Vertical

Tree Management & Consultancy

Arboricultural Assessment

Commissioned by: Sally Anne and Simon James Prowse

Site: 25 Amourin Street, North Manly NSW 2100

Within: Northern Beaches Council

Date of Inspection: 24 May 2022

Version: 1.0

Prepared by:

Vertical Tree Management & Consultancy

Level 5 Consulting Arborist, Derek Arnaiz (AQF level 5)

QTRA – Quantified Tree Risk Assessment

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1 Introduction / Aims/ Objectives:

1.1 Introduction

This Arboricultural preliminary Assessment version 1.0 has been prepared by Vertical Tree Management and Consultancy, Derek Arnaiz for the client, Sally Ann and Simon James Prowse. The report shall assess the existing viability of a site tree and a managed Council nature strip tree and consider the retention value and risk assessment as viewed on the day of the inspection. An assessment will be in relation to the design and construction of a dual occupancy dwelling within the site.

The trees have been assessed and given a retention value rating. Trees with low retention value should be removed. Tree with a medium retention value may be removed for the benefit of the outcome and trees with high retention values should be retained where possible.

The trees are located at allotment 10 DP19139, 25 Amourin Street, North Manly, NSW, 2100. The location will be referred to as the site from here within. The site is located within the Northern Beaches Council local government area and is subject to the relevant local government and legislative framework.

1.2 Aims

This report shall assess the site trees and advise on acceptable setback distances and impacts within the Tree Protection Zones:

- Methodology used in tree evaluation, retention value and Tree Protection zones & Structural Root Zones, p3.
- Tree data table with retention values p4.
- A scale plan showing the location of the trees on the subject site, Appendix A.
- Allocation of a number to each tree, p4 and Appendix A.
- Provide canopy spread and diameter at breast height and at ground level of each tree, p4.
- Indicate the tree retention values, Tree Protection Zone (TPZ), Structural Root Zone (SRZ) and assessment of the developable environment, p4.

1.3 Objectives

- Assess the condition of the trees.
- Determine the impact of development on the site trees.
- Provide recommendation for management and protection strategies for site trees.

1.4 The site

Located in the Northern Beaches Council (NBC) local government area, the site is Zoned R2 Low Density Residential. The parcel of land is approximately 450 m^2. The site is flat with scattered endemic, native vegetation. The rear yard contains a native under-storey community of vegetation. Within the front of the property is one stand-alone Banksia. This tree was once in a community of 3 trees which have been previously removed. Within Council's nature strip is one Council managed Weeping Bottlebrush. There is no vegetation within the block that is considered for retention.

A summary of the control checks for the land can be seen below in Table 1. Information within has been gained from NSW Government e Planning Spatial viewer website 24 May 2022.

Figure 1. Aerial photo of the site 25 Amourin Street, North Manly, NSW, 2100. Sixmaps, accessed 24 May 2022.

Table 1: Outline of site control measures listed on the land 25 Amourin Street, North Manly, NSW, 2100.

Planning Control	Conditioned	Not Conditioned
Zoning	R2 Low Density Residential	
Heritage Listed Property		X
Heritage Conservation Area		X
Terrestrial Biodiversity (CEEC-EEC)		X
Bush Fire Prone Land		X

2 Methodology:

2.1 Site Inspection

Site inspection was undertaken by the author on 24 May 2022.

2.2 Plans Provided

Assessment of potential impacts on the trees in the immediate vicinity of the development site was based on various PDF plans supplied by the client and include the following:

- ZAC Homes, Perspective, Sheet No. 00.0, Issue A, Concept Sketch, 14 December 2021
- ZAC Homes, Site Plan, Sheet 01.0, 14 December 2021
- ZAC Homes, Ground Floor Plan, Sheet 01.9, 14 December 2021
- ZAC Homes, First Floor Plan, Sheet 01.9.01, 14 December 2021
- ZAC Homes, Front and Right Elevations, Sheet 03.0, 14 December 2021
- ZAC Homes, Rear and Left Elevations, Sheet 03.1, 14 December 2021
- ZAC Homes, Perspective, Sheet No. 00.0, Issue B, Amended, 22 February 2022
- ZAC Homes, Perspective, Sheet No. 00.0, Issue C, Compliance Amendments, 25 February 2022
- ZAC Homes, Perspective, Sheet No. 00.0, Issue D, Amendments to Suit QR, 07 March 2022
- ZAC Homes, Perspective, Sheet No. 00.0, Issue E, Facade Updated, 28 March 2022
- Richard Hogan & Co., Detail Survey, Job Ref. 22219, 21 April 2022

