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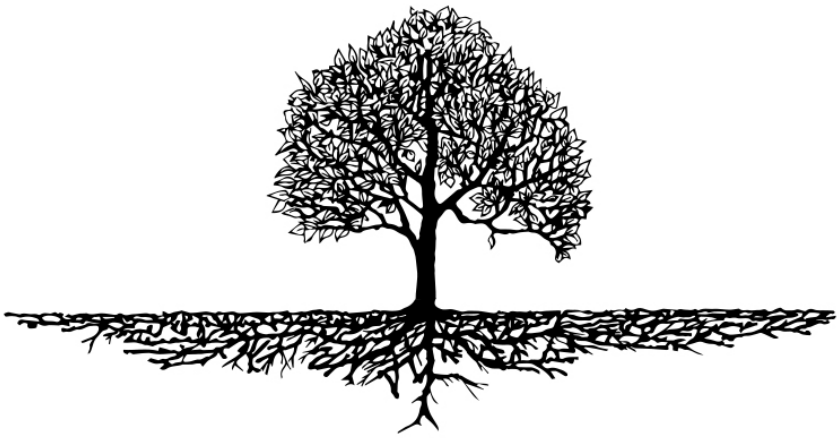
Client	Catherine Hrones
Location	129 Riverview Road Avalon
Document Type	Arbortom Assessment and Risk Assessment
Date	28th July 2019



The Ents Tree Consultancy

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1. Contents

2. Introduction

2.1 The client has engaged The Ents Tree Consultancy to obtain further advice about the condition of the tree nominated to be assessed on site to the rear of 129 Riverview Road Avalon. The tree will have a visual tree assessment completed and will have specialized diagnostic testing completed due to wounds located on the lower trunk. The client stated that tree was nominated to be assessed to due to concerns about the trees risk potential. The initial level 1 visual tree inspection (Lonsdale D), revealed that the tree has wounds at the base of the tree and continuing up the trunk into the primary branches. A cavity was observed in a primary root. The tree appeared to have average overall condition with some defects in its branching structure with reasonable vitality. The tree is however stunted in size due to its position and aspect. Due to the trees position and the wounds present, specialised diagnostic testing was completed to ascertain the extent of the decay present in the section tested. This methodology of tree assessment is consistent with the best practices of the industry and recognised industry standards.[1]

2.2 On the 6th May 2019 the client commissioned The Ents Tree Consultancy to further investigate the tree on site and to assess the decay in the nominated tree at the wound site at the base of the tree. The client requested a tree report assessing the condition of the tree and showing the results of the Arbortom test on tree the tree in the section nominated to be tested. This report will provide management options for the tree on site and a risk rating based on the TRAQ Risk Assessment Methodology, ISA Publication, Best management Practice, refer to Appendix 6. Consultation was sought with the client about the position and parts of tree to be inspected prior to a survey being completed. The overall health and condition of the tree will be assessed along with the tree's structural integrity.

2.3 The site inspection of the tree occurred on the 7th May 2019 with the test on the tree completed on the same day. The client who commissioned the report was present on the day of the initial tree inspection and was given the opportunity to provide a verbal brief in regard to background information for the tree on site. This tree report will assess the structure of the tree in an unbiased manner. The questioning of the client's or the client's representative is for the purpose of obtaining relevant information in regard to the tree's history, possible contributing factors to the trees present condition and the land use. On the 18th July 2019 the clients representative contacted the Ents Tree Consultancy to get the report amended to consider the tree for removal as a new travelator is proposed to be installed and the client no longer wishes to risk the failure of the tree onto the new structure or boat shed.

2.4 The purpose of this report is to assess the trees general health and to determine the structural integrity at the nominated position at the time of the inspection. A Useful Life Expectancy (ULE) rating will be assigned to the tree, refer to appendix 4. The report will be completed based on an industry standard visual tree assessment with no root mapping or aerial assessment completed. The advanced assessment was completed at the request of the client and is limited to the section nominated to be tested with the Arbortom Unit. The information in this report will be based on the information presented by the client at the time of the inspection as well as the site inspection.

2.5 To achieve the objectives of the report, the tree will be assessed noting the species, size, general condition with any significant defects discussed. The Arbortom unit will be used at approximately .2m above ground level on the trunk to provide detailed diagnosis of the trees residual wall thickness and structural strength loss in that area. The purpose of the Arbortom unit is to detect decay and the relative strength loss caused by the defective wood structure. The assessment will also consider residual wall thickness of the tree or the t/R ratio. The residual wall thickness is the remaining sound wood used to support the tree. A study by Mattheck and Breloer revealed that 30% or less sound wood (measured as a linear measurement from the centre of the tree to the bark) is likely to result in failure. The Arbortom unit also assesses the structural strength loss of the tree refer to Appendix 1b. The range that is acceptable is considered to be up to 30% strength loss. After that the structural integrity of the tree is in a range that is considered compromised (30-50%). Strength loss greater than 50% is considered unstable (Smiley & Coder).

