mm deep layer of mulch overlaid with rumble boards or road plates. Refer Figure 4. Truck/bog mats may be used if suitable for the applied loads.
<b>Heavy traffic &gt;3T</b>	Geo-textile fabric covered with a 300mm layer of compacted road base or railway ballast. Truck/bog mats or steel road plates may be used if suitable for the applied loads and use on site. Their installation is to be advised by the project arborist.

	Temporary load bearing surfaces and products such as Geo Cell may be used if appropriately engineered to the applied loads.
<b>Material laydown areas</b>	Heavy duty plywood boards, truck/bog mats or timber supports/battens are to be used beneath materials temporarily stored within a TPZ. The ply boards, truck/bog mats or timber supports are to be suitable for the load being placed upon them. Materials or timber supports are not to penetrate the existing soil profile.

- 4.7 The use of truck mats or Geo Cell type product within a TPZ is permissible if appropriate for the weight of the traffic being used.
- 4.8 Ground protection measures are to be installed after clearing and grubbing activities and prior to site works commencing and maintained in good order throughout the construction process. Ground protection within a TPZ is only to be removed when deemed necessary and under consultation with the project arborist. Care is to be undertaken when removing ground protection measures to avoid disturbance or damage to the underlying soil profile. The use of excavators to remove ground protection measures within a TPZ is to be supervised by the project arborist. Where the project arborist deems the use of excavators inappropriate within a TPZ temporary ground covers are to be manually removed using hand tools.
- 4.9 When operating heavy machinery and/or plant within an area of ground protection defined access and egress routes are to be used. Machinery movement is to be minimised during working operations. The turning and rotation of heavy tracked equipment is to be minimised within a TPZ. Further details regarding tree establishment of ground protection can be found as Figure 3.

## Appendix 1: Tree Assessment Schedule

Tree No	Botanical Name	Height (m)	Canopy Spread (m)	DBH (mm)	DAB (mm)	Age Class	Vigour	Condition	ULE	Landscape Significance	Retention Value	TPZ (m)	SRZ (m)	Comments
1	<i>Eucalyptus microcorys</i>	7	8	400	500	Mature	Good	Good	Medium	Medium	Medium	4.80	2.47	Suppressed growth due to overcrowding.
2	<i>Eucalyptus microcorys</i>	19	12	250	350	Mature	Good	Good	Medium	Medium	Medium	3.00	2.13	Suppressed growth due to overcrowding.
3	<i>Eucalyptus microcorys</i>	16	8	300	400	Mature	Good	Good	Medium	Medium	Medium	3.60	2.25	Suppressed growth due to overcrowding.
4	<i>Ficus benjamina</i>	16	8	80	180	Mature	Good	Good	Medium	Medium	Medium	2.00	1.61	Suppressed growth due to overcrowding.
5	<i>Eucalyptus punctata</i>	8	10	450	550	Mature	Good	Poor	Short	Low	Low	5.40	2.57	Suppressed growth due to overcrowding. Decay column on eastern aspect, borer damage, dieback to 20% of total canopy. Tree in decline.
7	<i>Eucalyptus microcorys</i>	16	6	400	500	Mature	Good	Good	Medium	Medium	Medium	4.80	2.47	Suppressed growth due to overcrowding.
8	<i>Eucalyptus microcorys</i>	16	10	400	500	Mature	Good	Good	Medium	Medium	Medium	4.80	2.47	Suppressed growth due to overcrowding.
9	<i>Eucalyptus microcorys</i>	17	8	300	400	Mature	Good	Good	Medium	Medium	Medium	3.60	2.25	Suppressed growth due to overcrowding.
10	<i>Eucalyptus saligna</i>	5	3	600	700	Mature	Good	Good	Medium	Medium	Medium	7.20	2.85	Suppressed growth due to overcrowding. Failures present
12	<i>Eucalyptus microcorys</i>	20	10	300	400	Mature	Good	Good	Medium	Medium	Medium	3.60	2.25	Suppressed growth due to overcrowding.
13	<i>Eucalyptus microcorys</i>	20	10	300	400	Mature	Good	Good	Medium	Medium	Medium	3.60	2.25	Suppressed growth due to overcrowding.
16	<i>Eucalyptus microcorys</i>	12	6	300	400	Mature	Good	Good	Medium	Medium	Medium	3.60	2.25	Suppressed growth due to overcrowding.
19	<i>Eucalyptus saligna</i>	15	16	600	700	Mature	Good	Good	Medium	Medium	Medium	7.20	2.85	Suppressed growth due to overcrowding.

