



Arboricultural Impact Assessment

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1. INTRODUCTION

- 1.1 Hugh the Arborist Pty Ltd have been instructed by Progressive Plans on behalf of the clients John Wilson and Katherine Abbot to provide a revised Arboricultural Impact Assessment Report for trees located on and adjoining the site in relation to a proposed development.
- 1.2 Below is a list of all documents and information provided to by the client to assist with preparing this report.
 - A) Detail and Level Survey, C.M.S Surveyors Pty Ltd, 8 July 2021
 - B) Architectural Drawings, Progressive Plans, Revision C – 29/5/2023
- 1.3 The site and tree inspections were carried out on 25 September 2021. Access was available to the subject site and adjoining public areas only.

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 all significant trees within 5 metres of proposed development works. For the purpose of this report a significant tree is a tree with a height equal to or greater than 5 metres in height.
 - 2.1.2 Determine the trees estimated contribution years and remaining, useful life expectancy and award the trees a retention value.
 - 2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).
 - 2.1.4 Provide pragmatic recommendations for the management of trees and mitigation of construction impacts on retained trees.
 - 2.1.5 Specify tree protection measures for trees to be retained in accordance with AS 4970-2009.

3. LIMITATIONS

- 3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.
- 3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

- 3.3 The tree inspections were visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.
- 3.4 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.
- 3.5 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.
- 3.6 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.
- 3.7 All diagrams, plans and photographs included in this report are visual aids only, and are not to scale unless otherwise indicated.
- 3.8 Hugh The Arborist neither guarantees, nor is responsible for, the accuracy of information provided by others that is contained within this report.
- 3.9 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.
- 3.10 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.
- 3.11 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 above ground level) - millimetres.
- 4.1.5 Estimated height - metres
- 4.1.6 Estimated crown spread (Radius of crown) - metres
- 4.1.7 Health
- 4.1.8 Structural condition
- 4.1.9 Amenity value
- 4.1.10 Estimated remaining contribution years (SULE)¹
- 4.1.11 Retention value (Tree AZ)²
- 4.1.12 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, Japanese made 170mm blade digging knife 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). See appendices for more information.
- 4.5 Details of how the observations in this report have been assessed are listed in the appendices.

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).

5. SITE LOCATION & BRIEF DESCRIPTION OF DEVELOPMENT WORKS ASSESSED

- 5.1 The site is located in the suburb of Bayview, New South Wales, which is located in the Northern Beaches Council area. All trees at the site are subject to protection under the Pittwater Local Environmental Plan (LEP) 2014⁴ and Pittwater 21 Development Control Plan (DCP) 2014.⁵ The site is not located inside a Heritage Conservation Area and does not form part of a heritage item in the LEP heritage maps.⁶ The whole site is identified as containing 'biodiversity' in the LEP biodiversity maps.⁷

6. OBSERVATIONS AND GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

- 6.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection, can be found in the tree inspection schedule in appendix 2, where the indicative tree protection zone (TPZ) and Structural Root Zone (SRZ) has been calculated for each of the subject trees. The TPZ and SRZ should be measured in radius from the centre of the trunk. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. 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 appendix 3 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.
- 6.2 **Site Plan:** In appendix 1 two site plans have been prepared, where the tree information including canopy spread, TPZ and SRZ have been overlaid onto the site plans. The following plans are included in appendix 1;
- Appendix 1: Existing Site Plan
 - Appendix 1A: Proposed Site Plan

⁴ Pittwater Local Environmental Plan 2014, <https://legislation.nsw.gov.au/#/view/EPI/2014/320/historical2017-08-25/full>.

⁵ Pittwater 21 Development Control Plan, <https://eservices.northernbeaches.nsw.gov.au/ePlanning/live/pages/plan/book.aspx?exhibit=PDCCP>.

⁶ Pittwater LEP Heritage map - Sheet HER_011, https://eplanningdlprod.blob.core.windows.net/pdfmaps/6370_COM_HER_011_010_20160118.pdf, accessed 9 October 2021.

⁷ Pittwater LEP Biodiversity map - Sheet BIO_011, https://eplanningdlprod.blob.core.windows.net/pdfmaps/6370_COM_BIO_011_010_20140217.pdf, accessed 9 October 2021.

- 6.3 **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.
- 6.4 **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.
- 6.5 **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.
- 6.6 **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.

7. ASSESSMENT OF CONSTRUCTION IMPACTS

7.1 **Table 1:** In the table below the impact of the proposed development has been assessed.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
1	<i>Syncarpia glomulifera</i>	AA1	8.7	237.8	3.2	Minor	The proposed bin storage platform encroaches into the TPZ by 3% (6.6m ²) but not into the SRZ, which is a minor TPZ encroachment and indicates that the tree will not be significantly impacted on the provision the demolition of structures within the TPZ is carried out using tree sensitive methods. See section 8.2.	Retain and protect
2	<i>Syncarpia glomulifera</i>	AA1	11.5	415.5	3.4	Minor	The proposed bin storage platform and front entrance path encroach into the TPZ by 4% (16m ²) but not into the SRZ, which is a minor TPZ encroachment and indicates that the tree will not be significantly impacted on the provision the demolition of structures within the TPZ is carried out using tree sensitive methods. See section 8.2.	Retain and protect
3	<i>Syncarpia glomulifera</i>	AA1	6.4	128.7	2.7	Major	The proposed bin storage platform and front entrance path encroach into the TPZ by 11% (14m ²) but not into the SRZ, which is major TPZ encroachment. However, there is an existing building located between the trunk and proposed structures and the structure has been proposed to be installed on piers suspended above the fall of the natural ground. This indicates that the tree is unlikely to be significantly impacted by the proposed works providing the piers can be installed to avoid significant tree roots. See section 8.2 for details.	Tree sensitive construction required



