

AGILITY

Professional Tree Service Pty Ltd

Arborist Report

Jeffries Circuit, Williamstown NSW

Arboricultural Impact Assessment
for proposed development.

Performed 20 August 2024

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REPORT JN21956 Version 3

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2 Summary

This Arboricultural report was prepared for Built to provide an Arboricultural Impact Assessment of nine (9) trees located within or immediately adjacent (within 5m) to the proposed carpark development at Jeffries Circuit, Williamstown NSW (The subject site). The report has been prepared to aid in the assessment of a development application for the installation of a carpark.

It seeks to identify the trees within the site, provide information on their current health and condition and to assess their remaining useful life expectancy. Along with landscape significance, these factors are then used to determine their suitability for retention and preservation.

This report will assess the potential impact of the proposed development on the subject trees and, where viable, make recommendations for amendments to the design or construction methodology where necessary to minimize any adverse impact. The report also provides recommended tree protection measures to ensure the long-term preservation of the trees to be retained.

On the 20th of August, an on-site inspection and ground level visual tree assessment was undertaken by William Mittins. Nine (9) untagged trees were identified within 5m of the proposed development, consisting of native species. The impact of the proposed development was assessed based on the drawings prepared by DesignInc, drawing DA004.dwg dated 26/7/2024 (Site Plan).

The proposed development will necessitate the removal of nine (9) trees of low and very low retention value. These include T1, T2, T3, T5, and T6 (all Eucalyptus species), T4 (Sydney Red Gum), and T7, T8, and T9 (Broad-leaved Paperbark).

None of these trees are considered significant or worthy of special measures to ensure their preservation. Due to BAE's security restrictions for having trees within 5m of their perimeter fence line and NASF Guideline C- Managing Risk of Wildlife Strikes within the Vicinity of Airports these trees are to be replaced with low shrubs as indicated in the landscape plans. The removal of these trees to accommodate the proposed development of the carpark without equivalent replacement planting is considered warranted in this instance.

Using Australian Standard AS 4970-2009 (Protection of Trees on Development Sites) as a point of reference and guide, recommendations have been made regarding tree protection measures and tree sensitive construction measures to limit the impact of works on retained trees located within the road verge to the south. No notable impact on the health or stability of these trees is expected if the recommendations of this report are followed.

3 Introduction

This arboricultural report was prepared for Built to provide an Arboricultural Impact Assessment of nine (9) trees located within or immediately adjacent (within 5m) to the proposed development at Jeffries Circuit, Williamstown NSW (The subject site). The report has been prepared to aid in the assessment of a development application for the construction of a carpark and associated landscaping.

3.1 Site

The subject property is a vacant block being part of Proposed Lot 100, and Proposed Lot 101, and 102 in Lot 11, DP 1036501, 38 Cabbage Tree Road, and part Lot 43, DP 1045602 and part Lot 103, DP 873512, located at Williamstown Drive, Williamstown NSW. As indicated by the site survey, the properties are rectangular parcels of land sharing a property boundary with Newcastle Airport to the north. The two lots have been cleared of vegetation and are level with compacted graded soil across the site.

3.2 Site Location

Figure 1 shows the location of Jeffries Circuit, Williamstown NSW.

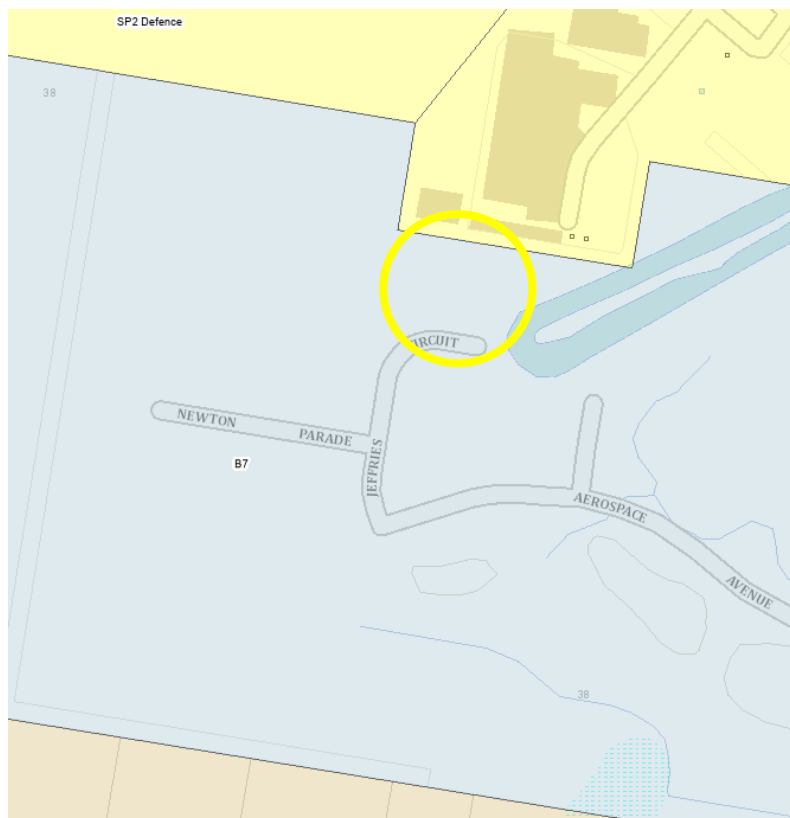


Figure 1 - Location of Site (NSW Planning Portal)

3.2.1 Relevant Legislation

The site resides in the Port Stephens Council (LGA), is zoned B7 (Business Park) and is not a designated 10/50 area (NSW Rural Fire Service, 2024).

The following documents contain the LGA legislation covering the site:

- *Port Stephens Local Environmental Plan 2013 (pub. 12-5-2020) (LEP)*
- *Port Stephens Development Control Plan 2014 (pub 14-5-2020 (DCP)*
- *State Environmental Planning Policy (Biodiversity and Conservation) 2021*
- *Port Stephens Biodiversity Specification 2024*

3.3 Subject Trees

The subject trees were inspected by William Mittins of Agility Professional Tree Service on the 20 August 2024. All trees were untagged and had been previously plotted by surveyors on site plans prepared by DesignInc, drawing reference number DA004 Rev E dated 26/7/2024 (Existing & Demolition Plan). Several smaller trees (and the contents of garden beds A and B) were shown on this plan however were not assessed as they do not constitute a tree within the council framework. For reference, the trees have been plotted on the attached Tree Protection Plan (Appendix 9), based on drawing LA002 Rev B dated 30/08/2024 by DesignInc, and numbered corresponding to their order of assessment. The approximate locations of the trees are depicted in Figure 2 below.

The numbers used in this plan correlate with the Tree Assessment Schedule (Appendix 8.1).

The health of the nine (9) existing trees within the site was rated as good during the site assessment. The individual ratings are listed in the Tree Assessment Schedule (Appendix 8.1). Refer to section 8.6 for explanation of tree assessment terms.

The structure of the nine (9) existing trees (woody perennials) within the site was rated as good or fair-good (7) and poor (2) during the site assessment. The individual ratings are listed in the Tree Assessment Schedule (Appendix 8.1). Refer to section 8.6 for explanation of tree assessment terms.



