



PEAKE ARBORICULTURE

ARBORICULTURAL IMPACT ASSESSMENT

**Lot 10/2/DP5466
55 Surfers Parade
Freshwater, NSW 2096**

Prepared on: 12/04/2021

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1 INTRODUCTION & AIMS

1.1 This Arboricultural Impact Assessment (AIA) was requested by Matthew Power on the 25th of March 2021. This AIA is to address the potential impacts upon surrounding trees from the proposed development of Lot 10/2/DP5466 55 Surfere Parade, Freshwater NSW 2096 (the subject site). The subject site can be seen in figure 1 below.

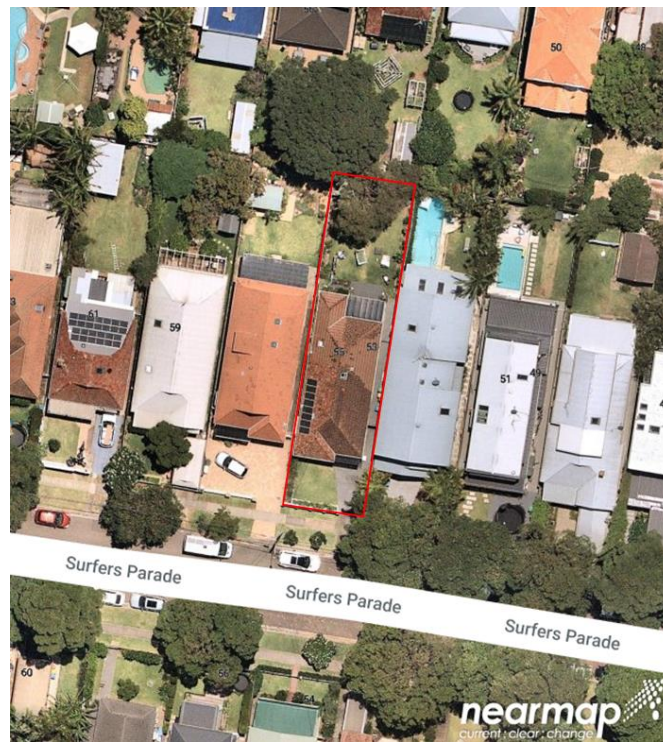


Figure 1: The subject site, site boundary shown in red. (Nearmap, 2021)

1.2 The aim of this report is to:

- Examine Councils policies in regards to application requirements needed for the preparation of an Arboricultural Impact Assessment.
- Visually assess and identify the subject trees & the environment in which they grow.
- Assess construction impacts for each subject tree through the revision of plans for the proposed development.

1.3 This report will recommend tree protection measures that will aim to minimise the impacts from the proposed construction on subject trees to be retained.

2 DEVELOPMENT CONTROLS & RELEVANT LEGISLATION

- 2.1 Lot 10/2/DP5466 55 Surfers Parade, Freshwater NSW 2096 is zoned R2 – Low Density Residential and is located within the Local Government Area of Northern Beaches Council (NSW Government, n.d.)
- 2.2 Warringah Development Control Plan 2011 Amendment 14, specifically part E1 Preservation of Trees or Bushland Vegetation (Northern Beaches Council, 2011 (amendment 14- 20/10/2018)) has been considered in the preparation of this report.
- 2.3 Part H Appendices, of the Warringah Development Control Plan 2011 (Northern Beaches Council, 2011 (amendment 14- 20/10/2018)) contains information required for the preparation of an Arboricultural Impact Assessment. This includes
 - Appendix 8 - Removal of Tree Tests
 - Appendix 9 - Tree Retention Assessment
 - Appendix 11 - Class 2-9 Buildings
 - Appendix 12 - Tree Protection Plan
- 2.4 State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (NSW Government, 2017) has been considered in the preparation of this report. The aims of the policy are to;
 - *“(a) to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and*
 - *(b) to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation.”*