2.3 Tree Numbering System

A tree numbering system was assigned to the trees indicated in Appendix A.

2.4 Tree Protection Zone (TPZ)

TPZ was calculated using the Australian standard AS4970 - “Protection of Trees on Development Sites” formula.

2.5 Structural Root Zone (SRZ)

SRZ was calculated using the Australian standard AS4970 - “Protection of Trees on Development Sites” formula.

2.6 Amendments

Recommendations for amendments to the proposed development were based on Australian Standards for AS 4970 - 2009 “Protection of Trees on Development Sites”.

2.7 Incursions

Allowable incursions to Tree Protection Zones were based on Australian Standards for AS 4970 2009 “Protection of Trees on Development Sites” and the author’s extensive experience with trees on development sites.

2.8 Destabilisation

Potential destabilization from root severance within the Structural root Zone (SRZ) based on data compiled from findings of Matheck (1994).

2.9 Plans and retention value

Plans showing canopy, retention value, Tree Protection Zone and Structural Root zone and tree protection device locations indicated in Appendix A.

2.10 Tree protection & specification

Tree protection & specification in accordance with AS4970-2009.

2.11 Assumptions

1. The information provided is accurate and true to the conditions of the site.
2. The information provided has been ground truth or has been otherwise stated.
3. The techniques for excavation, construction boring and dismantling are in keeping with traditional methods unless otherwise stated.

3 Tree Assessment Data

Table 2. Tree Assessment Data for trees located in 25 Amourin Street, North Manly NSW 2100

Number	Species	Height	width	DBH	DGL	TPZ	SRZ	Age Class	Health	Condition	Amenity	ULE	Retention Value	Notes
1	*Callistemon viminalis*	7	7	23	44	2.8	2.3	Mature	Good	Fair	Medium	3	Low	The Council owned Weeping Bottlebrush is in fair health and structure. Tree is multi-stemmed at ground level with a poor structured union. This union has a potential for failure. Tree is considered a standard example for the species and is a stand-alone species in the local landscape. The tree has low landscape significance with low retention value.

Number	Species	Height	width	DBH	DGL	TPZ	SRZ	Age Class	Health	Condition	Amenity	ULE	Retention Value	Notes
2	*Banksia serrata*	11	8	60	78	7.2	3	Mature	Fair	Fair	Medium	3	Medium	The mature Old Man Banksia is located within the front yard of the property, is in fair health with good structure. The tree grows dominantly within the front yard of the property and surrounding area with a moderate landscape significance. Tree is currently located approximately 4 meters from the external wall of the existing dwelling. Tree has been excessively crown raised over its lifetime and is densely epicormic throughout the mid and upper canopy. Various locations of previous pruning are developing minor decay with low callous wood forming at these locations. The tree is in early stages of decline likely as a result of repeated over pruning over its lifetime.

***DBH – Diameter at Breast Height; **DGL – Diameter at Ground Level ***TPZ – Tree Protection Zone; ^SRZ – Structural Root Zone, ~ Approximately. Appendix B – Explanatory notes**

DW = Dead wood (%), CS = Clear stem - no branching (m), LC = Live Crown (%)

4 Tree Protection Zone & Structural Root Zone

4.1 Tree Protection Zone (TPZ)

The TPZ is the principal means of protecting trees on development sites. The TPZ is 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 TPZ is calculated using the Australian standard AS4970 - “Protection of Trees on Development Sites” formula. Development encroachments are referred to as: 1) No impact (0%) incursion; 2) Low impact (<10%) of minor consequence; 3) Medium impact (<20%) incursion where the project arborist is to demonstrate the tree(s) remain viable by tree sensitive construction techniques; and 4) High level impact (>20%) where design changes or further information is required to manage tree vitality.