2.6 To assess the level of risk the tree poses to the surrounding buildings, structure s and the land users a Tree Risk Assessment will be completed based on the tree at the time of the assessment and the areas use. The TRAQ Tree Risk Assessment will be completed based on the tree at the time of the assessment and the areas use. The trees Risk Potential was recorded using the TRAQ methodology and criteria from the ISA Publication, Best management Practice, Tree Risk Assessment. Refer to Appendix 6 for the Likelihood Matrix under the risk categorisation section of the QTRA form. The trees Risk Potential was recorded using the criteria from the ISA Publication, Best management Practice, Tree Risk Assessment, Refer to Appendix 6. The trees risk is considered in normal weather conditions over a one-year period. This methodology of tree assessment is consistent with the best practices of the industry and recognised industry standards. Please note that no root mapping and a limited aerial assessment was completed for the purpose of the assessment.

2.7 The trees characteristics and eventual size will be taken into consideration as will the trees position in relation to the existing structures and hard scapes. Recommendations will be outlined in section 5 of the report.

3. Methodology

3.1 The tree was assessed using the standard Visual Tree Assessment technique (VTA). The tree was assessed from the ground for the purpose of this report. VTA is an internationally recognised practice in the visual assessment of trees as formulated by Mattheck & Breloer (1994)[2].

3.2 A Lufkin 6.5m diameter tape was used to obtain the Diameter at breast height (DBH) as recommended at 1.4 metres unless otherwise stated due to variations in the trees form.

3.3 The height of the tree was estimated and the spread of the trees canopy was paced out.

3.4 A Canon 5D mark II Digital camera with a selection of lenses (11-24mm, 24-105mm, 100mm Macro) were used to take all photographs in this report. No digital enhancement of the images provided occurred. Some distortion of images may be seen due to the width of the 11-24mm lens.

3.5 The Arbortom 3D Impulse Tomography is unit was used to assess the internal properties of the tree using the velocity of soundwaves. The Arbortom sensors are hit lightly with a hammer when in position and the stress waves are measured, converted into velocities. The recorded impulse velocities are presented as a line graph, 2D or 3D image depending on the individual trees requirement and reveal the presence of decay. The Arbortom unit does not drill the tree and is relatively non-destructive. Refer to Appendix 1 for results.

3.6 A Bosch Professional DLE 50 hand held laser was used to measure distances on site.

4. Assessment of Tree(s)

Tree #	Species	Height (m)	Trunk Diameter (DBH*)	Canopy Spread (m)	Estimated Age Class	ULE Rating ****	Land Value	STARS Value +	Risk Rating	Observations and comments
1	*Eucalyptus piperita* Sydney Peppermint Gum	8	.75 DAC .82	NS 7 EW 9	Mature	2	M	M	Low (people) Low to Moderate (property)	• A mature tree with average health, average vigour and below average form for the species. This specimen is growing out of a west facing rock shelf and its growth has been stunted, limiting its height. • The tree has a moderate level of deadwood, a low level of dieback and a low level of epicormic shoots. The tree has an average level of vitality. • The tree has some branches leaning to light to the west due to aspect and competition. • The tree has wounds at the base with a large hollow visible. The tree also has cavities in its branching structure, with one cavity visible in a southern primary root. • Resonance with a rubber mallet could not confirm the extent of the decay. • To ascertain the level of decay present in the base of the tree, the tree was tested at .2m with a sonic tomography unit, refer to Appendix 1.

Explanatory Notes for Table

- *Dbh = Diameter of trunk at breast height.
- ** DAC = Diameter above collar of roots.
- ***TPZ is the recommended TPZ 12x the DBH at 1.4m, SRZ is the trees structural root zone. Refer to AS4970 for details.
- ****ULE Explanation can be found in Appendix 4.
- # The Risk rating criteria can be found in Appendix 6
- + Refer to Appendix 7 for STARS Rating.

3 Discussion

5.1 The tree nominated to be inspected is located to the rear of 129 Riverview Road Avalon. The tree is significant in the immediate landscape but is not likely to be considered important in the local areas landscape in terms of amenity and function due to its small size. The tree is endemic and has habitat value. The tree has been nominated to be assessed due to the wounds present at the base of the tree's trunk which were identified during a termite inspection. The tree will have its health and structure assessed with a detailed diagnostic assessment in one section of its trunk which is most likely to have decay or where the defect is likely to have its greatest influence.

5.2 The tree is located on a partially exposed site, receiving some protection from surrounding structures, trees and topography. The soil on site appears to be sandy, shale loam and has been disturbed previously for the construction of the landscapes and buildings. The tree was present for some of the renovation / building and landscape works, with no evidence of damage incurred during the construction process. The level of disturbance underground is unknown for the tree on site. No testing has been completed for the trees root zone or the trees crown. An aerial inspection was not completed for this tree. A test was completed at .2m from the estimated ground level with the Arbortom, Sonic Tomography Unit. It should be noted that the tree is growing out of a cliff face with difficult access to the trees trunk.

5.3 **Tree 1** is a mature tree with average health, below average vigour and below average form with average vitality. This tree has a moderate level of deadwood, a low level of dieback and a low level of epicormic shoots. The tree is stunted due to the harsh growing conditions in which it is located, a western cliff face. The tree has two wounds at its base a large hollow inside the tree. There is also a wound on the southern structural root and there is decay in the trees primary as well as the secondary branching structure. The tree has mistletoe in its crown.

