HUGH
THE ARBORIST

Preliminary Arboricultural Assessment Report

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1. INTRODUCTION

1.1 This report has been commissioned by the client Pollyanna Hayward to present data from an Arboricultural survey carried out at 19 Dress Circle Road Avalon NSW.

1.2 All trees assessed have been allocated retention values to assist with understanding the potential constraints posed by high value trees during the design process.

Table 1: documents provided for the assessment

Title	Author	Date	Reference on document
Site Survey	Survey plus	21/10/2022	21679_DET_1A

1.3 This report has been prepared as a Preliminary Arboricultural Assessment Report intended to be used by planners and designers to assist in understanding the retention values, health and structural condition of the existing tree population on and adjoining the site when proposing a new development.

1.4 The site inspection was carried out on 16th August 2023. Access was available to the subject site and adjoining public areas only. All tree data was collected during this assessment.

1.5 The weather at the time of the assessment was clear with average visibility.

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

2.1.1 Conduct a visual assessment from ground level of trees located on and adjoining the site within five metres of the boundary.

2.1.2 Survey and record locations of trees located on and adjoining the site that have been identified on the survey plan provided.

2.1.3 Determine the trees estimated contribution years and remaining useful life expectancy.

2.1.4 Award each tree a retention value and determine the extent of the Tree Protection Zone.

2.1.5 Provide information on Tree Protection Zones and Structural Root Zones in accordance with Australian Standards.

3. LIMITATIONS

3.1 The findings of this report are based on the observations and site conditions at the time inspection.

3.2 All observations were carried out from ground level. No detailed additional testing was carried out on trees or soil on site and none of the surrounding surfaces were lifted for investigation.

3.3 Where access was limited, trees have been assessed from one side only, these trees have been identified in the tree inspection schedule as ‘inaccessible’.

3.4 Access was not available to several neighbouring trees, these tree dimensions have been estimated from within the property boundary.

3.5 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.6 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.7 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with a spp.

3.8 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.9 Hugh The Arborist neither guarantees, nor is responsible for, the accuracy of information provided by others that is contained within this report.

3.10 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.

3.11 Where trees are stated as retainable under the current proposal, this will only become a reality if all recommendations and specifications are followed exactly.

3.12 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.

3.13 Alteration of this report invalidates the entire report.

4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

4.1.1 Tree common name
4.1.2 Tree botanical name
4.1.3 Tree age class
4.1.4 DBH (Trunk/Stem diameter at breast height/1.4m) - millimetres.
4.1.5 DAB (Trunk diameter directly above the root buttress) – millimetres.
4.1.6 Estimated height - metres
4.1.7 Estimated crown spread (Radius of crown) - metres
4.1.8 Health
4.1.9 Structural condition
4.1.10 Amenity value
4.1.11 Estimated remaining contribution years (SULE)[1]
4.1.12 Retention value (Tree AZ)[2]
4.1.13 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DBH tape or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools I used during the assessment were a digital camera and a Leica DistoD410 digital laser tape.

4.4 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009) [4] and in some cases estimated. See appendices for information.

4.5 All information was imported into our geographical information system (GIS) PT-mapper pro. This software was used to measure/calculate all encroachment estimates included in this report and overlaid onto the survey plan provided.

4.6 Details of how the observations in this report have been assessed are listed in the appendices.

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[1] Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, http://www.treeaz.com/.

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

5. SITE LOCATION AND BRIEF DESCRIPTION OF PROPOSAL

5.1 The site is located in the suburb of Avalon within the Northern Beaches Local Government Area (LGA). This assessment has been carried out in accordance with the following legislation and policy;

5.1.1 Pittwater Local Environmental Plan (LEP) 2014

5.1.2 Pittwater 21 Development Control Plan (DCP) 2014

5.1.3 State Environmental Planning Policy (Biodiversity and Conservation 2021)

Site location plan provided by Sixmaps [5]

5.1 The site is not located within a heritage conservation area and has not been identified as a heritage item. The front and rear of the site have been identified as containing biodiversity according to the NSW Planning Portal Spatial Viewer [6].

5.2 The vegetation within the site and adjoining sites consists of native and exotic species.

[5] https://maps.six.nsw.gov.au/

[6] *https://www.planningportal.nsw.gov.au/spatialviewerhistoric/#/find-a-property/address*

5.3 The site is orientated approximately north east to south sweet. The site increases steeply in grade and contains several level changes supported by retaining walls of varying heights.