## Appendix 2: Development Impacts Schedule

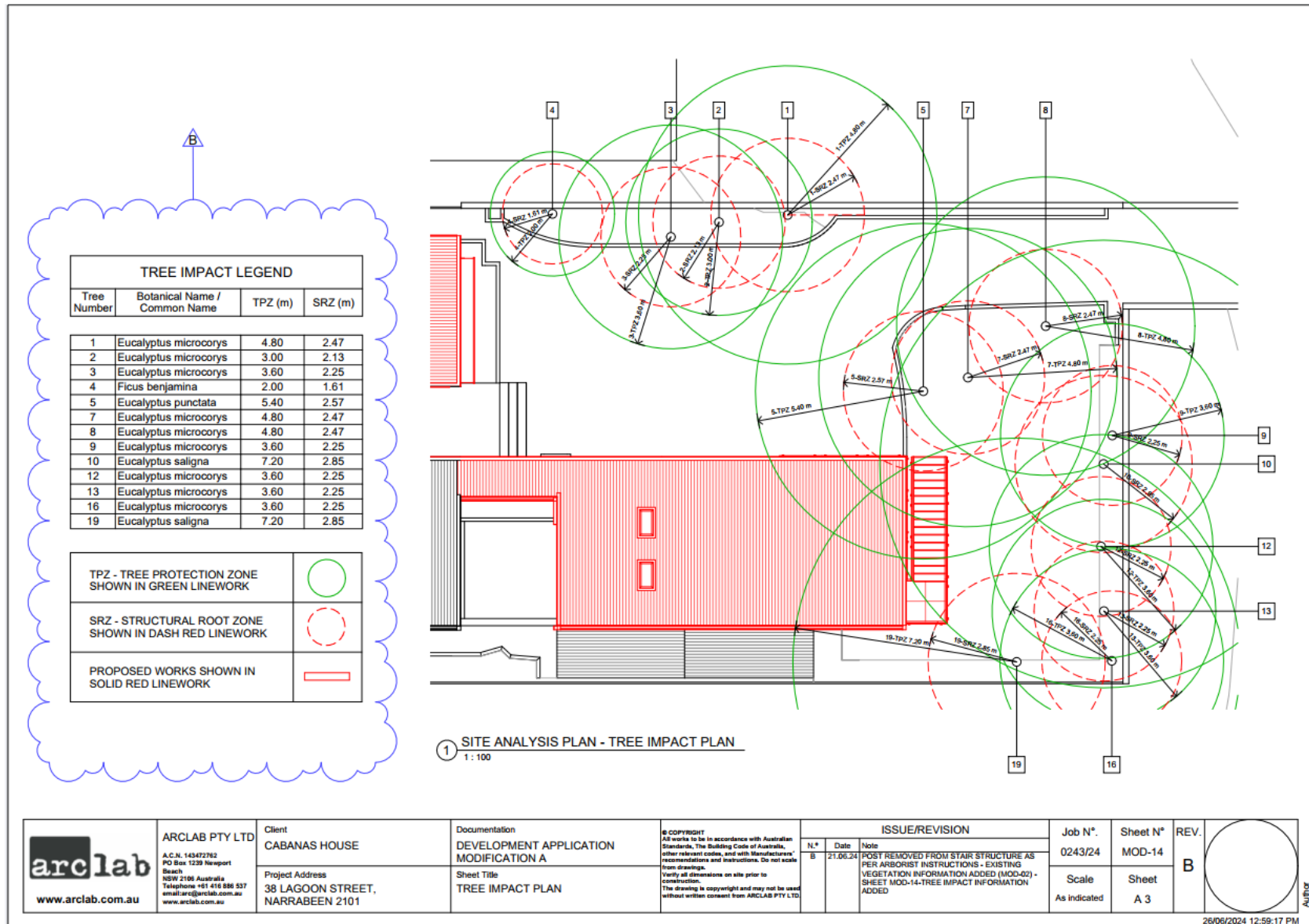
Tree No	Tree name	Development Impacts	Controls	Retain or Remove Tree	Hold Point
1	<i>Eucalyptus microcorys</i>	The protection zone of the tree is clear of the proposed works.	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	
2	<i>Eucalyptus microcorys</i>	The protection zone of the tree is clear of the proposed works.	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	
3	<i>Eucalyptus microcorys</i>	The protection zone of the tree is clear of the proposed works.	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	
4	<i>Ficus benjamina</i>	The protection zone of the tree is clear of the proposed works.	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	