5.4 The test with the Arbortom unit at .2m above the ground level revealed that the tree has a high amount of decay present in the section tested, with an unacceptable amount of strength loss (refer to Appendix 1a). The Arbortom image (Appendix 1B), shows that the tree has lost between 19 & 34% of its structural strength at .2m above ground level. Approximately 30 - 50% is a critical amount of strength loss, depending on the position of the decay, tree species and shape of the tree, (Smiley & Coder). The species of fungus present is a white rot that causes wood to become brittle and soft later. (Weber & Mattheck).

5.5 The decay recorded at .2m is unacceptable at this stage in the trees life and the tree could fail due to the amount of decay present. Due to the trees limited size, the tree may be pruned to reduce the likelihood of failure in the tree, however the decay in the root system cannot be quantified. Another likely cause of failure for this tree would be from the branches which would be a low risk to people but may hit the building on the lower side of the slope. This tree has average vitality and is forming reaction wood at the base of the tree, however the wounds are not likely to ever callus over and growth appears to have slowed. The decay present in the tree is significant forming a large column. The tree has failed the test in the section tested. Other areas may also fail the test for structural strength loss. Pruning may be able to reduce the risk of failure in this tree.

5.6 A tree risk assessment has been completed using the ISA, TRAQ Tree Risk Assessment methodology which is based on the Best Management Practice for Tree Risk Assessment, refer to Appendix 5. Within the target zone of the tree there is the client's boat house and the adjoining boat houses. There is also the client's rear yard and the adjoining rear yards. The areas within the fall zone of the tree appeared to be of low use for most of the time and received moderate levels of use for limited times during the week. The areas are used intermittently by people, but the structures are always in the fall zone. The consequence of a tree part failing, will either be damage to the surrounding hardscapes and damage to the adjoining building. The pedestrian traffic is intermittent and the chances of hitting a person are unlikely with minor to significant consequences, (depending on the type of failure).

5.7 Using the risk matrix as shown in appendix 5 the likelihood of failure within the next year is possible from the primary, second / third order branches. A failure from the tree's trunk or the trees basal plate is also possible. The chances of hitting a structure are somewhat likely, combined with the consequence of hitting a structure, minor to severe, (depending on the type of failure). The consequences of the tree part failing and hitting the target are low to moderate. This tree receives a rating of having a low to moderate level of risk, for hitting a building / built structure based on the assessment criteria.

5.8 Using the risk matrix as shown in appendix 5 the likelihood of failure within the next year is possible from the primary, second / third order branches. A failure from the tree's trunk or the trees basal plate is also possible. The chances of hitting a person is unlikely, combined with the consequence of hitting a person, (minor to significant). The consequences of the tree part failing and hitting the target are low. This tree receives a rating of having a low level of risk for hitting a person based on the assessment criteria.

5.9 To reduce the risk of the tree to as low as reasonably practicable, removal is the best option. Consideration and further advice should be sought by the client about the stability of the soil if the tree is removed. Another option is to reduce the tree which will in turn, reduce the weight in the tree's branches, the trees trunk and the trees root plate by reducing the overall size of the tree. This will reduce the risk of the tree failing and damaging the boat shed below.

5.10 The client has stated that the installation of the travellator will result in the installation of piers and the cut of a section of soil near the tree. The client has decided that the risk is too great to manage the tree especially if there is excavation proposed within 5m of the tree.

6 Recommendations

6.1 The tree nominated to be assessed is mature and significant in the immediate landscape. The tree has average health and below average structure. The tree appears to have suffered previous failures or pruning in the past which has led to decay in the trees structure. The decay extends into the trees root system and the trees crown. The tree has a lean-to light, with a short trunk, the branches also have a lean-to light with some mistletoe in the crown. These factors may contribute to the failure of the tree.

6.2 The testing completed at .2m on the trunk of the tree has revealed that the tree has a 19 & 34% structural strength loss. This level of strength loss is in a range that is considered a high risk for failure. This level of risk can be reduced by reduction pruning and to limit the stress placed on the trees trunk, branches and root system by loading. Removal of the tree should be considered by the client if they do not accept the level of risk presented by the tree. Before the tree is removed, consideration should be given to the soil stability in the cliff face.

6.3 A tree risk rating has been completed and the tree receives a low / medium level of risk for hardscapes / building (depending on the type of failure) and a low risk rating for pedestrians. If the risk level is accepted by the client, the tree could be retained and monitored with a low level of risk for people and a low / medium risk to property. If the client does not accept the level of risk presented by the tree an application should be made to council or appropriate authority to remove the tree.

6.4 Due to the new structures being built around the tree, the client no longer wishes to risk a failure of the tree onto the building or travellator. The trees structure has entered the strength loss percentage where it could fail at any time. Building infrastructure under the tree or completing excavation works near the tree is not recommended. The client would like to remove and replace the tree. This appears to be the best management option for the tree with the lowest risk exposure.

Please do not hesitate to call ***0422 265 128*** if you have any questions regarding the contents of this report.