4.2 Minor Encroachment

If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, Detailed root investigations should not be required. Variations can only be made by an AQF5 Consulting Arborist (Project Arborist).

4.3 Major Encroachment

If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ, the project arborist must demonstrate that the tree(s) would remain viable. this may require root investigation by non-destructive methods and consideration of relevant factors listed in AS4970 Clause 3.3.4.

4.4 Structural Root Zone (SRZ)

The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree. The SRZ only needs to be calculated when major encroachment into a TPZ is proposed. The SRZ calculated using the Australian standard AS4970 - “Protection of Trees on Development Sites” formula. Excavation within the structural root zone should be avoided. In the event this cannot be avoided the site arborist (AQF level 5) must be present. Excavation must be non-destructive such as hand excavation or Airspade® or other.

The trees identified to have a major incursion within the calculated TPZ or SRZ by excavations, disturbance or soil fill will require an assessment of the impact to the tree. The incursion must be assessed and determined in accordance with AS4970 “Protection of Trees on Development Sites”. Trees with major incursions may be adversely impacted with long term health and stability problems. Identification of work within the TPZ or SRZ will allow the site Arborist to recommend alternative solutions where possible.

4.5 Variations of the TPZ

It may be possible to encroach into or make variations to the standard TPZ. Encroachment includes excavation, compacted fill, and machine trenching. Encroachment into the tree protection zone (TPZ) is sometimes unavoidable. Any loss of TPZ compensated for elsewhere.

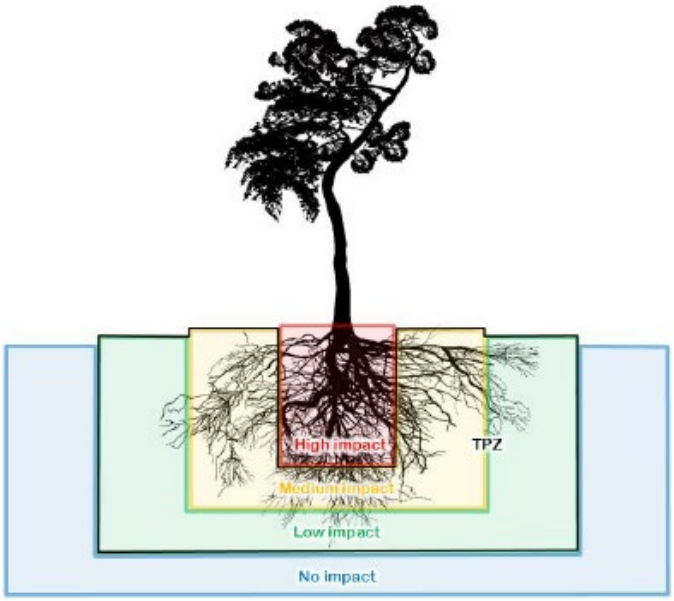

Figure 2. Low medium and high impact zones in reference to the tree

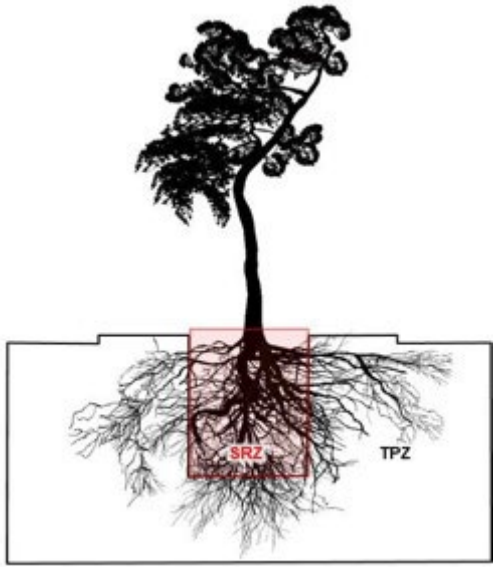

Figure 3. Structural root Zone the area required for tree stability

5 Discussion

Tree 1 Callistemon viminalis

The Council owned Weeping Bottlebrush is in fair health and structure. Tree is considered a standard example for the species and is a stand-alone species in the local landscape. The tree has low landscape significance with low retention value. This is required for removal for the proposed development. Design modifications have been explored, however, are not considered viable.

