

Project No: 87-91/NUW/17 Report No: 87-91/NUW/AIA/B

ARBORICULTURAL IMPACT ASSESSMENT

87-91 Nuwarra Road Moorebank

Prepared for: ST GEORGE COMMUNITY HOUSING

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1.0 INTRODUCTION

1.1 Background

- 1.1.1 This Arboricultural Impact Assessment Report was prepared for Signature Project Management, on behalf of St George Community Housing, in relation to the proposed redevelopment works at 87-91 Nuwarra Road, Moorebank. The purpose of this Report is to undertake a Visual Tree Assessment¹ (VTA), determine the impact of the proposed works on the trees, and where appropriate, recommend the use of sensitive construction methods to minimise adverse impacts.
- 1.1.2 In preparing this Report, the author is aware of and has taken into account the objectives of *Liverpool City Council's Tree Management Policy (2011)*, Australian Standard 4970 Protection of Trees on Development Sites (2009), Australian Standard 4373 Pruning of Amenity Trees (2007) and Australian Standard 2303 Tree Stock for Landscape Use (2015).

Refer to Methodology (Appendix 1)

- 1.1.3 This impact assessment is based on an assessment of the following supplied documentation/plans only:
 - Detail Survey (dated 20/09/2016) prepared by Peak Surveying
 - Landscape Plan Level 0 (dated 25.01.18, Rev F) prepared by Stitch Design Studio

Refer to Plans (Appendix 2)

1.2 The Proposal

- 1.2.1 The supplied plans show the works include:
 - Demolition of existing structures and pavements
 - Construction of new residential units
 - Construction of car parking with a new driveway crossover accessing Nuwarra Road
 - Associated works and landscaping

Refer to Plans (Appendix 2)

2.0 RESULTS

2.1 The Site

- 2.1.1 The site comprises of three (3) residential allotments (nos. 87, 89 and 91) located to the western side of Nuwarra Road, and is bound by residential allotments to the north, south and west.
- 2.1.2 The site is rhomboidal in shape and is generally level. A dwelling is located roughly centrally within each separate allotment.

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¹ Mattheck & Breloer (2003)

2.2 The Trees

- 2.2.1 Eleven (11) trees/groups of trees were assessed using the VTA² criteria and notes, and comprise a mix of locally indigenous, Australian native and exotic species. An additional six (6) trees are located outside of the site boundaries and have been identified alphabetically. The species and Diameter at Breast Height (DBH) measurements of these trees were recorded (estimated in cases of limited access) for the purposes of determining Tree Protection Zone (TPZ) calculations only. Tree E is located on the Nuwarra Road road reserve and is managed by Liverpool City Council.
- 2.2.2 Tree 6 *Ligustrum lucidum* (Large Leaf Privet) is listed as a *Priority Weed for all of NSW* by the Department of Primary Industries.³
- 2.2.3 Tree F *Syagrus romanzoffianum* (Cocos Palm) is listed as an exempt species within the Liverpool City Council Tree Preservation Order.⁴
- 2.2.4 A search of the BioNet Atlas of NSW Wildlife Database was undertaken in September 2017. Tree 1 *Eucalyptus nicholii* (Narrow Leaf Peppermint) was identified at the site and is listed as a *Vulnerable Species* under the NSW *Biodiversity Conservation Act (2016)* and the Commonwealth *Environment Protection and Biodiversity Conservation Act (1999).*⁵ Based on its age, size and location, this tree is a planted specimen and is not a component of a locally indigenous vegetation community.
- 2.2.5 As required by Clause 2.3.2 of *Australian Standard 4970 Protection of Trees on Development Sites (2009)*, each of the trees assessed has been allocated a Retention Value. The Retention Value is based on the tree's Useful Life Expectancy and Landscape Significance with consideration to its health, structural condition and site suitability. The Retention Values do not consider any proposed development works and are not a schedule for tree retention or removal. The trees have been allocated one of the following Retention Values:
 - Priority for Retention
 - Consider for Retention
 - Consider for Removal
 - Priority for Removal
- 2.2.6 Full results of the VTA are shown in the Tree Assessment Schedule (Appendix 3).

3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 Trees to be removed

3.1.1 The supplied plans show that eleven (11) trees within the site are proposed for removal as part of the development. This includes two (2) trees with a Retention Value of *Consider for Retention,* seven (7) trees with a Retention Value of *Consider for Removal* and two (2) trees with a Retention Value of *Priority for Removal*.