Regards

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AQF Level 4 Advanced Certificate in Urban Horticulture

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Disclaimer

All trees have been assessed based on the information and facts of the site and as presented by the client or relevant parties at the time of inspection. No responsibility can be taken for incorrect or misleading information provided by the client or other parties. The nominated tree/s are assessed for biological requirements and hazard potential with reasonable care. The trees are assessed from the ground and by visual means only unless otherwise stated. All tree protection and tree preservation measures are designed to minimise the damage to the tree/s or to reduce the hazard potential of the tree/s. No responsibility can be taken by the author of this report for future damage to structures by the existing trees or planted trees. Trees are inherently dangerous, therefore will always have a hazard potential. Trees fail in ways that are not predictable or fully understood. There is no guarantee expressed or implied that failure or deficiencies may not arise of the subject trees in the future. No responsibility is accepted for damage to property or injury/death caused by the nominated tree/s.

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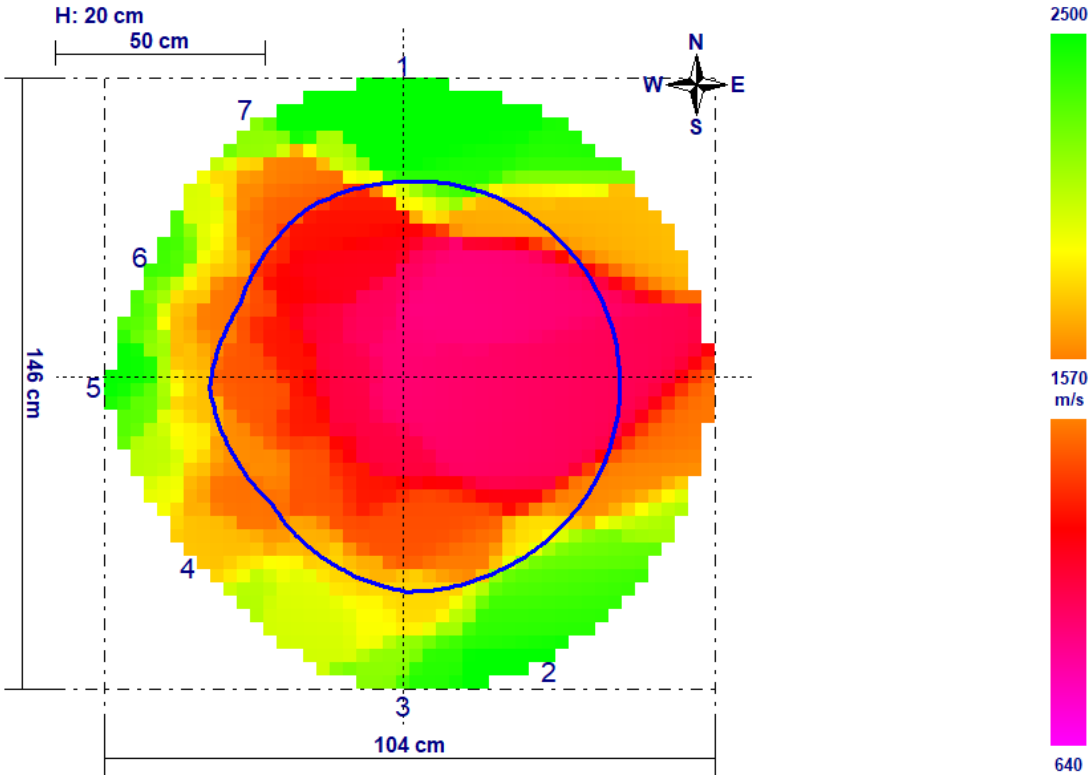
Appendix 1 Arbortom Readings