Tree 2 Banksia serrata

The mature Old Man Banksia located within the front yard of the property is in fair health with good structure. The tree grows dominantly within the front yard of the property and surrounding area with a moderate landscape significance. Tree has been excessively crown raised over its lifetime and is densely epicormic throughout the mid and upper canopy. The tree is in early stages of decline likely as a result of repeated over pruning over its lifetime. This is required for removal for the proposed development. Design modifications to retain the tree have been explored, however are not considered viable.

6 Recommendations

6.1 Trees identified for removal

Table 3 - Trees identified for removal at 25 Amourin Street, North Manly, NSW, 2100.

Number	Species	Action
1	*Callistemon viminalis*	Remove
2	*Banksia serrata*	Remove

6.2 Trees identified to be retained

Table 4 – No Trees identified to be retained 25 Amourin Street, North Manly, NSW, 2100.

7 Standards

7.1 Owners/builders responsibilities

It is the responsibility of the owner/builder to make this report available to all contractors associated with the development at the site. The following Tree protection Plan, report version one should be adhered to ensure that the trees are viable into the future.

7.2 Tree related works

All tree related work relevant to this report is to be conducted in accordance with:

- The NSW Workcover Code of Practice: Amenity Tree Industry 1998.
- The AS4970-2007 “Protection of Trees on Development Sites”.
- All tree related work must be undertaken by an arborist with an Australian Qualification Framework Level 3 in Arboriculture or above.
- All tree related work carried out in the vicinity of overhead power lines must be undertaken by a qualified arborist with a current Power lines Awareness Certificate.

7.3 The Site Arborist (Vertical Tree Management & Consultancy)

The site arborist will record tree health prior to commencement of construction and provide a Tree Protection Plan setting out tree protection measures, methods and supervision requirements.

7.4 Certification of works

The site arborist will provide certification at three stages of the project, prior, during and at the final stages for the compliance of tree protection measures. Changes to the tree protection will also be recorded as required.

7.5 The Site Arborist

The arborist will oversee work and provide advice for tree work within the tree protection zone and Structural Root Zone. A report will be required for pruning tree roots greater than 40mm in diameter.

7.6 Consent for works

All tree related work must have written consent from the relevant control authority (local Council).

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Disclaimer statement. The response of a living tree to its immediate environment is dynamic throughout its entire life cycle due to external influences giving each tree a unique natural variability. A visual tree assessment addresses the external symptoms presented by a tree. This cannot exclude a tree from the potential for failure due to unforeseen circumstances. This report cannot provide a conclusive recommendation regarding any part of a tree root system that is not exposed for visual inspection. Additionally, it cannot not be assumed, that a tree will be safe in all conditions in the future. Appropriate management, assessment, and maintenance aim to mitigate risks to an acceptable level. This report is the opinion, advise or recommendation based on the information supplied by the client or observation of the author.

Appendix A – Tree Location and Retention - 25 Amourin Street, North Manly NSW 2100