Figure 2 - Location of trees within site (Nearmap)

3.4 Heritage and Environmental Overlays

The subject site is not listed as a heritage item in the *Port Stephens Local Environmental Plan 2013* (pub. 12-5-2020). The site is not shown as having terrestrial biodiversity on the LEP maps. None of the subject trees are listed as a threatened species by the *NSW Biodiversity Conservation Act 2016* or the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999*. None are listed weed species in NSW. (Department of Primary Industries, 2023)

3.5 Scope / Aim

The purpose of this report is to identify the trees on the site within 5m of the proposed development and trees that will be impacted during the development process and provide information on their current health and condition and to assess their remaining useful life expectancy. The significance of the subject tree will be assessed with consideration given to habitat, ecological, cultural and historical factors and then use these factors to determine their suitability for retention and preservation.

This report will assess the potential impact of the proposed development on the subject trees and make recommendations for amendments to the design or construction methodology where necessary to minimize any adverse impact. The report also provides recommended tree protection measures to ensure the long-term preservation of the trees to be retained where appropriate.

4 Method

4.1 Tree Data Collection, Structure and Health Assessment

An on-site inspection and ground level visual tree assessment (VTA) was undertaken by William Mittins on the 20 August 2024. The tree data was recorded in a Tree Assessment Table and is attached as (Appendix 8.1).

The approximate age of the trees and tree height was estimated. Trunk diameters were measured with a diameter tape or calipers. Defects and anomalies were identified, assessed and measured using a measuring tape or estimated if at height. Photographs were taken at the time of the site inspection by the inspecting arborist.

Structure and health were assessed using the VTA procedure (Mattheck & Breloer, 1994) on both biological and mechanical factors. More detailed inspections including, root crown excavation, basic or electronic sounding or internal wood strength testing were not undertaken.

4.2 SULE, Significance & Tree Retention Value

SULE (Useful Life Expectancy) is an estimate of the tree's sustainability in the landscape. This was calculated using a method from Barrell Consultancy (Barrell, 2001). Tree significance was assessed using criteria developed by Andrew Morton (Morton, 2006) shown in appendix 8.3.

Retention values are derived from a combination of SULE and Landscape Significance and were determined using Table 1 below (Couston & Howden, 2001):

Table 1 - Table 2 Retention value determination (Couston & Howden, 2001)

Estimated Life Expectancy	Landscape Significance Rating						
	1	2	3	4	5	6	7
Greater than 40 Years	High Retention Value						
15 to 40 Years			Moderate Retention				
5 to 15 Years		Value		Low Ret. Value			
Less than 5 Years					Very Low Retention Value		
Dead or Hazardous							

Table 2 Retention Values Categories

Rating	Constraints for trees within this category
High Retention Value	These trees are worthy of retention and design consideration should be made as a priority to allow their retention. Careful consideration should be given for to the retention of these trees. Recommended setbacks of buildings and infrastructure from the tree should be used to minimise any adverse impact.
Moderate Retention Value	These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g., placement of ancillary structures, garden retaining walls, driveway levels). These trees should be retained if possible, however retention is considered less critical. If removed, replacement planting should be considered.
Low Retention Value	These trees are not considered to worthy of any special measures to ensure their preservation, due to current health, condition or suitability. They should not be a constraint to design layout.
Very Low Retention Value	Potentially hazardous, poor specimens or weeds. These trees should be removed irrespective of any proposed development.

The SULE, significance and retention value of each tree is listed in the Tree Assessment Schedule found in Appendix 8.1.

4.3 Tree Protection Zones

The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk of the tree as specified in Appendix 8.2. An indicative TPZ has been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites) at 12 x DBH of the tree and listed in the Impact Assessment Schedule (Appendix 8.2).

The intention of the TPZ is to ensure protection of the root system and canopy from any potential damage from construction works and ensure the long-term health and stability of each tree to be retained.

Incursions to the root zone occur due to excavations, changes in ground levels, (either lowering or raising the grade), trenching or other forms of soil disturbance such as ripping, grading or inverting the soil profile. Such works may cause damage or loss of part of the root system, leading to an adverse impact on the tree.

4.4 Structural Root Zones

The Structural Root Zone (SRZ) is a radial measurement that depicts the area required for tree stability. An indicative SRZ has been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites), being $(DAB \times 50)^{0.42} \times 0.64$. The SRZ of the trees on site are specified in the Impact Assessment Schedule (Appendix 8.2).

Incursions into the SRZ are not recommended as they are likely to damage the woody roots which may affect the trees stability in the ground (Mattheck, 2007) and may cause the tree to decline or die (Urban, 2008).

4.5 Acceptable Encroachments to Root Zone or Canopy

4.5.1 Minor Encroachment

Unavoidable encroachment into the TPZ, that is outside the SRZ and where the area less than 10% of the area of the TPZ may be accepted. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. Examples of acceptable incursions are shown in Appendix 8.4. Greater incursions to the TPZ may result in an adverse impact on the tree.

4.5.2 Major Encroachment

Where incursions greater than 10% of the TPZ are unavoidable, exploratory excavation using non-destructive methods may be required to evaluate the extent of the root system affected and determine whether the tree can remain viable (Standards Australia, 2009).

4.5.3 Canopy Encroachment

Where pruning of the canopy is required, the removal of foliage and branches to the extent of less than 10% of the total foliage volume is generally tolerable provided the removal of branches does not create large wounds or disfigure the natural form and habit of the tree. The minimum pruning as required to accommodate any proposed works is desirable. Extensive pruning can result in a detrimental impact on tree health and may lead to exposure of remaining branches to wind forces that they were previously sheltered from, leading to a greater risk of branch failure.

Clearance to between the building line and canopy should consider any projecting structures, such as balconies, awnings and the roofline and any requirement for temporary scaffolding to be erected during construction (typically 1-1.5 metres wide). High structures should preferably be located outside the canopy drip line to avoid or minimise canopy pruning.

5 Impact Assessment

The intention of this assessment is to determine the incursions to the root zones and canopies created by the proposed development and evaluate the likely impact of the proposed works on the subject trees. Details shown on the following plans and documents were reviewed for this assessment:

Table 3 - Reviewed plans and documents

Title	Author	Drawing Number	Date
Existing & Demolition Plan	DesignInc	DA004 Rev E	26/07/2024
Landscape site plan 01	DesignInc	LA002 Rev B	30/08/2024
Landscape Plan – Staff Rest area	DesignInc	LA004 Rev B	30/08/2024
Protection of Trees on Development sites	Standards Australia	AS4970-2009	2009
Pruning of Amenity Trees	Standards Australia	AS4373-2007	2007

No underground plumbing or services plans, irrigation plans, excavation plans, geo-technical reports or sediment control plans or similar other than listed above were viewed relating to the proposed development.

A summary of the impact by the proposed development on each subject tree is shown in the Impact Assessment Schedule (Appendix 8.2). The following has been used to form the impact assessment:

- Existing Relative levels
- Tree protection zone (TPZ).
- Structural root zone (SRZ).
- Footprint and envelope of the proposed building works and temporary structures.
- Incursions into the TPZ and SRZ, including estimated cut and fill beyond the building footprint.
- Incursions into canopy as part of the proposed building envelope or temporary structures.
- Assessment of impact of works to the existing trees.