6. GENERAL INFORMATION FOR PROTECTING TREES ON DEVELOPMENT SITES.

6.1 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in appendix 3.

6.2 **Structural Root Zone (SRZ):** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula; $(DAB \times 50)^{0.42} \times 0.64$. There are several factors that can vary the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally, work within the SRZ should be avoided. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ.

6.3 **Minor encroachment into TPZ:** Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.

6.4 **Major encroachment into TPZ:** Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment.

6.5 **Variations to the TPZ & SRZ:** The TPZ and SRZ identified in AS4970-2009 are indicative only as number of factors can affect root growth patterns. Tree roots are adventitious and will seek out favourable growing conditions. Root growth can be affected by a number of factors including previous structures, obstacles such as rocky outcrops, soil characteristics including topography, soil volume and drainage. The lean and stability of a tree can also affect root growth as additional roots are likely to develop on the side of the root plate under tensile loading (roots on the opposite side to the direction of the lean). Trees on slopes will often produce additional root growth on the upper side of the tree. The only way to accurately identify the location of significant roots inside the TPZ and SRZ is to carryout non-invasive root investigations and prepare a root zone map (see section 6.7 for more information about root investigations). The root zone map can then be used by a qualified arborist to provide a higher level of accuracy of the potential impact to the viability of the tree.

6.6 **Changes to soil levels inside the TPZ:** Generally existing soil level should not be altered inside the TPZ of trees to be retained (unless root investigations have previous been undertaken to demonstrate that the changes to levels will not significantly impact the viability of the tree). Areas of fill should not exceed 100mm and fill material must be granular material that does not significantly inhibit the exchange of water and gases through the soil profile. The existing ground level must not be graded down or lowered inside TPZ without prior assessment of a consulting arborist in relation to the impact to the tree.

6.7 **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

6.8 **Underground services:** The location of all underground services must be clearly identified in the development proposal. If possible underground services should be located outside the TPZ of trees to be retained. Where this is not possible underground services should be installed using directional drilling methods or manual excavations to minimise the impact to trees identified for retention. Section 4.5.5 of AS4970-2009 says that 'The directional drilling bore should be at least 600 mm deep. The project arborist should assess the likely impacts of boring and bore pits on retained trees. For manual excavation of trenches the project arborist should advise on roots to be retained and should monitor the works'.[7]

6.9 **Landscape plan:** Where landscaping is proposed inside the TPZ of trees to be retained additional root disturbance should be avoided where possible. Tree sensitive landscaping may be required inside the TPZ of trees identified for retention to minimise further impact to the tree, such as avoiding retaining walls that will require additional excavations and areas of cut/fill. Advice may be required from the project arborist. General landscaping advice is provided below;

- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 50mm or increased by more 100mm without assessment by a consulting Arborist.
- New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, consider pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.
- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpath should be located outside the SRZ.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- Generally under the LEP, the council will request that each protected tree removed is replaced with at minimum one tree that will grow to similar dimensions. The replacement trees should be specified in the landscape for the development. Any replacement tree should be planted at least 5m from any

[7] Council Of Standards Australia, *AS 4970 Protection of trees on development sites* (2009) page 18.

significant structures to prevent future issues occurring. Any replacement tree must be selected in accordance with AS2303-2015 Tree stock for landscape use.

- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

6.10 **Maintenance pruning:** Maintenance pruning may be required for trees identified for retention in high use areas of the site. The maintenance pruning should include removing all deadwood greater than 25mm in diameter, rubbing/crossing branches and suspended branches. All tree works should be carried out by a qualified and experienced arborist, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).

6.11 **Tree protection:** Site specific tree protection measures must be included in the Arboricultural impact assessment for the development, including preparing a tree protection plan (TPP) and Arboricultural work method statement (AMS) for all trees at the site detailing the location of all tree protection and methods to minimise any impact to trees that are to be retained.

6.1 **Tree Retention Value:** The system used to award the retention value is Tree AZ. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) is included in the appendices to assist with understanding the retention values. Using tree AZ, all trees assessed have been awarded a retention value from the following three categories.

Category	**Example recommendation**
AA	Every effort should be made to preserve and retain trees in this category.
A	The trees in this category should be retained if it is reasonably possible.
Z	The trees in this category should not cause a constraint on the development proposals. They should be retained only if they do not or will not cause a risk to people or property. Further investigations of defects, such as decay testing or root collar excavations, may be required to retain some trees in this category.