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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
4	<i>Syncarpia glomulifera</i>	AA1	4.9	75.4	2.5	Minor	The proposed bin storage building and front entrance path encroach into the TPZ by 10% (7m ²) but not into the SRZ. This is a minor encroachment that is unlikely to significantly impact the tree.	Retain and protect
5	<i>Syncarpia glomulifera</i>	AA1	5.3	88.2	2.5	Major	The proposed bin storage platform and front entrance path encroach into the TPZ by 13% (11.5m ²) but not into the SRZ, which is major TPZ encroachment. However, there is an existing building located between the trunk and proposed structures and the structure has been proposed to be installed on piers suspended above the fall of the natural ground. This indicates that the tree is unlikely to be significantly impacted by the proposed works providing the piers can be installed to avoid significant tree roots. See section 8.2 for details.	Tree sensitive construction required
6	<i>Syncarpia glomulifera</i>	A1	5.2	84.9	2.5	Major	The proposed garage and driveway encroach into the TPZ by 27% (23m ²) and into the SRZ, which is major TPZ encroachment indicating that the stability and/or condition of the tree will potentially be impacted. Plan DA10, DA16 and DA21 show the majority of the structure to be suspended on piers which have been located outside of the SRZ of the tree. The subject site falls sharply at the front indicating a significant void will remain below the structure so most of the TPZ area encroached upon will be largely undisturbed. The section of driveway within the SRZ area has a pier either side of the SRZ indicating the driveway can transect across the SRZ without affecting the natural ground level. One section of the crossover closest to the kerb has not been proposed on piers. However, it represents less than 5% of the total encroachment and given the remainder of the encroachment is raised on piers is not considered to be significant. If the tree is to be retained in a	Tree sensitive construction required

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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
							viable condition, all piers are to be located outside of the SRZ area as shown on DA10 and all pier locations must be flexible to allow the retention of significant tree roots.	
7	<i>Syncarpia glomulifera</i>	AA1	5.5	95.0	2.5	Major	The proposed bin store platform, entrance stairs, garage and driveway encroach into the TPZ by a total of 31.6% (30m ²) and into the SRZ, which is major TPZ encroachment indicating that the stability and/or condition of the tree will potentially be impacted. As discussed with trees 3, 5 and 6 the structures within the site boundaries are proposed to be installed on a pier and beam structure above the natural ground. Plan DA10 also shows no piers will be installed within the SRZ area indicating the structure can transect across the natural ground in the SRZ without disturbing significant tree roots. If the tree is to be retained in a viable condition, all piers are to be located outside of the SRZ area as shown on DA10 and all pier locations must be flexible to allow the retention of significant tree roots.	Tree sensitive construction required
8	<i>Archontophoenix cunninghamiana</i>	Z3	2.5	19.6	N/A	Footprint	The trunk is located within the footprint of the proposed garage. Exempt species.	Remove
9	<i>Archontophoenix cunninghamiana</i>	Z3	2.5	19.6	N/A	Footprint	The trunk is located within the footprint of the proposed garage. Exempt species.	Remove
10	<i>Archontophoenix cunninghamiana</i>	Z3	2.5	19.6	N/A	Footprint	The trunk is located within the footprint of the proposed driveway. Exempt species.	Remove

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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
11	<i>Archontophoenix cunninghamiana</i>	Z3	2.5	19.6	N/A	Footprint	The trunk is located within the footprint of the proposed driveway. Exempt species.	Remove
12	<i>Bauhinia spp</i>	Z10	4.7	69.4	2.4	None	No encroachment into the TPZ.	Retain and protect
13	<i>Ficus spp</i>	A1	4.2	55.4	2.3	None	No encroachment into the TPZ.	Retain and protect
14	<i>Ficus coronata</i>	A1	2.6	21.2	1.9	None	No encroachment into the TPZ.	Retain and protect
15	<i>Unknown spp</i>	Z10	2.0	12.6	1.5	None	No encroachment into the TPZ.	Retain and protect
16	<i>Angophora costata</i>	A2	5.9	109.4	2.7	None	No encroachment into the TPZ.	Retain and protect
17	<i>Buckinghamia celsissima</i>	A1	3.1	30.2	2.0	None	No encroachment into the TPZ.	Retain and protect
18	<i>Olea europaea subsp cuspidata</i>	Z3	2.0	12.6	1.7	None	No encroachment into the TPZ.	Retain and protect
19	<i>Allocasuarina littoralis</i>	A1	4.9	75.4	2.5	Minor	A proposed retaining wall encroaches into the TPZ by 2% (1.6m ²) but not into the SRZ, which is minor TPZ encroachment and indicates that the tree will not be significantly impacted.	Retain and protect
20	<i>Unknown spp</i>	Z10	2.3	16.6	2.0	None	No encroachment into the TPZ.	Retain and protect