3 METHOD

- 3.1 The tree and site were visually assessed from ground level, using methods developed by the Visual Tree Assessment (VTA) process (Claus Mattheck, 2006). No detailed inspections as described in the VTA process have been undertaken. The genus and species of the trees were recorded as well as the dimensions for diameter at breast height (DBH), diameter above buttress (DAB) and canopy width (when the measurement of a DBH and DAB has not been practical, such as in the case of low branching or mallee trees, a DBH and DAB measurement has been allocated based on tree size). Height and age of the trees were estimated as well as the percentage of deadwood, the tree was given a Health / Vigour rating and signs and symptoms of pests and diseases were looked for. Structural defects and comments were recorded.
- 3.2 Calculations have been made using guidelines supplied in AS4970-2009 Protection of Trees on Development Sites (Standards Australia, 2009) for the;
- Tree Protection Zone (TPZ),
 - Structural Root Zone (SRZ),
 - Live Crown Ratio (LCR),
 - Live Crown Size (LCS),
- 3.3 The tree has been allocated a landscape significance rating of Low, Medium or High using the *IACA Significance of a Tree, Assessment Rating System (STARS)*© (IACA, 2010). Stars assessment criteria includes:
- Condition and Vigour
 - Form, species specific
 - Provenance, age and botanical significance
 - Heritage and Ecological significance
 - Size, shape, and local amenity value
 - Restrictions to tree growth
- Appendix A contains the assessment criteria in full.
- 3.4 The tree has been given a Useful Life Expectancy (ULE) rating, categorised as either;
- Long – 40+ years
 - Medium – 15-40 years
 - Short – 5-15 years
 - Consider for removal - <5 years

4 OBSERVATIONS

4.1 Listed in Table 1 below are observations from the subject tree relating to;

- Health and vigour. Rated between 0 and 5. 0 = Dead, 5 = Excellent.
- Deadwood. An overall % has been estimated.
- Structural defects and comments.
- Any signs/symptoms of pest and disease attack.
- Previous pruning or wounds.

Tree No.	Genus/Species & Common Names	Health Vigour	Dead wood %	Structural Defects/ Comments	Pests/ Disease	Pruning/ Wounds
1	<i>Agonis flexuosa</i> Willow Myrtle	2.5	20-25%	Previous branch failure in western canopy visible. Tip dieback visible on northern Stem.	Fungal bracket visible on western stem, most likely <i>Phellinus</i> sp.	None visible

Table 1: Tree Observations

4.2 Listed in Table 2 below are measurements from the subject tree relating to;

- Diameter at breast height (DBH).
- Diameter above buttress (DAB).
- Canopy spread – measured to the North, East, South and West (N, E, S, W).
- Tree height.
- Lowest scaffold branch.

Tree No.	Species	Maturity	Height (m)	Lowest Scaffold (m)	Spread (m)				DBH / Multi (cm)	DAB (cm)
					N	E	S	W		
1	<i>Agonis flexuosa</i>	Mature	5	2	4	5	5	3	72	86

Table 2: Tree Measurements

4.3 Listed in Table 3 Below are calculations from the subject trees relating to:

- Tree Protection Zone (TPZ)
- Structural Root Zone (SRZ)
- Live Crown Ratio (LCR)
- Live Crown Size (LCS)

Tree Number	Species	TPZ (m)	SRZ (m)	Live Crown Size (m ²)	Live Crown Ratio (%)
1	<i>Agonis flexuosa</i>	8.64	3.11	26	60%

Table 3: Calculations from the subject trees

5 TREE RETENTION VALUES

5.1 Trees have been allocated a retention value using the priority Matrix in the *IACA Significance of a Tree, Assessment Rating System (STARS)©* (IACA, 2010). The Matrix uses the Landscape Significance rating combined with the Useful Life Expectancy (ULE) to determine a retention value of either;

- Priority for Retention (High) – All measures must be taken to retain and protect these trees. If the guidelines set out in AS4970-2009 Protection of trees on development sites cannot be used to protect the trees, design modification or re-location of the proposed development should be considered.
- Consider for Retention (Medium) – Retention of these trees should remain a priority. If the trees are adversely affecting the proposed development and all protection measures have been considered but are not viable, removal can be considered.
- Consider for Removal (Low) – Retention of these trees is not important. No modification to design should be considered for their retention.
- Priority for Removal – Trees in an irreversible decline, weed species or hazardous trees. These trees should be removed.

