Arboricultural Impact Assessment

Date: 17/06/2025

Tree address: 16 Brenda Road

Maida Vale WA 6057

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Contents

1. Executive Summary

1.1 Perth Arbor Services were engaged to assess a mature *Eucalyptus nicholii* located at 16 Brenda Road, Maida Vale, following concerns regarding root disturbance associated with recent development works.

1.2 Assessment confirmed major Tree Protection Zone (TPZ) encroachment, with exploratory trenching revealing a complete absence of roots in critical areas. A limestone retaining wall has also been installed within the tree's outer TPZ, further indicating significant soil disturbance. Several retained trees nearby—*primarily Corymbia calophylla and Eucalyptus marginata*—are exhibiting visible decline, with two Jarrah observed to be completely dead.

1.3 The subject tree has sustained irreversible root damage and no longer meets minimum standards for safe retention. Structural stability is likely compromised, and continued decline is expected. Removal is strongly recommended, as it is no longer reasonable or responsible to retain the tree within a developed context.

1.4 It is the professional opinion of the author that no dwelling, structure, or high-use area should be established within the tree's potential fall zone. The risks associated with failure cannot be reliably mitigated due to the extent of the damage, size of the tree and significant trunk-lean, creating an elevated **unacceptable** risk rating post-construction.

2. Introduction

2.1 Perth Arbor Services was contracted by the owners of 16 Brenda Road, Maida Vale, WA to undertake an independent arboricultural assessment of a mature *Eucalyptus nicholii* located at 16 Brenda Road, Maida Vale. The purpose of this assessment is to determine the current health and structural condition of the subject tree and to assess the extent of any impacts resulting from nearby development activity.

2.2 The consulting arborist attended the site on the morning of 17 June 2025 at approximately 7:30 am. Weather conditions were cloudy, though visibility was sufficient to allow for a comprehensive ground-level inspection. The subject tree was visually assessed in accordance with industry standards, and limited non-destructive exploratory excavation was undertaken to investigate suspected encroachment within the Tree Protection Zone (TPZ).

2.3 Documents reviewed:

- Standards Australia, 2009, *AS 4970–2009 Protection of Trees on Development Sites*, Standards Australia, Sydney.

3. Methodology

3.1 Visual Tree Assessment (VTA) is a non-invasive method developed by Claus Mattheck in 1994 to assess a tree's structural integrity and health. It relies on identifying external signs of internal weaknesses or mechanical stress. By examining the roots, trunk, branches, and crown, arborists can evaluate a tree's condition and determine whether further investigation or management is required.

3.2 During assessment, arborists look for signs of stress or decline—such as reduced leaf size, discoloured or sparse foliage, deadwood, cankers, or fungal fruiting bodies. These indicators are compared against typical species traits and may highlight underlying biological or structural issues.

3.3 The following data was collected for the tree:

- Images of tree
- Botanic and common name
- Tree dimensions (Height x Width (width measured at longest axis)
- Diameter at breast height (DBH)
- Health and general observations
- Structure and general observations
- Useful life expectancy (ULE)
- Retention value
- Quantified Tree Risk Assessment (QTRA)
- Recommended works
- Comments

3.4 The specimen tree was assessed from ground level, height was measured using a Nikon Forestry Pro rangefinder, crown spread was measured using a trundle-wheel at ground level; and trunks measured with logger's diameter tape. No invasive tests were conducted or samples taken and any assessments of decay are qualitative only.