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21	<i>Elaeocarpus reticulatus</i>	A1	4.0	50.3	2.2	Minor	A proposed retaining wall and deck encroach into the TPZ by 3% (1.6m ²) but not into the SRZ, which is minor TPZ encroachment and indicates that the tree will not be significantly impacted.	Retain and protect
22	<i>Syncarpia glomulifera</i>	AA1	6.8	145.3	2.8	Minor	A proposed retaining wall and deck encroach into the TPZ by 6% (8.6m ²) but not into the SRZ, which is minor TPZ encroachment and indicates that the tree will not be significantly impacted.	Retain and protect
23	<i>Podocarpus elatus</i>	A1	3.8	45.4	2.2	None	No encroachment into the TPZ.	Retain and protect
24	<i>Castanospermum australe</i>	Z10	2.0	12.6	1.5	None	No encroachment into the TPZ.	Retain and protect
25	<i>Allocasuarina littoralis</i>	A1	4.0	50.3	2.2	None	No encroachment into the TPZ.	Retain and protect
26	<i>Syncarpia glomulifera</i>	AA1	3.8	45.4	2.2	None	No encroachment into the TPZ.	Retain and protect
27	<i>Syncarpia glomulifera</i>	Z9	3.6	40.7	2.1	None	No encroachment into the TPZ.	Retain and protect
28	<i>Syncarpia glomulifera</i>	Z9	3.4	36.3	2.1	None	No encroachment into the TPZ.	Retain and protect
29	<i>Syncarpia glomulifera</i>	AA1	4.6	66.5	2.3	None	No encroachment into the TPZ.	Retain and protect
30	<i>Allocasuarina littoralis</i>	Z10	4.8	72.4	2.4	None	No encroachment into the TPZ.	Retain and protect



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31	<i>Syncarpia glomulifera</i>	Z10	3.7	43.0	2.1	Minor	The proposed pool and deck encroach into the TPZ by 4% (3.2m ²) but not into the SRZ, which is minor TPZ encroachment and indicates that the tree will not be significantly impacted.	Retain and protect
32	<i>Allocasuarina littoralis</i>	A1	2.0	12.6	1.7	None	No encroachment into the TPZ.	Retain and protect
33	<i>Syncarpia glomulifera</i>	AA1	6.1	116.9	2.7	Major	<p>The tree is located in an adjoining site.</p> <p>The proposed pool and paving encroach into the TPZ by 20% (23.6m²) and into the SRZ, which is major TPZ encroachment and indicates that the stability and/or condition of the tree will potentially be impacted.</p> <p>However, there is an existing retaining wall aligned at the extent of the proposed pool/paving that separates a significant change in levels. The excavations for the swimming pool have been limited to the higher northern end and represent up to 6% of the encroachment outside of the SRZ area. Due to the existing level changes it is unlikely that significant tree roots will be encountered during the excavation and the pool is higher than the RL of the tree base. The remainder of the pool has been proposed to be installed on piers which are proposed to utilize the existing fall of the site rendering the underside of the pool above the existing natural ground line according to the plans provided. If the tree is to be retained in a viable condition all piers are to be flexible to retain significant tree roots and the only reduction in levels limited to the northern side of the swimming pool as shown in plan DA25.</p>	Tree sensitive construction required

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34	<i>Allocasuarina littoralis</i>	A1	5.0	78.5	2.4	Minor	A proposed pool and paving encroach into the TPZ by 5% (4.3m ²) but not into the SRZ, which is minor TPZ encroachment and indicates that the tree will not be significantly impacted.	Retain and protect

8. CONCLUSIONS

8.1 **Table 2:** Summary of the impact to trees during the development;

Impact	Reason	Category A Tree numbers		Category Z Tree numbers	Total trees
		AA	A	Z	
Trees recommended to be removed	Building construction, new surfacing and/or proximity to proposed structures	0	0	8,9,10,11	4
Trees requiring tree sensitive construction methods to be retained	Removal of existing surfacing/structures and/or installation of new surfacing/structures may impact the viability of the trees	3,5,7,33	6	0	5
Trees recommended to be retained	Removal of existing surfacing/structures and/or installation of new surfacing/structures will not impact the viability of the trees	1,2,4,22,26,29	13,14,16,17,19,21,23,25,32,34	12,15,18,20,24,27,28,30,31	25

8.2 Construction Design/Specification Requirements for Tree 3,5,6,7 and 33: To

ensure the trees are not adversely impacted by the construction, it must be demonstrated the following design and construction specifications can be implemented within the TPZ of the trees. If the construction cannot be completed in accordance with these specifications, the trees may not be viable for retention.

8.2.1 **Tree Sensitive Pier Footings:** To minimise root loss in the TPZ of the trees, the footings of the proposed garage, driveway, stairs, bin area and swimming pool must be located to avoid significant tree roots in the TPZ and SRZ. To ensure that significant tree roots are retained, it must be demonstrated by the project engineer that the following construction methods can be implemented;

- All excavations for piers must be carried out manually under the supervision of the project Arborist (see section 11 for details of manual excavation and project Arborist).
- The location of piers must be flexible to avoid significant roots (roots greater than 40mm in diameter). If practical, it is recommended that piers are located to avoid the SRZ of the trees. All roots greater than 40mm in diameter must be retained unless the project arborist has assessed and approved in writing that severing the root will not impact the condition or stability of the tree. If the location of piers cannot be flexible during the construction phase, root

investigations will be required in the location of the proposed piers to assess the impact to the trees roots.

- Cross beams/slabs must be located on or above the existing soil grades.
- The piers should be located a minimum of 200mm from any root to be retained that is greater than 40mm in diameter.

9. RECOMMENDATIONS

- 9.1 This report assesses the impact of a proposed development at the site to all significant trees within ten metres of proposed development works. Thirty-four trees have been identified and assessed.
- 9.2 Four category Z trees are proposed to be removed as part of the development works.
- 9.3 Twenty five trees are proposed to be retained and will be subject to minor encroachments or no encroachments at all. Of these, nine are category Z trees, ten are category A1 trees and six are category AA1 trees.
- 9.4 The remaining four category AA1 trees (trees 3, 5, 7 and 33) plus tree 6 (category A1) will require tree sensitive construction measures to be implemented if they are to be retained in a viable condition. See section 8.2 for details.
- 9.5 All trees to be retained must be protected in accordance with AS4970-2009, details of which are included in section 10. Generic tree protection guidance has been provided in section 10, as the site is highly constrained by trees and the location of tree protection will be guided by the construction methods (site access, vehicle movement, lifting areas, material and waste storage). It is recommended that a detailed tree protection plan (TPP) is prepared for the development in accordance with AS4970-2009. The TPP should be prepared in conjunction with the principal contractor in combination with the construction management plan for the site. The TPP should be prepared by a consulting Arborist with a minimum AQF level 5 qualification.
- 9.6 No landscape plan has been assessed in this report. See section 10.10 for general guidance in relation to minimising the impact of proposed landscaping to retained trees and replacement tree planting.
- 9.7 No services plan has been assessed in this report, all services plans should be subject to review by a consulting Arborist. Where possible underground services should be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques in accordance with AS4970-2009, see section 10.11 for more information.

