ARBORICULTURAL IMPACT ASSESSMENT

Saint Patricks College-Strathfield.

Prepared for: St. Patricks College, Strathfield.

Prepared by: Tom Hare
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Date: November 24, 2019.

Rev. 2: February 24,2020

Executive Summary

Tree four, five and six (4, 5 &6) are poorly formed Eucalyptus robusta and will require removal for the basement car parking.

Tree seven (7) is a mature Melaleuca quinquenervia- Paperbark which will require removal for the basement car park and new Tennis courts.

Trees eight and nine (8 & 9) are council street trees. These trees will suffer some level of tree protection zone encroachment and specific tree protection measures will be required.

Trees twelve to nineteen (12-19) are juvenile-semi-mature Zelkova serrata. The trees are generally in poor condition with die-back evident in most canopies. The building seems likely to result in significant pruning to provide suitable clearance from the new structure and scaffolding. Even if the rootzones are unaffected due to the differing soil levels, the trees will be going from full sun to full shade and would seem inappropriate to retain.

Trees twenty-three and twenty-four (23 & 24) are large mature Melaleuca quinquenervia- Broad-leaved paperbark. The trees will require removal to enable the promenade to be constructed.

The remaining trees (1-10-11-20-21-22) will be unaffected by the development.

The proposed development at St. Patricks College, Strathfield will require the removal of ten (10) trees of low retention value (4-6-12-13-14-15-16-17-18-19).

Four (4) trees of medium retention value will require removal based upon current design (5-7-23-24).

Trees 1-2-3-8-9-10-11-20-21-22 will require tree protection throughout the development.

Once the designs have been finalised and construction drawings have been prepared, the findings of this report should be cross-checked to ensure accuracy of information.

Generic tree protection measures are provided in Appendix 2.

A site-specific tree protection plan will also need to be compiled to specify the tree protection requirements relative to each tree to be retained.

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Introduction

Truth about trees have been engaged by Richie Chacon- Director of Business Services- St. Patricks College-Strathfield, to provide an Arboricultural Impact Assessment (AIA) in relation to a proposed development at St. Patricks College, Strathfield.

The existing Tennis courts are to be demolished and replaced with a new multi-level building which will incorporate underground car parking as shown in figure 1 below.

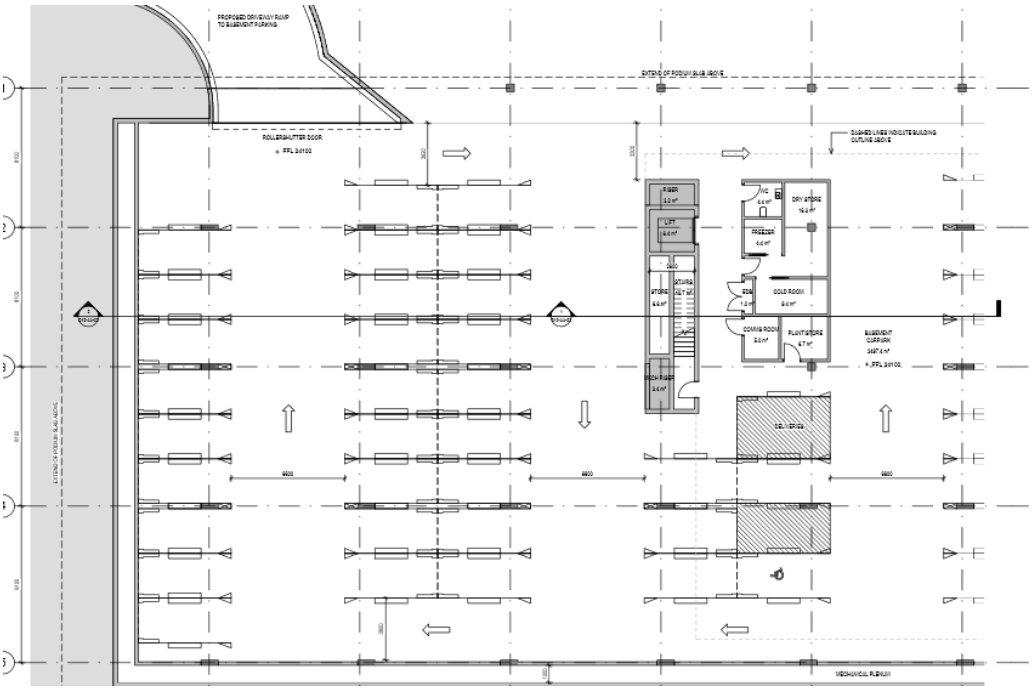

Figure 1- Plan showing the proposed basement car parking

Other features of the proposal include 2 new Tennis courts on ground level and 2 more on the rooftop (level 3) of the proposed building. There is also a paved public promenade as shown in figure 2 below.

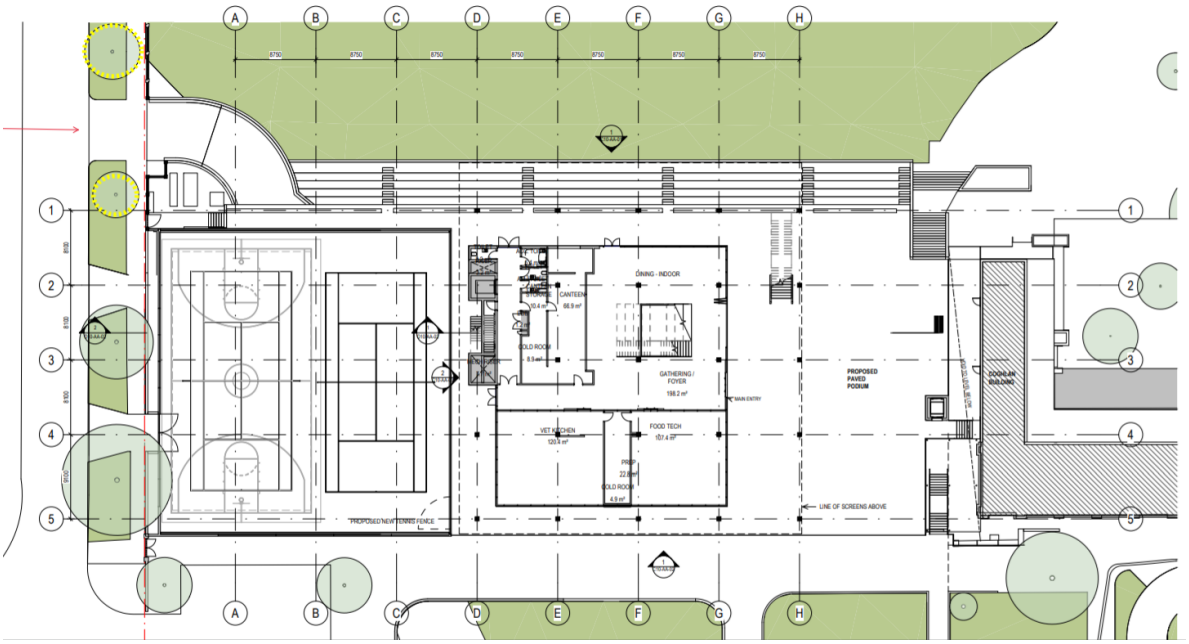

Figure 2- The ground floor plan showing new Tennis courts on the south-western side of the proposed building and a paved promenade on the north-eastern side.