Tree No	Tree name	Development Impacts	Controls	Retain or Remove Tree	Hold Point
5	<i>Eucalyptus punctata</i>	The proposed works pose an 18% encroachment into the protection zone of the tree and an encroachment of $\geq 5\%$ into the SRZ. The proposed encroachment is dominantly academic other than the excavation footprint of landing pad for cantilevered steps, the remaining area is an existing hardstand area and an existing garage which occupies the full area of encroachment. No canopy conflict has been observed with the proposed addition.	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. All excavation works undertaken within the protection zone of the tree are to be supervised and monitored by the project arborist. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	
7	<i>Eucalyptus microcorys</i>	The proposed works pose an 10% encroachment into the protection zone of the tree. The proposed encroachment is academic as the existing ground features include a hardstand area and an existing garage which occupies the full area of encroachment. No canopy conflict has been observed with the proposed addition	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	
8	<i>Eucalyptus microcorys</i>	The protection zone of the tree is clear of the proposed works.	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	
9	<i>Eucalyptus microcorys</i>	The protection zone of the tree is clear of the proposed works.	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	
10	<i>Eucalyptus saligna</i>	The protection zone of the tree is clear of the proposed works.	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	

Tree No	Tree name	Development Impacts	Controls	Retain or Remove Tree	Hold Point
12	<i>Eucalyptus microcorys</i>	The protection zone of the tree is clear of the proposed works.	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	
13	<i>Eucalyptus microcorys</i>	The protection zone of the tree is clear of the proposed works.	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	
16	<i>Eucalyptus microcorys</i>	The protection zone of the tree is clear of the proposed works.	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	
19	<i>Eucalyptus saligna</i>	The proposed works pose an 16% encroachment into the protection zone of the tree. The proposed encroachment is academic as the existing ground features include a hardstand area and an existing garage which occupies the full area of encroachment. No canopy conflict has been observed with the proposed addition	Establish a tree protection zone under guidance of the project arborist to allow for practical construction. Tree protection fencing is to meet the requirements of point 4.3. Appropriate ground protection measures are to be implemented in accordance with point 4.6 where any encroachment into the TPZ exists. Monitor the health and condition of the tree throughout the construction phase of the project.	Retain	



## Appendix 3: Tree Location Plan



#### Appendix 4: Schedule of works and responsibilities

Hold Point	Task	Responsibility	Certification	Timing of Inspection
1	Indicate clearly (with spray paint) trees approved for removal only	Principal Contractor	Project Arborist	Prior to demolition and site establishment
2	Establishment of tree protection fencing and additional root, trunk and/or branch protection	Principal Contractor	Project Arborist	Prior to demolition and site establishment
3	Supervise all excavations works proposed within the TPZ	Principal Contractor	Project Arborist	As required prior to the works proceeding adjacent to the tree
4	Inspection of trees by Project Arborist	Principal Contractor	Project Arborist	Monthly during construction period
5	Final inspection of trees by Project Arborist	Principal Contractor	Project Arborist	Prior to the issue of Occupation Certificate

## Appendix 5: Tree Inspection Criteria.

**Tree number:** Identifying number given to individual (or group of) trees.

**Botanical Name:** Latin name for tree showing genus and species.

**Common Name:** The common name given to the tree.

**Tree Dimensions:** The physical dimensions of the tree.

- **Height:** Estimated or measured height of tree in meters.
- **Spread:** Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH):** The estimated or measured diameter of trunk in given in millimetres measured at 1.4m from ground.