- 9.8 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners. This report should be submitted as supporting evidence with any tree removal/pruning or development application

10. ARBORICULTURAL WORK METHOD STATEMENT (AMS) AND TREE PROTECTION REQUIREMENTS

- 10.1 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site and be provided a copy of this report.
- 10.2 **Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.
- 10.3 **Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 3 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).
- 10.4 **Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principle contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. I recommend regular site inspections on a frequency based on the longevity of the project, this is to be agreed in the initial meeting.

10.5 Tree protection Specifications: See section 10.5 for site/tree specific requirements. It is the responsibility of the principle contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

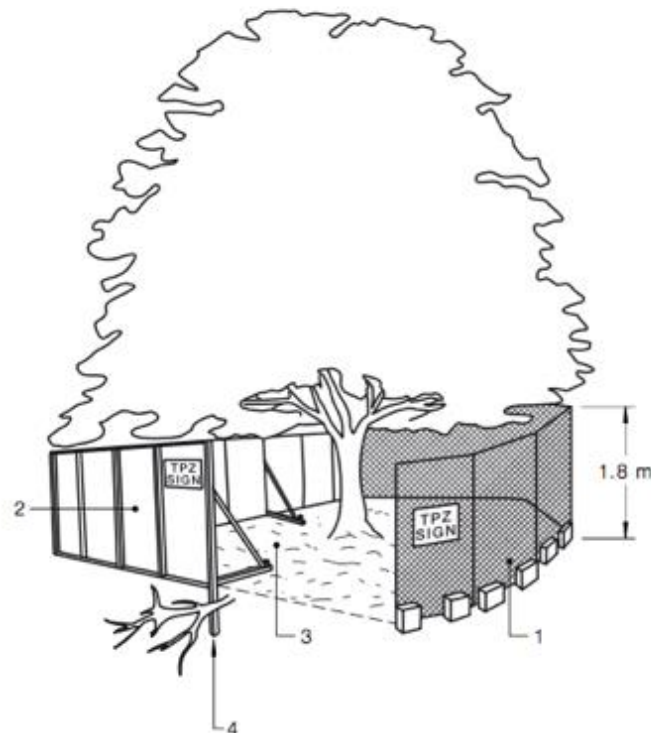
10.5.1 Protective fencing: Where it is not feasible to install fencing at the specified location due to factors such restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing in unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

10.5.2 TPZ signage: Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
- The name, address, and telephone number of the developer/builder and project Arborist

10.5.3 Trunk and Branch Protection: The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

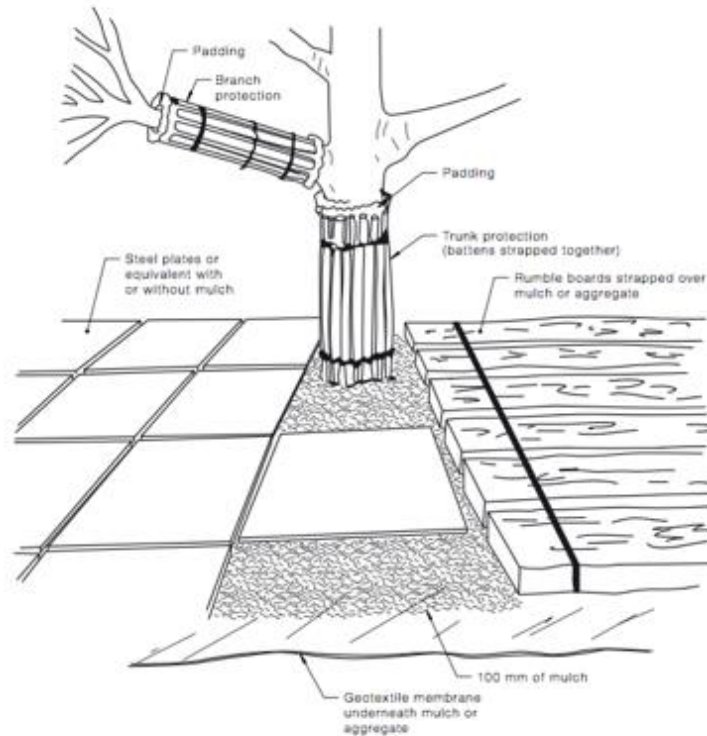
- 10.5.4 **Mulch:** Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works) must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.
- 10.5.5 **Ground Protection:** Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric, overlaid with durable timber boards/plywood. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.



LEGEND:

- 1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
- 2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
- 3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
- 4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

An image from AS4970-2009,⁸ with example tree protection.



NOTES:

- 1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
- 2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

An image from AS4970-2009,⁹ with example tree protection.

10.6 Restricted activities inside TPZ: The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

- A) Machine excavation.
- B) Ripping or cultivation of soil.
- C) Storage of spoil, soil or any such materials
- D) Preparation of chemicals, including preparation of cement products.
- E) Refueling.
- F) Dumping of waste.

⁸ Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.