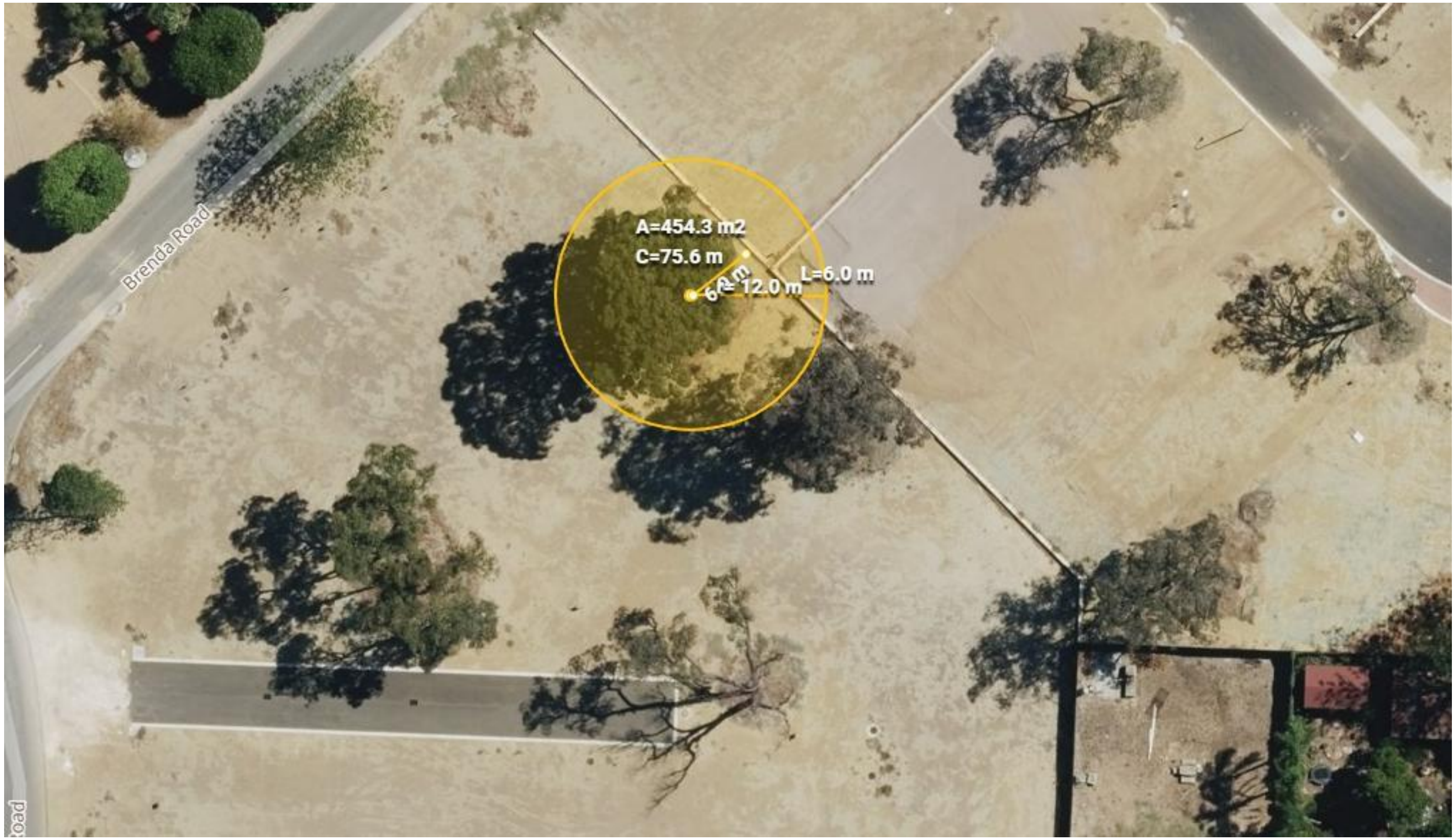
4. Limitations

4.1 When conducting a ground-based visual tree assessment, several limitations must be acknowledged. This assessment is primarily based on observable features and conditions visible from ground level. No specialised techniques, such as conductive soil testing, tomography, or aerial inspections, were employed during this evaluation. As a result, certain underlying issues that may affect the health and stability of the tree might remain undetected.

4.2 The conclusions and recommendations provided in this report are based on the professional opinions of consulting arborists, informed by their training and experience in arboriculture. While efforts are made to provide an accurate and thorough assessment, it is essential to recognise that tree health and stability can be influenced by numerous factors that may not be visible at ground level. Internal decay or structural weaknesses may exist within the trunk or branches, but without advanced diagnostic tools, these conditions cannot be accurately assessed through visual inspection.

4.3 Furthermore, the dynamic nature of living trees means that their condition can change rapidly due to environmental factors, diseases, or pests. The limitations inherent in a ground-based visual assessment highlight the importance of ongoing monitoring and evaluation to maintain tree health.

5. The Site



Above: Overhead view of the site with subject tree TPZ and distance to retaining wall indicated *(Vexcel)*

Above: Overhead view of the site with estimated undisturbed zones indicated with cirlces/ovals *(Vexcel)*

6. The Tree

Subject tree (tagged #50)	
Botanic name	*Eucalyptus nicholii*
Common name	Peppermint Gum
Diameter at breast height (DBH)	100cm
Health / vigour	Poor – evident by crown mostly consisting of expicormic growth
Structure	Poor – Previously lopped
Age class	Mature
Safe Useful Life Expectancy (SULE)	0-5 years
Tree dimensions (Height, crown projection)	Approx 15.2m tall, approx. 17m spread at furthest axis
Retention value	High
Quantified Tree Risk Assessment (QTRA)	<1/1,000,000 (No targets beneath presently)
Structural Root Zone (SRZ) radius	3.3m
Tree Protection Zone (TPZ) radius	12m

7.1 Observations

7.1.1 The subject tree, measures approximately 15.2 metres in height, with a canopy spread of approximately 17 metres and a Diameter at Breast Height (DBH) of 100 cm. Initial assessment revealed signs of potential root excavation encroaching beyond 10% of the Tree Protection Zone (TPZ). This was confirmed through exploratory non-destructive digging.

7.1.2 Exploratory trenching conducted approximately 4.3 metres from the trunk of the subject tree, just beyond the area visibly left undisturbed by the developer measured 2.5 metres in length and 600 mm in depth. No structural or fibrous roots were encountered within this trench, indicating significant root loss or in the Tree Protection Zone (TPZ).

7.1.3 On the northern side of the tree, approximately 6 metres from the trunk centre, a limestone retaining wall constructed of 350 mm limestone blocks set below ground level has been installed.

7.2 Discussion

7.2.1 The subject tree and surrounding retained trees were likely impacted during the early stages of site development, with clear evidence of encroachment into their respective Tree Protection Zones (TPZs). The confirmed disturbance beyond the 10% threshold is classified as a major encroachment under *AS 4970–2009 Protection of Trees on Development Sites*, requiring justification, minimisation, and the implementation of mitigation strategies.

7.2.1.1 Encroachment into the Tree Protection Zone exceeds 66%, well beyond the acceptable thresholds outlined in AS 4970-2009. As such, the original development did not meet minimum protection standards for the retention of this tree

7.2.2 Adjacent retained trees—predominantly Corymbia calophylla and Eucalyptus marginata—are exhibiting visible signs of decline, including canopy thinning, reduced foliage density, and general stress. Notably, within the development area, at least two Eucalyptus marginata trees were observed to be completely dead, with desiccated foliage still attached, indicating rapid or unmitigated decline. The presence of these dead trees further supports the conclusion that extensive and uncompensated root disturbance has occurred across the site.

7.2.3 Such symptoms are consistent with severe root system disruption, which reduces the tree's capacity for water and nutrient uptake, weakens structural anchorage, and predisposes affected trees to drought stress and secondary pathogen invasion. When TPZ guidelines are not adhered to, even trees retained on-site may follow a trajectory of progressive decline and eventual failure.

7.2.4 Due to its compromised anchorage and declining condition, the tree presents an elevated risk of failure. If structures or frequent-use areas are constructed nearby, it would create an unacceptable public safety hazard

7.2.5 While the tree's retention value is classified as 'High' based on species and original form, this is overridden by its current condition. The irreversible damage, structural instability, and short safe useful life expectancy render the tree unsuitable for retention in a developed context