7. OBSERVATIONS AND TREE RETENTION VALUES ON SITE

7.1 **Refer to appendix 1, 1A and 2 to review the sites trees and retention values.**

7.2 **Tree information**: Details of each tree assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in Appendix 2, the indicative tree protection zone (TPZ) has been calculated for the subject trees. The TPZ and SRZ should be measured in radius from the centre of the trunk. The subject trees have been awarded a retention value based on observations taken on site. The system used to award the retention value is Tree AZ.

7.3 **Tree AZ** is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in the appendices to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

7.4 **Site plans:** The following site plan have been included as appendices in the report:

- Appendix 1A – Existing Site Plan
- Appendix 1B – Tree Retention Plan

7.5 **Table 2: Low value category Z trees.** The following table contains trees allocated a Z rating. These trees are either listed as exempt species in the municipality, are in poor condition with a low potential for improvement and generally a short useful life expectancy. Consideration is also given to applying the category Z rating if the tree can easily be replaced and reach the same size within 5-10 years of installing.

Tree Number	Botanical Name	Retention Value
1	*Howea forsteriana*	Z3
3	*Callistemon viminalis*	Z2
9	*Strelitzia nicolai*	Z3
10	*Olea europaea subsp. cuspidata*	Z3
12	*Phoenix canariensis*	Z3
17	*Ligustrum lucidum*	Z3
18	*Corymbia maculata*	Z10
19	*Corymbia maculata*	Z10
21	*Olea europaea subsp. cuspidata*	Z3
26	*Schefflera actinophylla*	Z3
28	*Phoenix canariensis*	Z3
31	*Archontophoenix cunninghamiana*	Z3
32	*Nerium oleander*	Z3

7.6 **Table 3: Category A trees.** The following table contains trees allocated an A rating. These trees have been assessed as being free of or having only minor defects that could be addressed with remedial care.

Tree Number	Botanical Name	Retention Value
2	*Corymbia maculata*	A1
4	*Corymbia maculata*	A1
5	*Corymbia maculata*	A4
6	*Corymbia maculata*	A1
7	*Corymbia maculata*	A2
8	*Corymbia maculata*	A1
11	*Corymbia maculata*	A2
13	*Corymbia maculata*	A2
14	*Corymbia maculata*	A1
15	*Corymbia maculata*	A4
16	*Corymbia maculata*	A1
20	*Corymbia maculata*	A2
22	*Corymbia maculata*	A2
23	*Corymbia maculata*	A2
24	*Corymbia maculata*	A2
25	*Corymbia maculata*	A1
27	*Acmena smithii*	A1
29	*Corymbia maculata*	A1
30	*Livistona australis*	A1
33	*Livistona australis*	A1
34	*Corymbia maculata*	A1

8. CONCLUSIONS AND ADDITTIONAL OBSERVATIONS

8.1 Tables 2 and 3 provide a list of all trees assessed and their corresponding retention values. All tree data can be found in Appendix 2 ‘Tree Inspection Schedule’.

8.2 These values relate to the condition and value of the trees as well as their eligibility for retention or removal under Council policy and legislation. This report does not provide consent to remove or prune trees.

8.3 A total of thirteen trees have been assessed as low value category Z trees.

8.4 A total of twenty one trees have been assessed as category A trees. One of which (T15) has been assessed as a category A4 tree as it contains a hollow that may be providing habitat. It is recommended the tree be assessed by an Ecologist prior to any works carried out or proposed works impacting the tree.

8.5 **Site Constraints.** The site contains numerous retaining walls within the Tree Protection Zones of high value trees. These structures have the potential to impact the spread and distribution of tree roots and any proposed design should be reviewed by a consulting Arborist to determine the impacts on trees. Generally speaking, retaining walls within Tree Protection Zones should not be excavated into unless either root investigations have been carried out to determine the presence of significant tree roots or a consulting Arborist deems the structure not to have affected the distribution of tree roots.

8.6 Relocating or transplanting trees must be carried out by an Arborist or Horticulturalist that is experienced in moving established trees. Initial preparation for transplanting can be a timely process and it is recommended that the option of installing a new advanced tree to achieve an instant effect is considered against the risk of preparing and moving an already established tree.