The proposed development will necessitate the removal of nine (9) trees of low and very low retention value. These include Tree no's T1, T2, T3, T5 and T6 (*Eucalyptus* spp.), T4 (Sydney Red Gum) and T7, T8 & T9 (Broad-leaved Paperbark). None of these trees are considered significant or worthy of special measures to ensure their preservation. Due to BAE's security restrictions for having trees within 5m of their perimeter fence line and NASF Guideline C-Managing Risk of Wildlife Strikes within the Vicinity of Airports these trees are to be replaced with low shrubs as indicated in the landscape plans. The removal of these trees to accommodate the proposed development of the carpark without equivalent replacement planting is considered warranted in this instance.

The existing trees on the southern side of Jeffries Circuit could be at risk of damage from construction activities if proper precautions are not taken. The trees should be protected during construction to prevent stockpiling, compaction of the soil and accidental damage by following recommendations outlined in Section 6 (Tree Protection Guidelines).

No retained trees require canopy pruning to accommodate the proposed development. No other trees will be adversely affected by the proposed development. No habitat hollows were observed in any of the subject trees at the time of the inspection and as such the proposed development is unlikely to impact local wildlife habitat.

6 Tree Protection Recommendations

6.1 Tree Protection Plan & Arborist Involvement

This report adopts Australian Standard AS 4970-2009 (Protection of Trees on Development Sites) as a point of reference and guide for the recommended tree protection measures. The following tree protection measures should be read in conjunction with the Tree Protection Plan (Appendix 9) and must be available onsite prior to the commencement of and during works.

An arborist, of minimum AQF 5 and experienced in tree protection on construction sites, shall be engaged and consulted prior to any scope of works changes within the tree protection zones of retained trees where activities differ from that listed in this report. Changes to site layouts or excavation requirements must be reevaluated prior to commencement.

Arborist recommendations and tree protection measures listed in this report are to be added to information provided during site induction for all workers prior to their commencement of work.

6.2 Prohibited Activities

The position of tree protection measures including the recommended tree protection zones are indicated in the Tree Protection Plan (Appendix 9). These measures ensure the retained trees can be protected during the proposed development. In accordance with AS4970-2009 the following activities are restricted within the TPZ:

- A. Machine excavation, including trenching.
- B. Excavation for silt fencing.
- C. Cultivation.
- D. Storage.
- E. Preparation of chemicals, including preparation of cement products.
- F. Parking of vehicles and plant.
- G. Refueling.
- H. Dumping of waste.
- I. Wash down and cleaning of equipment.
- J. Placement of fill.
- K. Lighting of fires.
- L. Soil level changes.
- M. Temporary or permanent installation of utilities and signs.
- N. Physical damage to the tree.

6.3 Tree Damage

Care must be taken when operating cranes, drilling rigs, and similar equipment near retained trees to prevent damage to tree canopies, including foliage and branches. Under no circumstances should branches be torn off by construction equipment. If there is a potential conflict between tree canopies and construction activities, consult the Site Arborist for guidance.

If any tree is damaged during the construction period, a consulting arborist (AQF 5) must be engaged to assess the damage and recommend remedial actions to mitigate any adverse effects. These remedial actions should be carried out as soon as practicable and must be certified by the arborist.

6.4 Tree Protection Fencing

Tree Protection Fencing shall be installed at the perimeter of the Tree Protection Zone in the locations shown on the Tree Protection Plan (Appendix 9). The Tree Protection Fence shall consist of 1.8m high temporary chain wire panels supported by steel poles (with diameter greater than 20mm), anchored by movable weighted blocks. They shall be fastened together and supported to prevent sideways movement. The fence must have a lockable opening for access. The tree's woody roots shall not be damaged during the installation of the Tree Protection Fencing and machinery should not enter the TPZ. Existing site boundary fences may form part of the enclosure. Figure 3 shows an example of appropriate tree protection fencing.

The Tree Protection Fence shall be erected prior to the commencement of works onsite and shall be maintained in good condition for the duration of the development period. The Tree Protection Fence shall only be removed, altered, or relocated with the authorization from the site arborist in consultation with the site supervisor.

Where tree protection is required on trees located on the verge modified tree protection fencing is required as shown in Figure 4 and Figure 5.

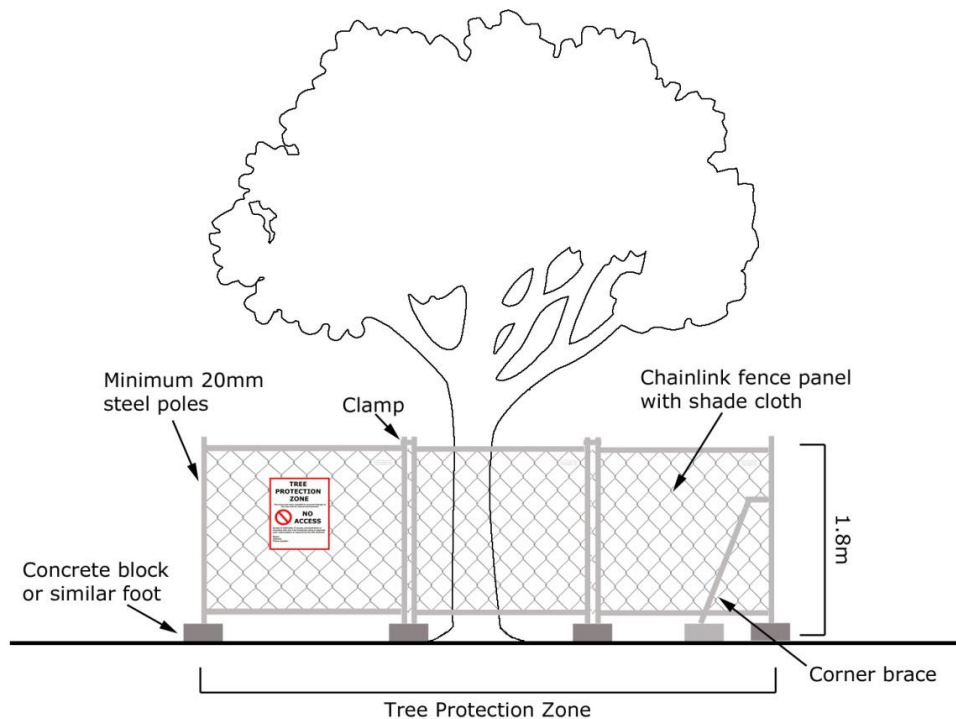


Figure 3 - Example Tree protection Fencing (Jeremy Novello)

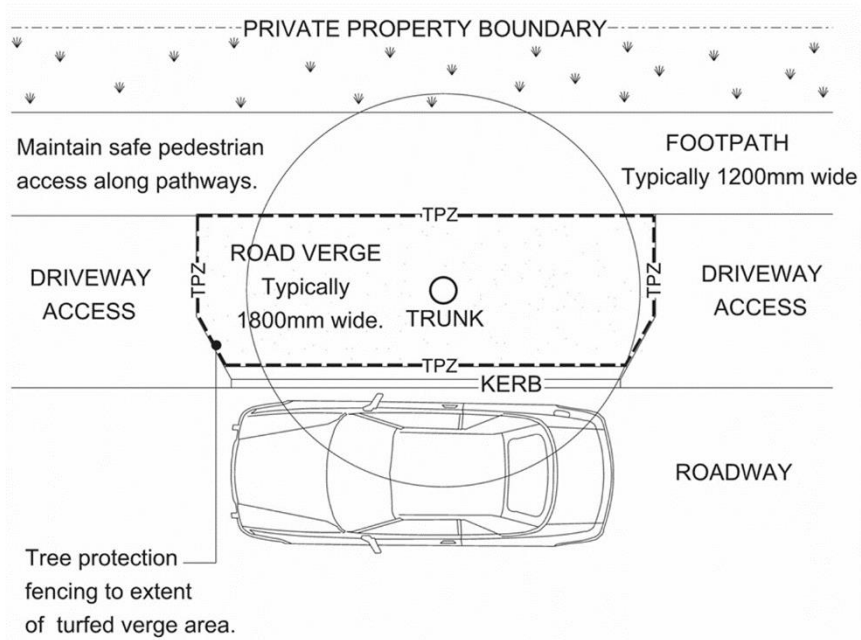


Figure 4 - Modified Tree Protection Fencing for road verge. (Newcastle City Council, 2018)

