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For

Warburton Highway Developments Pty Ltd

Site location

2420 Warburton Hwy Yarra Junction

Report type

Arboricultural Construction Impact Assessment

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1. Summary

This report was commissioned by Mr. Robert Pace of Warburton Highway Developments Pty Ltd to assess the condition of twenty-four trees located on or adjacent to 2420 Warburton Hwy, Yarra Junction and to evaluate the impacts on these trees arising from the proposed development on this site.

Of those trees assessed:

- Five trees are located in Council managed road reserves.
 - Two of these trees are shown as being removed on the plans of the proposed development.
 - It is unlikely that three of these trees will be impacted by the proposed development.
- Four trees are located in the drainage reserve to the south of the subject site. These trees are shown as being removed as part of the proposed development.
- Fifteen trees are located on the subject site.
 - Two trees are of high retention value. These trees are shown as being removed.
 - Three trees are of moderate retention value. These trees are shown as being removed.
 - Six trees are of low retention value. These trees are shown as being removed.
 - One tree has a height of less than 5 metres and a trunk diameter (measured at breast height) of less than 16cm. This tree was not formally assessed.
 - Three trees are recommended for removal based on the assessment of their health and/or structure.

2. Document control

File reference	File type	Modifications	Date
6581 220201	CIR	Original document. Construction impact assessment for twenty-four trees.	01/02/2022
6581 220429	CIR	Report revised for new plans.	29/04/2022
6581 220429a	CIR	Minor corrections.	29/04/2022

3. Introduction

This report was commissioned by Mr. Robert Pace of Warburton Highway Developments Pty Ltd to assess the condition of twenty-four trees located on or adjacent to 2420 Warburton Hwy, Yarra Junction and to evaluate the impacts on these trees arising from the proposed development on this site.

Specifically the report addresses the following issues:

- The health and structural condition of the trees.
- The suitability of these trees for retention on the site in light of the proposed development.
- The impact of the development on these trees.
- Recommendations for the protection of these trees.

This report is based, in part, on the plans provided and the accuracy of these plans is assumed. Inaccuracies in the plans provided may invalidate all or parts of this report.

The location of services within the site is not known and the possible impact of any services installation on the retained trees at this site is not included within this report.

The site was inspected by Dan van Kollenburg of this office on Thursday, 27 January 2022.

4. Documents reviewed

The following documents were reviewed in the preparation of this report.

Date	Title	Author	Company
07/09/2021	Plan of Feature Survey	S. Mertens	JCA Land Consultants
April 2022	Existing Conditions Plan (Ref: 21-037 TP Issue A. 1 of 6)	T. Michaels	TMC Building Design Group
April 2022	Proposed Site Layout Plan (Ref: 21-037 TP Issue A. 2 of 6)	T. Michaels	TMC Building Design Group

5. Scope

All of those trees that are considered significant to the site and that are located either on the site or within four metres of the site boundaries are addressed in this report.

Significant trees are generally those that are greater than five metres in height and/or with a Diameter at Breast Height (DBH) of greater than 15 cm.

6. Site context

This site is located within a General Residential Zone – Schedule 1 (GRZ1) within the municipal area of Yarra Ranges.

The following town planning overlays relating to trees are applicable to this site:

1. *Bushfire Management Overlay* (BMO).
2. *Significant Landscape Overlay – Schedule 22* (SLO22).

Under the SLO22, a permit is required to remove, destroy or lop any indigenous vegetation or substantial tree. A substantial tree is defined as having a diameter at breast height (DBH) greater than 0.16 metres 1.3 m above the ground. (Equivalent to a circumference of 0.5 metres at breast height).

This does not apply:

- If the lopping of vegetation is undertaken to assist its regeneration.
- If the vegetation is dead.
- To the partial removal of branches directly overhanging dwellings, garages or outbuildings so that they are not overhanging or within 2 metres of the building.
- If the vegetation to be removed is within 2 metres of a building.
- If the species appears in the *Shire of Yarra Ranges Environmental Weed List - Clause 22.05*.

Of those trees assessed, a planning permit is required to remove Trees 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 18, 19, 20, 21, 22, 23 and 24.

7. Notes

1. Trees 6,10 and 21 were not shown on the survey provided.
 - a. These trees have been added to the enclosed site plans based on a visual estimation of their location.
 - b. The location of these trees and the estimation of construction impact for these trees are approximate only.
2. The position of Tree 13 was incorrect on the plans provided for this project. This tree position as shown on the enclosed plans has been altered to reflect the actual location of this tree.
3. The following tree is less than 5 metres in height and are not considered significant to the site. These trees are shown on the site feature survey but have not been assessed as a part of this report.