9. BIBLIOGRAPHY/REFERENCES

- Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009).
- Council of Standards Australia, *AS4373 Pruning of amenity trees* (2007).
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- Pittwater 21 Development Control Plan (DCP) 2014
- Pittwater Local Environment Plan (LEP) 2014
- State Environmental Planning Policy (Biodiversity and Conservation 2021)
- Managing Trees During Construction, Smiley. T, Hite. K, ANSI A300 Part 5 Standard Practices.

10. LIST OF APPENDICES

The following are included in the appendices:

Appendix 1 – Existing Site Plan
Appendix 1A – Tree Retention Plan (trees AZ)
Appendix 2 - Tree inspection schedule
Appendix 3 – Health
Appendix 4 – Amenity Value
Appendix 5 – Age Class
Appendix 6 – Structural Condition
Appendix 7 – SULE Categories
Appendix 8 – Retention Values
Appendix 9 – Trees AZ
Appendix 10 – TPZ Encroachment

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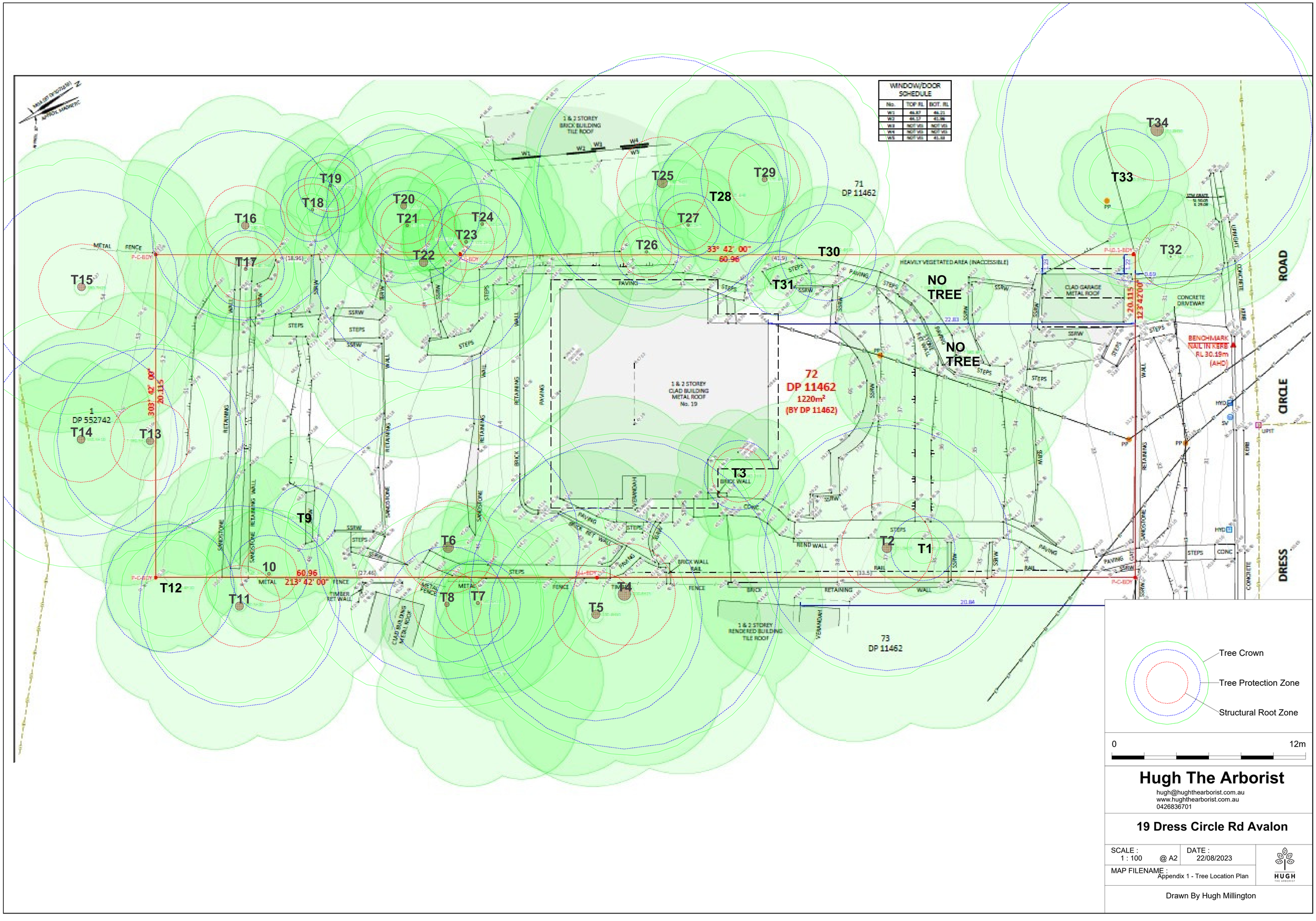