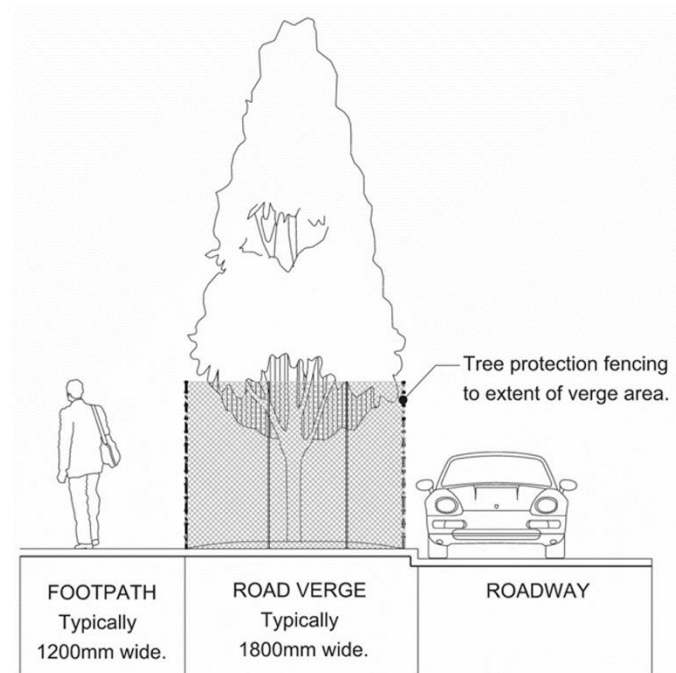


Figure 5 - Modified Tree Protection Fencing for road verge. (Newcastle City Council, 2018)

6.5 Signage

Tree Protection Signage shall be attached to the Tree Protection Zone and displayed on each tree protection fencing, clearly visible from within the development site. The signs shall be repeated at 10m intervals or closer where the fence changes direction. The signage shall be installed prior to the commencement of works onsite and shall be maintained in good condition for the duration of the development period.

The signs shall be a minimum size of 600 x 500mm. The lettering on the sign should comply with AS 1319. An example is shown in Figure 6.

Each sign shall advise the following details:

1. **TREE PROTECTION ZONE**
2. **NO ACCESS.**
3. If access, encroachment or incursion into this Tree Protection Zone is required, prior authorisation is required by the Site Arborist.
4. Name, phone number and email the site arborist.



Figure 6 - Example TPZ sign

6.6 Stockpiling and Site Sheds

The existing hardstand area is to be designated as the storage and stockpiling. This includes storage of building materials, waste and waste receptacles, stockpiling of spoil or fill, stockpiling of bulk materials, such as soil, sand, gravel, road base or the like and stockpiling of demolition waste.

Any required site buildings or sheds, such as offices, toilets or storage containers should be located within these areas. None of the above should be present within the TPZ of retained trees unless explicitly specified by the tree protection plan or in consultation with the site arborist.

6.7 Service Corridors

Access to this site is via Jeffries circuit. No access is to be made within the southern verge area of the road. Positioning of any cranes or piling rigs should be in such a way so as not to damage any part of the canopy of retained trees during operation. No access or parking of vehicles is to occur within the fenced TPZ of the retained trees. This area is marked in the Tree Protection Plan (Appendix 9) as a tree protection zone.

6.8 Ground Protection

Construction haul routes should be restricted to existing paved areas whenever possible. If it is not feasible and haul routes or access for plant and equipment must cross soft landscape areas within the Tree Protection Zones (TPZs) of any tree designated for retention, 20mm thick marine ply sheets or track mats must be placed over the ground surface. This helps minimize soil compaction and disturbance to the underlying soil profile and root zone.

Ground protection must be installed before any site work begins and maintained in good condition throughout the construction period. Upon completion of the work, the ground protection should be removed carefully to avoid damaging or disturbing the underlying soil profile.

6.9 Tree Removal

Nine (9) trees and garden bed A and B require removal to facilitate the proposed works. Tree removal contractors removing these trees are briefed on the need to protect other retained trees during tree removal operations. No plant or machinery shall enter the TPZ of retained trees during the removal process.

Tree removal works must be undertaken in accordance with the NSW Work Cover Authority Code of Practice, Tree Work 2007 and is recommended to be carried out by a qualified arborist, minimum AQF level 3.

6.10 Earthworks and Trenching

Any grading, trenching, or other earthworks that is adjacent to the TPZ of any retained tree may expect to encounter tree roots and a such works should be avoided. Should unavoidable works occur they must be monitored by the site arborist.

RECOMMENDED HOLD POINT – An AQF5 Arborist must be present during any excavation required within the TPZ of retained trees.

Excavations within the TPZ of retained trees are to be hand dug prior to machinery being used. Placement should be such as avoiding large roots. Roots should be exposed to the edge of the required area and any encountered greater than 25mm should be cut neatly with pruning saw or secateurs.

Any necessary root pruning must be performed in accordance with Australian Standard 4373-2007 – Pruning of Amenity Trees by a qualified and experienced arborist. Roots greater than 40mm in diameter should not be removed or pruned without prior consultation with a Consulting Arborist (AQF Level 5).

Excavators and machinery used to dig footings should always remain as far from the trees as practicable and minimize movement in those areas identified as within the root zone of retained trees.

Care must be taken to prevent the inversion of soil layers on the site, especially within the TPZ. Placing clay over coarse-textured soils can reduce water infiltration and create a perched water table, which may lead to moisture stress and potential decline or death of underlying tree roots.

6.11 Underground Services

Trenching for services is considered construction work. Therefore, any planned trenching activities not covered in this report should be assessed by an AQF5 arborist before they commence and as they are identified.

Whenever possible, proposed stormwater lines and other underground services should be located outside the TPZ of retained trees. If this is not feasible, consider alternative methods such as suspending pipelines beneath building floors, using non-destructive excavation techniques, or employing Horizontal Directional Drilling (HDD).

If installation within TPZs is unavoidable, adhere to the following procedures:

- Trenching for underground services and stormwater pipes within the TPZs of retained trees must utilize non-destructive excavation methods.
- Large woody roots (greater than 40mm in diameter) encountered during excavation should be preserved where possible. This can be done by tunneling beneath the roots, rerouting the service, or using similar techniques.
- If preserving roots is impractical and root pruning is required, a qualified arborist (AQF Level 5) must evaluate the proposed pruning to assess its potential impact on the tree's health and stability.

For the installation of underground services and stormwater pipes within the Structural Root Zones (SRZs) of retained trees, use Horizontal Directional Drilling (HDD), also known as sub-surface boring or micro-tunneling for large diameter pipes. Ensure that the invert level of the pipe, plus the pipe diameter, is below the estimated root zone depth, with a minimum depth of 1 meter to the invert level of the pipe.