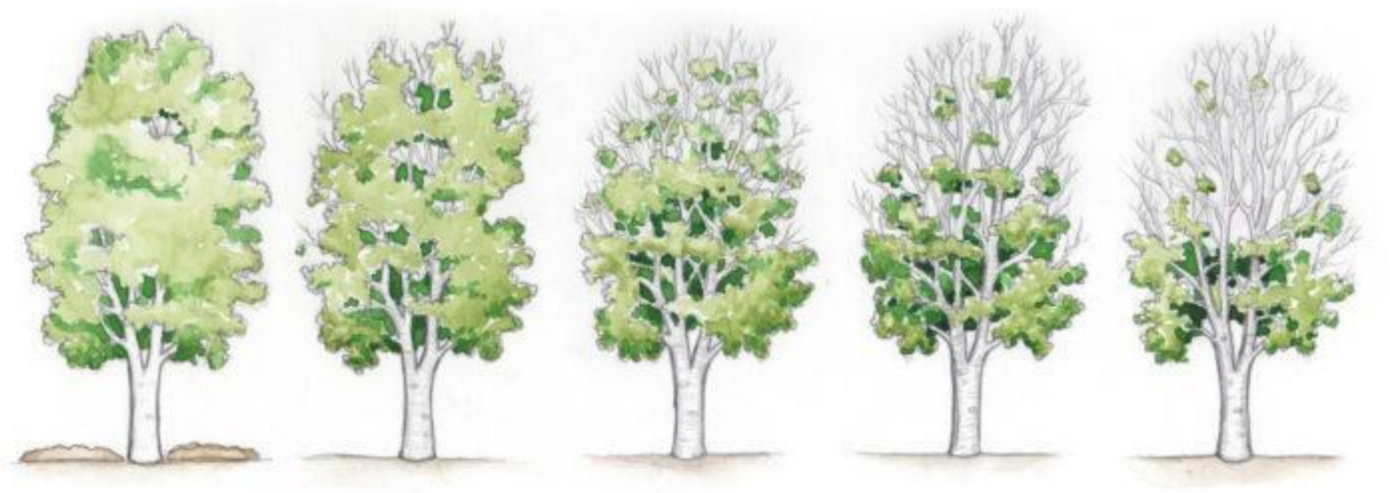
7.3 Tree Mortality Spiral

7.3.1 The decline of trees such as the various Jarrah trees around the development often follow a progressive physiological and structural deterioration process known as the tree mortality spiral. This concept describes a feedback loop where initial stress factors weaken a tree's defence mechanisms, leading to compounding damage and eventual death if the stressors persist or intensify.

7.3.2 The tree mortality spiral begins with abiotic stresses—such as drought, soil compaction, root severance or nutrient deficiency—that impair root function and reduce water and nutrient uptake *(McDowell et al., 2008*). As a tree becomes physiologically compromised, it initiates compensatory responses such as epicormic sprouting to maintain photosynthetic capacity *(Kozlowski & Pallardy, 2002).* While this adaptive response temporarily sustains energy production, it diverts resources away from growth and defence.

7.3.3 Concurrently, stress-induced weakening of the tree's vascular system and bark integrity, exemplified by growth cracks and canker formation, create entry points for opportunistic pathogens and wood-decaying fungi, such as Armillaria species *(Shigo, 1991).* Colonisation by these biotic agents further reduces the tree's functional root mass, amplifying water stress and nutrient deficits.

7.3.4 This downward cycle escalates, with the tree becoming increasingly susceptible to secondary stressors including insect attack, further fungal decay, and mechanical failure *(Manion, 1991).* Unless the tree's environment or condition improves through management interventions, the mortality spiral culminates in irreversible decline and death.



Above: Visual representation of tree mortality spiral (Berkshire)

8. Recommendations

8.1 Given the extent of root disturbance identified during assessment confirmed to exceed the tolerable threshold for TPZ encroachment as defined in AS 4970–2009 and the lack of viable rooting volume on all sides, the subject *Eucalyptus nicholii* is considered to be structurally compromised.

8.2 The root damage appears to have occurred during earlier site development activities and has significantly impaired the tree's ability to anchor, uptake water and nutrients, and maintain overall physiological health. In its current condition, the tree presents an elevated risk of failure, particularly under wind loading or adverse weather conditions.

8.3 As the damage is pre-existing and the tree no longer meets acceptable safety or retention standards, complete removal of the subject tree is recommended. This should be carried out by a qualified arborist with a minimum AQF Level 3 certification, in accordance with best industry practice.

8.4 Where feasible, a suitable replacement tree of local provenance should be planted post-construction, with adequate soil volume, drainage and long-term irrigation planning, to ensure successful establishment.

AS 2303:2018 – Tree Stock for Landscape Use (Standards Australia, 2018)

AS 4970–2009 – Protection of Trees on Development Sites, for the establishment and ongoing care of the replacement stock

9. References

- Australian Standard AS4373-2007 Pruning of amenity trees: *Standards Australia*.
- Australian Standard AS4970–2009 *Protection of trees on development sites*: Standards
- Australia.
- Matheny N. Clark J. 1998: *Trees and Development a Technical Guide to Preservation of*
- *Trees During Land Development: International Society of Arboriculture, Champaign,*
- *Illinois, USA.*
- Dunster J.A., Smiley E.T., Metheny N. and Lilly S. 2013. *Tree Risk Assessment Manual.*
- *International Society of Arboriculture, Champaign, Illinois USA.*
- IACA, 2010, *Sustainable Retention Index Value (SRIV), Version 4, A visual method of objectively rating the viability of urban trees for development sites and management, based on general tree and landscape assessment criteria, Institute of Australian Consulting Arboriculturists, Australia,* www.iaca.org.au .

10. Glossary of Arboricultural Terminology

Age Class:

Given as a guide to the current life stage of the tree. Ultimately, the level of maturity that a tree may reach is dependent on the growing environment. Age class is rated according to the following categories:

Category	Description
New Planting	Planted within approx. 2 years
Juvenile	Approx 2-10 years old
Semi-mature	Approx 10-20 years old
Mature	>25 years old – considered to be at the peak of growth
Over-mature	In the declining phase of the tree’s natural expected lifespan

Amenity:

Amenity refers to the biological, functional, and aesthetic characteristics of trees within an urban environment (Hitchmough, 1994).

Co-dominant:

This term describes stems or branches that are equal in size and relative importance.

Compression Wood:

A type of reaction wood produced by conifers, found on the underside of branches and leaning trunks.

Condition:

Condition refers to the tree’s form and growth habit as influenced by its environment (such as aspect, competition with other trees, and soil conditions) and the state of the scaffold (i.e., trunk and major branches), including structural defects like cavities, crooked trunks, or weak trunk/branch junctions. These factors are not directly related to the tree's health, meaning a tree can be healthy yet still be in poor condition.

Dead Wood:

This term refers to any limb that no longer contains living tissues, such as leaves or bark.

Decay:

Decay is the process by which woody tissues degrade due to fungi or bacteria breaking down cellulose and lignin. Different types of decay affect various tissue types, spread at different rates, and have diverse impacts on both the tree's health and structural integrity.

Decline:

Decline refers to a tree's response to reduced energy levels due to stress. Recovery from decline is often slow and difficult, and it is typically irreversible.

Diameter at Breast Height (DBH):

This measurement indicates the diameter of a tree trunk at breast height, which is 1.4 meters above ground level.

