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TREE REPORTS

CONSULTATION

PROJECT MANAGEMENT

Email:

ABN 67097422449

Tree Management Plan (TMP)

Must be read with our A2 Tree Protection Plan Drawing dated 22nd August 2024

For ...

TAG Ferntree Gully Pty Ltd

Location ...

**1157 to 1165 Burwood Highway
Ferntree Gully**

Prepared by ...

Diploma of Horticulture
Diploma of Horticulture – Arboriculture
ISA Certified Arborist
Member (610) Landscape Design Institute

**22nd August 2024
Revised 3rd September 2024**

Landscapes by Design and Tree Reports Melbourne

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I was contacted by you and asked to provide a Tree Management Plan for this property. I understand there is a proposal to develop the site as a childcare centre.

Background

We have an arborist report prepared by John Patrick Landscape Architects Pty Ltd June 2022 for the Victorian Civil and Administrative Tribunal 1457/2021 and Planning Permit P/2020/6347. It says 1.25 and 8.9 "Tree 15 within the western area of the subject site." It is not included in the Bushfire Management Plan but must be cut off to base habitat pruned and relocated on its side within the western area of the subject site. We have also read the Bushfire Management Plan by Terramatrix (v2.5) – 17-6-2024 and included trees to be retained and removed as per John Patrick Landscape Architects Revision D dated 30 November 2022. Prior to any works commencing and as per AS 4970 Protection of Trees on Development Sites (AS 4970) ...

The Trees

All trees to be retained must be protected with initial Tree Protection Fencing (TPF) installed as per our Tree Protection Plan Drawing (TPPD) prior to any works commencing at all. The site supervisor and initial contractors must meet with the Project Arborist (PA) on site prior to any works commencing.

Any new contractors engaged must be either briefed by the PA or by the site supervisor and given a copy of this TMP to read and be familiar with. Following all retained trees as per our TMP must be protected as per our TPPD and such protection left in place until construction is complete. During construction the PA must visit site at least once per month and update the PA document and TMP. Prior to the landscaping stage the landscape contractors must meet with the PA prior to their works commencing and not remove any Tree Protection unless supervised and instructed by the PA to do so. Any works to any surface within any Tree Protection Zone (TPZ) must be carried out by hand using as required non-destructive methods under the direct supervision of the PA. The PA must inspect the site following landscaping is complete and provide a Post Construction report in the PA document and TMP detailing any damage done to any tree, photographic evidence of such, any remediation works completed and photographs of every tree and provide such in writing to the relevant authority.



Tree 3 is a Messmate Stringybark which must be protected with Tree Protection Fencing (TPF) as per our TPPD.



Tree 4 a Swamp Gum must be protected with Initial Tree Protection Fencing and prior to construction works commencing with Secondary Tree Protection Fencing and mulching and planking as per our TPPD.



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Tree 5 green a Messmate must be protected as per Tree 3.



Trees 7 and 7A both Swamp Gums.

Tree 7 has a Tree Protection Zone (TPZ) area of 12.6 m2 and encroachment into TPZ of 2.1 m2 or 16.7 %.

Tree 7A has a TPZ area of 12.6 m2 and encroachment into TPZ of 3.9 m2 or 30.1 %.

Both encroachments are from the proposed retaining wall and exceed 10 % which is not acceptable as per AS 4970 and we have marked both for removal.



Trees 8 right and 9 both Messmate left must be protected as per Tree 4.

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Two preceding images and image left Trees 16C a Swamp Gum, 17 a Narrow leaved Peppermint, 18, 19 and 20 Swamp Gums, 21 and 22 Messmates, 23, 24 and 25 Swamp Gums and 26 a Narrow Leaved Peppermint all must be protected as per Tree 3.

Tree 28 is missing.



Tree 31 a Messmate must be protected as per Tree 4.

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Tree 34 a Messmate must be protected as per Tree 3.



Trees 38A orange and 38B green both Messmates must be protected as per Tree 3.



Trees 47 orange a Swamp Gum, 46A green a Swamp Gum 46B blue a Swamp Gum must be protected as per Tree 3.

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Tree 46C green a Black Wattle must be protected as per Tree 4 and 46D blue a Messmate must be protected as per Tree 3.



Trees 46E orange, 46F blue are Messmates and 46G blue a Swamp Gum must be protected as per Tree 3.



Trees 49 yellow a Blackwood, 50 orange a Swamp Gum, 51 green a Long Leaved Box and 52 blue a Long Leaved Box all must be protected as per Tree 3.

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Tree 53 a Black Wattle must be protected as per Tree 3.



Tree 53A a Swamp Gum must be protected as per Tree3.



Tree 54 a Messmate must be protected as per Tree 3.

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Tree 55 a Messmate must be protected as per Tree 3.

Tree 56 a Messmate is not included as it is external to the property and its TPZ is not within the property.

Tree Management Plan (TMP)

The approved TMP and TPPD must be available on site prior to the commencement of works including demolition unless. Demolition may or may not be required depending on the site.

It identifies key stages where monitoring and certification will be required.

Only works approved by the planning permit and endorsed plans are permitted. Any additional works must be approved prior by the Responsible Authority in writing.

A Project Arborist (PA) must be appointed and the name and contact details of the PA responsible for implementing the endorsed TMP must be submitted to the Responsible Authority (RA) in writing.

Prior to any works commencing including demolition, levelling of the site, excavations, tree removal, delivery of building/construction materials and/or temporary buildings all Tree Protection Fencing (TPF) mulching and Tree Protection Signage must be in place as per AS 4970 Protection of Trees on Development Sites (AS 4970) and our definitions following and recorded by the PA in writing. All of such must be maintained in good condition for the duration of the project and the mulch as required topped up to eliminate soil erosion from heavy rains if they occur. Given the existing conditions on site this will improve moisture content during warmer periods. Most trees to be retained are a good distance away from the proposed development footprint meaning there will be no adverse effects upon them as a result of changes to surface or ground water.

The PA must be suitably qualified in arboriculture and experienced in tree protection on development sites. The PA must hold a minimum AQF Level 5 in Arboriculture or equivalent with all works relating to trees carried out in accordance with the AS4970 or AS 4373 Pruning of Amenity Trees (AS4373).

The PA is responsible for monitoring and certifying details of what takes place on site with regard to the trees as per this TMP.

Any modification to the TMP must be approved by the PA, noted within the TMP and provided to the Responsible Authority within seven days and approved by the RA in writing.

Only works within the permit and endorsed plans are permitted. Any variations must be approved by the RA and supervised by the PA.

The TMP must be viewed by those in control of or involved in site or building works as an Occupational Health and Safety Plan for Trees or a Tree. This means all involved in the project and all workers engaged on the site and within the project must be inducted, instructed, educated, and continuously monitored to ensure the trees are protected.

The PA and site manager must work together, and the PA be engaged to always ensure through stages of the project the trees are not negatively impacted upon and adequately always protected.