Tree Number	Species	Landscape Significance Rating	Useful Life Expectancy	Retention Value
1	<i>Agonis flexuosa</i>	Low	Medium	Low-Medium

Table 4: Tree Retention Values

6 CONSTRUCTION IMPACTS

- 6.1 The subject Willow Myrtle (subject tree) has a major encroachment of 16% proposed within the TPZ, also encroaching the SRZ.
- 6.2 To reduce impacts upon the subject tree, excavation for the proposed pool has been reduced to outside of the SRZ. The proposed pool lounge extending into the SRZ is proposed to be primarily cantilevered with one support pier to be constructed above existing ground level along the northern border. Figure 2 below shows an excerpt of the Ground floor plan with the SRZ dashed in orange and the TPZ dashed in blue and an excerpt of Section B-B with the cantilevered pool lounge detailed.

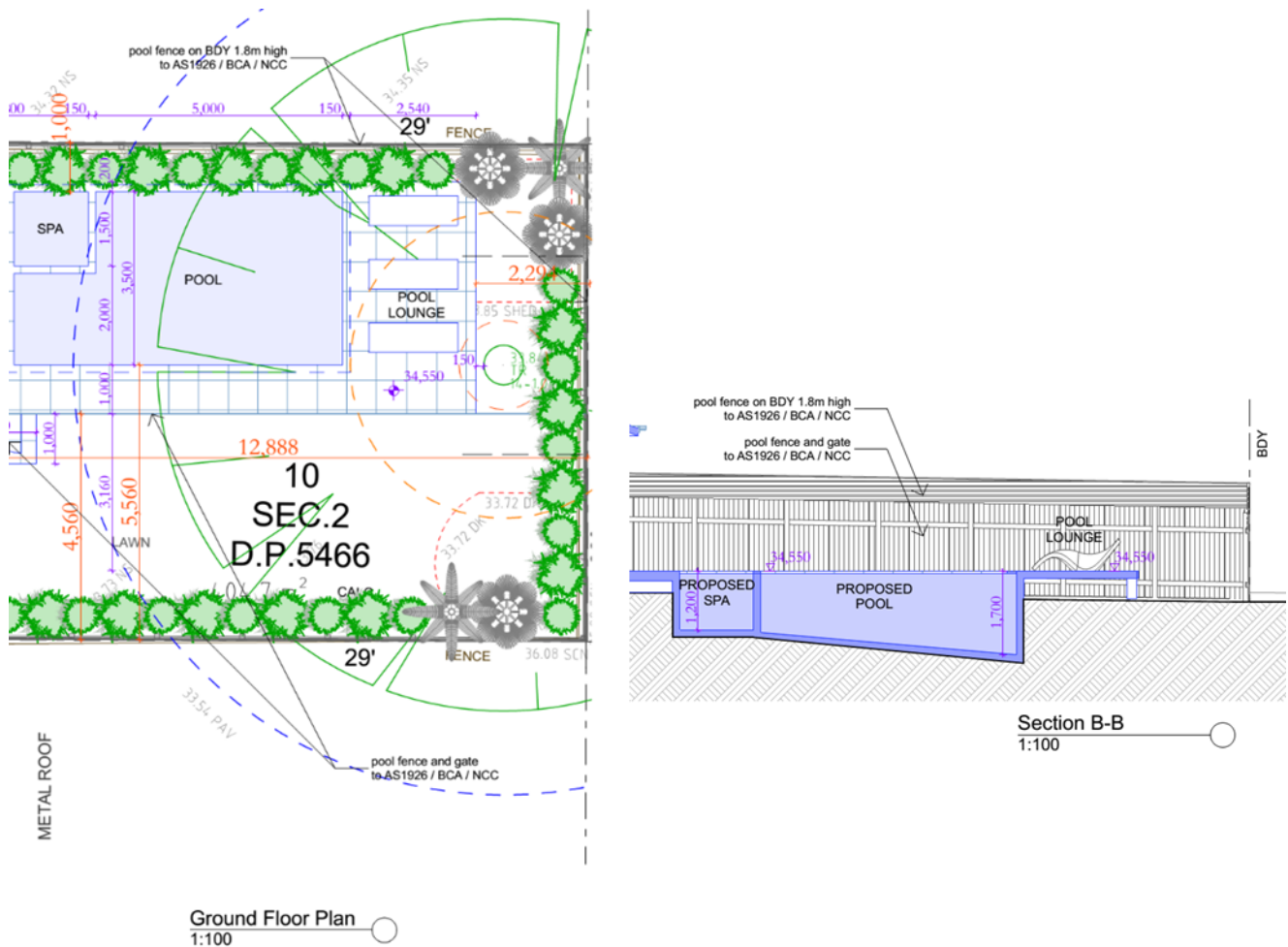


Figure 2: Ground Floor Plan and Section B-B excerpts.

- 6.3 Due to excavation being restricted to outside of the SRZ and the use of a suspended section within the SRZ, no detrimental impacts are expected from the proposed development. Physical tree protection measures and arboricultural supervision will be required during construction.

7 DOCUMENTS USED IN THE PREPARATION OF THIS REPORT

7.1 Listed in table 6 below are documents used in the preparation of this report.

Document type	Source/ Author	Title	Date
Survey Plan	C.M.S Surveyors Pty Ltd	Survey Plan	12/03/2020
Plan	sketchArc	DA3 – Site, Site Analysis	19/03/2021
Plan	sketchArc	DA4 – Ground Floor plan	19/03/2021
Plan	sketchArc	DA 7-8 – Elevations	19/03/2021
Plan	sketchArc	DA24-34 – Sections	19/03/2021

Table 5: Documents used in the preparation of this report.

8 RECOMMENDATIONS

- 8.1 The appointment of a project arborist (AQF Level 5) for the duration of the project, must be made prior to the commencement of any site works including demolition, to implement tree protection measures recommended below and in the Tree Protection Specification.