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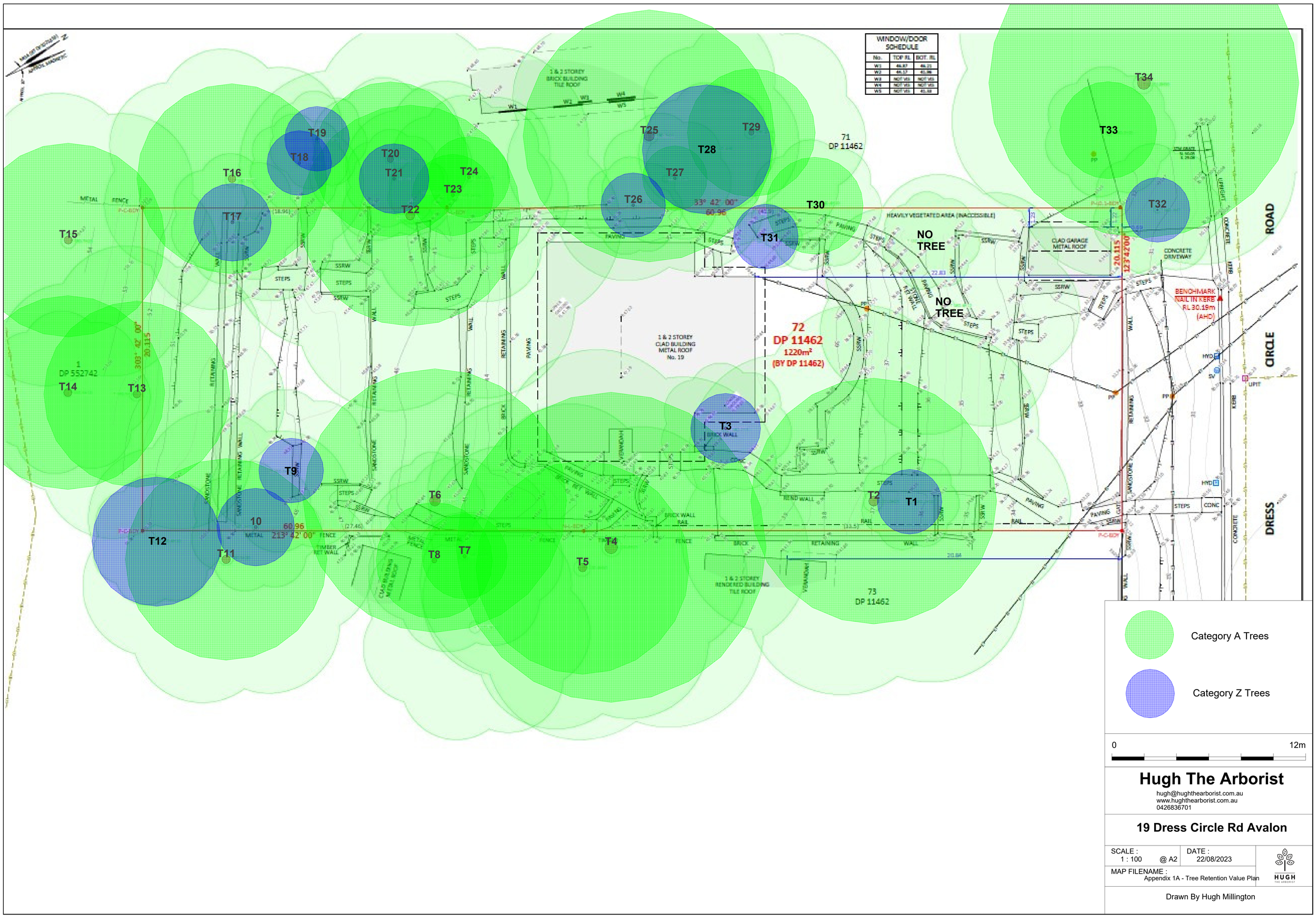
19 Dress Circle Rd Avalon