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² Mattheck & Breloer (2003)

³ Department of Primary Industries (2017)

⁴ Liverpool City Council (2017)

⁵ NSW Office of Environment and Heritage (2011)

3.1.2 Table 1: Trees to be removed

Consider for Retention	Consider for Removal	Priority for Removal	
8 & 10	2, 4, 5, 6, 7, 9 & 11	1 & 3	

- 3.1.3 No trees with a Retention Value of *Priority for Retention* are proposed for removal.
- 3.1.4 In addition to the above, Tree D *Eucalyptus* sp. is also proposed for removal. Tree D is located on the Nuwarra Road road reserve. Whilst this could be retained as part the proposed development, it is of poor health and structural condition and is recommended for immediate removal.

3.2 Trees to be retained

3.2.1 The supplied plans show that Trees A-C, E and F which are located on the neighbouring properties are to be retained.

No works are proposed within the Tree Protection Zone (TPZ) areas of these trees.

3.3 Replacement Planting

3.3.1 Replacement planting is recommended to offset the removal of the trees. Replacement planting should be supplied in accordance with *Australian Standard 2303 (2015) Tree Stock for Landscape Use.*

4.0 CONCLUSION

- 4.1 Eleven (11) trees/groups of trees were assessed in preparation of this Report, and comprise a mix of locally indigenous, Australian native and exotic species. An additional six (6) trees are located outside of the site boundaries and have been addressed within this Report.
- 4.2 The supplied plans show the works include demolition of existing structures and pavements, construction of new residential units and car park, and associated works and landscaping.
- 4.3 The supplied plans show all of the trees within the site are to be removed as part of the proposed development. In general, the trees are relatively small specimens which are of low quality. In this regard, of the eleven (11) trees assessed, nine (9) trees were determined of being of low Landscape Significance and two (2) trees of moderate Landscape Significance. No trees have been determined to be of high or very high Landscape Significance or have been allocated a Retention Value of *Priority for Retention*.
- In addition to the above, Tree D *Eucalyptus* sp. is also proposed for removal. Whilst this could be retained as part the proposed development, it is of poor health and structural condition and is recommended for immediate removal.
- 4.5 The supplied plans show that Trees A-C, E and F which are located on the neighbouring properties are to be retained. No works are proposed within the TPZ areas of these trees. TPZ fencing consisting of 1.8m high wire mesh panels supported by concrete feet should be installed at the perimeter of the TPZ areas which fall within the site to exclude the development works and prevent construction damage.
- 4.6 Replacement planting is recommended to offset the removal of the trees. Replacement planting should be supplied in accordance with *Australian Standard 2303 (2015) Tree Stock for Landscape Use.*

5.0 LIMITATIONS & DISCLAIMER

TreeiQ takes care to obtain information from reliable sources. However, TreeiQ can neither guarantee nor be responsible for the accuracy of information provided by others. Plans, diagrams, graphs and photographs in this Arboricultural Report are visual aids only and are not necessarily to scale. This Report provides recommendations relating to tree management only. Advice should be sought from appropriately qualified consultants regarding design/construction/ecological/heritage etc issues.

This Report has been prepared for exclusive use by the client. This Report shall not be used by others or for any other reason outside its intended target or without the prior written consent of TreeiQ. Unauthorised alteration or separate use of any section of the Report invalidates the Report.

Many factors may contribute to tree failure and cannot always be predicted. TreeiQ takes care to accurately assess tree health and structural condition. However, a tree's internal structural condition may not always correlate to visible external indicators. There is no warranty or guarantee, expressed or implied that problems or deficiencies regarding the trees or site may not arise in the future. Information contained in this report covers only the trees assessed and reflects the condition of the trees at the time of inspection. Additional information regarding the methodology used in the preparation of this Report is attached as Appendix 1. A comprehensive tree risk assessment and management plan for the trees is beyond the scope of this Report.

Reference should be made to any relevant legislation including Tree Management Controls. All recommendations contained within this Report are subject to approval from the relevant Consent Authority.