- 8.2 Prior to the commencement of any site works, stem protection is to be installed upon the trunk of the subject tree. An example of completed stem protection is available in section 9.6 of this report. This is to mitigate possible impacts from site activities (loading and unloading of materials and movement around site etc.) It is recommended that tree protection fencing is also installed to exclude the un-developed portion of the TPZ within the subject site from construction activities. An example of tree protection fencing is available in section 9.7 of this report, the final location of Tree Protection Fencing is to be determined by the Project Arborist following consultation with the project manager (to allow for site access etc.).
- 8.3 The project arborist (AQF5) must be present to monitor and certify inground works within the TPZ of the subject tree. Any tree roots exposed during excavation with a diameter greater than 30mm within the TPZ must be assessed by the site arborist.

Any tree roots exposed during excavation with a diameter of less than 30mm within the TPZ of a retained tree must be cut cleanly with a sharp blade in accordance with section 9 of AS4373-2007 Pruning of Amenity Trees (Standards Australia, 2007).

9 TREE PROTECTION SPECIFICATION – AS PER AS4970 – 2009

Tree Protection will be undertaken in the three stages listed below. Certification from the project arborist is required at/during each stage.

9.1 PRE – DEVELOPMENT STAGE

- Prior to any tree removal an AQF level 5 arborist must be engaged as project arborist to oversee all arboricultural aspects of the project, including tagging all trees and identifying trees for removal.
- Tree protection should be installed by a minimum AQF level 3 arborist and be supervised by an AQF level 5 arborist in accordance with the guidelines from AS4970-2009 Protection of trees on development sites (Standards Australia, 2009), and the information provided in this report.
- All trees to be retained must be visually assessed and their current health and condition recorded. The minimum assessment categories are provided below.