Dieback:

This describes the death of growth tips and partial limbs, typically occurring from tip to base. Dieback often signals stress and overall tree health issues.

Epicormic Shoots:

These shoots emerge from adventitious or latent buds and often have a weak attachment point. They usually arise as a response to stress and serve as a survival mechanism, indicating current or past stress events such as fire, pruning, or drought.

Hazard:

A hazard is anything that poses a potential risk to health, life, or property.

Health:

Relates to the tree vigour and canopy density. The characteristic assigned to the tree may be represented as a combination of any of these categories (e.g. Fair to Poor or Fair–Poor). In these instances, there may be a combination of the characteristics listed below or the foliage density is at the upper or lower scale of each category. In some cases, 'Health' may be noted as being 'Very Good' which indicates an optimal condition or 'Very Poor' which indicates that the tree is of such poor health and is unlikely to recover. In some cases, the 'Health' condition will be provided as 'Dead'. In this case, there is no observable indication that the tree is alive at the time of inspection. Health is rated according to the following categories:

Category	Description
Good	Foliage density / bud formation (Deciduous) is greater than 75% at optimal growth. There is less than 10% canopy dieback present and foliage has no or very minor tip dieback. Tree may also have visible extension growth if it is in active growth and is showing no signs of nutrient deficiency (i.e. chlorosis) or active pest or disease presence. The tree may also have good wound wood development.
Fair	Foliage density / bud formation (Deciduous) is between 50-75% at optimal growth for the species. There may be 10-30% canopy dieback present and foliage may have minor tip dieback. Tree maybe showing signs of normal growth, but it is not consistent throughout the crown. Some foliage discolouration may be present from possible nutrient deficiency or other cause (i.e. pest or disease)
Poor	Canopy may be asymmetrical (not typical for the species and affecting vigour) and or canopy may be suppressed. There may be greater than 30% canopy dieback present and foliage density is below 50%. Stunted growth through leaf size or petiole extension and discolouration of the leaf may be present. Tree may be producing epicormic shoots as a stress response. Nutrient deficiency, lack of resources (water, light etc) or pathogens may be the causal agent in the tree's decline

Included Bark:

This term describes the development pattern at branch or stem junctions where bark folds inward instead of being pushed outward. This genetic flaw can create weak attachment points, preventing healthy tissue from forming a strong joint.

Retention Value:

Retention value pertains to the combination of factors regarding the tree's condition, including form, health, and structure.

Scaffold Branch/Root:

This refers to a primary structural branch of the crown or a primary structural root of the tree.

Structural Root Zone (SRZ):

The SRZ is the area where the tree's structural support roots are located. Excavation in this zone can significantly destabilize the tree. Calculations for the SRZ are necessary only when encroachment into the Tree Protection Zone (TPZ) is proposed. Elevated construction may be feasible with a specific root zone assessment, but the minimum SRZ will not be less than 1.5 meters for trees with a stem diameter under 150 mm.

Suppressed:

In crown classification, suppressed trees are those that have been overtopped, resulting in restricted crown development from above.

Tension Wood:

This type of reaction wood is produced by broad-leaved tree species and forms on the upper side of branches, stems, and leaning trunks.

Topping or Lopping:

This refers to an unacceptable pruning practice that involves removing terminal growth, leaving a cut stub. Topping can severely damage the tree.

Tree Protection Zone (TPZ):

The TPZ is the minimum distance from the centre of the tree trunk where protective fencing or barriers should be installed to create an exclusion zone. This zone helps the tree cope with disturbances from construction activities. Proper tree protection minimizes root damage and reduces the risk of decline or structural instability due to root damage. To protect the tree, no excavation, stockpiling of materials, or machinery use is allowed within the TPZ during development works.

Visual Tree Assessment (VTA):

VTA is a defect analysis procedure developed by Mattheck and Breloer (1994) that utilizes the growth responses and form of trees to identify defects.

11. Disclaimer

11.1 This report has been prepared exclusively for the client by Rowan Barkey and is intended solely for their use. The information, analysis, and recommendations contained herein are based on site conditions, observations, and available knowledge at the time of assessment. This report is not transferable to any third parties and may not be reproduced, distributed, or used in any form without prior written consent from Rowan Barkey.

11.2 This report has been prepared in good faith and to the best of the author's training, experience, and knowledge at the time of inspection. Arboricultural assessments are inherently interpretive, and opinions may vary between qualified practitioners. This report does not have the authority to condemn or mandate the removal of any tree that is not under the client's ownership or legal control. Furthermore, recommendations provided herein do not guarantee approval by the relevant local government or statutory body. Any works involving protected or neighbouring trees still require written consent from the appropriate authority or landowner. No refunds will be issued if the client disagrees with the findings or recommendations of this report nor if the findings of this report do not lead to the client's desired outcome.

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12. Appendices

12.1 QTRA Method

12.1.0 Quantified Tree Risk Assessment (QTRA) is an internationally recognised tree risk management framework for the assessment of the three primary components of tree failure risk. The assessment involves the estimation based on broad ranges of potential target, the size of the part of a tree that may potentially fail and the likelihood of failure to calculate the Risk of Harm (RoH).

12.1.1 The risk assessment methodology is based around an assessment of the risk that may or may not happen within the coming 12-month period (QTRA Ltd, 2015). It is not an assessment of the Risk of Harm over a longer time period (such as 5 or 10 years). Quantified Tree Risk Assessment Ltd (2015) provides a non-technical summary of the system as: Tree safety management is a matter of limiting the risk harm from tree failure while maintaining the benefits conferred by trees. Although it may seem counter intuitive, the condition of trees should not be the first consideration. Instead, tree managers should first take account of the usage of the land on which the trees stand, which in turn will inform the process of assessing the trees.

12.1.2 The Quantified Tree Risk Assessment (QTRA) system applies established and accepted risk management principles to tree safety management. Firstly, the targets (people and property) upon which trees could fail are assessed and quantified, thus enabling tree managers to determine whether to assess trees and to what degree of rigour a survey or inspection of the trees is required. Where necessary, the tree is then considered in terms of both size (potential impact) and probability of tree or branch failure. Values derived from the assessment of these three components (target, size and probability of failure) are combined to calculate the probability of significant harm occurring. The system moves the management of tree safety away from labelling trees as either 'safe' or 'unsafe' and requiring definitive statements of tree safety from either tree surveyors or tree managers. Instead, QTRA quantifies the risk of harm from tree failure in a way that enables tree managers to balance safety with tree value and operate to predetermined risk thresholds. (QTRA Ltd 2015)

12.1.3 The three primary components of the risk assessment are defined and quantified below. Target, Persons or property or other things of value (i.e. parked cars) which might be harmed by mechanical failure of the tree or by objects falling from it. The target is defined by the average occupation over a 24-hour period.