Project: Arbortom test 2019375
Location: 129 Riverview Road Avalon

Tree: Tree 1
Tree species: Diffuse porouos

Date: 20190507
North: 0°

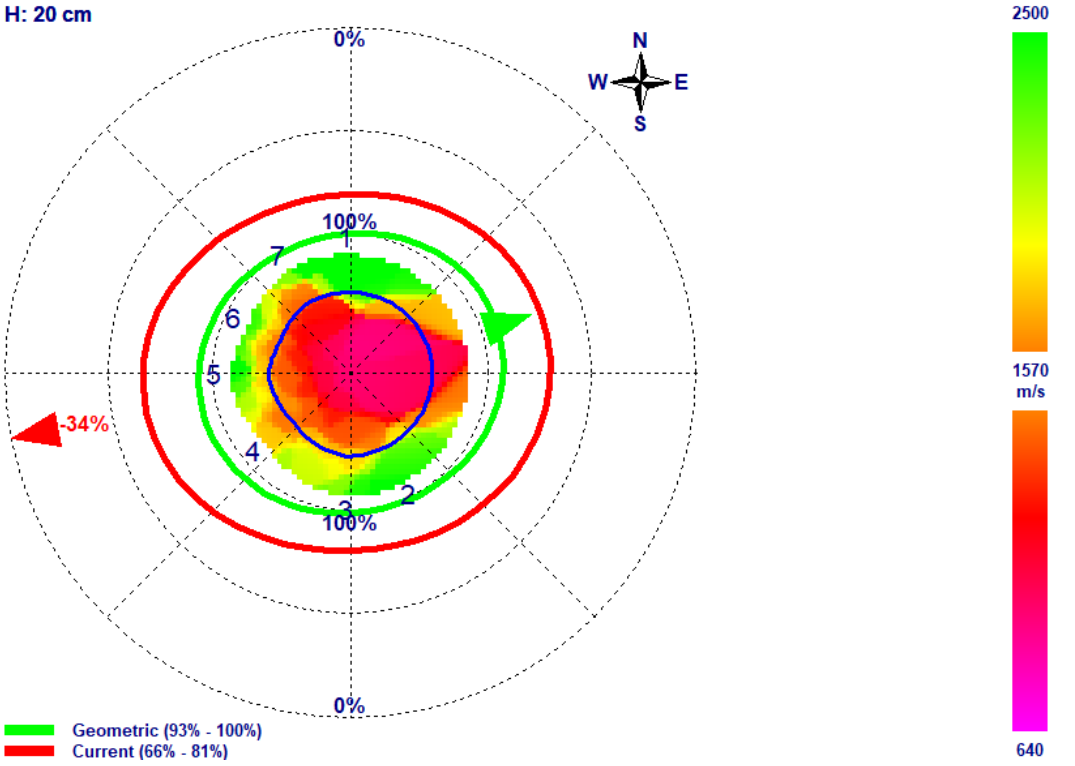


Reading A above shows the decay present in the tree at .15m.
Reading B Below shows the relative strength loss in the tree at between 6 and 12% at .1m above ground. NOTE: Sensor 1 is facing North. *Measurements at approximately 35-50% strength loss are at a critical point for failure, refer to Ratio weighted / geometric. The arrows indicate the direction of fall based on the weakest point of the tree. If you view these images from the top of the screen and then the bottom more detail can be seen. Definite color boundaries are not apparent as this is the way the trees wood is d*ecayed.

Project: Arbortom test 2019375
Location: 129 Riverview Road Avalon

Tree: Tree 1
Tree species: Diffuse porouos

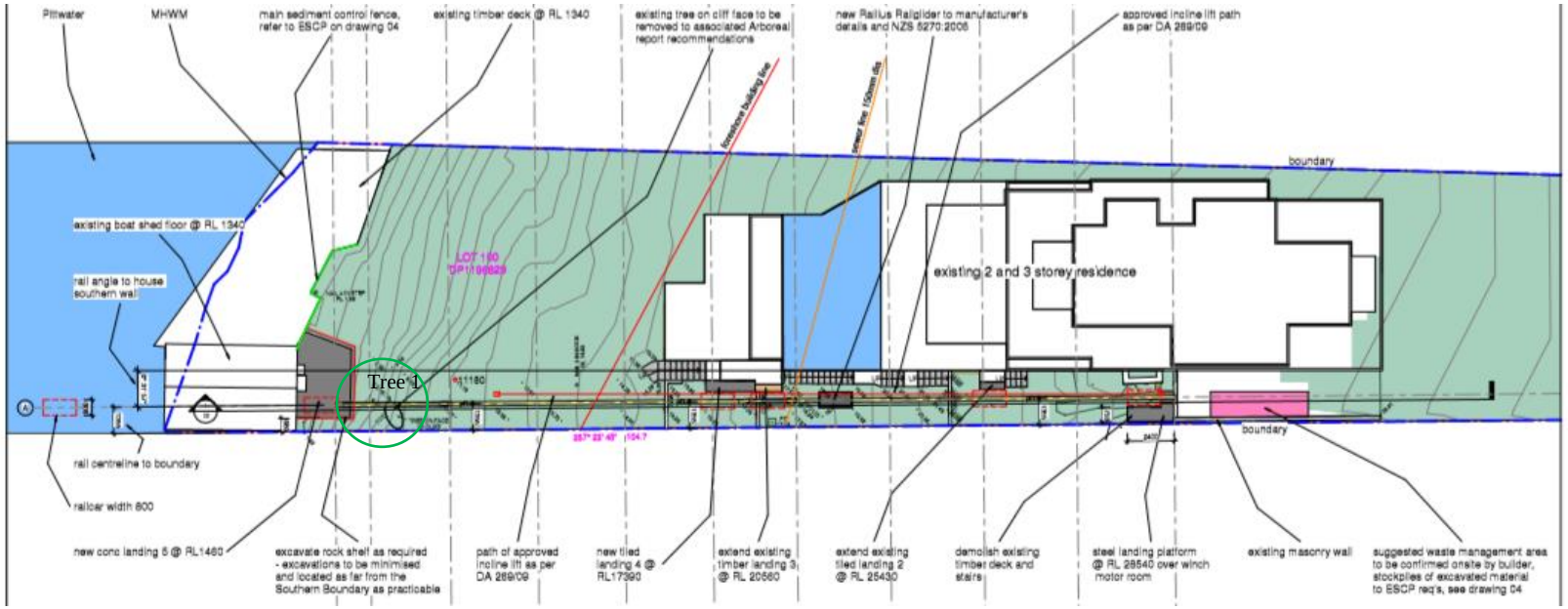
Date: 20190507
North: 0°



Appendix 2 Tree Images

Image 1 above left shows tree 1 to the rear of the site. Image 2 shows tree 1 and the test site with the hollows in the trees structure.

Appendix 3 Site Plan



Appendix 4 ULE Rating

Useful Life Expectancy (ULE): Useful life expectancy refers to an expected period of time the tree can be retained within the landscape before its amenity value declines to a point where it may detract from the appearance of the landscape and/or becomes potentially hazardous to people and/or property. ULE values consider tree species, current age, health, structure and location. ULE values are based on the tree at the time of assessment and do not consider future changes to the tree's location and environment which may influence the ULE value.