SCALE :	DATE :
1 : 100 @ A2	22/08/2023

MAP FILENAME : Appendix 1 - Tree Location Plan

Drawn By Hugh Millington



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SCALE : 1 : 100 @ A2

DATE : 22/08/2023

MAP FILENAME : Appendix 1A - Tree Retention Value Plan

Drawn By Hugh Millington

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1 (mm)	Stem 2 (mm)	Stem 3	Stem 4	Stem 5	Stem 6	DBH (mm)	DAB (mm)	Health	Structure	Landscape Value	SULE	Trees AZ Value	TPZ Radius (m)	SRZ Radius (m)	Notes
1	Kentea Palm	*Howea forsteriana*	Semi-mature	8	1	150						150	NA	Good	Good	Low	1. Long	Z3	2.0	NA	
2	Spotted Gum	*Corymbia maculata*	Semi-mature	18	8	634						634	700	Good	Good	Very High	1. Long	A1	7.6	2.8	
3	Weeping Bottlebrush	*Callistemon viminalis*	Semi-mature	6	1	180						180	200	Good	Good	Moderate	1. Long	Z2	2.2	1.7	Proximity
4	Spotted Gum	*Corymbia maculata*	Semi-mature	18	10	800						800	900	Good	Good	High	1.Long	A1	9.6	3.2	
5	Spotted Gum	*Corymbia maculata*	Semi-mature	18	6	550						550	600	Good	Fair	High	2. Medium	A4	6.6	2.7	Large deadwood neighbors tree and hollow in trunk
6	Spotted Gum	*Corymbia maculata*	Semi-mature	20	10	680						680	720	Good	Good	Very High	1. Long	A1	8.2	2.9	
7	Spotted Gum	*Corymbia maculata*	Semi-mature	9	4	220						220	300	Good	Fair	Moderate	2. Medium	A2	2.6	2.0	Suppressed neighbors tree
8	Spotted Gum	*Corymbia maculata*	Semi-mature	15	6	300						300	350	Good	Good	High	1. Long	A1	3.6	2.1	
9	Giant Strelitzia	*Strelitzia nicolai*	Mature	7	1	100	100					141	NA	Good	Good	Very Low	1. Long	Z3	2.0	NA	Exempt
10	African Olive	*Olea europaea subsp. cuspidata*	Semi-mature	9	4	200						200	220	Good	Good	Very Low	1. Long	Z3	2.4	1.8	Exempt
11	Spotted Gum	*Corymbia maculata*	Semi-mature	15	6	520						520	530	Good	Good	Very High	1. Long	A2	6.2	2.5	Neighbors tree
12	Canary Palm	*Phoenix canariensis*	Semi-mature	8	3	500						500	NA	Good	Good	Low	1. Long	Z3	4.0	NA	Neighbors tree exempt
13	Spotted Gum	*Corymbia maculata*	Semi-mature	16	6	480						480	500	Good	Fair	Moderate	2. Medium	A2	5.8	2.5	Old buttress wound is responding well. Tree is asymmetric wound on compression side
14	Spotted Gum	*Corymbia maculata*	Semi-mature	18	8	500						500	600	Good	Good	Very High	1. Long	A1	6.0	2.7	
15	Spotted Gum	*Corymbia maculata*	Semi-mature	18	8	500						500	600	Good	Fair	Very High	2. Medium	A4	6.0	2.7	Hollows
16	Spotted Gum	*Corymbia maculata*	Semi-mature	16	6	490						490	510	Good	Good	Very High	1. Long	A1	5.9	2.5	
17	Broad Leaved Privet	*Ligustrum lucidum*	Semi-mature	7	3	200						200	300	Good	Good	Very Low	4. Remove	Z3	2.4	2.0	Weed species
18	Spotted Gum	*Corymbia maculata*	Young	10	1	150						150	180	Fair	Fair	Low	3. Short	Z10	2.0	1.6	Suppressed neighbors tree
19	Spotted Gum	*Corymbia maculata*	Young	10	1	150						150	180	Fair	Fair	Low	3. Short	Z10	2.0	1.6	Suppressed neighbors tree
20	Spotted Gum	*Corymbia maculata*	Semi-mature	15	6	400						400	450	Fair	Good	Moderate	2. Medium	A2	4.8	2.4	Neighbors tree
21	African Olive	*Olea europaea subsp. cuspidata*	Semi-mature	5	3	180						180	200	Good	Fair	Very Low	1. Long	Z3	2.2	1.7	Neighbors tree exempt
22	Spotted Gum	*Corymbia maculata*	Semi-mature	18	8	570						570	600	Good	Fair	Moderate	2. Medium	A2	6.8	2.7	Heavy pruning and irregular canopy structure
23	Spotted Gum	*Corymbia maculata*	Semi-mature	8	4	210						210	220	Good	Fair	Moderate	2. Medium	A2	2.5	1.8	Suppressed
24	Spotted Gum	*Corymbia maculata*	Semi-mature	8	4	210						210	220	Good	Fair	Moderate	2. Medium	A2	2.5	1.8	Suppressed
25	Spotted Gum	*Corymbia maculata*	Semi-mature	19	8	650						650	700	Good	Good	Very High	1. Long	A1	7.8	2.8	Neighbors tree in retaining wall
26	Umbrella	*Schefflera actinophylla*	Semi-mature	7	1	150						150	170	Good	Good	Low	1. Long	Z3	2.0	1.6	Neighbors tree exempt
27	Lilly Pilly	*Acmena smithii*	Semi-mature	7	3	160						160	170	Good	Good	Moderate	1. Long	A1	2.0	1.6	Neighbors tree
28	Canary Palm	*Phoenix canariensis*	Semi-mature	8	3	500						500	NA	Good	Good	Low	1. Long	Z3	4.0	NA	Neighbors tree exempt
29	Spotted Gum	*Corymbia maculata*	Semi-mature	11	8	330						330	390	Good	Good	High	1. Long	A1	4.0	2.2	Neighbors tree
30	Cabbage Palm	*Livistona australis*	Semi-mature	8	2	380						380	NA	Good	Good	High	1. Long	A1	3.0	NA	
31	Bangalow Palm	*Archontophoenix cunninghamiana*	Semi-mature	7	1	200						200	NA	Good	Good	Low	1. Long	Z3	2.0	NA	Exempt
32	Oleander	*Nerium oleander*	Mature	5	2	20	50	50	50	50		102	300	Good	Good	Very Low	1. Long	Z3	2.0	2.0	
33	Cabbage Palm	*Livistona australis*	Semi-mature	5	2	200						200	NA	Good	Good	High	1. Long	A1	3.0	NA	
34	Spotted Gum	*Corymbia maculata*	Semi-mature	19	10	800						800	900	Good	Good	Very High	1. Long	A1	9.6	3.2	