Methodology

A site visit was conducted on Monday 18th November 2019.

Assessment was undertaken of all trees within and directly adjacent to the proposed development site, which had the potential to be impacted upon by the proposed development.

The site is located within the municipality of Strathfield Council.

The site was checked against the Strathfield council heritage maps which showed that part of the subject site adjacent to the proposed development is a heritage item, so the standard tree management controls may not apply.

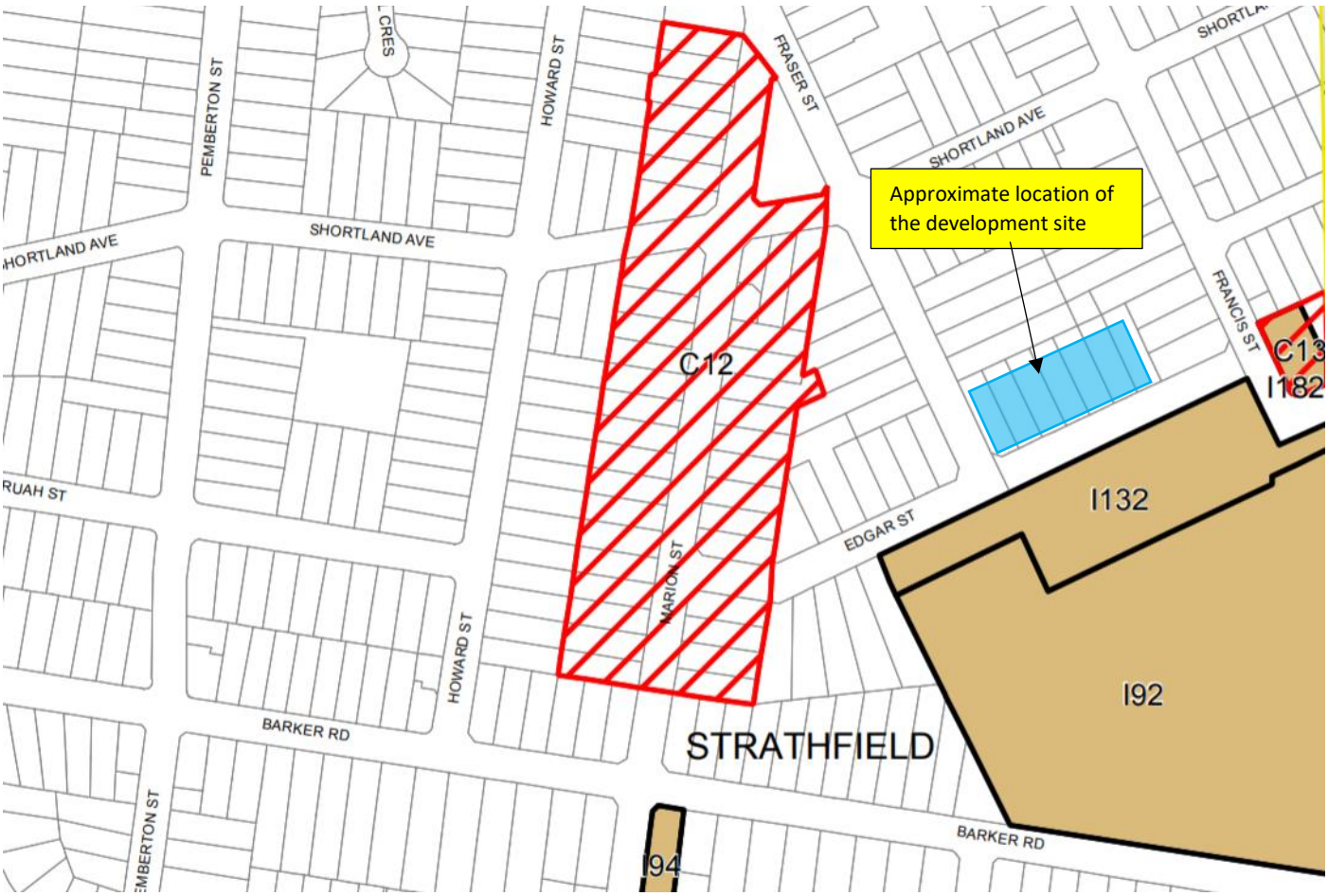

Figure 3- Heritage map showing a heritage item in close proximity to the proposed development.

Tree Management of Strathfield Council's Comprehensive Development Control Plan 2005 prohibits the following:

- Cutting down, removing, injuring or poisoning any part of a tree above or below ground, having a height greater than four (4.0) metres or a girth greater than half (0.5) metre measured at point one (1.0) metres above ground level.
- Undertaking works within 5 metres from the base of a tree
- Failing to plant, protect or care for a tree which is required to be planted, protected or cared for as a condition of consent.

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Council consent is not required for:

- Pruning, control and eradication or removal of trees, which are listed as noxious weeds by the Department of Primary Industries for the Strathfield Local Government Area. Refer to the website: Department of Primary Industries for the Strathfield Local Government Area
- The following trees - Ficus elastica (Rubber Tree), Privet (large and small leaf), Umbrella Trees, Rhus Trees, and commercial fruit tree varieties.
- Exempt species area listed in Appendix 1 of the DCP unless the trees are or form part of a heritage item and/or are a contributory element to the heritage significance of a conservation area or where the tree is listed on Council's Significant Tree Register.
- Removal of dead branches from a tree in accordance with AS 4373-2007 Pruning of Amenity Trees.

Work must be undertaken in accordance with the WorkCover NSW Code of Practice for the Amenity Tree Industry and the guidelines in Australian Standard AS 4373 Pruning of Amenity Trees.

Assessment of the trees was undertaken using the framework of the visual tree assessment procedure (VTA) as prescribed by Mattheck & Broeler 1994.[1]

Tree Protection Zones and Structural Root Zones were calculated in accordance with AS4970-2009- The Protection of Trees on Development Sites [2](see Section 1.2). Tree Retention Values were determined using the IACA 'Significance of a Tree, Assessment Rating System [3](STARS – see Section 1.3). This report will discuss the current structural condition and health of the trees and will provide recommendations regarding their viability relative to proposed works.