Category rating	Category definition in years	Category rating
1	> 40 Years	High
2	15 to 40 Years	Medium
3	10-20 Years	Low
4	0 Years	Dead

Appendix 5 References

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Mattheck, C and Breloer H. (1994) The Body Language of Trees: A handbook for failure analysis. Pg 196 The Stationary Office, London

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Smiley Thomas E, Matheny Nelda, and Lilly Sharon, (2011), Best Management Practices Tree Risk Assessment, Martin Graphics, Champaign, Illinois.

Standards Australia (2007), Pruning of Amenity Trees AS4373.

Weber K, Mattheck C, Manual of Wood Decays (2003), p89, The Arboricultural Association, Ampfield House, Ampfield, Romsey, Hampshire.

Appendix 6 TRAQ ISA Risk Assessment

This Tree Risk Assessment is the Likelihood Matrix from the risk categorization section of the TRAQ form for Tree Risk Assessment Qualified Arborists 2013. This TRAQ form has been based on the Best Management Practice for Tree Risk Assessment, E. T Smiley, Nelda Matheny, Sharon Lily, published by the ISA 2011.

The Tree Risk Categorization in this case is a qualitative risk assessment used by qualified tree assessors in combination with a matrix to assign risk. The assessor considers possible targets, the target zone, occupancy rates, site specific factors, Tree species, noted defects and environmental factors within a specified period.

The tree assessor uses this information to Categorize risk for the Likelihood of failure, combined with the Likelihood of impacting a target. These two categories make up the first table (table 1) in the Tree Risk Matrix. The second table assesses the Tree Risk rating by combing the Likelihood of failure and impact in table 1 with the Consequences of the branch or tree failing, refer to table 2. The end result is a risk rating of low, moderate, high or severe.

The Likelihood of failure options,

- **Improbable**- the tree or branch is not likely to fail in normal weather conditions within the specified time period.
- **Possible**- Failure of the tree or branch could occur in normal weather conditions within the specified time period.
- **Probable**- the tree or branch may be expected to fail in normal weather conditions within the specified time period.
- **Imminent**- the tree or branch failure has started and is likely to occur in the near future, even without significant wind or load. This is a rare occurrence for the risk assessor to encounter and immediate action must be taken to prevent harm to people or property.

The Likelihood of impacting a target options,

- **Very low-** The chance of the failed tree or branch hitting a target is remote. This would be the case in a site with no targets or a rarely used site or a site that is protected by from impact by other structures.
- **Low-** It is not likely that the failed tree or branch will impact the target. This would be the case in a site which is fully exposed to the tree but is used occasionally, a frequently used area that is partially exposed to the assessed tree.
- **Medium-** The failed tree or branch may or may not hit the target with nearly equal likelihood. This would be the case in a frequently used area that is fully exposed on one side to the assessed tree, or a constantly occupied area that is partially protected for the assessed tree.
- **High-** The failed tree or branch will most likely impact the target. This would be the case when a fixed target is fully exposed to the assessed tree or near a high use road or walkway with an adjacent street tree.

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Table 1. The matrix used to estimate the likelihood of a tree failure impacting a specified target.

Likelihood of failure	Likelihood of Impacting Target			
	Very Low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Categorizing Consequences of failure

- **Negligible**- consequences are those that involve low value property damage or disruption that can be replaced or repaired and does not involve personal injury.
- **Minor**- consequences are those that involve low – moderate property damage, disruptions in traffic or disruption in communications or minor personal injury.
- **Significant**- consequences that involve property damage of a moderate to high value, considerable disruption or personal injury.
- **Severe**- consequences that could involve serious personal injury or death, damage to high value property or disruption of important activities.

Table 2. Risk rating matrix showing the level of risk as the combination of likelihood of a tree or part failing and impacting a target and severity of the associated consequences.

Likelihood of failure and impact	Consequences			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

The four levels of risk as used in the table are defined below and should be used in making recommendations.

- **Extreme**- The extreme risk category applies in situations in which failure is *imminent* and there is a high likelihood of impacting the target with severe consequences. The tree risk assessor should recommend mitigation measures to be taken as soon as possible. This may involve immediately restricting the target zone.

- **High**- High risk situations are those for which consequences are *significant* and likelihood is *very likely* or *likely* or consequences are *severe* and likelihood is *likely*. This combination of likelihood and consequences indicates that the tree risk assessor should recommend mitigation measures. The decision for mitigation and timing of treatment depends upon the risk tolerance of the tree owner or risk manager.

- **Moderate**- Moderate risk situations are those in which consequences are *minor* and likelihood is *very likely* or *likely* or likelihood is somewhat likely and consequences are *significant* or *severe*. The tree risk assessor should recommend mitigation and or retaining the tree with monitoring. The decision for mitigation and timing depends upon the risk tolerance of the tree owner or manager.

- **Low-** The low risk category applies when consequences are *negligible* and likelihood is *unlikely* or consequences are *minor* and likelihood is *somewhat likely*. Some trees with this level of risk may benefit from mitigation or maintenance measures, but immediate action is not usually required. Tree risk assessors may recommend retaining and monitoring these trees as well as mitigation that does not include tree removal.