ID	Genus / Species:	Common Name:	Origin:	Weed species:	Height (m)/ Trunk circ (cm):
6	Kunzea ericoides	Burgan	Melbourne	No	2 / 25
Number of tree/s in this section (Total): 1					

4. This report was modified by Roger Greenwood and an additional site inspection was not undertaken.

8. Methodology

Each tree was assessed using the Visual Tree Assessment (VTA), as devised by Claus Mattheck. The assessment consists of 3 stages and compares the tree being inspected to a notionally healthy, vigorous and defect free tree.

The 3 stages of VTA are

1. Visual inspection of the tree for defect symptoms and overall vitality. If there are no signs of any problems the assessment is concluded.
2. If a defect is suspected on the basis of the symptoms, the presence or absence of that defect must be confirmed by thorough examination.
3. If the defect is confirmed, it must be quantified and the strength of the remaining part of the tree evaluated.

It should be noted that a visual tree assessment is visual only. The quantification and evaluation (stage 3) may be beyond the scope of a visual inspection and require further investigation including a separate climbing assessment.

Tree heights were measured using a laser range finder (TruPulse 360).

Trunk diameter (DBH) was measured using a surveyor's diameter tape at 1.4 m above ground level.

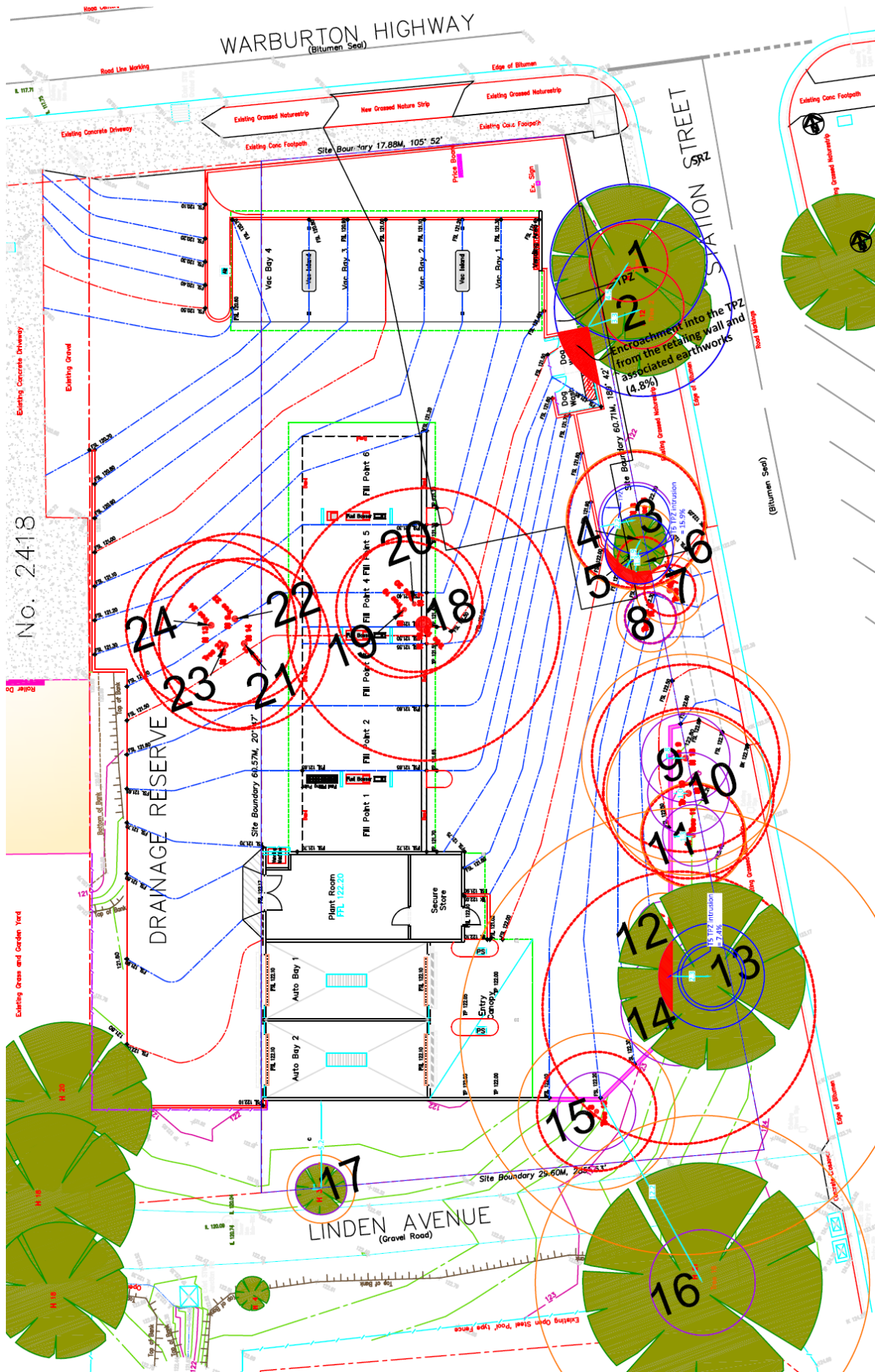
If a tree could not be accessed, the height and DBH were estimated.