Explanatory Notes

Tree Species - Botanical name followed by common name in brackets. Where species is unknown it is indicated with an '*spp'.*
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y), Dead (D).
Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level. Where DBH has been estimated it is indicated with an 'est'.
Diameter Above root Buttresses (DAB): Measured with a DBH tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Tree Protection Zone (TPZ) - DBH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the TPZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - $(DAB \times 50)^{0.42} \times 0.64$. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
(x) Indicates the measurement taken for the diameter at tree base above the buttress roots.
(E) Indicates estimated measurements.

Appendix 3 – Assessment of Health

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

Appendix 4 Landscape Value

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
1. SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register	The subject tree is scheduled as a Threatened Species as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999	The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species
	The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to Commemorate an important historical event	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance
2. VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m²; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence	The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value	The subject tree has a large live crown size exceeding 100m²; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of this DCP.	The subject tree has a medium live crown size exceeding 40m²;The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crowndensity of more than 50% (thinning to normal); and The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
5. LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item	The subject tree is scheduled as exempt (not protected) under the provisions of this DCP due to its species, nuisance or position relative to buildings or other structures.	The subject tree has a small live crown size of less than 40m² and can be replaced within the short term (5-10 years) with new tree planting
6. VERY LOW	The subject tree is causing significant damage to a heritage Item.	The subject tree is listed as an Environment Weed Species in the Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
7. INSIGNIFICANT	The tree is completely dead and has no visible habitat value	The tree is a declared Noxious Weed under the Noxious Weeds Act (NSW) 1993 within the relevant Local Government Area.	The tree is completely dead and represents a potential hazard.

Ref: *Determining the retention value of trees of development sites,* presentation handouts at TAFE NSW Ryde College, March 2012

Appendix 5 - Age class

Determining the exact age of a tree is difficult without carrying out potentially invasive testing. The age class of the subject tree has been estimated using the definitions below.