A pre-demolition meeting if applicable and following a pre-construction meeting must be attended by the site manager, the PA and contractors to produce the TMP and its requirements.

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Following, at all times the site manager must ensure all future workers or others involved with the project are introduced to and understand the TMP or have the PA visit the site to brief them.

Each stage must have the tree management activities recorded and certified by the PA to the satisfaction of the RA.

Any removal or pruning of Council owned trees must be undertaken by a council approved contractor.

The RA must be notified in writing within 24 hours of any breach of the TMP or where damage has occurred to any protected tree.

Post holes for fencing within any TPZ of any trees including neighbouring must be either hand dug using non-destructive methods or excavated for using hydro excavation where any roots greater than 40mm diameter or a mass of fibrous roots are not damaged, the post location moved to be clear of such roots by at least 100 mm and such works must be supervised by the PA.

Any existing fencing within any TPZ deemed to be protecting any trees that is removed for any reason must be replaced immediately or mulching and planking installed as per AS 4970 and our Definitions following.

Any services to be located within a TPZ will either be located outside of a TPZ, bored under a TPZ to a minimum depth of 800 mm, or installed using hydro excavation under the supervision of the PA.

Any minor roots under 45 mm diameter uncovered during any stage of a project including demolition must be reported to the PA and under the PA's direct supervision pruned as per AS 4373 Pruning of Amenity Trees.

Any TPF, mulching and planking and tree protection signage must be maintained in good condition until the completion of the construction works on site to the satisfaction of the RA.

The RA must ensure all contractors, tradespersons including demolition workers who install services or work near trees to be retained are made aware of the need to preserve the trees and to minimize impacts on the trees through appropriate work practices.

There must be no works or excavation into any TPZ unless authorised in writing by the RA.

Any such works and all works within any TPZ must be supervised by the PA and carried out using non-destructive methods such as hydro excavation.

There is to be no vehicular or pedestrian access, trenching or soil excavation, storage or dumping of any soils, materials, equipment, vehicles, machinery or waste products, construction of entry and exit pits for underground services or any other actions or activities that may result in adverse impacts to any protected tree into any TPZ unless authorised in writing by the RA and supervised by the PA.

Any tree pruning required must be carried out by an arborist with at least AQF level 3 qualifications as per AS 4373 Pruning of Amenity Trees and detailed to the RA in writing prior to such works taking place. This includes any root pruning required which must be carried out or supervised by the PA as per AS 4373 and provide a detailed photographic diagram specifying what pruning will occur and be approved by the RA in writing.

The Final Certification Supervision Timetable as required in the TMP and TPPD must be completed and submitted to the satisfaction of the Responsible Authority before the occupation of the development and/or commencement of the use or at such later date as is approved by the Responsible Authority in writing.

Removal of protection works, and cessation of the TMP and TPPD must be authorised by the RA at completion of works in writing.

All tree protection works must be supervised and signed off as being complete by the PA.

Watering through the project duration must be carried out as per our Definitions following and any TPZ including signage and must be maintained as per AS 4970.

Alternate Protection Measures

At times during a project issues may arise where different tree protection measures may need to be used, such as mulching, planking, branch, trunk protection or a NDRI is required to be carried out if TPF is moved. Any such different tree protection measures must be as per AS 4970, and not carried out without written permission from the RA and supervised by the PA.

Engineered Footing Systems to Protect Trees

Where there are structures planned to be built within TPZs it is impossible without carrying out a Non-Destructive Root Investigation (NDRI) to ascertain what roots may be present within a TPZ that require protection

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Not sensitive footings (e.g. pier and beam, waffle slab, suspended slab, or cantilevered foundations) must be used within the Tree Protection Zone of all retained trees.

If alternative footings are required, they must be approved by the Responsible Authority in writing and may require supporting evidence such as a Non-Destructive Root Investigation.

Any footing within a TPZ must be lined with an impervious membrane to ensure no toxic substances can leach into the root system of a tree.

All excavations within Tree Protection Zones must be directly supervised by the PA and approved by the RA.

Landscaping and Hard Surfaces, Driveways Paths etc.

Following construction landscaping, hard surfaces, driveways paths etc. within any TPZ must be supervised by the PA with no excavation into any TPZ except when using non-destructive measures as per AS 4970 and approved by the RA in writing.

Hydrology

We note and reference the hydrology report by AS James Pty Ltd. The extent of excavation adjacent to trees being retained has been considered within this Tree Management Plan.

Project Arborist Name:

Contact Details:

Email:

Mobile:

Date Appointed:

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Final Certification Supervision Timetable

Stages of Development at which the PA must inspect Tree Protection Measures

<p>Site Establishment</p> <p>Prior to any works commencing TPF with tree protection signage stating Tree Protection Zone – Keep Out at maximum 3 metre centres must be installed as shown on the TPPD and mulching and planking where required. Following installation of these tree protection measures they must be inspected by the PA to ensure they are in place and protecting the trees adequately.</p> <p>PA required locate temporary infrastructure to minimize impact on retained trees.</p> <p>Certification of tree protection measures by PA and provide in writing to the RA.</p> <p>Signed by Project Arborist</p>	<p>Prior to works commencing through until all Tree Protection Methods are in place</p> <p>Date</p>
<p>Pre-Construction – Site Preparation</p> <p>Maintain protective measures which must be approved by the PA.</p> <p>Landscape plan must be checked for compliance with the TPPD by the PA if there is one.</p> <p>Small infrastructure removed by hand within any TPZ.</p> <p>Pruning for clearance if required as per AS 4373 Pruning of Amenity Trees 2007.</p> <p>TPF with signage at maximum 3 metre centres in place together with mulching if required must be in place.</p> <p>Building materials storage areas identified and marked on plans.</p> <p>Site excavation within TPZs completed under supervision of PA.</p> <p>Certification of tree protection measures by PA and provide in writing to the RA.</p> <p>Signed by Project Arborist</p>	<p>Following Site Establishment prior to construction</p> <p>Date</p>
<p>Demolition</p> <p>Project Arborist must supervise demolition.</p> <p>TPF with signage at maximum 3 metre centres together with mulching if required must be in place.</p> <p>Demolition can be carried out.</p> <p>If machinery is used to carry out or help with the demolition, a "long armed" machine such as an excavator must be used that can stand outside any TPZ to carry out any works.</p> <p>Any works within a TPZ must be carried out by hand if possible and must be supervised by the PA in coordination with the site manager and any workers or others involved.</p> <p>Certification of tree protection measures by PA and provide in writing to the RA.</p> <p>Signed by Project Arborist</p>	<p>Date</p>
<p>Construction</p> <p>Initial induction meeting with PA and project principal / supervisor must be carried out.</p> <p>Irrigation if required for protected trees must be installed if specified.</p> <p>Inspection commenced which must be recorded in Project Arborist Notes 4 to 6 Week Inspection Cycles following.</p> <p>Prior to any construction works commencing Secondary TPF, mulching and planking must be installed if required as defined and approved by the PA.</p> <p>All workers must be briefed by the PA and / or site manager to be careful they do not spill or allow any deleterious substances into the root zone of any tree and to not enter a TPZ without permission from the PA.</p> <p>When it is necessary to modify the position of TPF to allow any works within a TPZ, such must be supervised by the PA and comply with AS 4970 and our definitions following, and that information provided to the RA in writing.</p> <p>Any services must be located outside of any TPZ or located using hydro excavation or bored under any TPZ to a minimum depth of 800 mm and prior approved by the RA in writing.</p> <p>Certification of tree protection measures by PA and provide in writing to the RA.</p> <p>Signed by Project Arborist</p>	<p>Date</p>
<p>Post Construction</p> <p>Once construction is completed there may be other activities on the site such as landscaping.</p> <p>The landscaping supervisor must be inducted by the PA prior to landscaping commencing.</p> <p>Given the trees' locations any other works such as landscaping must be supervised by the PA. The landscape plan must be checked for compliance with the TPPD by the PA if there is one prior to works commencing.</p> <p>Installation of irrigation services, control of compaction work, installation of pavement, retaining walls and anything else that could impact upon protected trees must be supervised by the PA.</p> <p>Following also supervised by PA; remove selected protective measures as necessary, carry out remedial tree works.</p> <p>Certification of tree protection measures by PA and provide in writing to the RA including project completion details.</p> <p>Signed by Project Arborist</p>	<p>Date</p>
<p>Final Certification</p> <p>The PA must assess the condition of trees and make recommendations for any necessary remedial actions.</p> <p>Following the PA must certify (as appropriate) that the completed works have been carried out in compliance with the approved plans and specifications for tree protection and provide to RA in writing.</p> <p>Statement to be provided by PA to include but not be limited to the condition of the retained trees, details of any deviations from the approved tree protection measures and their impacts on trees. Copies of all monitoring documentation must be provided to the RA in writing within one week of project completion.</p> <p>Signed by Project Arborist</p>	<p>Date</p>