6.12 Maintaining the TPZ and Retained Trees

6.12.1 During Construction

The site supervisor is to inspect trees and tree protection measures whilst onsite and provide recommendations for repairs and modifications to the tree protection measures as required. Additionally, they will document any tree injury, pest or disease that may present during construction and seek arborist advice should issues be noted.

Retained site trees with proposed encroachments may be impacted by root damage and require additional maintenance and monitoring during construction. These trees shall be temporarily irrigated on a schedule and to a volume to be determined by a consulting arborist in the absence of rainfall. Each irrigation shall wet the soil within the TPZ to a depth of 150-450mm (Fite & Smiley, 2016).

Organic mulch shall be installed by hand in the TPZ of any tree nominated for retention where practicable to a uniform depth of 50-100mm and be re-applied where necessary (approximately every 12-18 months). Mulch should not be piled against the trunk of a tree. Mulch is not to be stockpiled within any trees TPZ, unless it is to be spread within 24 hours. No delivery trucks should enter the TPZ of any retained trees.

Any landscape or construction works including, planting, garden edging, soil importation and installation of irrigation or lighting not assessed for this report should be evaluated by an AQF5 arborist as they are identified and prior to their commencement.

6.12.2 Post Construction

The removal of tree protection measures post construction shall be done in such a way as to not damage any retained trees and only at the approval of the site arborist. No vehicles or plant are to enter the TPZ of retained trees in the process of device removal.

Trees preserved on construction sites will generally benefit from having 50-100mm layer of organic mulch beneath the canopy (Matheny & Clark, 1998). Retain (or apply) mulch to all retained trees where practicable. Any mulch within the TPZ, not able to be retained, shall be removed by hand without damage to any tree roots.

Tree health and structure should be evaluated again by an AQF5 arborist post construction to determine if any changes have occurred during the construction process. Mitigation treatments should be recommended and implemented if any changes have been detected.

Pest, disease and weed management are also an important part of a post construction maintenance program (Matheny & Clark, 1998). Continue to monitor retained trees and seek arborist advice in the event treatment is required.

7 References

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8 Appendices

8.1 Tree Assessment Schedule

Tree No.	Species	Age Class	Height(m)	Canopy Spread(m)				DBH (cm) @ 1.4m	DAB (cm)	Live Crown Size (m ²)	Structure	Health/Vigor	SULE	Comments/Condition/Defects/Pests/Disease	Landscape Significance	Retention Value	Height to foliage
				N	E	S	W										
1	<i>Eucalyptus sp.</i> Eucalypt	Juvenile	5	1.5	1.5	1.5	1.5	12	16	8	Good	Good	5a	Juvenile tree, planted as a part of street tree planting.	5	LOW	1.5
2	<i>Eucalyptus sp.</i> Eucalypt	Juvenile	5	1	1	1	1	8	10	7	Good	Good	5a	Juvenile tree, planted as a part of street tree planting.	5	LOW	1.5
3	<i>Eucalyptus sp.</i> Eucalypt	Juvenile	7	2	2	2	2	16	21	22	Good	Good	5a	Juvenile tree, planted as a part of street tree planting.	5	LOW	1.5
4	<i>Angophora costata</i> Sydney Red Gum	Juvenile	4	1.5	1.5	1.5	1.5	10	13	7.5	Good	Good	5a	Juvenile tree, planted as a part of street tree planting.	5	LOW	1.5
5	<i>Eucalyptus haemastoma</i> Scribbly Gum	Semi Mature	8	2	2	2	2	15, 15, 15, 19	28	26	Fair	Good	3b	Small tree lopped at 1m with maturing epicormic growth weakly attached.	5	VERY LOW	1.5
6	<i>Eucalyptus sp.</i> Eucalypt	Semi Mature	8	2	2	2	2	15, 15, 15, 28	31	28	Fair	Good	3b	Small tree lopped at 1m with maturing epicormic growth weakly attached.	5	VERY LOW	1
7	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	Juvenile	4	1.5	1.5	1.5	1.5	6, 5	13	10.5	Good	Good	5a	Juvenile tree, planted as a part of street tree planting.	5	LOW	0.5
8	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	Juvenile	4	2	2	2	2	8	17	14	Good	Good	5a	Juvenile tree, planted as a part of street tree planting.	5	LOW	0.5
9	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	Juvenile	3.5	1.5	1.5	1.5	2	8	13	9.75	Good	Good	5a	Juvenile tree, planted as a part of street tree planting.	5	LOW	0.5