⁹ Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

- G) Wash down and cleaning of equipment.
- H) Placement of fill.
- I) Lighting of fires.
- J) Soil level changes.
- K) Any physical damage to the crown, trunk, or root system.
- L) Parking of vehicles.

- 10.7 **Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.
- 10.8 **Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 10mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).¹⁰ The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.

¹⁰ Council Of Standards Australia, AS 4373 *Pruning of amenity trees* (2007) page 18

- 10.9 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.
- 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 than 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.
 - 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.
- 10.10 **Underground Services:** Where possible underground services should be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention. No roots greater than 30mm in diameter should be severed during the installation of service pipes unless approved in writing by the project Arborist.
- 10.11 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

- 10.12 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.
- 10.13 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

11. HOLD POINTS

11.1 Hold Points: Below is a sequence of hold points requiring project Arborist certification throughout the development process. It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development.

11.2 Hold points applicable to the development have been shaded in grey.

Hold Point	Stage	Responsibility	Certification	Complete Y/N and date
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise.	Prior to work commencing.	Principle contractor	Project Arborist	
Project Arborist to assess and certify that tree protection has been installed in accordance with section 10 and AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	Principle contractor	Project Arborist	
In accordance with AS4970-2009 the project arborist should carry out regular site inspections to ensure works are carried out in accordance with the recommendations. I recommend site inspections on a monthly frequency.	Ongoing throughout the development	Principle contractor	Project Arborist	
Project Arborist to supervise all manual excavations and demolition inside the TPZ of any tree to be retained.	Construction	Principle contractor	Project Arborist	

Project Arborist to certify that all pruning of roots greater than 30mm in diameter has been carried out in accordance with AS4373-2007. All root pruning must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	Principle contractor	Project Arborist	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	Principle contractor	Project Arborist	
Project arborist to approve relocation of tree protection for landscaping. All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimise the impact to trees.	Landscape	Principle contractor	Project Arborist	
After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigor and authorize the removal of protective fencing. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of construction	Principle contractor	Project Arborist	
Any wounding or injury that occurs to a tree during the demolition/construction process will require the project arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. All remediation work is to be carried out by the project arborist, at the contractor's expense.	Ongoing throughout the development	Principle contractor	Project Arborist	

12. BIBLIOGRAPHY/REFERENCES

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13. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 1: Existing Site Plan
- Appendix 1A: Proposed Site Plan
- Appendix 2 - Tree inspection schedule
- Appendix 3 – Health
- Appendix 4 – Landscape Value
- Appendix 5 – Age Class
- Appendix 6 – Structural Condition
- Appendix 7 – SULE Categories
- Appendix 8 – Trees AZ Field Sheet
- Appendix 9 – TPZ Encroachment Examples