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Project Arborist Notes

Date	Stage	Note



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Tree Legend

Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) are mm radius from Centre of Trunk

No	Botanical Name	Common Name	Origin	Height	Canopy	DBH @ 1.4 m	TPZ	DAB	SRZ	Condition	SULE	Form	Structure	Age
1	Eucalyptus ovata	Swamp Gum	Native	16000	8000	480	5760	300	1996	Poor	Removal	Poor	Poor	Mature
2	Eucalyptus obliqua	Messmate	Native	10000	8000	566	6792	300	1996	Poor	Removal	Poor	Poor	Over Mature
3	Eucalyptus obliqua	Messmate	Native	7000	5000	224	2688	300	1996	Average	Medium (16-39 yrs)	Average	Good	Semi Mature
4	Eucalyptus ovata	Swamp Gum	Native	9000	10000	396	4752	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Mature
5	Eucalyptus obliqua	Messmate	Native	10000	10000	721	8652	300	1996	Poor	Removal	Poor	Poor	Over Mature
5A	Eucalyptus ovata	Swamp Gum	Native	7000	4000	150	2000	300	1996	Average	Medium (16-39 yrs)	Average	Good	Semi Mature
6	Eucalyptus obliqua	Messmate	Native	6000	4000	150	2000	300	1996	Average	Medium (16-39 yrs)	Average	Good	Semi Mature
7	Eucalyptus ovata	Swamp Gum	Native	7000	5000	150	2000	300	1996	Average	Removal	Average	Good	Semi Mature
7A	Eucalyptus ovata	Swamp Gum	Native	7000	5000	150	2000	300	1996	Average	Removal	Average	Good	Semi Mature
8	Eucalyptus obliqua	Messmate	Native	10000	8000	300	3600	300	1996	Average	Medium (16-39 yrs)	Poor	Poor	Mature
9	Eucalyptus obliqua	Messmate	Native	12000	8000	600	7200	300	1996	Average	Medium (16-39 yrs)	Average	Average	Mature
10	Eucalyptus ovata	Swamp Gum	Native	10000	4000	180	2160	300	1996	Poor	Removal	Poor	Poor	Semi mature
11	Eucalyptus ovata	Swamp Gum	Native	12000	2000	180	2160	300	1996	Poor	Removal	Poor	Poor	Young
12	Eucalyptus ovata	Swamp Gum	Native	15000	6000	500	6000	300	1996	Poor	Removal	Poor	Poor	Young
13	Eucalyptus ovata	Swamp Gum	Native	15000	7000	357	4284	300	1996	Poor	Removal	Poor	Poor	Over mature
14	Eucalyptus ovata	Swamp Gum	Native	15000	7000	388	4656	300	1996	Poor	Removal	Poor	Poor	Over mature
14A	Eucalyptus ovata	Swamp Gum	Native	2000	1000	150	2000	300	1996	Poor	Removal	Poor	Poor	Young
15	Eucalyptus ovata	Swamp Gum	Native	15000	12000	150	2000	300	1996	Poor	Removal	Poor	Poor	Young
15A	Eucalyptus ovata	Swamp Gum	Native	7000	1000	150	2000	300	1996	Average	Removal	Poor	Poor	Young
15B	Eucalyptus ovata	Swamp Gum	Native	6000	2000	150	2000	300	1996	Average	Removal	Poor	Poor	Young
16	Eucalyptus ovata	Swamp Gum	Native	8000	6000	600	7200	300	1996	Average	Removal	Poor	Poor	Young
16A	Eucalyptus cinerea	Argyle Apple	Native	6000	2000	150	2000	300	1996	Average	Removal	Poor	Poor	Young
16B	Eucalyptus ovata	Swamp Gum	Native	5000	2000	150	2000	300	1996	Average	Removal	Poor	Poor	Young
16C	Eucalyptus ovata	Swamp Gum	Native	8000	4000	150	2000	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Mature
16D	Eucalyptus ovata	Swamp Gum	Native	9000	3000	150	2000	300	1996	Average	Removal	Poor	Poor	Young
17	Eucalyptus radiata	Narrow Leaved Peppermint	Native	7000	5000	180	2160	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Young
18	Eucalyptus ovata	Swamp Gum	Native	8000	3000	150	2000	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Young
19	Eucalyptus ovata	Swamp Gum	Native	9000	4000	260	3120	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Young
20	Eucalyptus ovata	Swamp Gum	Native	8000	6000	260	3120	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Young
21	Eucalyptus obliqua	Messmate	Native	15000	6000	310	3720	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Young
22	Eucalyptus obliqua	Messmate	Native	20000	12000	600	7200	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Young
23	Eucalyptus ovata	Swamp Gum	Native	10000	5000	287	3444	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Young
24	Eucalyptus ovata	Swamp Gum	Native	7000	5000	216	2592	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Young
25	Eucalyptus ovata	Swamp Gum	Native	12000	6000	341	4092	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Mature
26	Eucalyptus radiata	Narrow Leaved Peppermint	Native	8000	9000	499	5988	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Mature
27	Eucalyptus ovata	Swamp Gum	Native	7000	6000	206	2472	300	1996	Average	Removal	Poor	Poor	Young
29	Eucalyptus ovata	Swamp Gum	Native	7000	6000	212	2544	300	1996	Average	Removal	Poor	Poor	Young
30	Eucalyptus obliqua	Messmate	Native	10000	7000	501	6012	300	1996	Average	Removal	Poor	Poor	Over Mature
31	Eucalyptus obliqua	Messmate	Native	17000	6000	800	9600	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Over Mature
32	Eucalyptus ovata	Swamp Gum	Native	9000	7000	432	5184	300	1996	Average	Removal	Poor	Poor	Young