Target

12.1.4 The target assessment must take into account a number of factors such as seasonal variation in numbers within the fall zone, the rate of occupation within the fall zone and the weather affected nature of targets (such as lower occupation in a park during storm conditions). There are six ranges of value that are given to the various targets such as human occupation, vehicle traffic movements and the cost of repair or replacement of property. The following table provides an overview of how the target range is determined.

Target Range	Property (repair or replacement cost)	Human (not in vehicles)	Vehicle Traffic (number per day)	Ranges of Value (probability of occupation or fraction of $3 400 000)
1	$3 400 000 – >$340 000 (£2 000 000 – >£200 000)	Occupation: Constant – 2.5 hours/day Pedestrians & cyclists: 720/hour – 73/hour	26 000 – 2 700 @ 110kph (68mph) 32 000 – 3 300 @ 80kph (50mph) 47 000 – 4 800 @ 50kph (32mph)	1/1 – >1/10
2	$340 000 – >$34 000	Occupation: 2.4 hours/day – 15 min/day Pedestrians & cyclists: 72/hour – 8/hour	2 600 – 270 @ 110kph (68mph) 3 200 – 330 @ 80kph (50mph) 4 700 – 480 @ 50kph (32mph)	1/10 – >1/100
3	$34 000 – >$3 400	Occupation: 14 min/day – 2 min/day Pedestrians & cyclists: 7/hour – 2/hour	260 – 27 @ 110kph (68mph) 320 – 33 @ 80kph (50mph) 470 – 48 @ 50kph (32mph)	1/100 – >1/1 000
4	$3 400 – >$340	Occupation: 1 min/day – 2 min/week Pedestrians & cyclists: 1/hour – 3/day	26 – 4 @ 110kph (68mph) 32 – 4 @ 80kph (50mph) 47 – 6 @ 50kph (32mph)	1/1 000 – >1/10 000
5	$340 – >$34	Occupation: 1 min/week – 1 min/month Pedestrians & cyclists: 2/day – 2/week	3 – 1 @ 110kph (68mph) 3 – 1 @ 80kph (50mph) 5 – 1 @ 50kph (32mph)	1/10 000 – >1/100 000
6	$34 – $3	Occupation: <1 min/month – 0.5 min/year Pedestrians & cyclists: 1/week – 6/year	None	1/100 000 – 1/1 000 000

Vehicle, pedestrian and property Targets are categorised by their frequency of use or their monetary value. The probability of a vehicle or pedestrian occupying a Target area in Target Range 4 is between the upper and lower limits of 1/1 000 and >1/10 000 (column 5). Using the VOSL $3 400 000, the property repair or replacement value for Target Range 4 is $3 400- >$340.

Size

12.1.5 Size takes into account the potential failure of a tree or by objects failing from it. Size takes into account the tree or branch size as well as the distance and orientation of the fall which influences the force of impact. The size may be discounted where they have undergone a significant reduction in weight due to degradation or shedding or subordinate branches referred to as 'Reduced Mass'. There are four size ranges that are determined from the part of the tree that is most likely to fail based on arboricultural knowledge and experience.

Size Range	Size of tree or branch	Range of Probability
1	> 450mm (>18") dia.	1/1 - >1/2
2	260mm (10$^{1}/_{2}$") dia. - 450mm (18") dia.	1/2 - >1/8.6
3	110mm (4$^{1}/_{2}$") dia. - 250mm (10") dia.	1/8.6 - >1/82
4	25mm (1") dia. - 100mm (4") dia.	1/82 - 1/2 500

* Range 1 is based on a diameter of 600mm.

Probability of Failure

12.1.6 The probability of tree or branch failure within the coming year is estimated and recorded as a range of seven (7) values. It is a comparison of the assessment of a tree or branch against a benchmark of a non-compromised tree at Probability of Failure Range 7, or a tree or branch that is expected to fail within the year - Probability of Failure Range 1. The Probability of Failure Range is based upon the risk assessors' knowledge of tree biology and structure.

Probability of Failure Range	Probability
1	1/1 - >1/10
2	1/10 - >1/100
3	1/100 - >1/1 000
4	1/1 000 - >1/10 000
5	1/10 000 – >1/100 000
6	1/100 000 – >1/1 000 000
7	1/1 000 000 – 1/10 000 000

The probability that the tree or branch will fail within the coming year.

QTRA Calculation

12.1.7 The range of values for each of Target, Size and Probability of Failure are used to calculate the Risk of Harm. These components are entered into a specific calculator to determine the Risk of Harm (RoH) which is

expressed as an overall probability (i.e. 1/ 100,000). The term 'ALARP' means 'As low as reasonably practical'. By definition this means that the risk should only be controlled if there will be significant benefit or a reduction in risk at a reasonable cost. For example, there may be a high cost to prune or undertake maintenance on a tree, however there will be no benefit in risk reduction if there is very minimal target occupation (i.e. target range 6 as above) The table below provides an overview of the probability thresholds and where risk management actions should be undertaken.

Thresholds	Description	Action
	Unacceptable Risks will not ordinarily be tolerated	• Control the risk
1/1 000		
	Unacceptable (where imposed on others) Risks will not ordinarily be tolerated	• Control the risk • Review the risk
	Tolerable (by agreement) Risks may be tolerated if those exposed to the risk accept it, or the tree has exceptional value	• Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value • Review the risk
1/10 000		
	Tolerable (where imposed on others) Risks are tolerable if ALARP	• Assess costs and benefits of risk control • Control the risk only where a significant benefit might be achieved at reasonable cost • Review the risk
1/1 000 000		
	Broadly Acceptable Risk is already ALARP	• No action currently required • Review the risk

12.2 IACA SRIV STARS Retention Value Method

12.2.0 In 1993, the British Standard approach was superseded by a methodology known as Safe Useful Life Expectancy (SULE) developed by Jeremy Barrell, a British arboriculturist. SULE was based loosely on the British Standard but is more systematic and rigorous in its approach. SULE made an attempt to assimilate the health, condition and value of a tree, using remaining life expectancy (in consideration of safety issues) as a measure of its sustainability in the landscape. This system was promoted as best practice in pre-development tree surveys and has been widely used throughout Britain, the United States and Australia. The concept behind SULE is that of sustained amenity, the longer a tree can contribute to amenity in a sustainable way (in consideration of safety and the proposed development), the higher the retention value.