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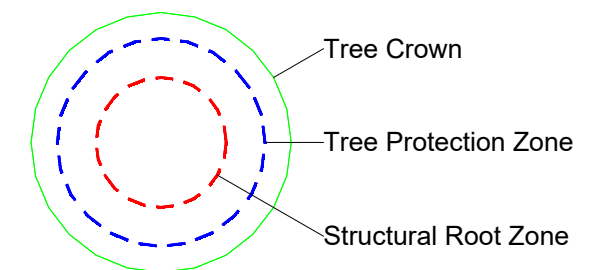
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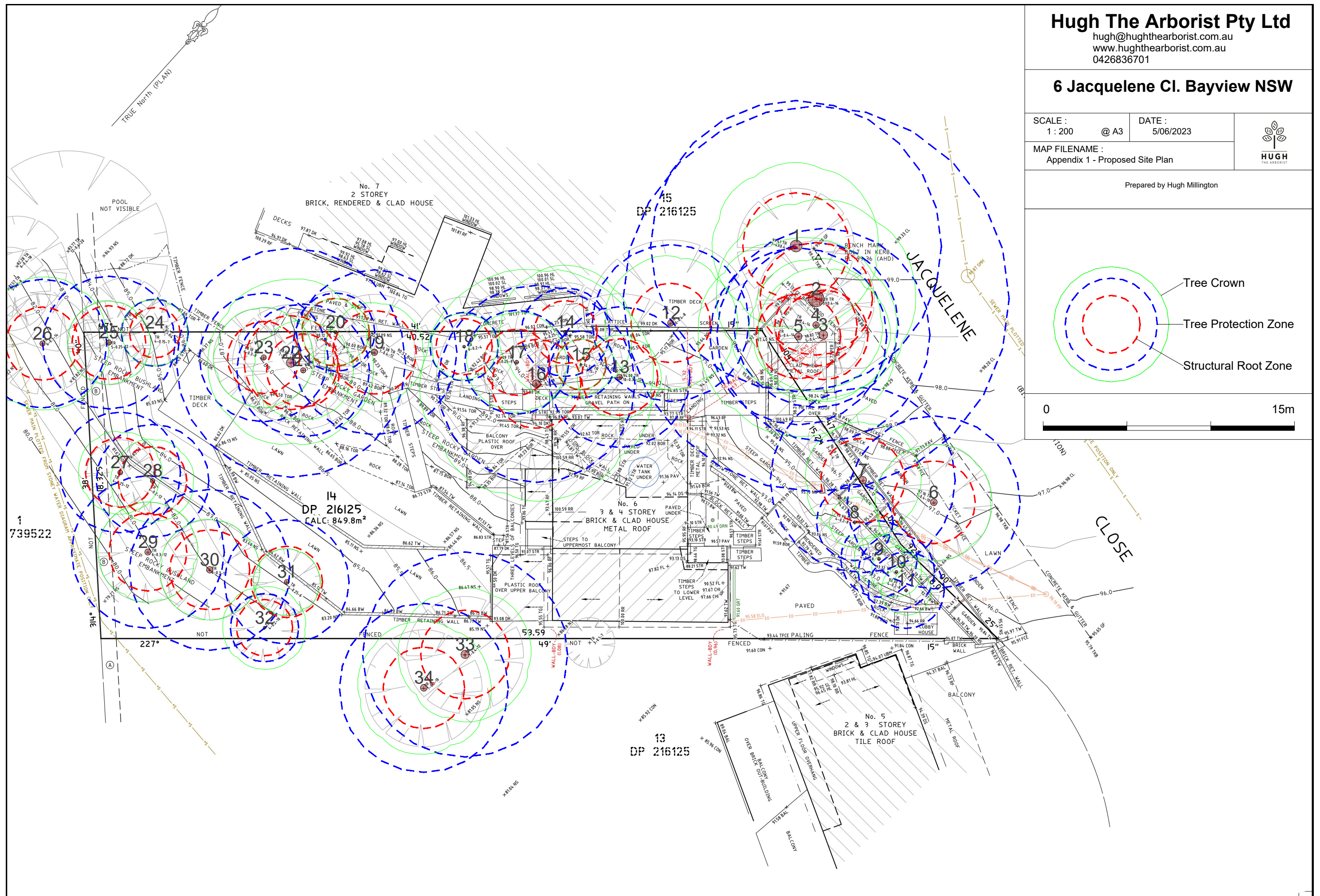
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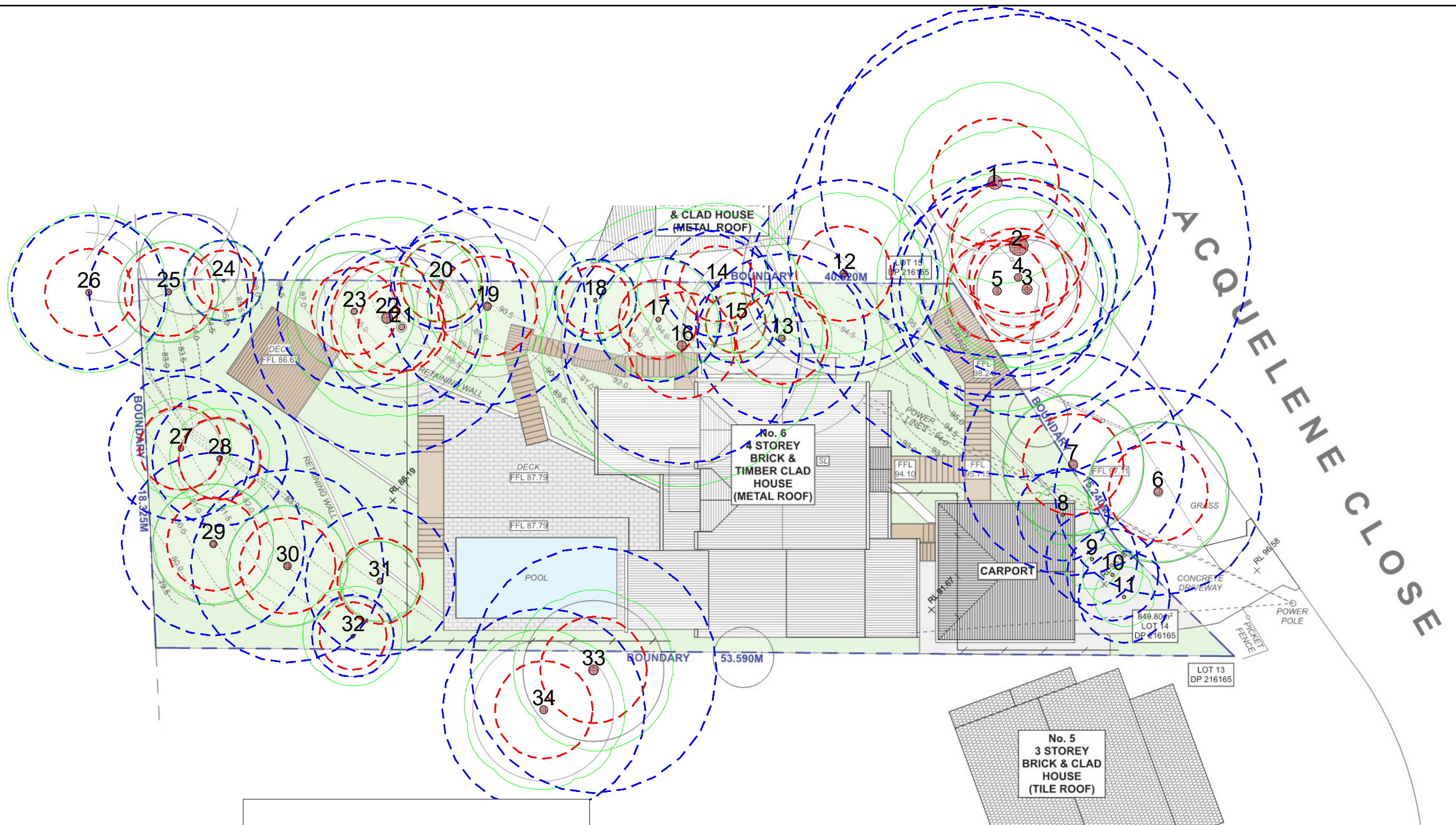


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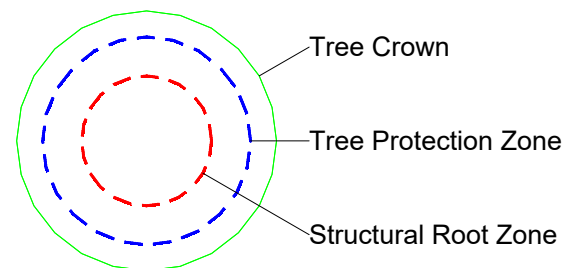
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Appendix 1A - Proposed Site Plan Revision 2