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6.0 BIBLIOGRAPHY & REFERENCES

Barrell (1995), 'Pre-development Tree Assessments', in *Trees & Building Sites, Proceedings of an International Conference Held in the Interest of Developing a Scientific Basis for Managing Trees in Proximity to Buildings,* International Society of Arboriculture, Illinois, USA, pp. 132-142

Harris, Clark & Matheny (1999), Arboriculture: Integrated Management of Landscape Trees, Shrubs And Vines, Prentice Hall, New Jersey

Matheny & Clark (1994), A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas, International Society of Arboriculture, USA

Mattheck & Breloer (1994), The Body Language of Trees: A Handbook for Failure Analysis, The Stationary Office, London

Simon, Dormer & Hartshorne (1973), Lowson's Botany, Bell & Hyman, London

Office of Environment and Heritage (2011), BioNet Atlas of NSW Wildlife.

Standards Australia (2009), Protection of Trees on Development Sites AS-4970

Standards Australia (2007), Pruning of Amenity Trees AS-4373

Standards Australia (2015), Tree Stock for Landscape Use AS-2303

Appendix 1: Methodology

- **Site Inspection**: This report was determined as a result of a comprehensive site during October 2017. The comments and recommendations in this report are based on findings from this site inspection.
- **1.2 Visual Tree Assessment (VTA)**: The subject tree(s) was assessed using the Visual Tree Assessment criteria and notes as described in *The Body Language of Trees A Handbook for Failure Analysis*. The inspection was limited to a visual examination of the subject tree(s) from ground level only. No internal diagnostic testing was undertaken as part of this assessment. Trees outside the subject site were assessed from the property boundaries only.
- **1.3** Tree Dimensions: The dimensions of the subject tree(s) are approximate only.
- **1.4 Tree Locations:** The location of the subject tree(s) was determined from the supplied plans.
- **1.5 Trees & Development**: Tree Protection Zones, Tree Protection Measures and Sensitive Construction Methods for the subject tree were based on methods outlined in *Australian Standard 4970-2009 Protection of Trees on Development Sites*.

The *Tree Protection Zone* (TPZ) is described in AS-4970 as a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The *Structural Root Zone* (SRZ) is described in AS-4970 as the area around the base of a tree required for the tree's stability in the ground. Severance of structural roots within the SRZ is not recommended as it may lead to the destabilisation and/or demise of the tree.

In some cases it may be possible to encroach into or make variations to the theoretical TPZ. A *Minor Encroachment* is less than 10% of the area of the TPZ and is outside the SRZ. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. A *Major Encroachment* is greater than 10% of the TPZ or inside the SRZ. In this situation the Project Arborist must demonstrate that the tree would remain viable. This may require root investigation by non-destructive methods or the use of sensitive construction methods.

- **1.6** Tree Health: The health of the subject tree(s) was determined by assessing:
 - I. Foliage size and colour
 - II. Pest and disease infestation
 - III. Extension growth
 - IV. Crown density
 - V. Deadwood size and volume
 - VI. Presence of epicormic growth
- 1.7 Tree Structural Condition: The structural condition of the subject tree(s) was assessed by:
 - I. Assessment of branching structure
 - (i.e co-dominant/bark inclusions, crossing branches, branch taper, terminal loading, previous branch failures)
 - II. Visible evidence of structural defects or instability
 - (i.e root plate movement, wounds, decay, cavities, fungal brackets, adaptive growth)
 - III. Evidence of previous pruning or physical damage
 - (root severance/damage, lopping, flush-cutting, lions tailing, mechanical damage)
- **1.8 Useful Life Expectancy (ULE)**: The ULE is an estimate of the longevity of the subject tree(s) in its growing environment. The ULE is modified where necessary to take in consideration tree(s) health, structural condition and site suitability. The tree(s) has been allocated one of the following ULE categories (Modified from Barrell, 2001):
 - I. 40 years +
 - II. 15-40 years
 - III. 5-15 years
 - IV. Less than 5 years

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⁶ Mattheck & Breloer (2003)