- No internal diagnostic testing has been completed.
- No sub surface root testing or soil testing has been completed.
- All observations were made from the ground only.
- Tree heights have been estimated and diameters have been measured with a diameter tape where access allowed.

The following drawings and resources were considered when completing the assessment:

Document name	Provided by	Document name	Provided by
191113- Briefing Package	BVN	AS4970-2009- The Protection of Trees on Development Sites	Standards Australia
Site survey	BVN	Strathfield Council Heritage Maps	Strathfield council

Figure 4- Document schedule showing documents referenced during assessment

[1] Mattheck & Broeler 1994- The Body Language of Trees.
[2] Standards Australia- AS4970-2009- The Protection of Trees on Development Sites
[3] IACA- Significance of a Tree Assessment Rating System- STARS

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Site Details

The site is at St, Patricks College, Strathfield, adjacent to the corner of Fraser Street and Edgar Street, Strathfield.

Figure 5- The subject site and surrounding area, Image taken from Google Maps 2019[4].

Figure 6- The subject trees with TPZ (Blue) and SRZ (Pink) overlaid using ArborCad v.7

[4] Google Maps 2019.

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Tree schedule

Tree No.	Species	Common Name	Height	Canopy Spread	DBH (mm)	DAB (mm)	Health	Structure	Age	Landscape significance	TLE	Retention value	TPZ (mm)	SRZ (mm)	Impact
1	Lophostemon confertus	Brush Box	6	10	400	490	Fair	Poor	Mature	Medium	15-40	Medium	4800	2453	**No significant impacts**
2	Lophostemon confertus	Brush Box	9	10	480	550	Fair	Poor	Mature	Medium	15-40	Medium	5760	2575	**Driveway to basement parking**
3	Lophostemon confertus	Brush Box	4	5	260	360	Fair	Poor	Semi-mature	Medium	15-40	Medium	3120	2155	**Driveway to basement parking**
4	Eucalyptus robusta	Swamp Mahogany	10	8	250	350	Fair	Poor	Mature	Low	5-15	Low	3000	2129	**Will require removal for basement parking**
5	Eucalyptus robusta	Swamp Mahogany	14	16	400	500	Fair	Fair	Mature	Medium	15-40	Medium	4800	2474	**Will require removal for basement parking**
6	Eucalyptus robusta	Swamp Mahogany	8	2	150	250	Poor	Poor	Juvenile	Low	0-5	Low	1800	1849	**Will require removal for basement parking**
7	Melaleuca quinquenervia	Broad-leaved paperbark	16	15	690	760	Fair	Fair	Mature	Medium	15-40	Medium	8280	2949	**Will require removal for basement parking**
8	Lophostemon confertus	Brush Box	4	8	280	390	Fair	Poor	Semi-mature	Medium	15-40	Medium	3360	2228	**Unaffected**
9	Lophostemon confertus	Brush Box	8	8	480	560	Fair	Poor	Mature	Medium	15-40	Medium	5760	2594	**Impacted by the demolition of the tennis courts**

Tree No.	Species	Common Name	Height	Canopy Spread	DBH (mm)	DAB (mm)	Health	Structure	Age	Landscape significance	TLE	Retention value	TPZ (mm)	SRZ (mm)	Impact
10	Lophostemon confertus	Brush Box	12	6	240	330	Fair	Fair	Mature	Medium	15-40	Medium	2880	2077	**Unaffected**
11	Lophostemon confertus	Brush Box	10	6	230	310	Fair	Good	Mature	Medium	15-40	Medium	2760	2024	**Unaffected**
12	Zelkova serrata	Japanese Elm	4	4	180	200	Poor	Poor	Semi-mature	Low	5-15	Low	2160	1683	**Heavily impacted by proposed building**
13	Zelkova serrata	Japanese Elm	7	6	200	290	Fair	Poor	Semi-mature	Low	5-15	Low	2400	1968	**Heavily impacted by proposed building**
14	Zelkova serrata	Japanese Elm	10	8	270	290	Fair	Fair	Mature	Low	5-15	Low	3240	1968	**Heavily impacted by proposed building**
15	Zelkova serrata	Japanese Elm	4	4	180	210	Fair	Poor	Semi-mature	Low	5-15	Low	2160	1718	**Heavily impacted by proposed building**
16	Zelkova serrata	Japanese Elm	5	4	230	270	Fair	Poor	Semi-mature	Low	5-15	Low	2760	1910	**Heavily impacted by proposed building**
17	Zelkova serrata	Japanese Elm	4	4	130	170	Fair	Fair	Juvenile	Low	5-15	Low	1560	1572	**Heavily impacted by proposed building**
18	Zelkova serrata	Japanese Elm	6	4	170	250	Poor	Fair	Semi-mature	Low	5-15	Low	2040	1849	**Heavily impacted by proposed building**

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Tree No.	Species	Common Name	Height	Canopy Spread	DBH (mm)	DAB (mm)	Health	Structure	Age	Landscape significance	TLE	Retention value	TPZ (mm)	SRZ (mm)	Impact
19	Zelkova serrata	Japanese Elm	8	4	230	240	Poor	Fair	Semi-mature	Low	5-15	Low	2760	1817	**Heavily impacted by proposed building**
20	Liriodendron tulipifera	Tulip Tree	17	8	330	440	Good	Good	Mature	Medium	40+	High	3960	2344	**Unaffected**
21	Liriodendron tulipifera	Tulip Tree	17	8	260	340	Good	Good	Mature	Medium	40+	High	3120	2104	**Unaffected**
22	Lophostemon confertus	Brush Box	19	11	720	870	Fair	Fair	Mature	High	15-40	High	8640	3121	**Unaffected**
23	Melaleuca quinquenervia	Broad-leaved paperbark	20	19	880	1300	Fair	Poor	Mature	Medium	15-40	Medium	10560	3695	**Will require removal for promenade**
24	Melaleuca quinquenervia	Broad-leaved paperbark	20	16	900	1300	Good	Poor	Mature	Medium	15-40	Medium	10800	3695	**Will require removal for promenade**