8.2 Impact Assessment Schedule

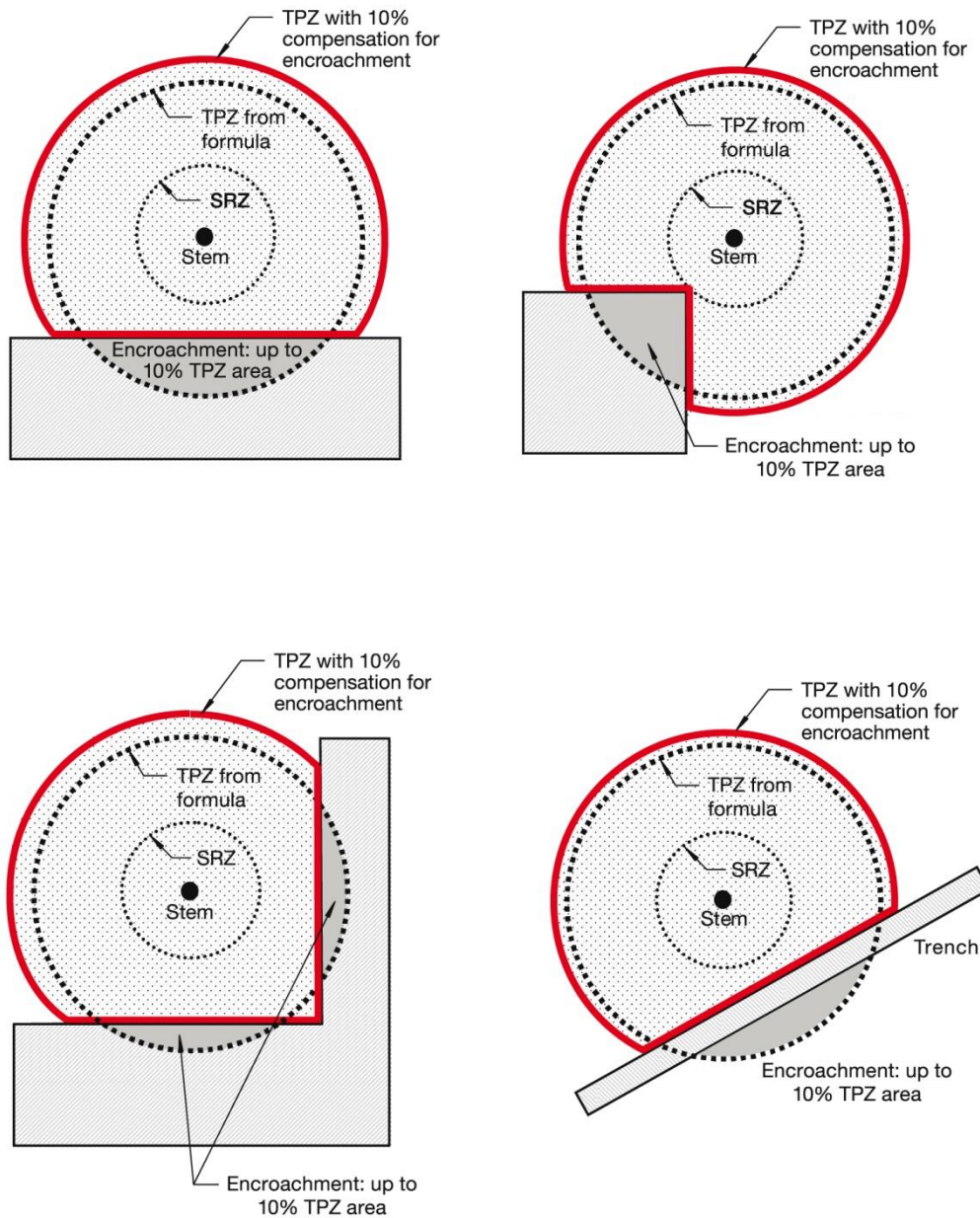
Tree No.	Species	Tree Protection Zone Radius (m)	Structural Root Zone Radius (m)	TPZ Area (m ²)	Proposed encroachments to rootzone (TPZ or SRZ) and/or canopy	% TPZ encroachment	% SRZ encroachment	Likely Impact	Recommendation
1	<i>Eucalyptus sp.</i> Eucalypt	2	1.53	12.57	The proposed development includes plans to replace this tree with low-height shrubs.	100	100	Proposed works will necessitate removal.	REMOVE TREE → Remove tree in accordance with Section 6.9.
2	<i>Eucalyptus sp.</i> Eucalypt	2	1.5	12.57	The proposed development includes plans to replace this tree with low-height shrubs.	100	100	Proposed works will necessitate removal.	REMOVE TREE → Remove tree in accordance with Section 6.9.
3	<i>Eucalyptus sp.</i> Eucalypt	2	1.72	12.57	The proposed development includes plans to replace this tree with low-height shrubs.	100	100	Proposed works will necessitate removal.	REMOVE TREE → Remove tree in accordance with Section 6.9.
4	<i>Angophora costata</i> Sydney Red Gum	2	1.5	12.57	The proposed development includes plans to replace this tree with low-height shrubs.	100	100	Proposed works will necessitate removal.	REMOVE TREE → Remove tree in accordance with Section 6.9.
5	<i>Eucalyptus haemastoma</i> Scribbly Gum	3.1	1.94	30.19	Located within the footprint of the proposed carpark.	100	100	Proposed works will necessitate removal.	REMOVE TREE → Remove tree in accordance with Section 6.9.
6	<i>Eucalyptus sp.</i> Eucalypt	3.6	2.02	40.72	Located within the footprint of the proposed carpark	100	100	Proposed works will necessitate removal.	REMOVE TREE → Remove tree in accordance with Section 6.9.
7	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	2	1.5	12.57	The proposed development includes plans to replace this tree with low-height shrubs.	100	100	Proposed works will necessitate removal.	REMOVE TREE → Remove tree in accordance with Section 6.9.
8	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	2	1.57	12.57	The proposed development includes plans to replace this tree with low-height shrubs.	100	100	Proposed works will necessitate removal.	REMOVE TREE → Remove tree in accordance with Section 6.9.
9	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	2	1.5	12.57	The proposed development includes plans to replace this tree with low-height shrubs.	100	100	Proposed works will necessitate removal.	REMOVE TREE → Remove tree in accordance with Section 6.9.

8.3 Assessment of Tree Significance

Table 4 - Determining Landscape significance Rating (Morton, 2006)

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 crown density 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 relevant 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.

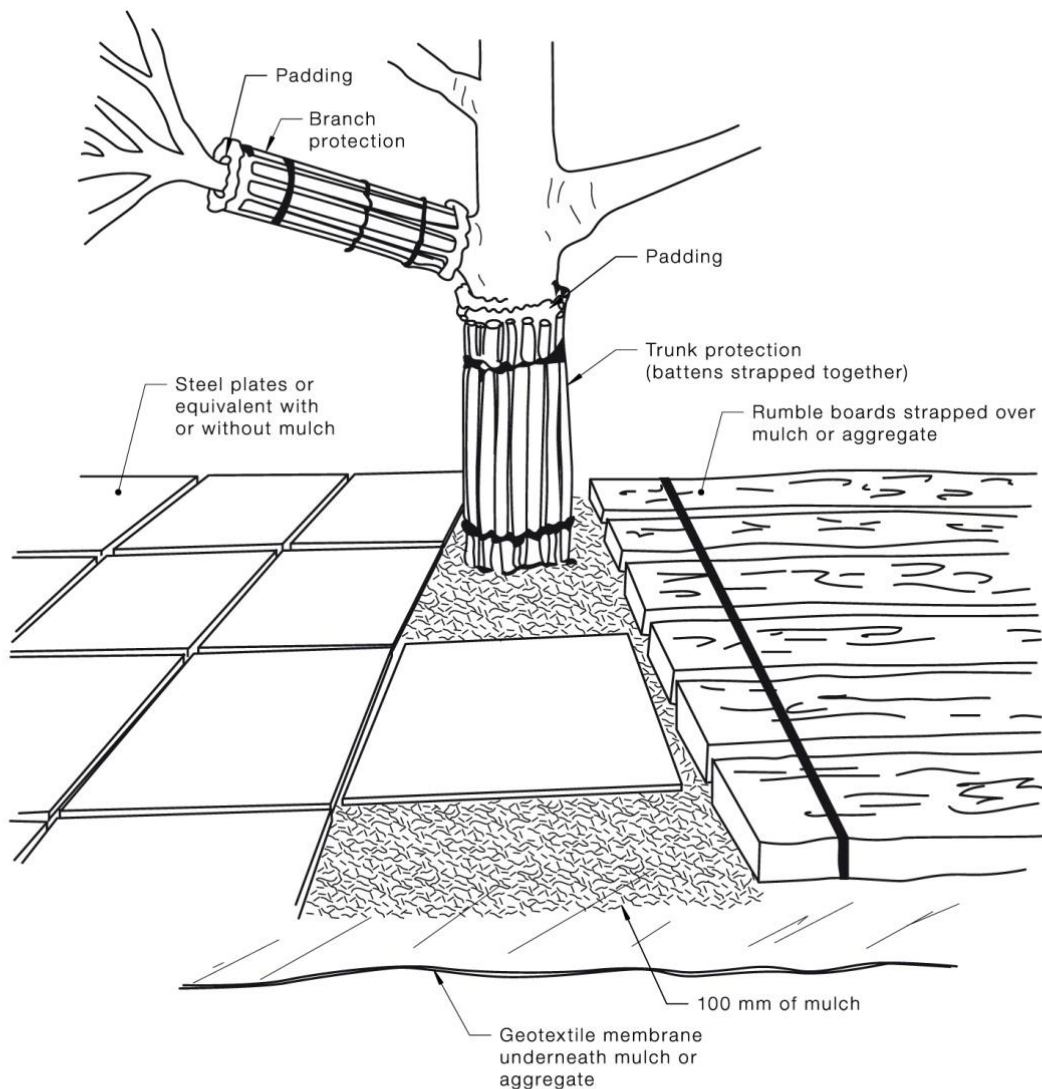
8.4 Acceptable Incursions to the Tree Protection Zone (TPZ)