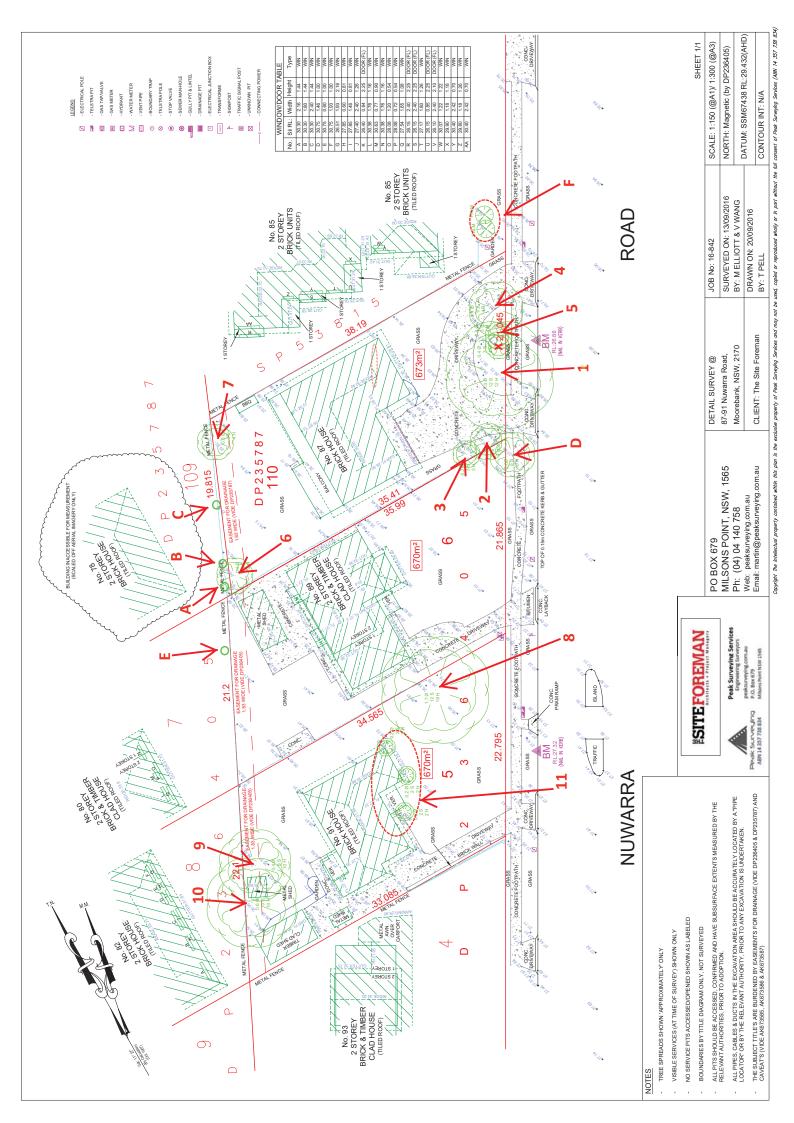
1.9 Landscape Significance: Landscape Significance was determined by assessing the combination of the cultural, environmental and aesthetic values of the subject tree(s). Whilst these values are subjective, a rating of high, moderate, low or insignificant has been allocated to the tree(s). This provides a relative value of the tree's Landscape Significance which may aid in determining its Retention Value. If the tree(s) can be categorized into more than one value, the higher value has been allocated.