Appendix 7 STARS Rating System

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

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

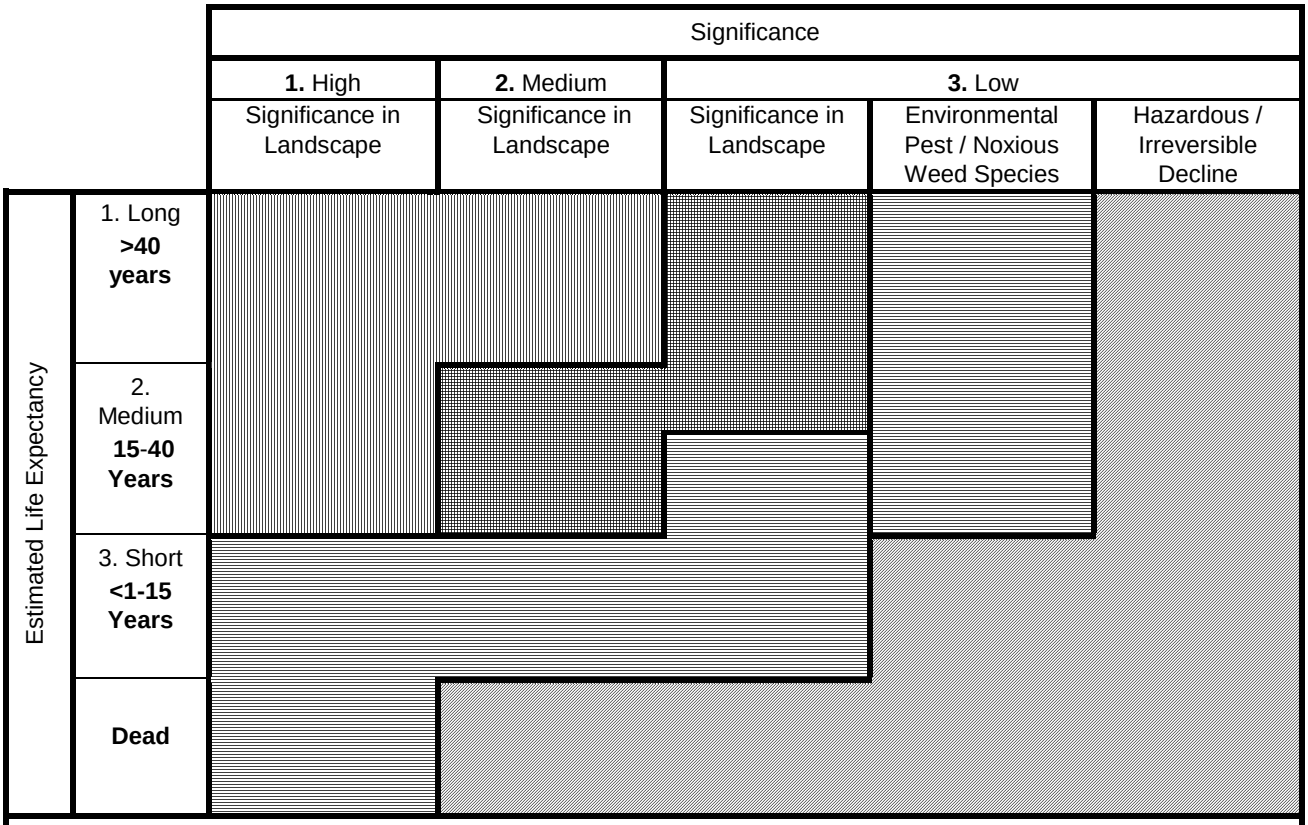
Hazardous/Irreversible Decline

- 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.

Table 1.0 Tree Retention Value - Priority Matrix.



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 *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.

REFERENCES

Australia ICOMOS Inc. 1999, *The Burra Charter – The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, www.icomos.org/australia

Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

Appendix 8 Glossary of Terms

Abiotic	Nonliving
Anthracnose	a fungal disease causing dead areas on the leaves, buds, stems.
Arboriculture	The science and art of caring for trees, shrubs and other woody plants in landscape settings.
Barrier Zone	Protective boundary formed in new wood in response to wounding or other injury.
Biotic	Alive, pertaining to living organisms.
Bracket	A fruiting body of a fungal pathogen.
Branch attachment	The structural union of a lateral branch.
Callus	Undifferentiated tissue produced in response to wounding.
Canker	A dead spot or necrotic lesion that is caused by a bark inhabiting organism/pathogen.
Cavity	an open wound characterized by the presence of decay resulting in a hollow.
Collar	the ring of tissue that surrounds the lateral branch at its point of attachment.
Compartmentalization	A physiological process that creates the chemical and physical boundaries that act to limit the spread of disease and decay organisms.
Compression wood	A type of reaction wood that forms on the underside of branches which tends to maintain a branch angle of growth.
Crown	The above ground parts of the tree, including the trunk.
DBH	The diameter of a trees trunk measured at 1.4m.
Decay	Process of degradation of woody tissues by fungi and bacteria through the decomposition of cellulose and lignin.
Decline	Progressive decrease in health of organs or the entire plant usually caused by a series of interacting factors.
Drip line	The width of the crown, as measured by the lateral extent of the foliage.
Epicormic shoot	a shoot that arises from latent or adventitious buds that occur on stems, branches or the bases of trees.
Failure	(tree failure), breakage of stem, branch, roots or loss of mechanical support in the root system.
Hazard	situation or condition that is likely to lead to a loss, personal injury, property damage or disruption of activities, a likely source of harm.
Included bark	Pattern of development at branch junctions where bark is turned inward, rather than pushed out; contrast with the branch nark ridge.
Mitigation	The process of reducing risk.
Mortality Spiral	The sequence of events describing a change in the trees health from vigorous to declining to death.
Photosynthesis	The transformation in the presence of chlorophyll and light, of carbon dioxide from (the air) and water (primarily from soil) into a simple carbohydrate and oxygen.
Pruning	systematic removal of branches of a plant usually a woody perennial.
Reaction wood	Specialized secondary xylem that develops in response to a lean or similar mechanical stress to restore the stem to vertical.
Risk	The combination of the likelihood of an event and the severity of the potential consequences
Structural defect	feature, condition or deformity of a tree that indicates a weak structure or instability that could contribute to failure.
Taper	The change in diameter over the length of trunks and branches. Important to mechanical support.
Target	people property or activities that could be injured or disrupted by a tree.
Tension wood	A type of reaction wood that trees form on the upper side of branches and stems and roots.
VTA	Visual Tree Assessment is a method of evaluating structural defects and stability in trees.
Wound	Any injury that induces a compartmentalization response.