32A	Eucalyptus obliqua	Messmate	Native	9000	3000	160	2000	300	1996	Good	Removal	Average	Average	Young
33	Eucalyptus ovata	Swamp Gum	Native	6000	3000	47	2000	300	1996	Average	Removal	Poor	Poor	Young
34	Eucalyptus obliqua	Messmate	Native	12000	7000	393	4716	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Mature
35	Eucalyptus obliqua	Messmate	Native	12000	6000	300	3600	300	1996	Average	Removal	Poor	Poor	Young
36	Eucalyptus ovata	Swamp Gum	Native	4000	3000	47	2000	300	1996	Average	Removal	Poor	Poor	Young
37	Eucalyptus obliqua	Messmate	Native	9000	7000	304	3648	300	1996	Average	Removal	Poor	Poor	Semi Mature
38	Eucalyptus obliqua	Messmate	Native	9000	6000	320	3840	300	1996	Average	Removal	Poor	Poor	Young
38A	Eucalyptus obliqua	Messmate	Native	10000	3000	180	2160	300	1996	Average	Medium (16-39 yrs)	Average	Good	Mature
38B	Eucalyptus obliqua	Messmate	Native	8000	2000	150	2000	300	1996	Average	Medium (16-39 yrs)	Average	Average	Semi Mature
39	Eucalyptus obliqua	Messmate	Native	8000	6000	300	3600	300	1996	Average	Removal	Poor	Poor	Semi Mature
40	Eucalyptus obliqua	Messmate	Native	12000	7000	460	5520	300	1996	Average	Removal	Poor	Poor	Semi Mature
41	Eucalyptus ovata	Swamp Gum	Native	10000	3000	170	2040	300	1996	Average	Removal	Poor	Poor	Young
41A	Eucalyptus ovata	Swamp Gum	Native	10000	4000	21	2000	300	1996	Average	Removal	Poor	Poor	Young
42	Eucalyptus obliqua	Messmate	Native	7000	3000	250	3000	300	1996	Average	Removal	Poor	Poor	Young
43	Eucalyptus ovata	Swamp Gum	Native	13000	6000	383	4596	300	1996	Average	Removal	Poor	Poor	Semi Mature
43A	Eucalyptus obliqua	Messmate	Native	8000	8000	300	3600	300	1996	Average	Removal	Poor	Poor	Semi Mature
44	Eucalyptus ovata	Swamp Gum	Native	8000	8000	299	3588	300	1996	Average	Removal	Poor	Poor	Semi Mature
45	Eucalyptus ovata	Swamp Gum	Native	12000	8000	379	4548	300	1996	Average	Removal	Poor	Poor	Semi Mature
45A	Eucalyptus obliqua	Messmate	Native	10000	6000	312	3744	300	1996	Average	Removal	Poor	Poor	Semi Mature
46	Eucalyptus obliqua	Messmate	Native	7000	5000	280	3360	300	1996	Average	Medium (16-39 yrs)	Average	Good	Semi Mature
46A	Eucalyptus ovata	Swamp Gum	Native	12000	6000	250	3000	300	1996	Average	Medium (16-39 yrs)	Poor	Poor	Semi Mature
46B	Eucalyptus ovata	Swamp Gum	Native	9000	4000	180	2160	300	1996	Average	Medium (16-39 yrs)	Average	Good	Semi Mature
46C	Acacia mearnsii	Black Wattle	Native	7000	7000	234	2808	300	1996	Average	Short (5-15 yrs)	Average	Average	Mature
46D	Eucalyptus obliqua	Messmate	Native	8000	4000	230	2760	300	1996	Average	Medium (16-39 yrs)	Average	Good	Semi Mature
46E	Eucalyptus obliqua	Messmate	Native	14000	7000	361	4332	300	1996	Average	Medium (16-39 yrs)	Average	Good	Semi Mature
46F	Eucalyptus obliqua	Messmate	Native	14000	3000	150	2000	300	1996	Average	Medium (16-39 yrs)	Average	Good	Semi Mature
46G	Eucalyptus ovata	Swamp Gum	Native	14000	2000	150	2000	300	1996	Average	Medium (16-39 yrs)	Average	Good	Semi Mature
46H	Eucalyptus obliqua	Messmate	Native	7000	4000	160	2000	300	1996	Average	Medium (16-39 yrs)	Average	Good	Semi Mature
47	Eucalyptus ovata	Swamp Gum	Native	12000	8000	300	3600	300	1996	Average	Medium (16-39 yrs)	Average	Good	Semi Mature
49	Acacia melanoxylon	Blackwood	Native	8000	5000	150	2000	300	1996	Poor	Short (5-15 yrs)	Poor	Poor	Semi Mature
50	Eucalyptus ovata	Swamp Gum	Native	13000	9000	354	4248	300	1996	Poor	Short (5-15 yrs)	Poor	Good	Semi Mature
51	Eucalyptus gonicalyx ?	Long Leaved box	Native	8000	5000	200	2400	300	1996	Average	Medium (16-39 yrs)	Average	Good	Young
52	Eucalyptus gonicalyx ?	Long Leaved box	Native	12000	4000	200	2400	300	1996	Average	Medium (16-39 yrs)	Average	Average	Semi Mature
53	Acacia mearnsii	Black Wattle	Native	16000	10000	400	4800	300	1996	Average	Short (5-15 yrs)	Poor	Poor	Mature
53A	Eucalyptus ovata	Swamp Gum	Native	12000	6000	200	2400	300	1996	Average	Medium (16-39 yrs)	Average	Average	Semi Mature
54	Eucalyptus obliqua	Messmate	Native	18000	8000	600	7200	300	1996	Average	Medium (16-39 yrs)	Average	Good	Mature
55	Eucalyptus obliqua	Messmate	Native	10000	8000	250	3000	300	1996	Average	Medium (16-39 yrs)	Average	Good	Mature
56	Eucalyptus obliqua	Messmate	Native	17000	12000	600	7200	300	1996	Average	Medium (16-39 yrs)	Average	Good	Mature
57	Eucalyptus obliqua	Messmate	Native	1000	1000	100	2000	300	1996	Average	Removal	Poor	Poor	Young
58	Eucalyptus obliqua	Messmate	Native	1000	1000	100	2000	300	1996	Average	Removal	Poor	Poor	Young



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Definitions - As per Australian Standard 4970 – 2009 – Protection of Trees on Development Sites (AS 4970):

AS 4970 Defines a Trees as ...