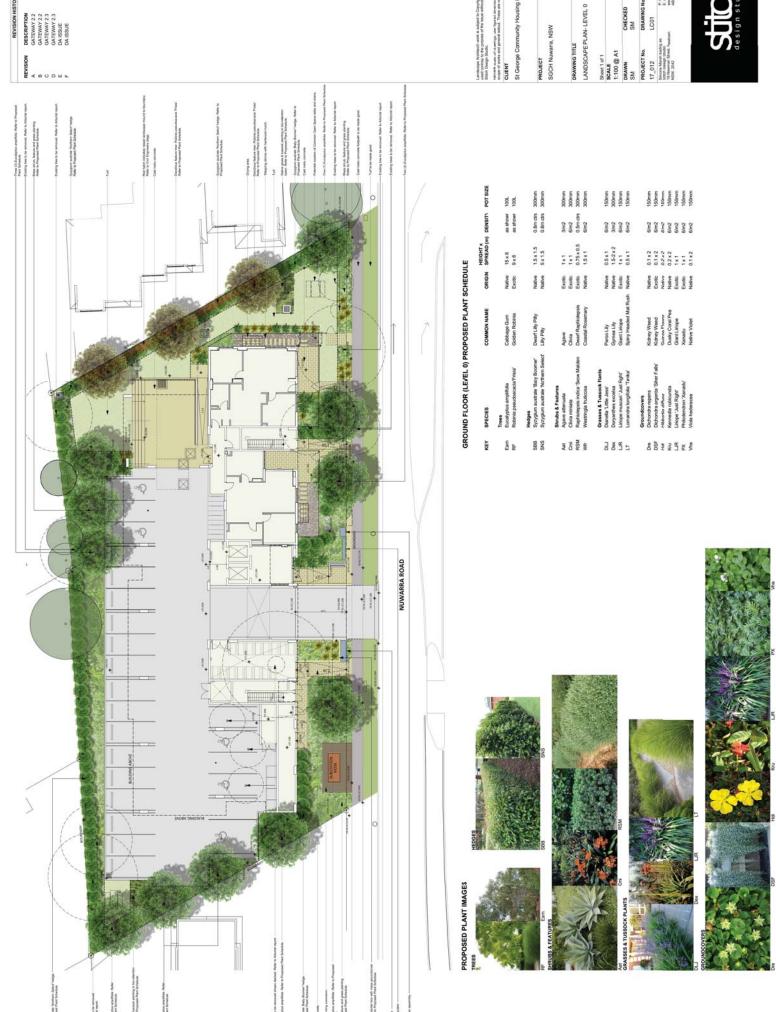
Landscape	Description	
Significance	Description	
	The subject tree is listed as a Heritage Item under the <i>Local Environmental Plan</i> with a local or state level of significance.	
Very High	The subject tree is listed on Council's Significant Tree Register or is considered to meet the criteria for significance assessment of trees and/or landscapes by a suitably qualified professional. The criteria are based on general principles outlines in the Burra Charter and on criteria from the Register of the National Estate.	
	The subject tree is a remnant tree.	
	The subject tree creates a 'sense of place' or is considered 'landmark' tree.	
	The subject tree is of local, cultural or historical importance or is widely known.	
Lligh	The subject tree has been identified by a suitably qualified professional as a species scheduled as a Threatened or Vulnerable Species or forms part of an Endangered Ecological Community associated with the subject site, as defined under the provisions of the <i>Threatened Species Conservation Act</i> 1995 (NSW) or the <i>Environmental Protection and Biodiversity Conservation Act</i> 1999.	
High	The subject tree is known to provide habitat to a threatened species.	
	The subject tree is an excellent representative of the species in terms of aesthetic value.	
	The subject tree is of significant size, scale or makes a significant contribution to the canopy cover of the locality.	
	The subject tree forms part of the curtilage of a heritage item with a known or documented association with that item.	
	The subject tree makes a positive contribution to the visual character or amenity of the area.	
Moderate	The subject tree provides a specific function such as screening or minimising the scale of a building.	
iviouerate	The subject tree has a known habitat value.	
	The subject tree is a good representative of the species in terms of aesthetic value.	
	The subject tree is an environmental pest species or is exempt under the provisions of the local Council's	
Low	Tree Management Controls	
LOW	The subject tree makes little or no contribution to the amenity of the locality.	
	The subject tree is a poor representative of the species in terms of aesthetic value.	
Insignificant	The subject tree is declared a Noxious Weed under the Noxious Weeds Act	

- **1.10 Retention Value**: Retention Value was based on the subject tree's Useful Life Expectancy and Landscape Significance. The Retention Value was modified where necessary to take in consideration the subject tree's health, structural condition and site suitability. The subject tree(s) has been allocated one of the following Retention Values:
 - I. Priority for Retention
 - II. Consider for Retention
 - III. Consider for Removal
 - IV. Priority for Removal

ULE		Landscape Significance			
	Very High	High	Moderate	Low	Insignificant
40 years +		Priority for Retention			
15-40 years	Priority for Retention	Priority for Retention	Consider for Retention	Consider for Removal	Priority for Removal
5-15 years		Consid	er for Retention		
Less than 5 years	Consider for Removal	Priority for Removal			

The above table has been modified from the Footprint Green Tree Significance and Retention Value Matrix.