Appendix 9 Curriculum Vitae

Education and Qualifications

- Undergraduate Graduate Certificate in Arboriculture (Level 8), University of Melbourne (2018-Present)
- Arboriculture Australia 3 Day Tree Anatomy Workshop 2015
- QTRA basic certificate 2014, QTRA Advanced Certificate 2016
- TRAQ Qualification 2014
- 2005 Diploma of Arboriculture (AQF Cert 5), Ryde TAFE. Distinction Pass.
- Barrell Tree Care Workshop- Trees on Construction Sites (Brisbane 2005)
- Tree Logic seminar- Urban Tree Risk Management (Sydney 2005)
- Tree Pathology and Wood Decay Seminar Sydney (2004)
- Excelsior Training Claus Mattheck (Sydney 2001)
- 2000 Tree Climbing Course (AQF Cert 2), Ryde TAFE.
- 1999 Advanced Certificate in Urban Horticulture, (AQF Cert 4), Ryde TAFE. Distinction Pass.
- 1995 Greenkeepers Trade Certificate (AQF 3) Ryde TAFE. Credit Pass.
- 1991 Higher School Certificate.

Conference Attendance/presentation of Scientific Papers

- Barrell Tree Care Workshop- Trees on Construction Sites (Brisbane 2005)
- Tree Logic seminar- Urban Tree Risk Management (Sydney 2005)
- Tree Pathology and Wood Decay Seminar Sydney (2004)
- Excelsior Training Claus Mattheck (Sydney 2001)
- Managing Mature Trees NAAA (Sydney 2000), Presented a Paper “Habitat Value of Mature Trees”

Professional Membership Accreditation

- Institute of Australian Consulting Arborists ACM 0482014
- Arboriculture Australia Member number 2527

Presentation of Scientific Papers

- Managing Mature Trees NAAA (Sydney 2000), Presented a Paper “Habitat Value of Mature Trees”

Industry Experience

- **2004 to Date, Sole Trader, The Ents Tree Consultancy.** Writing of tree reports for development applications, master plans, hazard evaluations, tree management plans and expert witness reports. Hazard assessments, tree surveys and consultations. Clients include The Royal Botanic Gardens Sydney, UNSW Master Planning Works including SIRF building, Tyree Building, DP sports field redevelopment, Sydney University Mays Green Precinct, Taronga Zoo Coastline Precinct, Capital Insight, Campbelltown Hospital Redevelopment, Parramatta Park Trust multiple jobs, Woollahra Council multiple jobs and many other jobs.
- **2003 to 2008, Arborist University of New South Wales**. Survey all trees on site, developed a Tree Management Database. Minimise hazard potential of all trees on site through evaluation and works. Generate and prioritise works and tree assessment-based areas usage, tree conditions and staff required. Development of UNSW Tree Protection Guidelines for master planning works. Acting Supervisor December 2006 to May 2007.
- **2003 Tree management Officer Randwick Council**. Liaise with public to explain and enforce the councils Tree Preservation order. Management of internal staff and contractors. Project management and co-ordination of street tree planting and maintenance.
- **1999 to 2003 Animal Food Production Manager and Arborist.** Management of Koala Food Plantation, Management of animal food supply registry for herbivores/omnivores. Coordination of staff contractors and volunteers. Maintain and manage tree management database, complete tree works within zoo grounds and at zoo owned plantations. Acting supervisor 6-month period 2002 for grounds dept and asset management trade team.
- **1998 to 1999 Sole Trader Techniques Lawn & Garden Consultancy.** Lawn, garden and Tree care. Garden design and maintenance. Tree works and tree removal. Installation of irrigation equipment.
- **1997 to 1998 Greenkeeper / Horticulturist Muirfield Golf Course.** General grounds duties, machinery maintenance, horticultural works, tree works
- **1992 to 1997 Greenkeeper / Horticulturist Ashlar Golf Course.** General grounds duties, machinery maintenance, horticultural works, tree works