1.4.6 Tree Long lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks (or as defined by the determining authority).

Therefore, unless otherwise required by the determining authority or if it is neighbouring and could be impacted upon, we do not include any plants under this size.

Determining the Tree Protection Zone (TPZ)

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. TPZ = DBH x 12

Where - DBH = trunk diameter measured at 1.4 metres above ground; radius is measured from the centre of the stem at ground level.

TPZ should not be less than 2 metres and no greater than 15 metres except where crown protection is required. Some instances may require variations to the TPZ.

The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 metre outside the crown projection.

This area is an estimate of the space required to maintain the health of a tree long term. It is entirely possible to work inside this Zone providing the care is exercised according to AS 4970.

Determining the Structural Root Zone (SRZ)

The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree. The SRZ only needs to be calculated when major encroachment into a TPZ is proposed.

There are many factors that affect the size of the SRZ; e.g. tree height, crown area, soil type, soil moisture etc. The SRZ may also be influenced by natural or built structures, such as rocks and footings. An indicative SRZ radius can be determined from the trunk diameter measured immediately above the root buttress using the following formula:

$$SRZ\ radius = (D \times 50)0.42 \times 0.64$$

Where - D = trunk diameter, in m, measured above the root buttress.

The SRZ for trees with trunk diameters less than 0.15m will be 1.5m.

It needs to be emphasised that this is an indicative calculation which generalizes all the conditions influencing the estimate. SRZ is often less than the indicated calculation. An Exploratory Root Excavation (ERE) or root investigation according to AS 4970 may provide more information on the extent of these roots.

TPZ and SRZ Encroachment

Any encroachment into TPZ should be advised and supervised by a qualified Arborist

AS 4970 says:

3.3 Minor encroachment

If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ detailed root investigations should not be required.

The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.

AS 4970 also says:

3.4 TPZ encroachment considerations

When determining the potential impacts of encroachment into the TPZ, the project arborist should consider the following:

(a) Location and distribution of the roots to be determined through non-destructive investigation methods (pneumatic, hydraulic, hand digging or ground penetrating radar). Photographs should be taken, and a root zone map prepared.

NOTE: Regardless of the method, roots must not be cut, bruised, or frayed during the process.

It is imperative that exposed roots are kept moist, and the excavation back filled as soon as possible.

The potential loss of root mass resulting from the encroachment: number and size of roots.

(b) Tree species and tolerance to root disturbance.

(c) Age, vigour, and size of the tree.

(d) Lean and stability of the tree.

NOTE: Roots on the tension side are likely to be most important for supporting the tree and are likely to extend for a greater distance.

(e) Soil characteristics and volume, topography and drainage.

(f) The presence of existing or past structures or obstacles affecting root growth.

(g) Design factors.

Tree sensitive construction measures such as pier and beam, suspended slabs, cantilevered building sections, screw piles and contiguous piling can minimize the impact of encroachment.



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When siting a structure near to a tree, the future growth of the tree, both above and below ground should be taken into account. Precautions should be taken at the planning and design stage to minimize potential conflict between trees and new structures. When the root zone is reactive clay, techniques such as localized pier and beam (bridged), screw pile footings or root and soil moisture control barriers may be appropriate to minimize effects on structures.

NOTE: Collaboration may be required between the project arborist and the geotechnical or structural engineer.

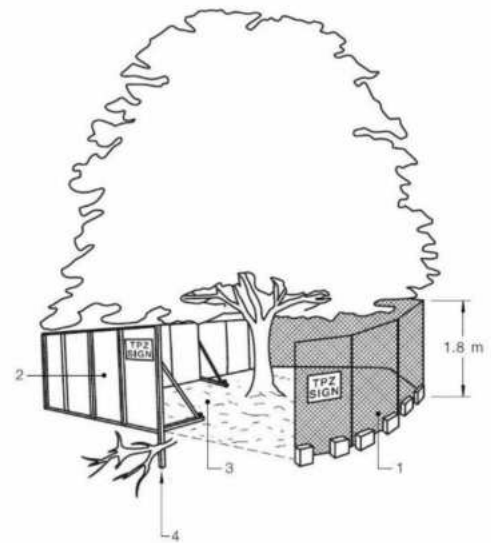
Landscapes by Design believes it is vital to ensure that construction is strong enough to withstand any encroachment by the tree as it grows. Proactive measure like root control barriers and moisture barriers before trees grow to maximum size may be considered.

Tree Protection Fencing

The image to the right provides an example of suitable protective fencing:

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. Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.



Tree Protection Fencing must be erected prior to any works of any nature commencing and before any machinery or materials are brought onto the site. Once erected this protective fencing must not be removed or altered until such time as all works associated with the construction are complete, unless approved and supervised by an Arborist.

Fencing must have signs attached to it saying "Tree Protection Zone – Stay Out" at maximum 2.4 metres centres or on each panel.

Immediately following erection of the Tree Protection Fencing, the Tree Protection Zones are to be weeded and then mulched with 75 mm depth of mulch or similar, that has been aged for at least 12 weeks.

No trenching or excavation is to occur within this Tree Protection Zones. If underground services must be routed within the TPZ, they should be installed by directional drilling or in manually excavated trenches. The directional drilling bore should be at least 600 mm deep. The project arborist should assess the likely impacts of boring and bore pits on retained trees. A NDRI may assist in this case. See Later section.

The Tree Protection Fencing Zone should be secured to restrict access.

AS 4687 – Temporary Fencing and Hoardings specifies applicable fencing requirements. Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter, and liquids into the protected area.

Fence posts and supports should have a diameter greater than 20 mm and be located clear of roots.

Existing perimeter fencing and other structures may be suitable as part of the protective fencing.

It is necessary to remove the Tree Protection Fencing to allow works to be carried out it must be reinstated daily immediately following completion of works. If works are carried out within the Tree Protection Zones, this work must be supervised by an Arborist. During required work suitable planking should be laid within the Tree Protection Zone to protect against compaction to the roots of the tree / trees from workers and vehicles. It is recommended that machinery does not enter the Tree Protection Zone (see 4.2 from AS 4970 below: "Activities generally excluded"), however rumble boards, plates, or sheets of heavy-duty materials over mulch and an impervious membrane must be used if vehicles need to move through the zone. Excavation can be carried out by machine using skilled operators briefed by and observed by an Arborist. Excavators should be operated and if possible, with the vehicle located outside the TPZ with its arm moving within it. In the case of a NDRI being conducted the workmen and their equipment are only in the area for a short time however extreme care must be taken to protect the trunk, canopy, and roots of the tree/s.