Visual assessment benchmark

- Health and Vitality (Good/Fair/Poor/Dead)
- Leaf Damage
- Pests and Diseases
- Deadwood percentage
- Dieback Percentage.
- Mechanical Damage
- Recent Pruning
- Certifying of Pre-Construction Tree Protection by the site arborist will conclude the pre-construction phase of development. Construction must not commence until Pre-Construction tree protection has been certified by the site arborist.
- The project manager is to be made aware of Tree Protection requirements for the duration of the project.



Pre-development Arboricultural Certification

	Pre-Development requirement met. (Y/N)	Project Arborist Signature	Date
All trees tagged. Trees for removal identified by project arborist.			
All tree protection measures have been correctly installed.			
A pre-development visual inspection of all trees to be retained has been undertaken by the project arborist			
The project manager has been made aware of all tree protection measures required for the duration of the project.			

9.2 DEVELOPMENT STAGE

- Tree protection measures must remain in place during this stage. They cannot be removed intermittently for access and any modifications to Tree Protection Fencing Locations as shown in the tree protection plan, must be authorised, recorded and carried out by the site arborist.
- The project arborist is to be present for all arboricultural supervision within TPZ's of retained trees, as recommended by the arboricultural impact assessment (AIA) and tree protection plan.
- The site arborist will conduct regular visits (every two months) in accordance with AS4970-2009 to visually assess and record the health and condition of the trees being retained.
- Tree protection measures will also be assessed regularly to ensure they are functioning correctly. Any maintenance required for Tree Protection measures will be performed.
- A stop work notice will be issued to the project manager if any Tree Protection Measures are not found to be complying with the Tree Protection Plan.
- Any incidents relating to retained trees must be reported immediately to the site arborist to be documented and a plan for remediation put in place.

Development Stage Arboricultural Certification.

	Development requirement met. (Y/N)	Project Arborist Signature	Date
Tree protection measures have remained in place for the duration of the development.			
Tree Health and vitality has not deteriorated during the development.			
Arboricultural supervision has been undertaken as required by the AIA and Tree Protection Plan			
Incidents relating to retained trees have been reported to the project arborist.			
Remediation has been implemented as necessary for the successful retention of retained trees.			

9.3 CONCLUSION OF DEVELOPMENT

- Final visit from the site arborist to report on the health and condition of the trees that have been retained and the removal of tree protection. Incidents documented during the development stage will be included in this report.
- Any remedial work necessary upon the completion of development will be recommended in the final report.
- Replacement trees are to be planted before the project arborists final inspection.

Conclusion of Development Arboricultural Certification.

	Development requirement met. (Y/N)	Project Arborist Signature	Date
Tree protection measures have remained in place for the duration of the development.			
Tree Health and vitality has not deteriorated during the development.			
All documentation from site inspections/supervision has been compiled.			
Remediation has been implemented as necessary for the successful retention of retained trees. Any remediation to be continued has been recommended in the final report.			
Replacement tree planting has been undertaken and all replacement trees have been planted correctly.			

9.4 TREE PROTECTION ZONE REQUIREMENTS

Tree Protection Zones (TPZs), will be set out before the commencement of construction works.

According to AS 4970-2009, activities excluded from the TPZ include but are not limited to-:

- (a) machine excavation including trenching
- (b) excavation for silt fencing
- (c) cultivation
- (d) storage
- (e) preparation of chemicals, including preparation of cement products
- (f) parking of vehicles and plant
- (g) refuelling
- (h) dumping of waste
- (i) wash down and cleaning of equipment
- (j) placement of fill
- (k) lighting of fires
- (l) soil level changes
- (m) temporary or permanent installation of utilities and signs
- (n) physical damage to the tree.

Source Australian Standard AS 4970-2009 *Protection of trees on development sites*.