12.2.1 The Institute of Australian Consulting Arboriculturists (IACA)© has also developed a methodology called the Sustainable Retention Value Index (SRIV)©. This method mainly concentrates on the viability of the tree within the development site (i.e. its sustainability in the landscape) without consideration of its landscape or amenity value. SRIV© acknowledges that arboricultural elements can be assessed fairly objectively by trained personnel, but assessing amenity values is highly subjective and fraught with difficulty, therefore it is ignored. In this method, trees that are normally considered of low retention value (such as dead trees and noxious weeds) are excluded from the assessment since the requirement to remove these trees would generally be a foregone conclusion.

Matrix - Sustainable Retention Index Value (S.R.I.V.)©

Developed by IACA – Institute of Australian Consulting Arboriculturists www.iaca.org.au
Version 4, 2010

To be used with the values defined in the Glossary.
An Index value as indicated where ten (10) is the highest value.

Age Class	Vigour Class and Condition Class					INSTITUTE OF AUSTRALIAN CONSULTING ARBORICULTURISTS IACA MANAGING URBAN TREES
	Good Vigour & Good Condition (GVG)	Good Vigour & Fair Condition (GVF)	Good Vigour & Poor Condition (GVP)	Low Vigour & Good Condition (LVG)	Low Vigour & Fair Condition (LVF)	Low Vigour & Poor Condition (LVP)
	Able to be retained if sufficient space available above and below ground for future growth. No remedial work or improvement to growing environment required. May be subject to high vigour. Retention potential - Medium – Long Term.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work may be required or improvement to growing environment may assist. Retention potential - Medium Term. Potential for longer with remediation or favourable environmental conditions.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work unlikely to assist condition, improvement to growing environment may assist. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. No remedial work required, but improvement to growing environment may assist vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment may assist condition and vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	Unlikely to be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment unlikely to assist condition or vigour. Retention potential - Likely to be removed immediately or retained for Short Term. Potential for longer with remediation or favourable environmental conditions.
(Y) Young	**YGVG - 9** **Index Value 9** Retention potential - Long Term. Likely to provide minimal contribution to local amenity if height <5 m. High potential for future growth and adaptability. Retain, move or replace.	**YGVF - 8** **Index Value 8** Retention potential - Short – Medium Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Medium-high potential for future growth and adaptability. Retain, move or replace.	**YGVP - 5** **Index Value 5** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Low-medium potential for future growth and adaptability. Retain, move or replace.	**YLVG - 4** **Index Value 4** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5 m. Medium potential for future growth and adaptability. Retain, move or replace.	**YLVF - 3** **Index Value 3** Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace.	**YLVP - 1** **Index Value 1** Retention potential - Likely to be removed immediately or retained for Short Term. Likely to provide minimal contribution to local amenity if height <5 m. Low potential for future growth and adaptability.
(M) Mature	**MGVG - 10** **Index Value 10** Retention potential - Medium - Long Term.	**MGVF - 9** **Index Value 9** Retention potential - Medium Term. Potential for longer with improved growing conditions.	**MGVP - 6** **Index Value 6** Retention potential - Short Term. Potential for longer with improved growing conditions.	**MLVG - 5** **Index Value 5** Retention potential - Short Term. Potential for longer with improved growing conditions.	**MLVF - 4** **Index Value 4** Retention potential - Short Term. Potential for longer with improved growing conditions.	**MLVP - 2** **Index Value 2** Retention potential - Likely to be removed immediately or retained for Short Term.
(O) Over-mature	**OGVG - 6** **Index Value 6** Retention potential - Medium - Long Term.	**OGVF - 5** **Index Value 5** Retention potential - Medium Term.	**OGVP - 4** **Index Value 4** Retention potential - Short Term.	**OLVG - 3** **Index Value 3** Retention potential - Short Term. Potential for longer with improved growing conditions.	**OLVF - 2** **Index Value 2** Retention potential - Short Term.	**OLVP - 0** **Index Value 0** Retention potential - Likely to be removed immediately or retained for Short Term.

IACA Significance of a Tree, Assessment Rating System (STARS) ©
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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 2001.

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 qualitative 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 Councils 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 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 dimension 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 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.