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

Figure 7 - Acceptable Incursions into the TPZ (Standards Australia, 2009)

8.5 Trunk, Branch and Ground 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.

Figure 8 - Examples of Trunk, Branch and Ground Protection (Standards Australia, 2009)

8.6 Glossary/Abbreviations

10-50	RFS vegetation clearing scheme for bushfire prone land.
Abiotic	Pertaining to non-living agents, e.g. environmental factors.
Absorbing roots	Non-woody, short-lived roots, generally having a diameter of less than one millimetre, the primary function of which is uptake of water and nutrients.
Adaptive roots	The adaptive growth of existing roots; or the production of new roots in response to damage, decay or altered mechanical loading
Age Class	<p>The assessment of the trees current age.</p> <p><u>Juvenile</u>: Small tree in terms of potential size, has not reached full reproductive ability, may have been recently planted.</p> <p><u>Semi-mature</u>: Tree in active growth phase of life cycle, not yet attained maximum expected physical size for its species and/or location.</p> <p><u>Mature</u>: Tree has reached maximum expected physical size for its species and/or location, is showing reduced seasonal extension growth.</p> <p><u>Over-Mature</u>: Tree is approaching the end of its life cycle and is exhibiting a reduction in vigour often evidenced by deterioration in health or structure. Entering senescence. The adaptive growth of existing roots; or the production of new roots in response to damage, decay or altered mechanical loading.</p>
Bark	A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem
Bottle-butt	A broadening of the stem base and buttresses of a tree, more than normal and sometimes denoting a growth response to weakening in that region, especially due to decay involving selective delignification
Bracing	The use of rods or cables to restrain the movement between parts of a tree.
Branch bark ridge	The raised arc of bark tissues that forms within the acute angle between a branch and its parent stem.
Branch-collar	A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base.
Brown-rot	A type of wood decay in which cellulose is degraded, while lignin is only modified.
Cambium	Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally.
Canker	A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria.
Cavity	A hollow space within a tree trunk or branch.
Compartmentalisation	The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defenses operating at the boundaries of the affected region.
Compression fork	An acute angled fork that is mechanically optimised for the growth pressure that two or more adjacent stems exert on each other.
Condition	An indication of the physiological condition of the tree. Where the term 'condition' is used, it should not be taken as an indication of the stability of the tree.
Crown/Canopy	The main foliage bearing section of the tree.
Crown lifting/raising	The removal of limbs and small branches to a specified height above ground level.
Crown thinning	The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure.
DAB	(Diameter at Base) Diameter of trunk at base of tree just above the root crown.
DBH	(Diameter at Breast Height) Diameter of trunk at 1.4m above the ground or nearest measurable point.
Deadwood	Dead branches existing in the crown. Branch or stem wood bearing no live tissues.
Decay	The breakdown of wood tissue within a tree, often caused by fungi or other organisms.
Defect	An imperfection, weakness, or lack of something necessary. In trees, defects are injuries, growth patterns, decay, or other conditions that may reduce the tree's structural strength.
Delamination	The separation of wood layers along their length, visible as longitudinal splitting
Dieback	The death of parts of a woody plant, starting at shoot-tips or root-tips.
Disease	A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms.
Dripline	A line formed around the edge of a tree by the lateral extent of the crown.
Encroachment	Construction activity within a portion of the TPZ expected to have an impact on the tree.
Epicormic Growth	Growth that arises from latent or adventitious buds that occur on stems and branches. Can be associated with stress.
Exudate	Fluid released by an organism through pores or a wound, a process known as exuding or exudation.
Flush cut	A pruning cut which removes part of the branch bark ridge and or branch-collar. Considered a poor tree pruning practice.
Girdling root	A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue.
Hazard beam	An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting.
Health	<p>Summaries the health and vigour of the tree.</p> <p><u>Excellent</u>: Canopy full, with dense foliage, leaves are entire with excellent size and colour for species with no pathogen damage. Excellent growth indicators.</p> <p><u>Good</u>: Canopy full, with minor variations to foliage density. Leaves are entire and of good size and colour for species with minimal or no visible pathogen damage. Good growth indicators.</p> <p><u>Fair</u>: Canopy with moderate variations in foliage density, leaves are not entire with reduced size and/or atypical colour. Moderate pathogen damage. Reduced growth indicators and visible amounts of deadwood/dieback, and epicormic growth.</p> <p><u>Poor</u>: Canopy density significantly reduced. Leaves are not entire, significantly reduced in size and/or discoloured. Significant pathogen damage. Significant amounts of deadwood and/or epicormic growth. Notable dieback of branch tips, possibly extensive.</p> <p><u>Dead</u>: No live plant material observed in canopy. Bark possibly delaminating from the trunk and/or branches.</p>
Heartwood	The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood.
Heave	A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also, the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate.
Included bark	Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact.
Incursion	See Encroachment.

Arborist Report

August 20, 2024

ISA	International Society of Arboriculture
LEP	Local Environment Plan
LGA	Local Government Area
Lignin	The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification.
Lions tailing	A term applied to a branch of a tree that has few if any side branches except at its end and is thus liable to snap due to end-loading. Often a result of poor pruning of the tree. Internal branches should be retained where possible.
Loading	A mechanical term describing the force acting on a structure from a particular source, e.g. the weight of the structure itself or wind pressure.
Longitudinal	Along the length (of a stem, root or branch).
Mycelium	The body of a fungus, consisting of branched filaments (hyphae).
Occlusion	Continued growth or successful closing of wound by callus tissue.
Pathogen	A micro-organism which causes disease in another organism.
Photosynthesis	The process whereby plants use light energy to split hydrogen from water molecules and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products.
Phytotoxic	Toxic to plants.
Probability	A statistical measure of the likelihood that a particular event might occur.
Rams-horn	In connection with wounds on trees, a roll of occluding tissues which has a spiral structure as seen in cross section.
Reactive Growth/ Reaction Wood	Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth).
Rib/Ribbing	A ridge of wood that has usually developed because of locally increased mechanical loading. Often associated with internal cracking in the wood of the stem, branch or root.
Ring-barking	The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage.
Root Crown/Crown	The area where a tree's trunk meets its roots at ground level.
Root zone	Area of soils containing absorptive roots of the tree/s described. The Primary root zone is that which we consider of primary importance to the physiological well-being of the tree.
Sapwood	Living xylem tissues.
Shedding	In woody plants, the normal abscission, rotting off or sloughing of leaves, floral parts, twigs, fine roots and bark scales.
SRZ	Structural Root Zone as derived by AS4970-2009. The area around the base of the tree required for the tree's stability in the ground.
Stress	In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature.
Structure	Summarises the structure of the tree from roots to crown. <u>Good</u> : Good form and branching habit. Minor structural defects that are insignificant and typical or common within the species. No fungal pathogens present. No visible wounds to the trunk or root plate. <u>Fair</u> : Moderate structural defects that impact longevity. Minor damage to structural roots. Small wounds present where decay could begin. No fungal pathogens present. A fair representation of the species. <u>Poor</u> : Significant structural defects present that have significant impact on longevity and result in poor representation of the species. Wounding evident with cavities and/or decay present. Damage to structural roots. <u>Hazardous</u> : Serious structural defects with failure determined to be imminent (<12 months). Defects may include active splits and/or partial branch or root plate failures. Trees require immediate Arboricultural work to alleviate the associated risks.
Structural roots	Roots, generally having a diameter greater than 10mm, and contributing significantly to the structural support and stability of the tree.
Subsidence	In relation to branches of trees, a term that can be used to describe a progressive downward bending due to increasing weight.
SULE	Useful life expectancy determined using (Barrell, 2001)
Taper	In stems and branches, the degree of change in girth along a given length.
Targets	In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it.
Target canker	A kind of perennial canker, containing concentric rings of dead occluding tissues.
Tip dieback	The death of some areas of the crown. Symptoms are leaf drop, bare twigs and dead branches.
TPZ	Tree Protection Zone, indicative as derived by AS4970-2009 or actual as described by the Tree Location Plan. Specified area above and below ground set aside for the protection of the tree's roots and crown.
Torsional stress	Mechanical stress applied by a twisting force.
Transpiration	The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells.
Vigour	A tree's built-in genetic capacity to resist stress and inherent growth attributes. The expression of carbohydrate expenditure to growth. A measure of physiological condition.
Vitality	In the trees current condition, the expected ability of the tree to continue growing with the resources it currently has.
VTA	Visual Tree Inspection as described by (Mattheck & Breloer, 1994)
Wind exposure	The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity.
Wind-throw	Whole tree failure due to the forces of wind.
White rot	A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded.
Wound	Any injury or damage to a tree's bark or wood tissue.
Woundwood	Wood with atypical anatomical features, formed in the vicinity of a wound.