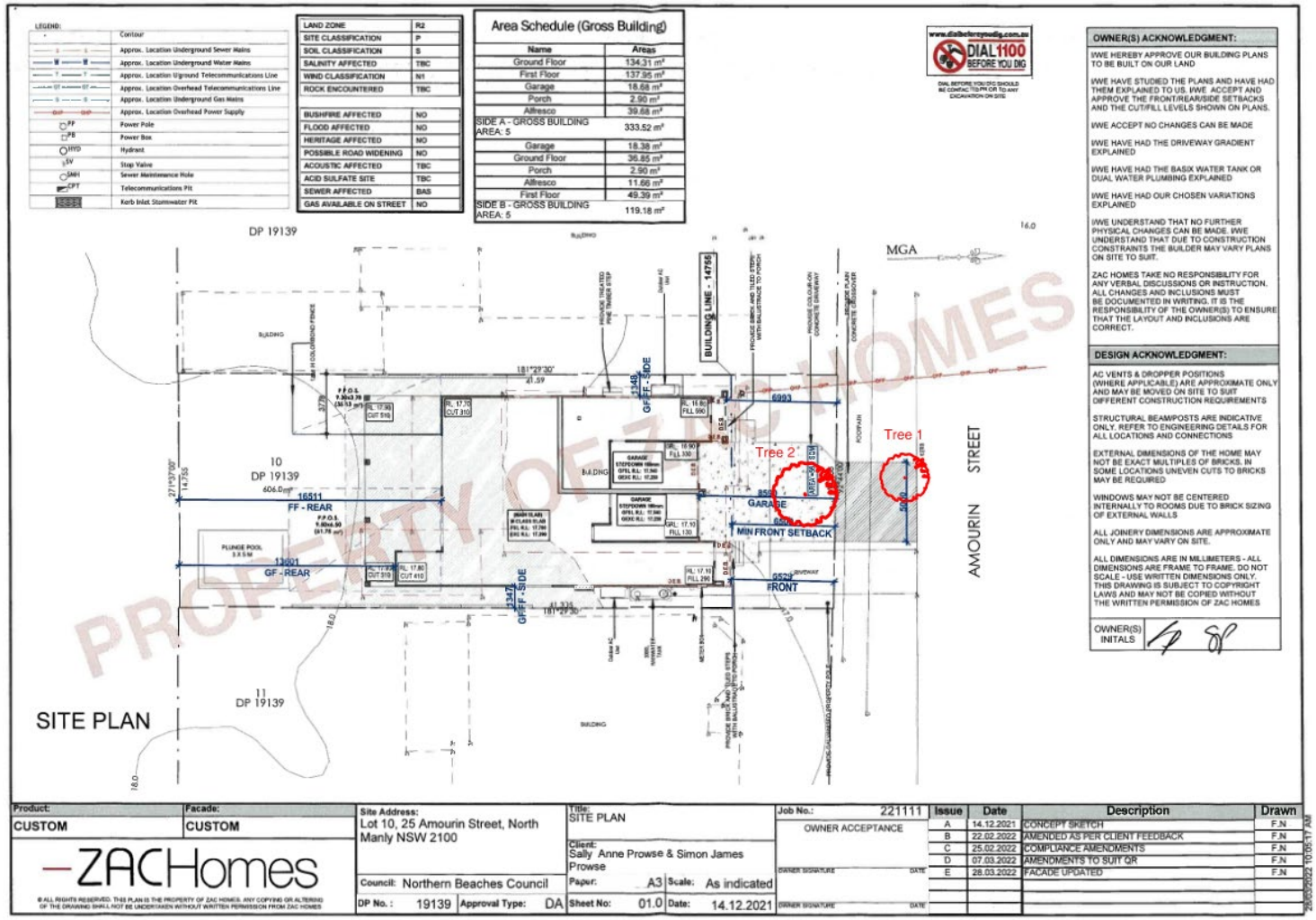

Figure 4 - Tree Location and Retention Plan

Appendix B - TREE ASSESSMENT TABLE EXPLANATORY NOTES Thyer Tree Valuation Method (1996)

AGE CLASS (Modified from *British Standard BS5837*-1991).
Immature (I): Young trees, less than 20% of life expectancy.
Semi-mature (S): Middle aged trees, 20-40% of life expectancy.
Mature (M): Trees between 40-80% of life expectancy.
Over-mature (O): Senescent trees, or those declining irreversibly. Less than 20% of life expectancy.

HEALTH - This evaluates a trees vitality and vigour as indicated by its crown density, leaf size, foliage colour and its ability to withstand wounding, pests, diseases, or changes to the growing environment.
Good: (G) Tree is generally healthy and showing signs of normal vigour and is expected to continue to remain so, provided conditions around the tree required for its survival do not change.
Average: (A) Tree is typical of the species, considering its age, without noticeable decline.
Fair: (F) Tree shows signs of normal vigour but shows some indications of decline due topsets and diseases or changes to its growing environment.
Poor: (P) Tree exhibits symptoms of advanced and irreversible decline due to fungal decay, severe dieback of branch and crown canopy, predation of pests, storm or lightning damage, root damage or instability of the tree and alterations to its growing environment.