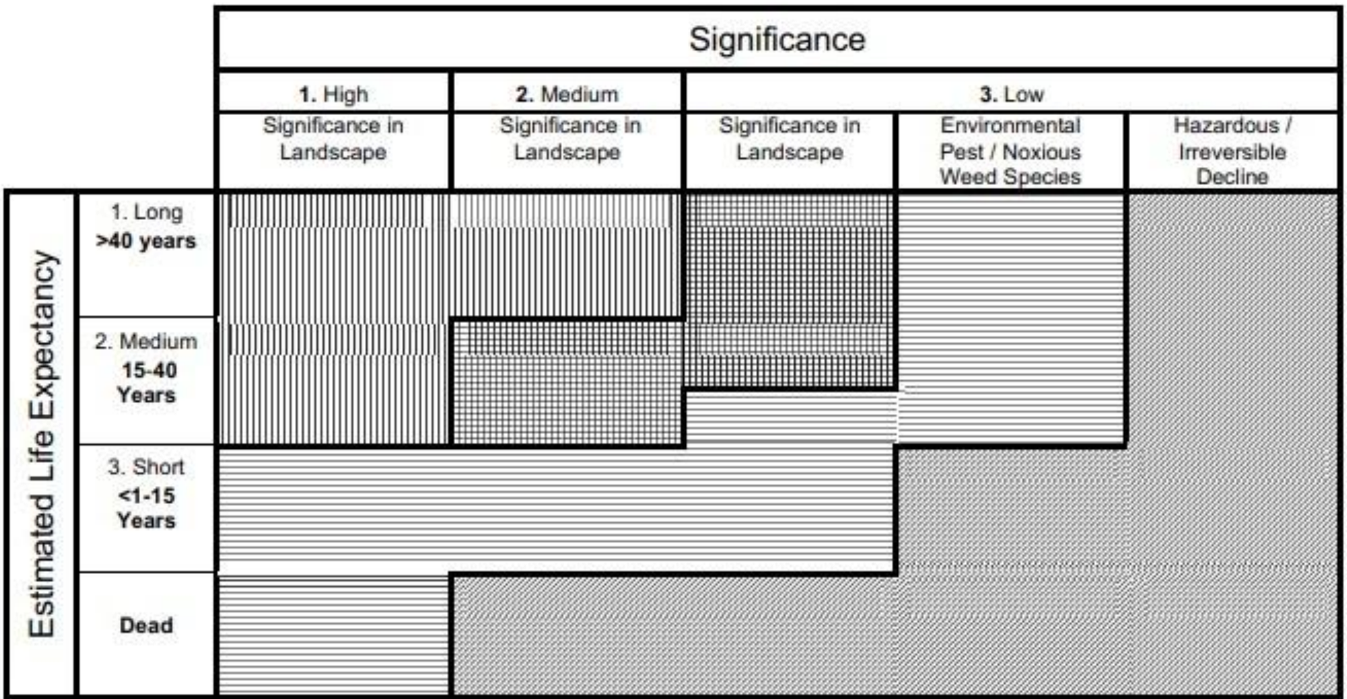
Hazardous/Irreversible Decline

- 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 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 monocultural stand in its entirety e.g. hedge.

Tree Retention Value - Priority Matrix.



<u>Legend for Matrix Assessment</u>

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MANAGING URBAN TREES

Priority for Retention (High) - 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 *Protection of trees on development sites*. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.

Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.

Consider for Removal (Low) - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.

Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

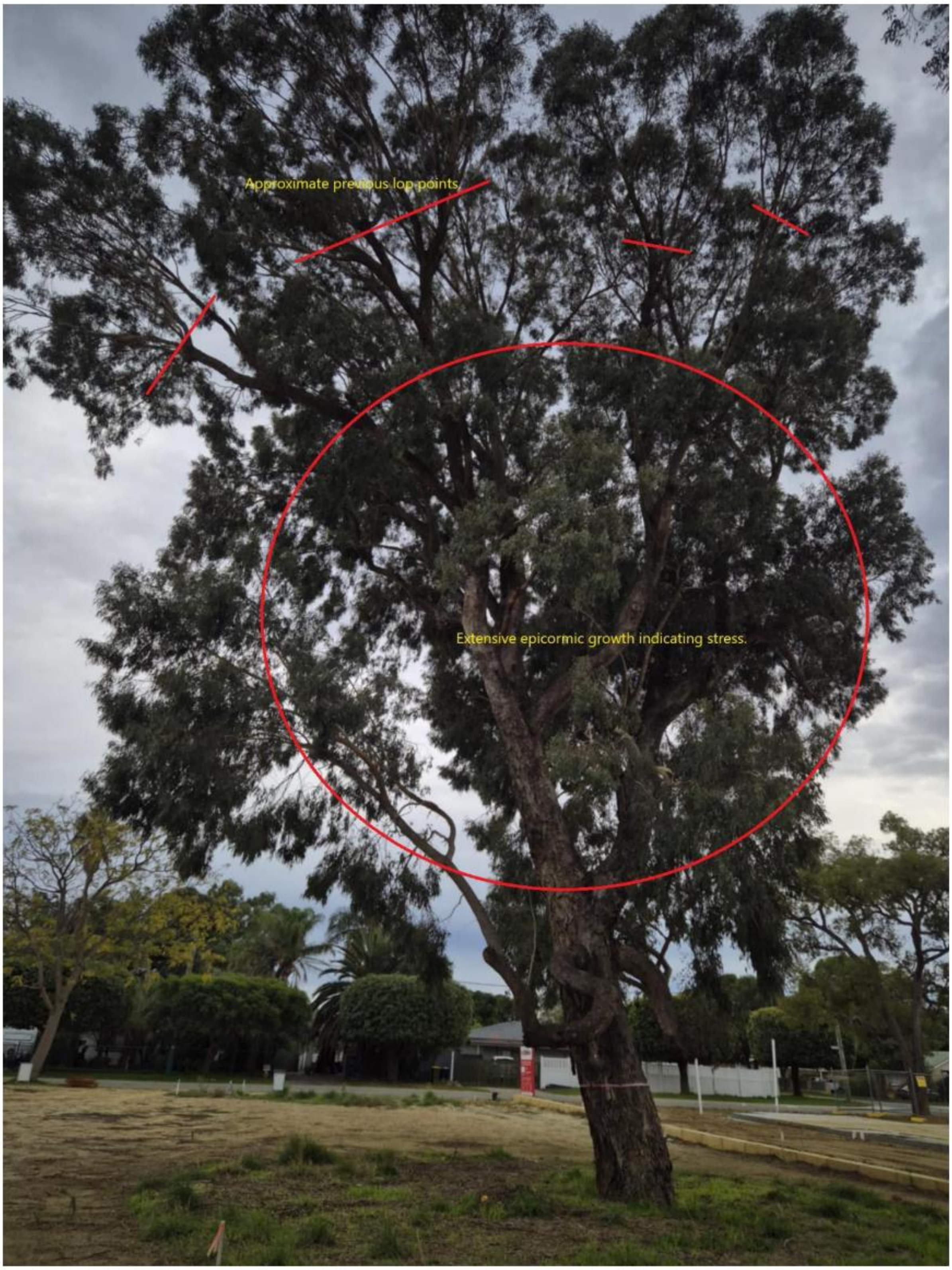
12.3 SULE (Safe Useful Life Expectancy)

12.3.0 In a planning context the time a tree can expect to be usefully retained is the most important long-term consideration. Safe Useful Life Expectancy (SULE) is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give safe life expectancy), then by economics, effects on better trees and sustained amenity (Barrel! 1993 and 1995). Trees with short SULE may at present be making a contribution to the landscape but their value to the local amenity will decrease rapidly towards the end of this period, prior to their being removed for safety or aesthetic reasons.