Category	Description
Young/Newly planted	• Young or recently planted tree.
Semi Mature	• Up to 20% of the usual life expectancy for the species.
Early mature/Mature	• Between 20% - 80% of the usual life expectancy for the species.
Over mature	• Over 80% of the usual life expectancy for the species.
Dead	• Tree is dead or almost dead.

Appendix 4 - Structural condition

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

Appendix 7 - Safe Useful Life Expectancy (SULE), (Barrel, 2001)

A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long	Useful life expectancy over 40 years
2. Medium	Useful life expectancy 15 to 40 years
3. Short	Useful life expectancy 5 to 15 years
4. Remove	Useful life expectancy under 5 years
5. Small/Young	Trees that could be transplanted or replaced with similar specimen.
6. Unstable	Tree has become hazardous or structurally unstable.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

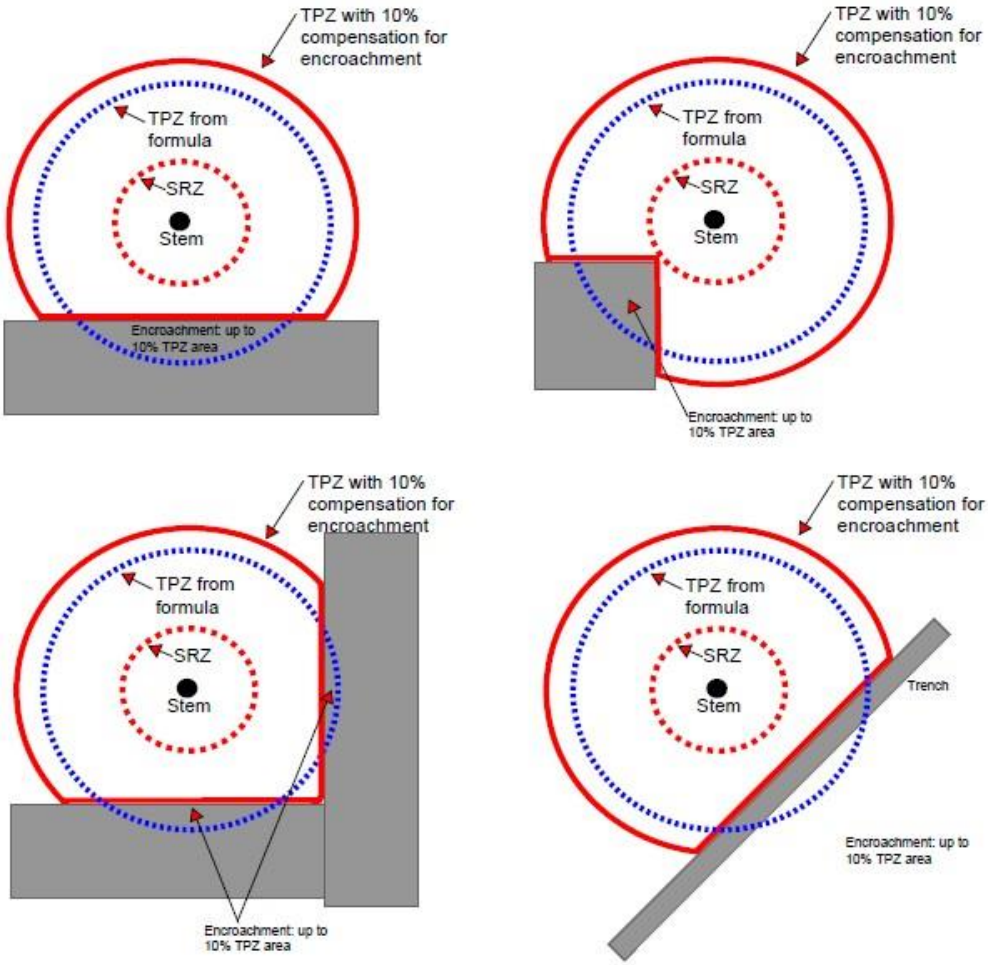
Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

A1	No significant defects and could be retained with minimal remedial care
A2	Minor defects that could be addressed by remedial care and/or work to adjacent trees
A3	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
A4	Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

NOTE: Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

Appendix 10 – Examples of TPZ Encroachment

Encroachment into the Tree Protection Zone is sometimes unavoidable. The following diagram shows examples of acceptable levels of encroachment and how they may be compensated for by providing additional space contiguous to the TPZ area.



Note: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.