STRUCTURAL CONDITION - This refers to the trees form, and growth habit modified by its environment, the state of the trunk and the main structural branches. It includes the presence of defects such as decay, weak branch junctions and other visible abnormalities. Although some trees without defects fail in storms, the presence of any defect will increase the chances of failure.
Good: (G) Trees with a single dominant trunk along which evenly spaced branches are spread. Branches have properly formed collars which provide strong attachment to the trunk and are about 25% of the trunk diameter. Minor structural defects may be present with low failure potential.
Average: (A) Trees which have structural defects and low failure potential.
Fair: (F) Trees with structural defects and medium failure potential, which require monitoring on an annual basis.
Poor: (P) Trees with defects which have failed, or have a high risk of failing soon, and corrective action must be taken as soon as possible.

Appendix C - IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA2010) ©

In the development of this document IACA acknowledges the contribution and original concept of the footprint green tree significance and 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 the 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 ACA dictionary for managing trees in urban environments 2009.

This rating system will assist in the planning process for proposed works, above and below ground where trees are to be retained on or adjacent a development site. This 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 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.
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 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 taxonomy *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.

USE OF THIS DOCUMENT AND REFERENCING

The IACA significance of a tree assessment rating system is free to use, but only in its entirety and must be cited as follows:

IACA, 2010 IACA significance of a tree assessment rating systems, institute of Australian consulting arborists, Australia www.iaca.org.au

GLOSSARY:

Aerial inspection - a close inspection of the aerial part of a tree, either by elevated work platform (EWP) or by an AQF level 3 arborist (climbing inspection).

Air spade - equipment providing a jet of compressed air to a hand-held device which helps to excavate roots almost non-destructively.

Amenity tree – a tree grown for purposes other than for production**.**

***AS4373*-2007** – Current Australian Standard for the Pruning of Amenity Trees**.**

AQF – Australian Qualification Framework for all educational and training purposes.

Axiom of uniform stress - is a self-optimizing structure because the growth of new wood tends to eliminate any stress concentrations, maintaining a uniform stress distribution.

Bacteria - one of the five kingdoms of living things. Some cause disease, many are decomposers and some are beneficial (such as nitrifying bacteria and those in the gut of animals).

Bark cambium (cork cambium, phellogen) - Layers of meristematic cells on the outer side of the phloem that give rise to the bark.

Branch order - The seedling axis, typically giving rise to the main stem, has a branch order of 0. Branches arising from axillary buds on the seedling axis are first-order branches, branches arising from them are second-order and so on, the shoots at the periphery of the crown having the highest order.

Callus - cells that forms over an injury or scar, that develops from actively dividing plant tissue.

Canker - A discrete area of dead or malformed bark caused by a pathogen.

Canopy - Of a single tree, its crown, emphasizing its spreading and enclosing character. Of a forest, the crowns of the larger trees considered collectively.

Chlorophyll - The pigment in green plants and a kind of bacteria (cyanobacteria) that permits photosynthesis. Chlorophyll is green because it absorbs light most strongly in the blue and red regions of the visible spectrum, reflecting the green.

Compartmentalization - A form of defense in woody plants, in which barriers resistant to invasion by pathogens or wood decay fungi are laid down while the wood is living (sapwood), and which continue to act passively once the wood is incorporated into heartwood.

Deadwood - Dead and decomposing wood including dead trees (whether standing, snapped or fallen), branches of any size, stumps and roots.

Defect - Any feature of a tree that is likely to make it less safe (in the case of a structural defect) or otherwise to reduce its health, longevity, landscape prominence or conservation value for any other reason.

Diameter - Broadly, the width of a cylindrical object like the main stem of a tree.

dbh – the diameter of a stem measured at breast height i.e. 1000mm.

Dip. Arb. – Diploma in Arboriculture.