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The Proposal

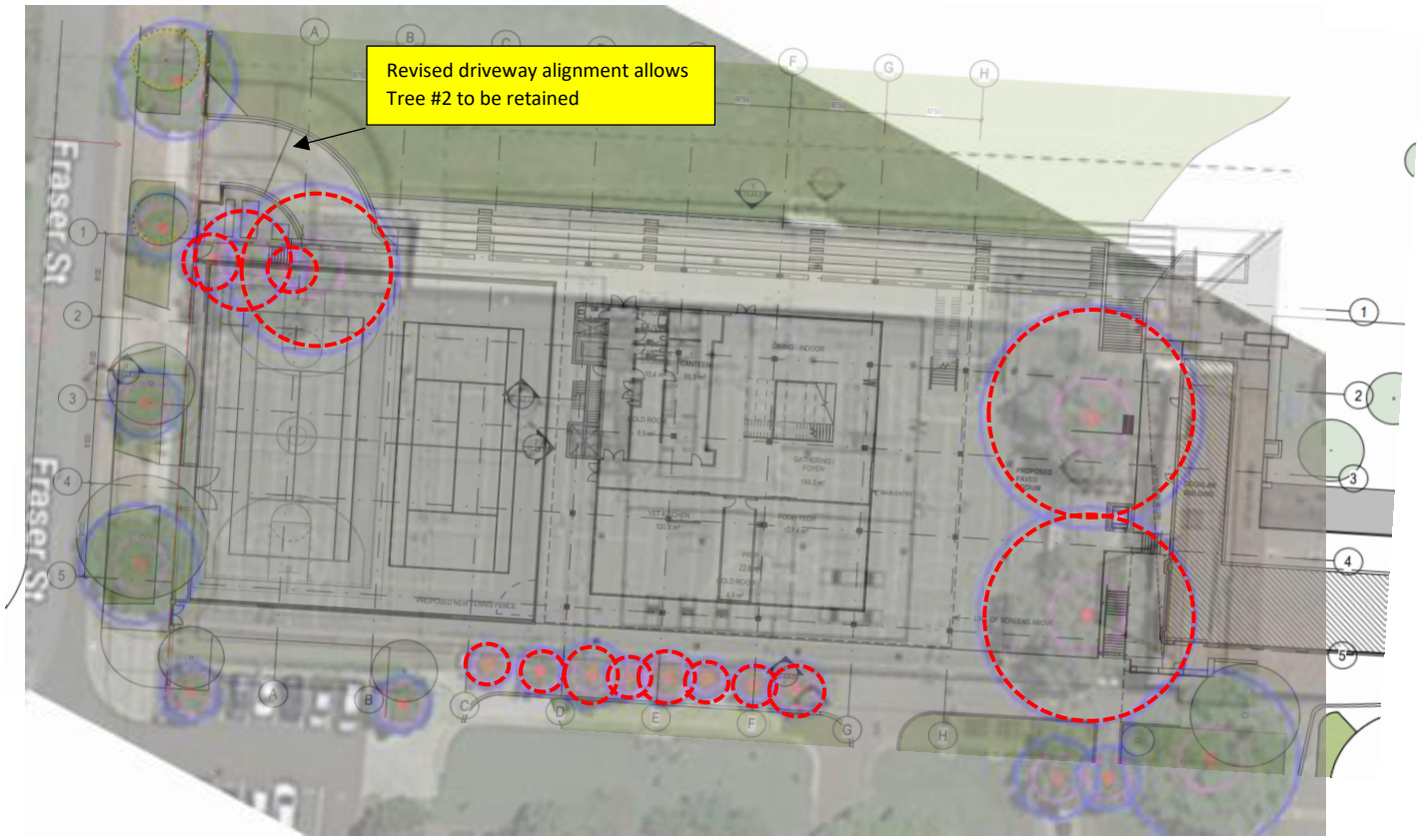

Figure 7- Trees for removal are shown in Red dashed lines.

Retention values

Retention value	
High	20-21-22
Medium	1-2-3-5-7-8-9-10-11-23-24
Low	4-6-12-13-14-15-16-17-18-19
Very low	N/A

Figure 8- Tree retention values using the STARS system.

Trees requiring removal/retention based on current plans

Proposed for	Tree number
Trees for removal	4-5-6-7-12-13-14-15-16-17-18-19-23-24
Trees for retention	1- 2- 3- 8-9-10-11-20-21-22

Figure 9- Table showing trees proposed for removal or retention based on current design.

Impact schedule

Tree two (2) is a council street tree and will receive moderate encroachment from the driveway into the basement car park. This species of tree is known to be tolerant of root disturbance and no significant impacts are expected. Arborist involvement will be required to confirm via non-destructive means, whether any significant tree roots will be impacted by the driveway alignment.

Tree three (3) is another council street tree that will receive minor encroachment from the driveway into the basement car park. This species of tree is known to be tolerant of root disturbance and no significant impacts are expected.

Tree four, five and six (4, 5 &6) are poorly formed Eucalyptus robusta and will require removal for the basement car parking.

Tree seven (7) is a mature Melaleuca quinquenervia- Paperbark which will require removal for the basement car park and new Tennis courts.

Trees eight and nine (8 & 9) are council street trees. These trees will suffer some level of tree protection zone encroachment and specific tree protection measures will be required.

Trees twelve to nineteen (12-19) are juvenile-semi-mature Zelkova serrata. The trees are generally in poor condition with die-back evident in most canopies. The building seems likely to result in significant pruning to provide suitable clearance from the new structure and scaffolding. Even if the rootzones are unaffected due to the differing soil levels, the trees will be going from full sun to full shade and would seem inappropriate to retain.

Trees twenty-three and twenty-four (23 & 24) are large mature Melaleuca quinquenervia- Broad-leaved paperbark. The trees will require removal to enable the promenade to be constructed.

The remaining trees (1-10-11-20-21-22) will be unaffected by the development.

Conclusions

The proposed development at St. Patricks College, Strathfield will require the removal of ten (10) trees of low retention value (4-6-12-13-14-15-16-17-18-19).

Four (4) trees of medium retention value will require removal based upon current design (5-7-23-24).

Trees 1-2-3-8-9-10-11-20-21-22 will require tree protection throughout the development.

A site-specific tree protection plan will also need to be compiled to specify the tree protection requirements relative to each tree.

Generic tree protection measures are provided in Appendix 2.

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Recommendations

1. Trees 4-5-6-7-12-13-14-15-16-17-18-19-23-24 should be removed to enable the development to proceed.
2. Trees 1-2-3-8-9-10-11-20-21-22 are currently proposed for retention and protection.
3. In relation to tree #2, Arborist involvement will be required to confirm via non-destructive means, whether any significant tree roots will be impacted by the proposed driveway alignment.
4. A site-specific tree protection plan must be prepared for this development, once designs have been finalised. The tree protection plan is to specify and explain the methods required to protect each of the trees to be retained adjacent to the development.
5. Tree protection fencing and signage must be installed in accordance with AS4970-2009, appendix 2 of this report and any subsequent tree protection plan.
6. All other tree protection measures must be completed in accordance with AS4970-2009, appendix 2 of this report and any subsequent tree protection plan.