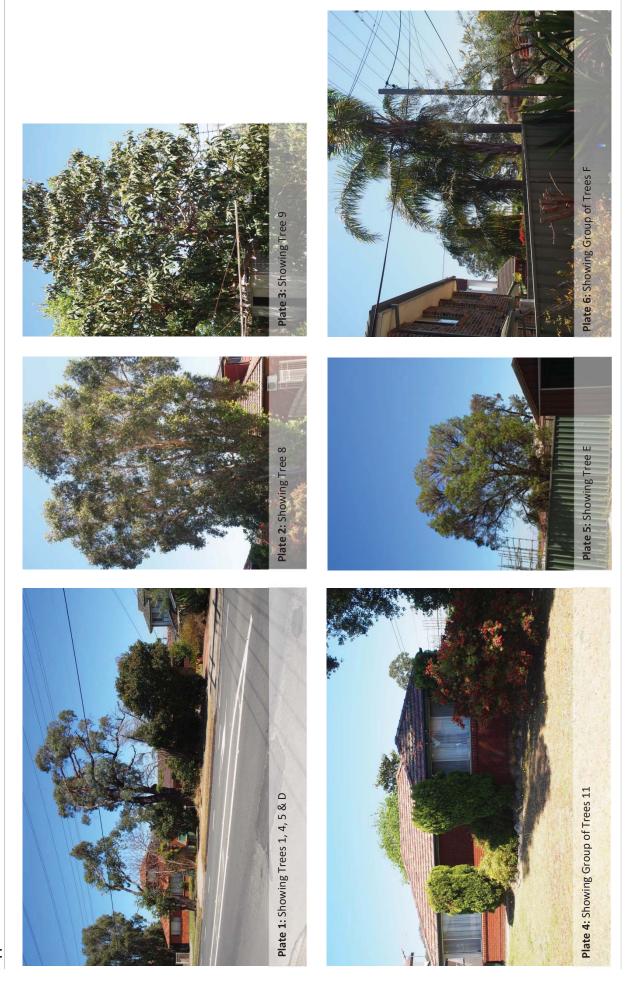


CHECKED SM DRAWING No. LC01

Radial TPZ (m) 4.8 7.2 2.0 2.0 2.0 Implication Remove Remove Remove Remove Remove Retention Removal Consider for Consider Priority for Removal Priority for Removal Consider Removal Removal Value for for L/Sign Low Low Low Low Po√ ULE (year) 5-15 5-15 5-15 **2 2** mature Mature Senesc Mature mature Semi-Semi-Late Age Class ent medium (25-75mmø) & large (>75mmø) deadwood in high Structures ocalised crown death. Crown volumes. Small (<25mmø), medium (25-75mmø) & large (>75mmø) Localised crown death. Crossing 75mmø) & large (>75mmø) deadwood in high volumes. Codominant inclusions, major. Bark Partially suppressed. Structures density 50-75%. Small (<25mmø), epicormic growth in moderate stages of decay. Structures within Wound(s), early signs of decay. Crown conflict with adjacent Small (<25mmø), medium (25of decay. advanced nclusion(s), major. Wound(s), branches. Crown density 25-50%. structures. Structures in SRZ. Heavily suppressed. Wound(s), Comments Structures within SRZ. advanced stages within SRZ. within SRZ. volumes. Structural Rating Good Good Poor Poor Fair Dormant. Health Rating rating. 8 N Poor Poor Good Fair DBH comb. 009 400 135 164 75 Crown Spread (m) 2 $^{\circ}$ m 7 Н Height (m) 10 2 4 3 4 (Narrow Leaf Peppermint) Viburnum ordoratissima (Sweet Viburnum) Jacaranda mimosifolia Cupressus macrocarpa (Monterey Cypress) Eucalyptus nicholli Species (Jacaranda) Thuja sp. Tree No. \vdash m 2 7 4

Appendix 3: Tree Assessment Schedule

Radial TPZ (m)	2.0	Q.	2.4	5.0
Implication	Retain	Remove	Retain	Retain
Retention Value				
L/Sign				
ULE (year)				
Age		Late Mature		
Comments		Crown density 25-50%. Small (<25mmø) & medium (25-75mmø) deadwood in moderate volumes. Small (<25mmø) & medium (25-75mmø) epicormic growth in high volumes. Co-dominant inclusions, major. Wound(s), advanced stages of decay. Structures within SRZ. Immediate removal recommended.		Group of two trees.
Structural Rating		Poor		
Health Rating		Poor		
DBH comb.	125		200	225
Radial Crown Spread (m)	2	m	4	4
Height (m)	Ŋ	o	9	9
Species	Ficus benjamina (Weeping Fig)	Eucalyptus sp.	Callistemon salignus (Willow Bottlebrush)	Syagrus romanzoffianum (Cocos Palm)
Tree No.	U	۵	ш	ш



Appendix 4: Plates