**Age Class:** An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead.

**Vigour:** Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous, or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crown, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

**Condition:** A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1<sup>st</sup>) and possibly (2<sup>nd</sup>) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour, and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced

senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from or contributed to by vigour.

- **Fair Condition** - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from or contributed to by vigour.
- **Good Condition** - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from or contributed to by vigour.

**Useful Life Expectancy (ULE)** is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases. ULE can be categorised as Long, Medium, Short, Remove, Young or Small.

- **Long (L):** Trees that appear to be retainable at the time of the assessment for more than 40 years with an acceptable level of risk.
- **Medium (M):** Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Short (S):** Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Remove (R):** Trees that should be removed within the next 5 years.
- **Young or Small Trees (Y):** Trees that can be reliably moved or replaced.

**Comments** – any notable features, characteristic or concerns regarding the individual tree.

## Appendix 6: Tree Significance Assessment Criteria & Retention Value Matrix

### IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured quantitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree significance – Assessment Criteria* and *Tree Retention Value – Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of High, Medium, and Low significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

### Tree Significance – Assessment Criteria

#### 1. High significance in landscape

- The tree is in good condition and good vigour.
- The tree has a form typical for the species.
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age.
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community, or listed on council's significant tree register.
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity.
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group, or has commemorative values.
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions.

#### 2. Medium significance in landscape

- The tree is in fair-good condition and good or low vigour.
- The tree has form typical or atypical of the species.
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area.
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street.
- The tree provides a fair contribution to the visual character and amenity of the local area.
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.

#### 3. Low significance in landscape

- The tree is in fair-poor condition and good or low vigour.
- The tree has form atypical of the species.
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings.
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area.
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen.
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions.
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms.
- The tree has a wound or defect that has the potential to become structurally unsound.
- **Environmental Pest / Noxious Weed Species**
  - The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
  - The tree is a declared noxious weed by legislation.
- **Hazardous / Irreversible Decline**
  - The tree is structurally unsound and/or unstable and is considered potentially dangerous.
  - The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term.

**The tree is to have a minimum of three (3) criteria in a category to be classified in that group.**

**Note:** The assessment criteria are for individual trees only, however, can be applied to a monoculture stand in its entirety e.g., hedge.

**Table 1.0 Tree Retention Value – Priority Matrix**

	Tree Significance					
		1. High	2. Medium	3. Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape		
Useful Life Expectancy					Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
	Long >40 years					
	Medium 15-40 years					
	Short <1-15 years					
	Dead or Young & Small					

**Legend for Matrix Assessment**

	<b>Priority for retention (High):</b> These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 <i>Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented e.g., pier and beam etc if works are to proceed within the Tree Protection Zone.
	<b>Consider for retention (Medium):</b> These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with the removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	<b>Consider for removal (Low):</b> These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	<b>Remove (R):</b> These trees are considered hazardous, in irreversible decline or weeds and should be removed irrespective of development.

**References**

Australia ICOMOS Inc. 1999, The Burra Charter – The Australian OCOMOS Charter for Places of Cultural Significance, International Council of Monuments and Sites, [www.icomos.org/australia](http://www.icomos.org/australia)  
 Draper BD and Richards PA 2009, Dictionary for Managing Trees in Urban Environments, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood Victoria, Australia.  
 Footprint Green Pty Ltd 2001, Footprint Green Tree Significance & Retention Value Matrix, Avalon, NSW Australia, [www.footprintgreen.com.au](http://www.footprintgreen.com.au)