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References

Mattheck, C. & Breloer, H. 1994, *The Body Language of Trees*.
The Stationery Office. London.

Matheny, N. & Clark, J. 1994. *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas.*
International Society of Arboriculture. Illinois.

Lonsdale, D. 1999. *Principles of Tree Hazard Assessment and Management.*
Arboricultural Association. Stonehouse (UK).

Barrell, J. 2009. *SULE: Its use and status into the new millennium.*
Barrell Tree Consultancy. Hampshire, UK.

Standards Australia. 2009. *AS4970-2009 Protection of trees on development sites.*
Standards Australia. Sydney.

IACA. 2010. *IACA Significance of a Tree, Assessment Rating System (STARS).*
Institute of Australian Consulting Arboriculturists. Australia. **www.iaca.org.au**

Google Maps. 2019. *The location of St. Patricks College, Strathfield.*
Accessed at **http://maps.google.com**
Accessed 25-11-19.

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Disclaimer:

The information contained within this report is to be used solely for the purposes that were specified at the time of engagement.

All attempts have been made to ensure the legitimacy of any information which has been gathered in the process of compiling this report, however Truth About Trees cannot be held liable for inaccurate or misguiding information which has been provided by others.

Any tree inspections or assessments which have been carried out for the purposes of this report are valid only at the time of inspection and are based on what could reasonably be seen or diagnosed from a visual inspection carried out from ground level.

All inspections, unless otherwise stated, are based upon Visual Tree Assessment (VTA) techniques, industry best practice and applied knowledge. No internal diagnostic testing or below ground investigation has been carried out, unless otherwise stated.

Trees are a dynamic living organism and as such they have a finite lifespan the end of which cannot always be predicted or understood, even apparently healthy trees can die suddenly or fall without warning. As such there is no warranty or guarantee provided, or implied, regarding the future risks associated with any tree.

Please feel free to contact me either via telephone or email if you have any questions regarding this report.

Kind regards

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Appendix 1: Tree assessment methodology

1.1 Visual Tree Assessment (VTA)

The VTA system is based on the theory of tree biology and physiology, as well as tree architecture and structure. This method is used by arborists to identify visible signs on trees that indicate good health, or potential problems. Symptoms of decay, growth patterns and defects are identified and assessed as to their potential to cause whole-tree, part-tree and/or branch failure. This system is based around methods discussed in `*The Body Language of Trees*'[5]. For the purpose of this report, elements of the VTA system will be used, along with industry standard literature, and other relevant studies that provide an insight into potential hazards in trees. This assessment is a snapshot of what could be reasonably seen or determined from a basic visual inspection. The VTA system is generally used as a means to identify hazardous trees; however it is important to realize that for a tree to be hazardous there must be a target; a hazard poses no risk if there is no exposure to the hazard.

1.1.1 Health and Vigour Assessment

The health and vigour of a tree is assessed by looking at the tree canopy and how it is performing. Certain indicators provide information on which to base the assessment. Abnormally small leaves, chlorosis (yellowing), sparse crown, wilting, and die-back can be signs of ill-health or decline but may also be related to a temporary imbalance due to drought or pest infestations. Epicormic growth can be a sign of stress and low energy reserves but can also be related to increased light levels through the removal or pruning of adjacent trees. Extension growth can be a good indicator of vigour but this can vary greatly between species and under differing climatic conditions. For these reasons, each individual symptom or observation needs to be assessed with objectivity and consideration of all available information.

1.1.2 Structural Assessment

The structural assessment of trees is carried out using the basic framework of Visual Tree Assessment. Signs and symptoms of defects are assessed to gauge the likelihood of failure, because not every defect constitutes a hazard e.g. *"…co-dominant stems are a structural defect. The severity of the defect is increased by included bark, large crowns and strong wind."*[6] If trees were removed purely on the basis that there were defects present without assessing the likelihood of failure or whether practical mitigation measures are available, the urban forest would cease to exist. A basic visual tree assessment is undertaken from ground level, if defects are suspected further investigation may be required and recommended. "*[When using] the Visual Tree Assessment (VTA) procedure for assessing trees, as the suspicion increases that defects are present, the examination becomes more thorough and searching."*[1]

"Some defects, especially some forms of decay, do not give rise to external signs and therefore tend to escape detection in a purely visual survey. If there is no reason for suspecting a hidden defect to occur within a particular part of the tree, there is no reasonable basis for carrying out a detailed internal assessment. Although in theory an unsuspected defect might be detectable by the use of specialized diagnostic devices, this would be impracticable in the absence of some external sign to indicate the place which should be probed. Also, internal examination without good reason is undesirable, as it usually causes injury to the tree and is unreasonably time consuming and costly."[7]

[5] Mattheck, C. & Broeler, H. 1994. *The Body Language of Trees*.

[6] Matheny, N. & Clark, J. 1994. *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas.*

[7] Lonsdale. 1999. *Principles of Tree Hazard Assessment and Management.*

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1.2 Tree Protection Zone (TPZ) & Structural Root Zone (SRZ) Calculations

In accordance with Australian Standard *AS4970-2009 Protection of trees on development sites*[8], Tree Protection Zone (TPZ) radius is calculated using the following procedure. Diameter of the trunk is measured at approximately 1.4m above ground level; this measurement is referred to as DBH (Diameter at Breast Height). $R_{TPZ} = DBH \times 12$. For multi-stemmed trees the formula used is $R_{TPZ} = \sqrt{[(DBH1)^2 + (DBH2)^2 + (DBH3)^2]}$. The TPZ is measured radially from the centre of the stem and must be protected on all sides.

The Structural Root Zone (SRZ) radius is calculated by measuring the diameter of the stem close to ground level, just above the basal flare. This measurement is taken as ***D*** and then used in the following formula: $R_{SRZ} = (Dx50)^{0.42} \times 0.64$ and becomes the Structural Root Zone, measured radially from the centre of the stem.

It is important to realize that these calculations provide a notional figure only and tree dynamics, form and site conditions will greatly affect these zones, and it is the job of the arborist to interpret the information correctly.