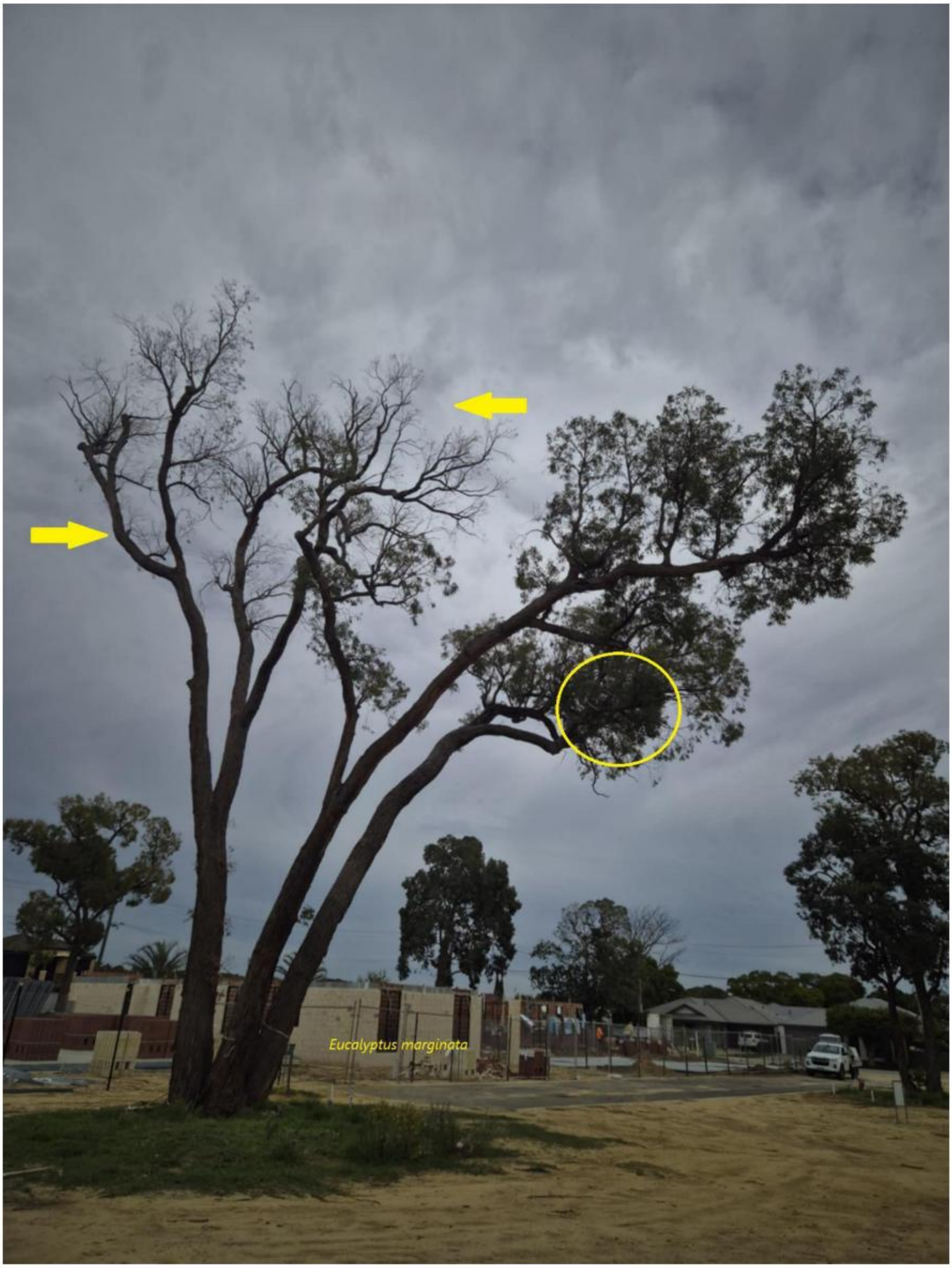
SULE categories

	1 LONG SULE	2 MEDIUM SULE	3 SHORTSULE	4 REMOVALS	5 MOVED OR REPLACED
A	Long: appeared to be retainable alt the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance.	Medium: appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance.	Short- appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance.	Removal: trees which should be removed within the next 5 years.	Moved or Replaced: Trees which can be readily moved or replaced
B	Structurally sound trees located in positions that can accommodate future growth	Trees that may only live between 15 and 40 more years	Trees that may only live between 5 and 1 5 more years.	Dead, dying, suppressed or declining trees through disease or inhospitable conditions	Small trees less than 5 metres (m) in height
C	Trees that could be made suitable for long-term retention by remedial tree care.	Trees that may live for more than 40 years but would be removed for safety or nuisance reasons.	Trees that may live for more than 15 years but would be removed for safety or nuisance reasons.	Dangerous trees through damage, structural defect, instability or recent toss of adjacent trees.	Young trees less than 1 5 years old but over 5m in height
D	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.	Trees that may live for more than 40 years but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees that may live for more than 15 years but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Dangerous trees through structural detects including cavities, decay, included bark, wounds or poor form.	Trees that have been regularly pruned to artificially control growth'
E		Trees that could be made suitable for retention in the medium term by remedial tree care	Trees that require substantial remedial tree care and are only suitable for retention in the short term.	Damaged trees that are' clearly not safe to retain	
F				Trees that may live for more than 5 years but should be removed to prevent interference with more suitable individuals or to provide space for new planting	
G				Trees that are damaging or may cause damage to existing structures within 5 years	
H				Trees that will become dangerous after removal of other trees for the reasons given in A) to F).	

12.4 Photos/Annotations


Approximate previous lop points.
Extensive epicormic growth indicating stress.


Symptoms of stress and decline
Neighbour's tree showing signs of historical and recent decline


Eucalyptus marginata

Tip dieback/reduced vitality indicating tree is in decline.


Deceased Jarrah


Tree in decline

12.5 Author accreditation/experience

12.5.1 Rowan Barkey is a highly qualified consulting arborist with over 15 years of experience in the arboriculture industry. He holds a Diploma of Arboriculture from Training for Trees Pty Ltd and a Certificate III in Arboriculture from South Metropolitan TAFE. Additionally, Rowan has completed a Certificate II in ESI (Energy Skills Solution) and is a licensed operator of the Quantified Tree Risk Assessment (QTRA) methodology.

12.5.2 As a dedicated professional, he is a member of several industry associations, including Arbwest, the International Society of Arboriculture (ISA), and Arboriculture Australia. Rowan's extensive training and practical experience enable him to provide informed and effective arboricultural assessments and recommendations.

Rowan Barkey

-AHC50520: Diploma of Arboriculture.
-AHCARB30820: Certificate 3 Arboriculture.
-Licensed QTRA assessor #8368
-Arboricultural Association of Western Australia member #4249
-ISA (International Society of Arboriculture) member #335080
-Arboriculture Australia Member #13307

End of report.