Prepared by Hugh Millington



Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	Stem 6	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
1	Turpentine	<i>Syncarpia glomulifera</i>	Mature	13	5	400	440	310	270			723	910	Good	Good	High	1. Long	AA1	8.7	3.2	Asymmetric crown shape.
2	Turpentine	<i>Syncarpia glomulifera</i>	Mature	18	6	960						960	1040	Good	Good	High	1. Long	AA1	11.5	3.4	None.
3	Turpentine	<i>Syncarpia glomulifera</i>	Mature	16	4	530						530	600	Good	Good	High	1. Long	AA1	6.4	2.7	Asymmetric crown shape.
4	Turpentine	<i>Syncarpia glomulifera</i>	Mature	16	4	410						410	490	Good	Good	High	1. Long	AA1	4.9	2.5	None.
5	Turpentine	<i>Syncarpia glomulifera</i>	Mature	15	6	440						440	530	Good	Good	High	1. Long	AA1	5.3	2.5	Asymmetric crown shape.
6	Turpentine	<i>Syncarpia glomulifera</i>	Mature	12	3.5	430						430	500	Good	Fair	High	2. Medium	A1	5.2	2.5	Co-dominant stems at 4m. Pruned for overhead powerline lines.
7	Turpentine	<i>Syncarpia glomulifera</i>	Mature	12	3.5	460						460	520	Good	Good	High	1. Long	AA1	5.5	2.5	None.
8	Bangalow Palm	<i>Archontophoenix cunninghamiana</i>	Mature	7	1.5	140						140	N/A	Good	Good	Low	1. Long	Z3	2.5	N/A	Exempt species.
9	Bangalow Palm	<i>Archontophoenix cunninghamiana</i>	Mature	7	1.5	150						150	N/A	Good	Good	Low	1. Long	Z3	2.5	N/A	Exempt species.
10	Bangalow Palm	<i>Archontophoenix cunninghamiana</i>	Mature	7	1.5	150						150	N/A	Good	Good	Low	1. Long	Z3	2.5	N/A	Exempt species.
11	Bangalow Palm	<i>Archontophoenix cunninghamiana</i>	Mature	7	1.5	190						190	N/A	Good	Good	Low	1. Long	Z3	2.5	N/A	Exempt species.
12	Orchid Tree	<i>Bauhinia spp</i>	Mature	9	4	390						390	450	Good	Fair	Medium	3. Short	Z10	4.7	2.4	Trunk growing through fence from adjoining site. Trunk possibly failed at 2-3m in past.
13	Fig	<i>Ficus spp</i>	Semi-mature	12	3.5	350						350	410	Good	Good	Medium	1. Long	A1	4.2	2.3	Species possibly Ficus obliqua.
14	Sandpaper Fig	<i>Ficus coronata</i>	Mature	8	4	220						220	260	Good	Good	Medium	1. Long	A1	2.6	1.9	None.
15	Unknown Species	<i>Unknown spp</i>	Semi-mature	7	1.5	130						130	150	Good	Good	Low	1. Long	Z10	2.0	1.5	None.
16	Smooth-barked Apple	<i>Angophora costata</i>	Mature	23	7	490						490	590	Fair	Fair	High	2. Medium	A2	5.9	2.7	Co-dominant stems at 4m that graft together higher in crown. Possible fungal bracket on stem at 7m.
17	Ivory Curl	<i>Buckinghamia celsissima</i>	Mature	8	3	230	120					259	290	Good	Good	Medium	2. Medium	A1	3.1	2.0	None.
18	African Olive	<i>Olea europaea subsp cuspidata</i>	Mature	4	2	170						170	200	Good	Good	Very low	2. Medium	Z3	2.0	1.7	Exempt species.
19	Black She-oak	<i>Allocasuarina littoralis</i>	Mature	10	3	410						410	510	Good	Good	Medium	2. Medium	A1	4.9	2.5	None.
20	Unknown Species	<i>Unknown spp</i>	Semi-mature	8	2	130	100	80	70			195	310	Fair	Fair	Low	2. Medium	Z10	2.3	2.0	None.
21	Blueberry Ash	<i>Elaeocarpus reticulatus</i>	Mature	12	3	330						330	370	Good	Good	Medium	1. Long	A1	4.0	2.2	None.
22	Turpentine	<i>Syncarpia glomulifera</i>	Mature	16	5	570						570	680	Good	Good	High	1. Long	AA1	6.8	2.8	None.
23	Brown Pine	<i>Podocarpus elatus</i>	Mature	9	3	320						320	360	Good	Good	Medium	1. Long	A1	3.8	2.2	None.
24	Blackbean	<i>Castanospermum australe</i>	Semi-mature	6	2	120						120	140	Good	Good	Low	1. Long	Z10	2.0	1.5	None.
25	Black She-oak	<i>Allocasuarina littoralis</i>	Mature	10	2.5	330						330	380	Good	Good	Medium	1. Long	A1	4.0	2.2	None.