9.5 TREE PROTECTION ZONE SIGNAGE

A tree protection zone sign must be affixed to all Fenced Tree Protection Zones. (Example Below)

TREE PROTECTION ZONE



NO ACCESS

Restricted Activities in the Tree Protection Zone
According to AS 4970-2009, activities excluded from the TPZ include but are not limited to-

- machine excavation including trenching
 - excavation for silt fencing
 - cultivation
 - storage
- preparation of chemicals, including preparation of cement products
 - parking of vehicles and plant
 - refuelling
 - dumping of waste
- wash down and cleaning of equipment
 - placement of fill
 - lighting of fires
 - soil level changes
- temporary or permanent installation of utilities and signs
 - physical damage to the tree.

Source Australian Standard AS 4970-2009 *Protection of trees on development sites.*

Site Arborist:
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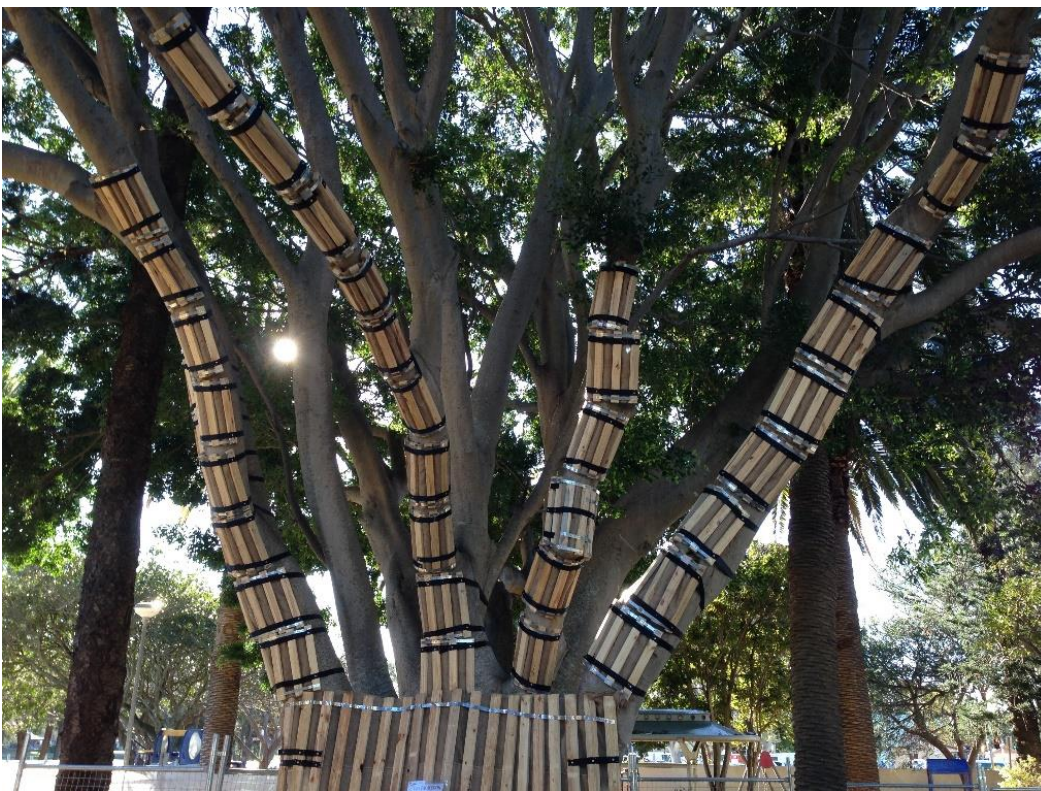
9.6 STEM & BRANCH PROTECTION REQUIREMENTS

Wherever stems and branches are to be protected. Timber boards are to be used with padding underneath that will protect damage to the trees bark. All stem and branch protection timbers are to be strapped to the subject tree. Examples of stem protection are shown below.



Boards held in Place by steel strapping.

Hessian is used as padding to prevent damage to the trees bark.