Drip zone – the area from one edge of the canopy to the other.

Expert witness - Someone capable of giving an expert opinion, to be relied upon in some official or legal process.

Fastigiate - A growth habit with branches strongly ascending, like Lombardy poplar. A common ornamental form.

Fibre buckling A local transverse failure in compression of the outer wood of a stem as it sways in a strong wind. The resulting adaptive growth gives rise to a characteristic ring-like bulge around the stem.

First-order branch – a branch which emanates directly from the trunk, in contrast to a scaffold branch, sometimes referred to as a primary branch.

Flush cut - A pruning cut that removes the branch collar and/or part of the branch ridge, slowing the occlusion of the wound.

Footing - A relatively broad base to a foundation to help spread load and improve the stability of a structure.

Fungi (singular 'fungus') - One of the four main groups (kingdoms) of organisms. There are two groups of higher fungi, the Basidiomycetes and Ascomycetes, while other groups are moulds. Many fungi are decomposers, including the relatively specialized wood decay fungi. Some are plant pathogens, some are symbiotic (see mycorrhiza, lichen) and some are cultivated by insects for food (see ambrosia beetle).

Included bark - Areas of bark on adjacent parts of a tree, typically on the inner faces of a narrow fork, which become grown over to occupy part of the internal joint.

Ganoderma spp. - A common wood decay fungus of the selective delignification type, causing root rot and butt rot mainly in broadleaf trees. The fruiting bodies of the fungus are woody brackets, commonly occurring in the flutes between the buttresses of big trees near ground level.

Heartwood - In a branch, main stem or root of sufficient diameter, the non-living inner wood, in contrast to the sapwood in which the xylem parenchyma cells are alive.

Lignin - A constituent of some plant cell walls making them stiff and woody. About 1/3 of the dry weight of wood is lignin.

Lion-tailing - A long branch with a tuft of secondary branches near the tip, a marked form of end loading, either arising naturally or from poor pruning practice.

Mistletoe - A semi-parasite, having green leaves for photosynthesis but growing into the host to obtain water and nutrients.

Mycelium - A network of hyphae making up the vegetative part of a fungus.

Mycelium - A network of hyphae making up the vegetative part of a fungus.

Osmosis - The flow of water across a semi-permeable membrane from a dilute solution to a more concentrated one, as from the soil water into a root cell or from the xylem into a leaf cell.

Quantified tree risk assessment (QTRA) - A refinement of visual tree assessment with emphasis on seeking to quantify the component probabilities of tree risk, particularly the occupancy of the target area, to arrive at an overall numerical or categorical risk.

Root Zone - Area encompassing the tree roots

Scaffold branch – a branch which emanates from a first-order branch, also known as a second-order branch.

Structural defect - A defect in a structure that makes it less able to withstand the forces applied to it.

t/R ratio - In hollow tree stems, the ratio of the thickness of sound wood to the radius. A criterion helpful in evaluating tree risk developed by Mattheck & Breloer (1994)

Tension wood - The kind of reaction wood found in broadleaf trees which is strong in tension and is characterized by a low lignin content.

Tree risk - The risk that a tree causes damage or injury if it (or part of it) suffers structural failure. Tree risk is a composite of several variables: hazard, probability, target value and occupancy.

Urban forest - Trees and other woody vegetation in the built environment considered collectively over an extensive area (eg. the jurisdiction of a local authority).

Vigour – the genetic capacity (potential) of a tree to resist strain. Vigour can be measured by applying a known stimulus [such as a wound] and then measuring the trees response. Vigour cannot be increased. Vigour is classified as either 'normal' or 'low' (Shigo, 1986, p.120).

Vitality – the ability (dynamic) of a tree to adapt to the conditions in which it finds itself. Vitality can be improved by; watering, mulching, fertilizing, aerating etc. (Shigo, 1986, p. 120). For the purpose of this report vitality shall be classified as either low or good.

VTA - Visual Tree Assessment

Windthrow- The fall of a tree in a high wind, with the breakage of the outer roots, so that the tree is uprooted. There are three main modes of windthrow.