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Irrigation

During warmer periods the Tree Protection Zones should be irrigated with 1 litre of clean water for every 1 cm of trunk girth measured at the soil / trunk interface on a weekly basis.

Persons, vehicles or machinery are to enter the Tree Protection Zones unless authorised to do so, preferably with permission from the Determining Authority.

Fuel, oil dumps or chemicals are allowed to be used or stored within the Tree Protection Zones; the servicing and refuelling of equipment and vehicles must be carried out away from the TPZ; no storage of material or equipment is to take place within them; nothing whatsoever, including temporary services wires, nails, screws or any other fixing device, is to be attached to any tree.

Activities Restricted Within TPZ

Activities generally excluded from the TPZ include but are not limited to — (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) refuelling.

(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, and

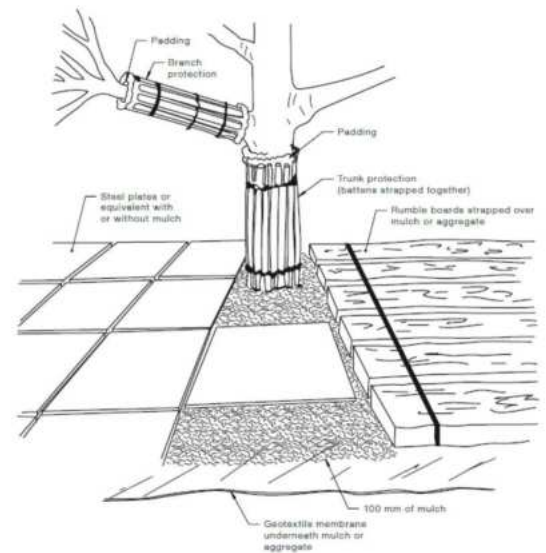
(n) physical damage to the tree

Non-Destructive Root Investigation (NDRI)

A NDRI according to AS 4970 may be conducted to provide more information on the extent of a tree's SRZ or encroachment over 10% into TPZ. The SRZ is an indicative measure, and the actual positions and extent of the roots can only be determined by an investigation. A trench is carefully excavated along a pre-determined line (for example, the edge of a proposed slab or decking posts) to a depth of at least 650 mm and no more than 300 mm wide. If roots are located, they must be carefully exposed without any damage to the root. The position and size of any roots found can be photographed, recorded and mapped. If there are too many large roots or root mats found the Arborist may decide to move the trench further from centre of trunk. A NDRI may indicate that a building can or cannot be placed in the proposed location, or that piers/stumps can be placed between roots, or that roots are not extending far enough to directly damage a building/path/pipe. The NDRI map may lead to design and engineering changes to enable a building, extensions, or earthworks that encroach into the TPZ, to proceed or be moved. Where possible the trenching is done by hand but there are times when machinery or water pressure excavation can be used under the supervision of an Arborist.

Trunk and Branch Protection

Trees impacted upon by construction works should be protected as per the Sketch 1 below. It is suggested that suitable rubberised padding material be used under 75 by 50 hardwood timber which is strapped with galvanised tin strapping approximately 30 mm wide at 900 mm spacing from bottom of trunk upwards and nailed or screwed to the hardwood timber with 25 mm long galvanised fasteners. The rubberised padding material should be perforated to allow air to the trunk, and not soak water into itself. No nails or screws are to enter the tree trunk or branches and care must be taken to ensure that no materials bite into the tree surface and scar or damage its surface in any way.



Ground Protection

The planking to the right in the sketch following is an example of the planking that could be used. If temporary access for machinery is required within the TPZ, ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Measures should include a permeable membrane such as

Geotextile fabric beneath a layer of mulch or crushed rock, below rumble boards as per sketch 1. Rubber matting and packing plywood may also be used. Under this planking or sheeting within the TPZ, a 75 mm layer of leaf mulch or similar, aged for at least 12 weeks and proven to contain no toxic substances must be installed. These measures may also be applied to root zones beyond the TPZ. Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.



Root Protection during Works within the TPZ

Some approved works within the TPZ, such as regrading, installation of piers or landscaping may have the potential to damage roots. If the grade is to be raised the material should be coarser or more porous than the underlying material. Depth and compaction should be minimized.

Manual excavation is the preferred method and should be carried out under the supervision of an arborist to identify roots critical to tree stability and determine the actual extent of the SRZ. A NDRI may be used with photographs and maps to serve as a guide for designers and workers.

Relocation or redesign of construction works may be required. (See preceding section)

Where the project arborist identifies roots to be pruned within or at the outer edge of the TPZ, they should be pruned with a final cut back to undamaged wood. Pruning cuts should be made with sharp tools such as secateurs, pruners, handsaws or chainsaws. Pruning wounds should not be treated with dressings or paints. It is not acceptable for roots within the TPZ to be 'pruned' with machinery such as backhoes or excavators.

Where roots within the TPZ are exposed by excavation, temporary root protection should be installed to prevent them drying out. This may include wire mesh or hessian sheeting as multiple layers over exposed roots and excavated soil profile, extending to the full depth of the root zone. Root protection sheeting should be pegged in place and kept moist during the period that the root zone is exposed.

Other excavation works in proximity to trees, including landscape works such as paving, irrigation and planting can adversely affect root systems. The project arborist should be consulted and supervise any works.