An Example of completed Stem Protection

9.7 TREE PROTECTION FENCING REQUIREMENTS

Tree protection Fencing must be a minimum of 1.8 metres in height and be held in place with locking clamps and concrete feet between each panel, see Figure 2 below.



An Example of Temporary Fencing

10 REFERENCES

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11 GLOSSARY OF TERMS

Age class:

Young – planted recently.

Semi Mature – Reached less than 20% of expected life span.

Mature – Between 20-80% of expected life span.

Over Mature – Past 80% of expected life span.

Health and Vigour:

0 – Dead tree.

1 – Advanced state of decline. Significant deadwood visible. <20% live foliage cover.

2 – Declining. Dieback and deadwood visible. 20-60% live foliage cover.

3 – Low to average vigour. Dieback or visible. 60-90% live foliage cover.

4 – Good vigour. Small amount of dieback visible. 90-100% live foliage cover.

5 – Excellent vigour. No dieback or deadwood visible. 100% live foliage cover.

Crown:

Measured from the top of the tree to the lowest branch, comprising of leaves and branches.

Deadwood:

Dead branches found in a trees crown. An entirely dead branch or stem.

Dieback:

The death of portions of the crown. The death of branches or shoots from the tips inward.

Defect:

A feature of a tree that affects the health or structure in an adverse manner.

Decay:

The process of micro-organisms breaking down woody tissue.

Cavity:

A void in a woody stem, usually created by decay. This can be open or closed.

Soil Texture:

The amounts of sand, silt and clay in a soil.

Soil pH:

A figure expressing the acidity or alkalinity of a soil.

DBH:

Diameter at Breast Height refers to the tree trunk diameter measured at breast height or 1.4 metres above ground level.

DAB:

Diameter Above the Buttress refers to the tree trunk diameter measured above the root buttress and is used to calculate the radius of the SRZ.

TPZ:

Tree Protection Zone The radius of the TPZ is calculated for each tree by multiplying the DBH x 12. To establish the TPZ this radius is measured from the centre of the stem at ground level and it is an area that is to be isolated from construction disturbance. Any encroachment into the TPZ of more than 10% is considered to be a major encroachment.

SRZ:

Structural Root Zone The radius of the SRZ is calculated using the following formula:

$r (SRZ) = (D \times 50)^{0.42} \times 0.64$ where D is the DAB measured in metres. It is the area around a tree that is required for tree stability and is usually applied on construction sites after there has been a major encroachment of the TPZ.

LCR:

Live Crown Ratio. The height of a trees crown, relative to the total height of the tree. Often used as an indicator of overall stability.

LCS:

Live Crown Size. The area of the crown as viewed from one aspect.

H/D:

Height over Diameter ratio. An indicator of failure due to slenderness. 30 is the optimum ratio. Greater than 50 is considered hazardous



12 RELEVANT APPENDICES

12.1 APPENDIX 1 – S.T.A.R.S.© (IACA 2010)

Significance of a Tree, Assessment Rating System* (IACA 2010) – S.T.A.R.S. ©

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. An example of its use in an Arboricultural report is shown as Appendix A.

Tree Significance - Assessment Criteria



High Significance in landscape

- The tree is in *Good condition* and *Good vigor*;
- 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.

Medium Significance in landscape

- The tree is in *Fair-Good condition* and *Good* or *Low vigor*;
- 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*.

Low Significance in landscape

- The tree is in fair-poor condition and good or low vigor;
- 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. Institute of Australian Consulting Arboriculturists (IACA 2010), *IACA Significance of a Tree, Assessment Rating System (STARS)*, www.iaca.org.au

Table 1.0 Tree Retention Value - Priority Matrix.

		Significance				
		1. High	2. Medium	3. Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1. Long >40 years					
	2. Medium 15-40 Years					
	3. Short <1-15 Years					
	Dead					

Legend for Matrix Assessment	
	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 <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.
	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.



USE OF THIS DOCUMENT AND REFERENCING The IACA Significance of a Tree, Assessment Rating System (STARS) is free to use, but only in its entirety and must be cited as follows:

IACA, 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

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