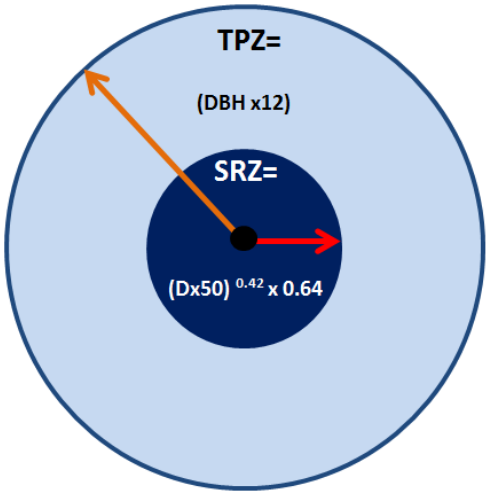

Figure 2 – A representation of TPZ & SRZ calculations.

For palms, cycads, tree ferns, and similar monocots, the TPZ is positioned at least 1m outside the crown projection. SRZs are not applicable to these plant types.

AS4970-2009[3] states "*a TPZ should not be less than 2m nor greater than 15m (except where crown protection is required*" and the minimum radius for an SRZ is 1.5m.

[8] Standards Australia. 2009. *AS4970-2009 Protection of trees on development sites.*

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1.3 Significance of a Tree, Assessment Rating System (STARS)

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

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined. An example of its use in an Arboricultural report is shown as Appendix A.

Tree Significance - Assessment Criteria

1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

IACA 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, www.iaca.org.au

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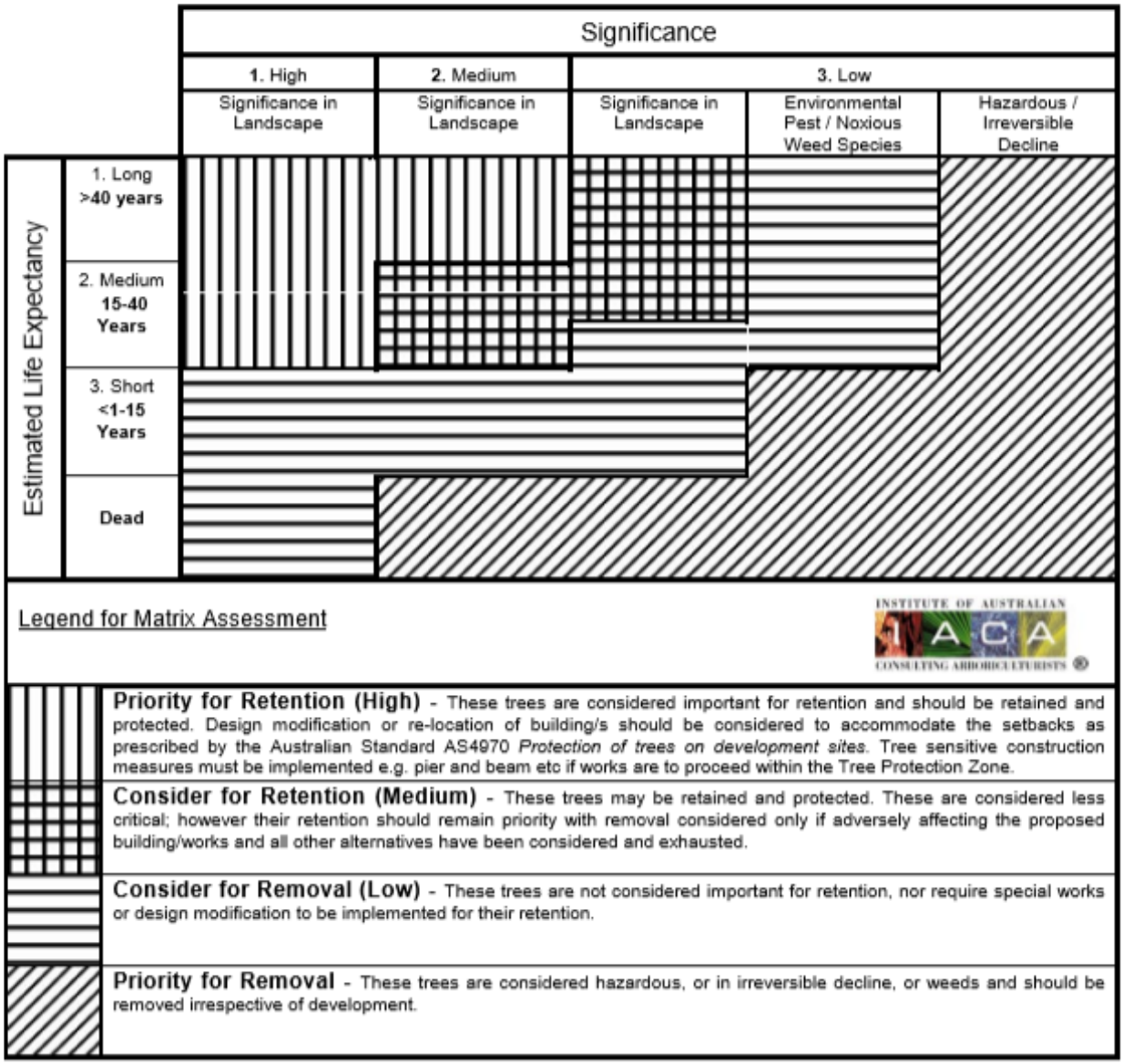
Table 1.0 Tree Retention Value - Priority Matrix.



USE OF THIS DOCUMENT AND REFERENCING

The IACA Significance of a Tree, Assessment Rating System (STARS) is free to use, but only in its entirety and must be cited as follows:

IACA, 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

REFERENCES

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

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

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

IACA 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, www.iaca.org.au

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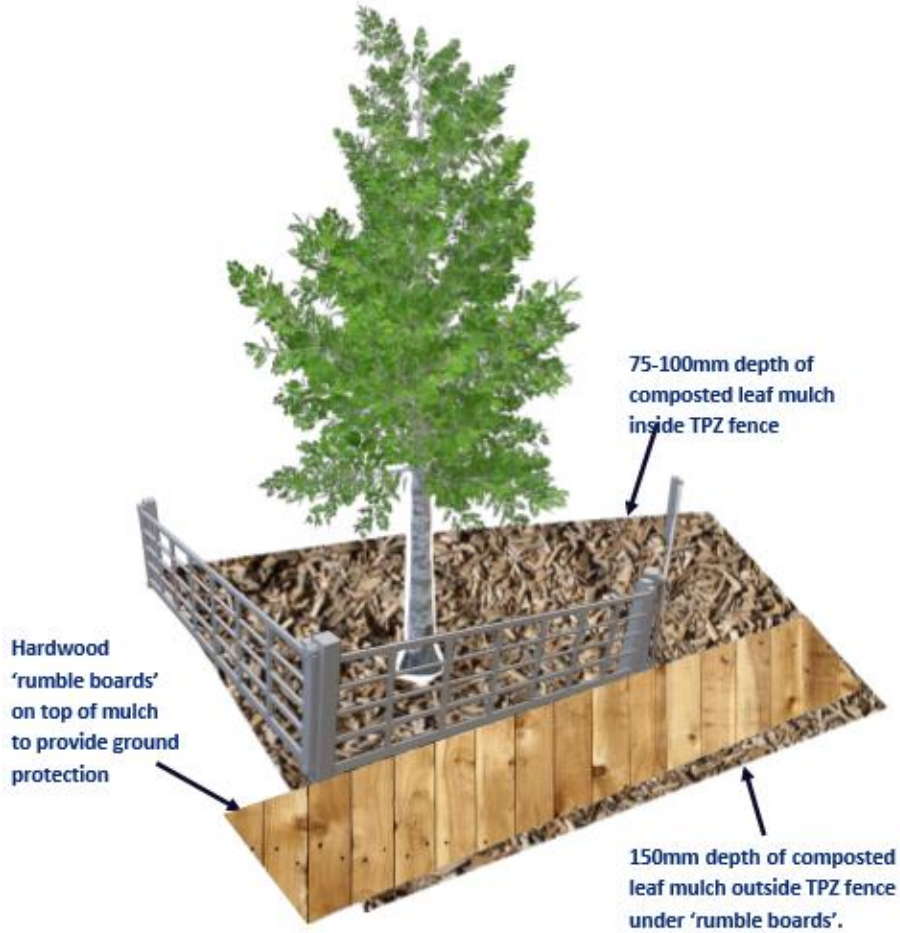
Appendix 2- Tree protection

Tree protection measures are used to isolate the calculated tree protection zone from the impacts of construction activities. Tree protection measures come in many different forms and types depending on the type of protection required for the situation. The protection measures can be broadly considered as tree root protection, canopy protection or trunk and branch protection.

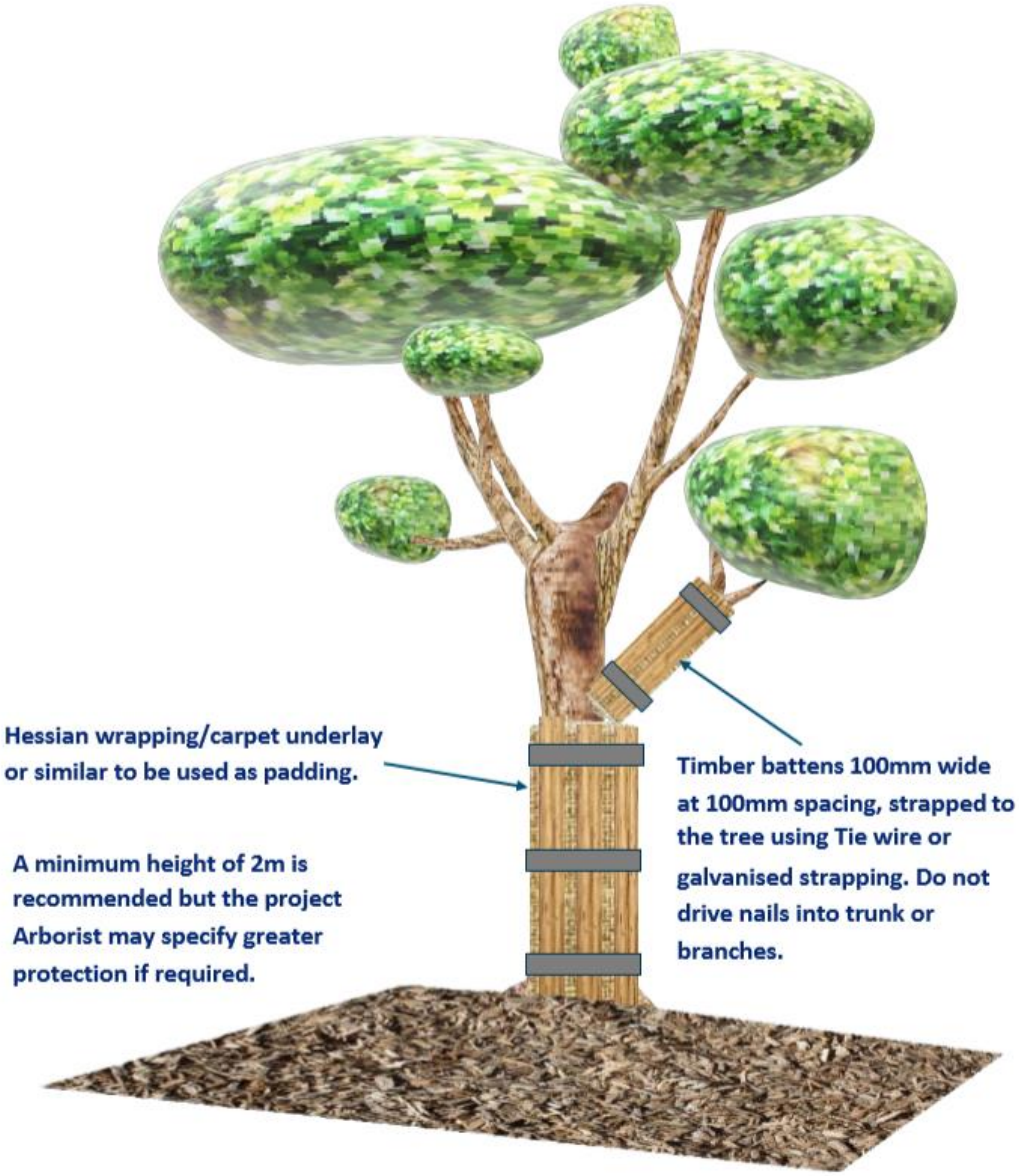
Tree root protection: TPZ Fencing- Figure 1

Tree root protection is generally achieved with the allocation and delineation of a tree protection zone (TPZ) in accordance with AS4970-2009- The Protection of Trees on Development Sites. Temporary fencing is used to isolate the area from construction activity and restrict unauthorized access. Where access into the TPZ is required and unavoidable, ground protection measures may be recommended to ensure that the tree roots which are to be protected remain undamaged during works within the TPZ. Any works within the allocated tree protection zones must be directly supervised by a project Arborist with a minimum AQF level 5 qualification. In situations where there are low lying tree branches to be protected, the TPZ may be extended beyond the calculated TPZ in order to incorporate canopy protection as shown below.

Ground protection: Access road within TPZ- Figure 2.



Trunk and branch protection- Figure 3.