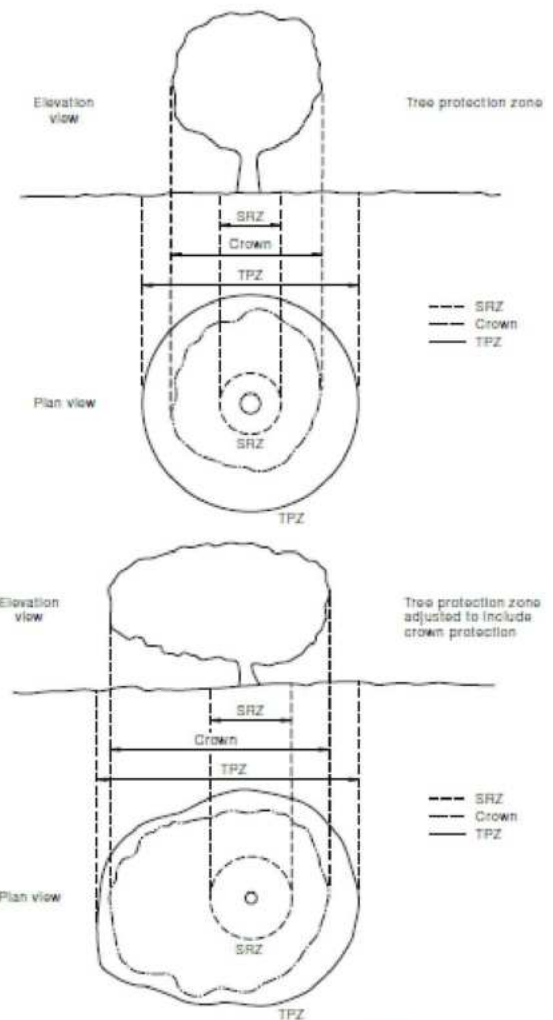
TPZ Encroachment Over 10%

If the proposed building footprint encroaches into the TPZ more than 10%; either the building footprint will have to change to reduce the encroachment to 10% or a NDRI could be carried out by an Arborist to determine the exact location of any roots present. Prior to a NDRI make certain to contact the Determining Authority to see if permission is required. If roots are discovered belonging to the tree that are under 40 mm diameter, they could be cut by an arborist to allow either the entire building footprint to be accommodated, or if that is not possible, a smaller redesigned building footprint to be accommodated. If the TPZ is varied following a NDRI (as per AS 4970) room must be allowed for the lost area to be compensated elsewhere. Roots greater than 40 mm diameter and fibrous root mats or clumps greater than 50mm diameter should not be cut but need to be worked around. A well-qualified arborist may cut a root greater than 40 mm diameter, but not greater than 100 mm diameter unless given permission to cut from the Determining Authority.

Alternatively, if a NDRI shows it is impossible to vary the TPZ, alternative "tree friendly" construction methods could be employed, such as installing a building slab above grade, pier, and beam methods, or building on stumps. Piers and stumps can be relocated to avoid damage to any significant roots discovered by the NDRI. These alternative building methods should be specified by a suitably qualified person.

Crown Protection

The crowns may be injured by machinery such as excavators, drilling rigs, cranes, trucks, hoarding installation and scaffolding. The TPZ may need to include additional protection of above ground parts of the tree. Where crown protection is required, it will usually be located at least one metre outside the perimeter of the crown (see Figure 2). The erection of scaffolding may require an additional setback from the edge of the crown. Crown protection may include pruning, tying-back of branches or other measures. If pruning is required, requirements are specified in AS 4373 and should be undertaken before the establishment of the TPF. NOTE: Pruning may require approval from the Determining Authority. See following section on



NOTE: Refer to Clause 3.2 for calculation of TPZ.
 FIGURE 2 INDICATIVE TREE PROTECTION ZONE



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Installing Underground Services within TPZ

Services should be routed outside the TPZ. If underground services must be routed within the TPZ, they should be installed by directional drilling or in manually excavated trenches. The directional drilling bore should be at least 600 mm deep. The project arborist should assess the likely impacts of boring and bore pits on retained trees.

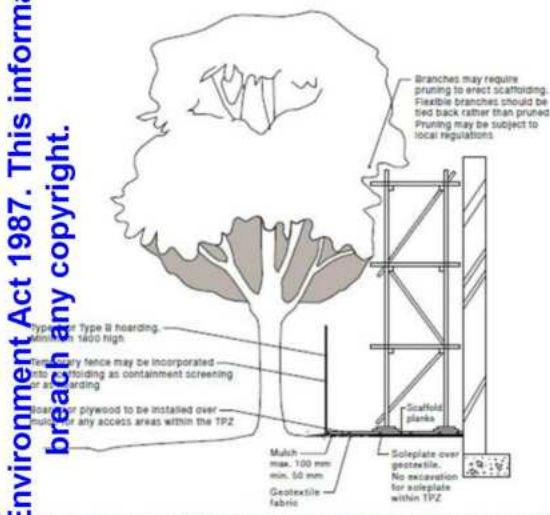
For manual excavation of trenches, the project arborist should advise on roots to be retained and should monitor the works. Manual excavation may include the use of pneumatic and hydraulic tools.

Pruning and Removal of Trees

If pruning is required, it should be carried out in accordance with Australian Standard 4373 - Pruning of Amenity Trees (AS4373) and any root pruning also as per AS 4973 - Specialist advice from a person with a minimum AQF Level 4 in Arboriculture should be sought before any root pruning occurs.

For or to the pruning of or removal of any tree the Determining Authority, usually the local council must be consulted to be certain the pruning or removal is allowed by them and is lawful.

Many development seek approval for tree removal and encroachment into the TPZ of trees from the Determining Authority; before planning or building preparation and drawings are completed. This is to ensure that building or other drawings are not prepared based on this report, when a relevant Determining Authority does not allow the trees nominated in our report to be removed, or their TPZ's encroached into.



NOTE: Excavation required for the insertion of support posts for tree protection fencing should not involve the severance of any roots greater than 20 mm in diameter, without the prior approval of the project arborist.

FIGURE 5 INDICATIVE SCAFFOLDING WITHIN A TPZ

Scaffolding

Where scaffolding is required, it should be erected outside the TPZ. Where it is essential for scaffolding to be erected within the TPZ, branch removal should be minimized. This can be achieved by designing scaffolding to avoid branches or tying back branches.

Where pruning is unavoidable it must be specified by the project arborist in accordance with AS 4970 and 4373.

NOTE: Pruning works may require approval by the determining authority.

Ground below the scaffolding should be protected by boarding (e.g. scaffold board or plywood sheeting) as shown in Trunk and Branch Protection earlier. Where access is required, a board walk, or other surface material should be installed to minimize soil compaction. Boarding should be placed over a layer of mulch and impervious sheeting to prevent soil contamination. The boarding should be left in place until the scaffolding is removed.

There is a risk of materials falling off the scaffold decking and into the TPZ, damaging the tree. Care must be exercised, and solid walls or mesh barriers be installed on any scaffolding over the TPZ.

Impervious membrane, mulch, boards or plywood must be used under the scaffold soleplates and no excavation is to be performed for the soleplates. It may be possible to erect secondary fencing inside the general TPZ fencing to further protect the tree from damage.

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Our Definitions:

Origin	Where the species originates from.
Category	Description
Not Set	Not reported
Endemic	A native to Australia that occurs naturally but only to that local area.
Native	Occurs naturally within Australia and its territories.
Exotic	Occurs naturally outside of Australia and its territories.
Indigenous	A native to Australia that occurs naturally in the local area and other places.
SULE	Safe Useful Life Expectancy
Category	Description
Not Set	Not reported.
Long (40+ yrs)	Expected to live over 40 years.
Medium (16-39 yrs)	Expected to between 16 and 39 years.
Short (5-15 yrs)	Expected to between 5 and 15 years.
Removal	We recommend removal of this tree.
Significance	The landscape value of the tree
Category	Description
Not Set	Not reported.
Most Significant	The most significant tree within the tree data collection area. Does not mean "Significant" as determined by the Relevant Authority.
Highly Significant	A tree deemed to be a good representative of its species and advantageous to the tree data collection area.
Less Significant	Not deemed to share the values of Most or Highly but may be suitable for retention determined by tree data collection area requirements.
Least Significant	Old in poor condition declining and really not suitable for retention.
Hazardous	A tree that may fail, is likely to fail and dependent upon report type may trigger a Hazard Tree Assessment.