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	Stem 6	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
26	Turpentine	<i>Syncarpia glomulifera</i>	Semi-mature	14	4	320						320	370	Good	Good	High	1. Long	AA1	3.8	2.2	None.
27	Turpentine	<i>Syncarpia glomulifera</i>	Semi-mature	11	2.5	300						300	330	Good	Poor	Medium	4. Remove	Z9	3.6	2.1	Trunk failed at 8m, weak/unstable regrowth.
28	Turpentine	<i>Syncarpia glomulifera</i>	Semi-mature	11	2.5	280						280	320	Good	Poor	Medium	4. Remove	Z9	3.4	2.1	Trunk failed at 8m, weak/unstable regrowth.
29	Turpentine	<i>Syncarpia glomulifera</i>	Mature	15	3	380						380	440	Good	Good	High	1. Long	AA1	4.6	2.3	None.
30	Black She-oak	<i>Allocasuarina littoralis</i>	Mature	12	3	400						400	460	Good	Fair	Medium	3. Short	Z10	4.8	2.4	Co-dominant stem has failed or died back at 7m. Upright stems in other stem also indicate possible previous failure.
31	Turpentine	<i>Syncarpia glomulifera</i>	Mature	6	2	310						310	350	Good	Poor	Low	4. Remove	Z10	3.7	2.1	Trunk failed at 5m, weak/unstable regrowth.
32	Black She-oak	<i>Allocasuarina littoralis</i>	Mature	7	2.5	170						170	200	Good	Fair	Medium	2. Medium	A1	2.0	1.7	None.
33	Turpentine	<i>Syncarpia glomulifera</i>	Mature	10	4	510						510	590	Good	Good	High	1. Long	AA1	6.1	2.7	None.
34	Black She-oak	<i>Allocasuarina littoralis</i>	Mature	11	4	420						420	480	Good	Fair	Medium	2. Medium	A1	5.0	2.4	None.

Explanatory Notes

Tree Species - 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).

Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level.

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.

Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3 – Assessment of Health

<u>Category</u>	<u>Example condition</u>	<u>Summary</u>
Good	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• The tree is in above average health and condition and no remedial works are required.
Fair	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	<ul style="list-style-type: none">• The tree is dead or almost dead.	<ul style="list-style-type: none">• 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 300m ² 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 200m ² ; 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 100m ² ; 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 40m ² ; 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 40m ² 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.

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.

<u>Category</u>	<u>Description</u>
Young/Newly planted	<ul style="list-style-type: none">• Young or recently planted tree.
Semi Mature	<ul style="list-style-type: none">• Up to 20% of the usual life expectancy for the species.
Early mature/Mature	<ul style="list-style-type: none">• Between 20% - 80% of the usual life expectancy for the species.
Over mature	<ul style="list-style-type: none">• Over 80% of the usual life expectancy for the species.
Dead	<ul style="list-style-type: none">• Tree is dead or almost dead.

Appendix 4 - Structural condition

<u>Category</u>	<u>Example condition</u>	<u>Summary</u>
Good	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• The tree is considered structurally good with well developed form.
Fair	<ul style="list-style-type: none">• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects.• The tree may have 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.	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• 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 tree's 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 <u>cannot</u> 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 <u>temporarily</u> 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.

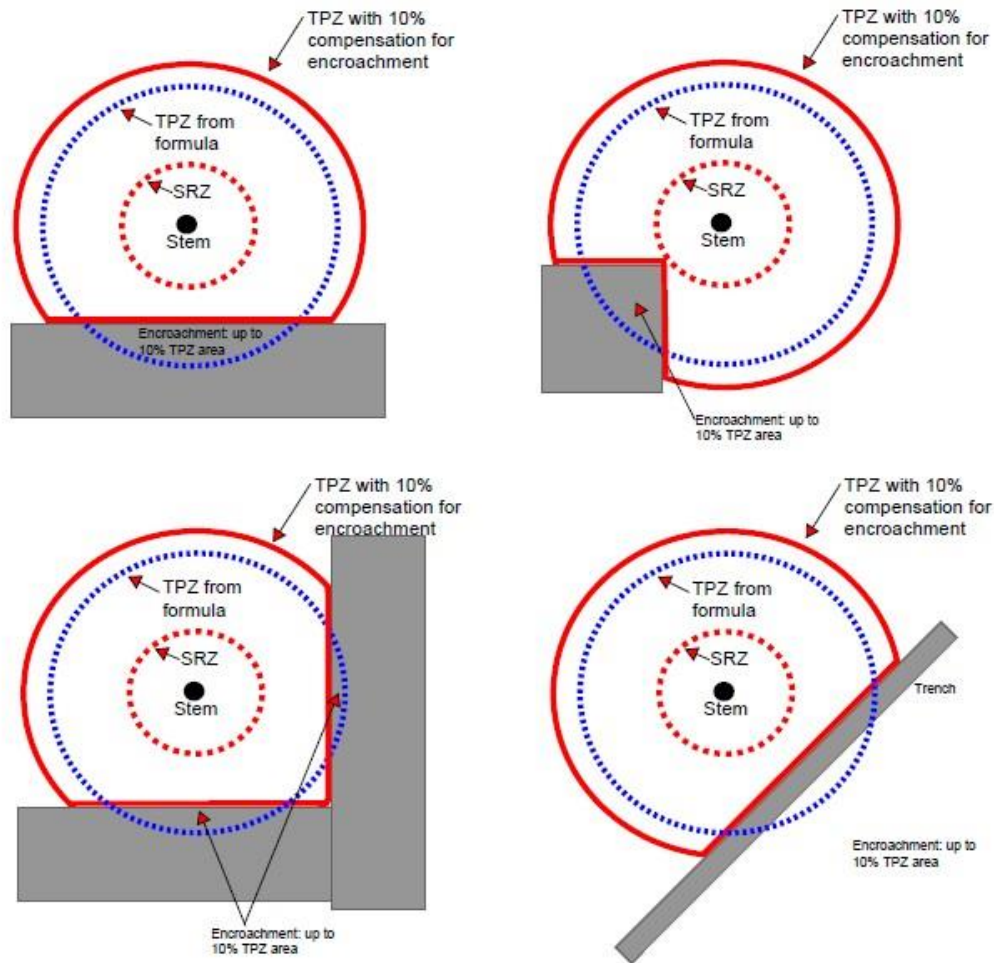
Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

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.