Tree protection specifications:

In accordance with AS4970-2009- The Protection of Trees on Development Sites, activities restricted within the TPZ include but are not limited to:

a) Machine excavation including trenching.
b) Excavation for silt fencing.
c) Cultivation.
d) Storage of materials or machinery.
e) Preparation of chemicals, including cement products.
f) Parking of vehicles and plant.
g) Refuelling of machinery.
h) Dumping of waste.
i) Wash down and cleaning of equipment.
j) Placement of fill.
k) Lighting fires.
l) Soil level changes.
m) Temporary or permanent installation of utilities and signs.
n) Physical damage to the tree.

Tree protection fencing:

Tree protection fencing is to be installed prior to site establishment, demolition or commencement of any works on site.

All fencing must be chainmesh fencing 1.8m in height, secured with concrete 'feet' and in accordance with AS4678-Temporary Fencing and Hoardings. Depending on the type of development, shade cloth or similar may be recommended to reduce the spread of dust, particulate matter and liquids into the protected area. Silt fencing may also be required and may be incorporated into the TPZ fencing if required. Once the TPZ fencing has been installed the site Arborist must provide a letter of certification of tree protection measures to the client which may be forwarded on to the private certifier or council. Tree protection fencing is not to me moved, realigned, dismantled or tampered with in any way and shall only be relocated under instruction of the project Arborist. (See Figure 1)

If the protective fencing requires temporary removal, trunk, branch and ground protection must be installed and must comply with AS 4970-2009 - Protection of trees on development sites. Existing fencing and site hoarding may be used as tree protection fencing, providing the TPZ remains isolated from construction activities. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Ground protection may include a permeable membrane such as geotextile fabric beneath a layer of mulch, crushed rock or rumble boards.

Any additional construction activities within the TPZ of the subject trees must be assessed and approved by the project arborist and must comply with AS 4970- 2009 - Protection of trees on development sites.

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Tree protection signage:

Tree protection zone signage must be installed and clearly visible from all angles within the site stating, "NO ENTRY TREE PROTECTION ZONE" and phone numbers for the site Arborist and site supervisor/foreman must be provided. TPZ signage must be laminated or otherwise protected to ensure that it remains legible for the duration of the project. (See Figure 1)

Ground protection:

Where access into the TPZ of a tree is necessary and unavoidable, the project Arborist must specify the methods of additional protection required. This may be ground protection in the form of 150mm depth of composted mulch beneath hardwood 'rumble boards' alternatively track mats or road plates may be used (See figure 2). Tree roots are essential for the uptake/absorption of water, oxygen and mineral ions (solutes). It is essential to prevent the disturbance of the soil beneath the dripline and within the TPZ of trees that are to be retained. Soil compaction within the TPZ will adversely affect the ability of roots to function correctly.

Generally, soil level changes within the TPZ of a tree is not recommended and is contrary to AS4970-2009 The Protection of Trees on Development Sites. Certain circumstances can arise where this may be necessary, and the requirements must be carefully considered by the project Arborist. If the grade is to be raised within the TPZ, the material should be coarser or more porous than the underlying material and the suitability of this action must be assessed by the project Arborist.

Trunk and branch protection:

Where there is the risk of accidental mechanical damage due to narrow access paths or large machinery movements, trunk and branch protection may also be recommended (see figure 3). The removal of bark or branches allows the potential ingress of micro-organisms which may cause decay. Furthermore, the removal of bark restricts the trees' ability to distribute water, mineral ions (solutes), and glucose.

Trunk protection shall consist of a layer of either Hessian wrapping, carpet underlay, geotextile fabric or similar wrapped around the trunk, followed by softwood timbers approximately 100mm wide, aligned vertically and spaced evenly around the trunk (with an approx. 100 mm gap between the timbers).

The timbers must be secured using galvanized hoop strapping or tie wire. The timbers shall be wrapped around the trunk but not fixed to the tree with nails, screws or other means, as this will cause injury/damage to the tree.

Crown protection:

Tree crowns/canopy may be injured or damaged by machinery such as; excavators, drilling rigs, trucks, cranes, plant and vehicles. Where crown protection is required, it will usually be located at least one meter outside the perimeter of the crown.

Crown protection may include the installation of a physical barrier, pruning selected branches to establish clearance, or the tying/bracing of branches.

Supervision of works within the TPZ:

If incursion/excavation amounting to greater than 10% of the TPZ is unavoidable, exploratory excavation (under the supervision of the Project Arborist) using non-destructive methods may be considered to evaluate the extent of the root system affected and determine if the tree can remain viable.

If the project arborist identifies conflicting roots that require pruning, they must be pruned with a sharp implement such as; secateurs, pruners, handsaws or a chainsaw back to undamaged tissue. All works within the TPZ of any tree to be retained must be completed under the direct supervision of the project Arborist. This may include non-destructive excavation or hand digging to locate individual piers or fence posts.

The project Arborist is to recommend measures to protect and preserve any roots uncovered during these activities, this may include wrapping the tree roots in hessian or similar and keeping them moist to prevent desiccation.

Any tree roots which are damaged are to be assessed by the supervising Arborist who is to determine the best course of action. If root pruning is recommended, the project Arborist should sever the damaged roots cleanly back to undamaged tissue and cover the exposed portion of root to prevent desiccation.

Where significant roots have been pruned, the project Arborist should complete a letter of certification including a root mapping report explaining the number and diameter of roots which were severed, what impacts are likely and provide recommendations for mitigation of such impacts if required.

All supervision works must be completed by an Arborist with a minimum AQF level 5 in Arboriculture.

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Hold points/ certification:

Arborist involvement will be required throughout the development process at key milestones, at a minimum these are:

1. Certification of tree protection installation prior to site establishment
2. Monthly inspection of trees to ensure tree protection measures are effective.
3. Supervision and certification of any works within tree protection zones.
4. Removal of tree protection measures and final certification.

The approved tree protection plan must be available onsite prior to the commencement of works, and throughout the entirety of the project. To ensure the tree protection plan is implemented, hold points have been specified in the schedule of works for Arborist involvement. It is the responsibility of the principal contractor to complete each of the tasks. Once each stage is reached, the work will be inspected and certified by the project arborist and the next stage may commence. Alterations to this schedule may be required due to necessity. However, this shall be through consultation with the project arborist only.

A recommended schedule of works for Arborist involvement is as follows:

Pre-construction:	Prior to demolition and site establishment indicate clearly (with spray paint on trunks) trees marked for removal only. Tree protection (for trees that will be retained) shall be installed prior to demolition and site establishment, this will include mulching of areas within the TPZ. Scheduled inspection of trees by the project arborist should be undertaken monthly during the construction period.
During Construction:	Inspection of trees by project arborist after all major construction has ceased, following the removal of tree protection measures.
Post Construction:	Final inspection of trees by project arborist to confirm tree condition and provide final letter of certification.

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