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Condition	The overall condition or health of the tree.
Form	The general shape of the tree as usually exhibited by this species
Structure	Is the tree sound and well-formed for the species?
Vigour	Is the tree growing well with good leaf cover if not deciduous during winter?
Category	Description
Not Set	Not reported.
Excellent	Excellent example of the species pertaining to that criteria.
Good	Good example of the species pertaining to that criteria. It could be better.
Average	Canopy that is not full with some pathogen damage, visible amounts of deadwood, may contain epicormic growth and may require arboricultural work, feeding and the like.
Poor	Poor example of the species pertaining to that criteria and may be better removed.
Retention Value	Is the tree suitable for retention?
Category	Description
Not Set	Not reported.
High	The tree should be retained if possible even if that means project modification or room retained for tree to grow into the future.
Moderate	The tree is suitable for retention, but other factors may mean it can be removed.
Low	The tree can be considered for removal. It has low intrinsic value and or not suitable for retention.
Neighbouring	The tree is neighbouring or external to the tree data collection site but must be considered if it could be impacted upon as per AS 4970 protection of Development Sites criteria for protection.
Council	Same as neighbouring but the responsibility of the Relevant Authority.
Hazardous	A tree that may fail, is likely to fail and dependent upon report type may trigger a Hazard Tree Assessment.
Age	The age of the tree
Category	Description
Not Set	Not reported.
Young	Tree is still small or juvenile.
Semi Mature	The tree has not reached it full mature or expected maximum size for its species.
Mature	The tree has not reached it full mature or expected maximum size for its species.
Over Mature	Old in poor condition declining and really not suitable for retention.

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Definitions - Terms:

Acute Branch Crotch – Angle on the inner side of the branch crotch is less than 90 degrees.

Apical Dominance - the main central stem of the plant is dominant over the other branches.

Bacterial Wet Wood - is a bacterial disease of certain trees, primarily elm, cottonwood, poplar, boxelder, ash, aspen, fruitless mulberry and oak.

Branch Union – point where a branch originates from the trunk or another branch; may be referred to as a crotch.

Bracket Fungi or Shelf Fungi - are the fruiting structures of many different fungi that cause heartwood decay in standing trees.

Co-dominant Stems – Co-dominant stems are two stems or trunks of equal size that develop from 2 apical buds at the tip of the same stem. Each

co-dominant stem is a direct extension of the stem below its origin. There are no branch collars or trunk collars at the base of co-dominant stems'

(Dr Alex Shigo) – Similar to **Bi-furcated** meaning two, **Tri-furcated** meaning three and **Quadrifurcated** meaning four.

Compartmentalise – (CODIT: Compartmentalization of Decay in Trees. Dr Alex Shigo) natural process of defence in trees by which they wall off decay in wood and heal wounds.

Crown Gall - plant disease probably caused by the bacteria or invasion of some sort into the tree

Dead Wooding - Removal of dead, dying and diseased branches throughout the crown.

Decurrent – growth habit developing a more rounded form with multiple scaffold branches

Determining / Relevant Authority – Usually refers to the Council responsible for the property being assessed but includes any government or semi-governmental authority that has control or liability under common law, and the role to encourage and enforce the developmental process including legislation relating to trees and plants.

Epicormic Shoots - An epicormic shoot is a shoot growing from an epicormic bud which lies underneath the bark of a trunk, stem, or branch of a plant. In older wood, epicormic shoots can result from severe defoliation or radical pruning.

Etiolation - is a process in plants grown in partial or complete absence of light. It is characterized by long, weak stems; smaller, sparser leaves due to longer internodes; and a pale-yellow colour (chlorosis).

Excurrent - growth habit with pyramidal crown and a central leader

Fall Zone – area under a tree or adjacent to it where if it failed it could impact upon.

Fines - Granular wood particles produced by borer insects that can be fine, medium, or coarse depending on the type of insect.

Flush Cut - Pruning technique in which both branch and stem tissue are removed; generally considered poor practice. Flush cuts can allow decay to enter back into the main trunk or branch.

Gall - abnormal outgrowth of tissues and can be caused by various parasites, from fungi and bacteria to insects and mites. Sometimes called a burl.

Ground Heaving – ground lifting or heaving as the root plate of a trees moves.

Hedges – Have a minimum TPZ and SRZ respectively of 2 and 1.5 metres from centre of trunk and neighbouring that could be impacted are assessed.

Included Bark - bark that becomes embedded in a crotch between branch and trunk or Co-Dominant Stems and causes a weak structure.

Indigenous – a plant occurring naturally in the area or region of the subject site.

Leak - Sap oozing from a tree caused by structural damage and / or disease or pests.

Late Growth – growth formed later in a tree's life cycle with perhaps poor attachment.

Obtuse Branch Crotch – where the angle on the inner side of the union is greater than 90 degrees.

Phototropism or Phototropic Lean - is the phenomenon in which plants follow or grow towards a light source, most commonly the sun.

Picus Tomograph - used for tree risk assessments in order to measure the thickness of the residual wall of trees with internal defects such as cavities or decay non-invasively with sound waves sent through the tree.

Reaction Wood - tree wood formed because of mechanical stress helping to provide strength to affected areas as in leaning trees, wind exposure, over weighting, compartmentalisation of decay etc. A sign a tree could fail.

Scaffold Branch – the permanent or structural branches of a tree

Senescence / Senescent – the condition or process of growing old especially the condition resulting from the transitions and accumulations of the deleterious aging process.

Significant Roots – Generally those greater than 50 mm diameter or a mass of fibrous roots but depends on tree size, species and distance from tree.

Torsional Loading – When a tree generally by the wind has had part of its structure twisted as it grows.

Tax – After a tree's name means identity of species may not be exact.

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Given factors like environmental, vegetative, and other overlays and local or other planning controls it is difficult to accommodate or satisfy all parties when assessing trees and other vegetation. It is very difficult to establish clear outcomes and impossible to determine that a tree can be deemed safe under all circumstances. No guarantee can be given that a tree is totally safe or will remain healthy given short-term adverse weather conditions or long-term climatic conditions or other environmental and physical factors. No guarantees can be given for any part of a tree's current or future stability. The writer and Landscapes by Design Pty Ltd does not accept any responsibility for any tree or part of it assessed, with regard to its ongoing stability and safety, or its capacity to damage property, other assets, or people.

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Landscape Designer and Consulting Arborist - Director
Diploma of Horticulture
Diploma of Horticulture - Arboriculture
Member Landscape Design Institute - 610

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