8.7 Limitations

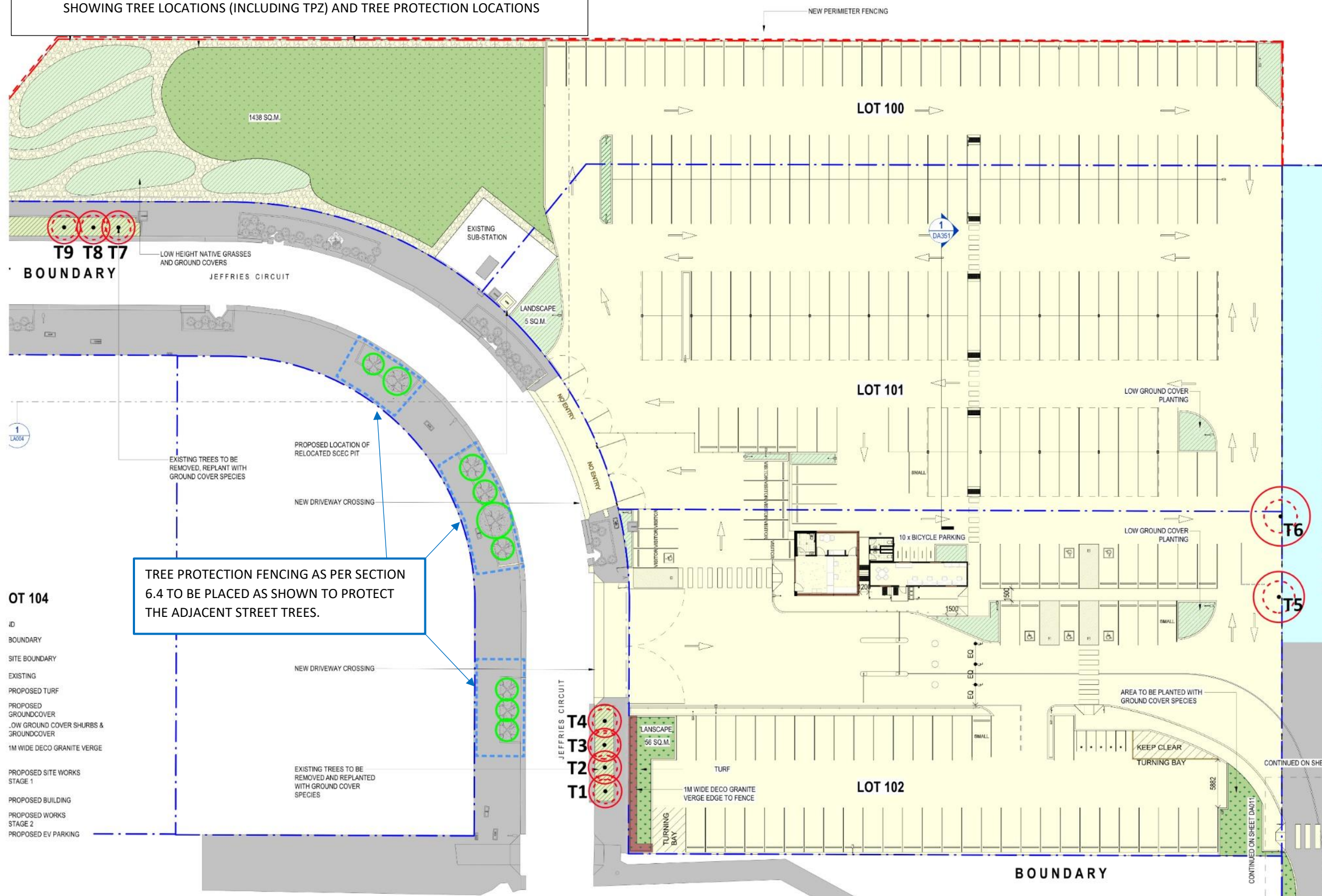
1. This report relates to the tree on the days of the inspection only, any changes to the site location, such as unsighted construction or landscape works may alter the results of this report.
2. Only the plans, specifications and pending development applications listed in section 5 were considered. It is possible that any other such documents that were not assessed or amendments to those plans could alter the results of this report.
3. This report, and any advice, opinions and recommendations given in it, is based on information supplied by the client and on data from inspections, measurements and analysis carried out by William Mittins of Agility Professional Tree Service Pty Ltd. No guarantee is implied for future tree safety. The client should rely on the report and its contents only to that extent

9 Plans

Attached are the following plans and drawings:

JN21956 01 V2 - Tree Protection Plan - Plan showing location of the subject trees and the location of tree protection recommendations.

SHOWING TREE LOCATIONS (INCLUDING TPZ) AND TREE PROTECTION LOCATIONS



T1 Tree number and trunk location as per survey


 **Tree for retention**



Tree for removal

- Tree Protection Zone and
- Structural Root Zone as per AS4970-2009

Tree protection fencing
as per section 6.4

ADDITIONAL NOTES 

AGILITY

8/6 Woodbine Place Toronto, NSW 2282
Ph: (02) 4946 8958 E: admin@agilitytrees.com.au
ABN 636 825 557

DATE: 20TH AUGUST 2024

NOTES: THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ARBORIST REPORT AND ITS ATTACHED SCHEDULES.
THIS PLAN HAS BEEN MODIFIED FROM THE SITE PLAN DRAWING BY DESIGNINC (LANDSCAPE SITE PLAN 01 – DRAWING NUMBER LA002 REVISION B DATES 30/8/24) TO GIVE AN ACCURATE REPRESENTATION OF TREE LOCATION WITHIN THE SITE, THEIR THEORETICAL TPZ AS PER AS4970-2009 AND LOCATION OF TREE PROTECTION RECOMMENDATIONS.
REFER TO ARBORIST REPORT FOR SPECIES AND MEASUREMENTS.

JN21956 01 VERSION2

SCALE: 1:500 @ A3