The photography used in this report was captured using a Fujifilm Finepix HS 20 Digital camera.

9. Site plan (existing)



9.1. Site plan (proposed)



10. Tree summary data

This table contains a summary of data pertaining to all trees shown and numbered on the enclosed feature and levels survey.

Underlined and italicised species names have not been assessed. Generally these trees are <5m tall, not found or stumps. The construction impact values are blank for these records.

1. **Retention value:** The retention value of the tree to the site.
 - a. Tree number and species name are **Bold** for High and Very high values trees.
2. **Retained?:** Indicates whether the tree is proposed to be retained on the site.
3. **Construction impact:** Indicates the impact of the proposed development on the tree.
 - a. **None:** Works do not intrude onto the tree's TPZ.
 - b. **Low:** Construction intrusion is less than 10% of TPZ and contiguous area exists to compensate for any loss.
 - c. **Moderate:** Construction intrusion exceeds 10% of TPZ but construction methods or other factors make tree retention possible.
 - d. **High:** Construction intrusion is excessive and tree retention is generally considered not possible within the development as currently proposed.
 - e. **Blank:** The tree has not been assessed.
4. **Location:** Whether the tree is located on the site or adjacent to the site.
 - a. **Site:** the tree is located on the site.
 - b. **Off site:** the tree is located on land adjoining the site.
 - i. Trees in this category should generally be preserved without significant impact.

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
1	Lophostemon confertus	Moderate	Retained	Low	Off site	2.3	4.6	11/119
2	Lophostemon confertus	Moderate	Retained	Low	Off site	2.4	5.2	12/135
3	Acacia mearnsii	Remove.	Removed	High	Site	2.2	4.1	8/107
4	Acacia mearnsii	Low	Retained	None	Site	1.5	2	6/28
5	Acacia mearnsii	Low	Retained	Moderate	Site	1.5	2	6/25
6	<u>Kunzea ericooides</u>	Very low	Removed	High	Site	1.5	2	2/25
7	Pittosporum undulatum	Low	Removed	High	Off site	1.5	2	4/28
8	Eucalyptus ovata	Moderate	Removed	High	Site	1.5	2	8/31
9	Eucalyptus ovata	High	Removed	High	Site	2.6	6.1	18/160
10	Melaleuca armillaris	Remove.	Removed	High	Site	2.4	4.8	6/126
11	Melaleuca armillaris	Remove.	Removed	High	Site	1.8	3.1	5/82
12	Acacia mearnsii	Low	Removed	High	Site	1.5	2	7/31
13	Melaleuca armillaris	Low	Retained	Low	Site	1.8	3.1	13/82
14	Eucalyptus ovata	High	Removed	High	Site	3.4	13.1	19/342
15	Acacia baileyana	Low	Removed	High	Site	2.3	4.6	8/119
16	Eucalyptus radiata	High	Retained	None	Off site	3.1	9.8	21/258

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
17	Pittosporum undulatum	Low	Retained	None	Off site	1.5	2	3/28
18	Eucalyptus ovata	Moderate	Removed	High	Site	3.4	13.2	18/346
19	Eucalyptus ovata	Moderate	Removed	High	Site	2	3.5	12/91
20	Acacia mearnsii	Low	Removed	High	Site	2	3.5	7/91
21	Eucalyptus ovata	Moderate	Removed	High	Off site	2	3.7	14/97
22	Eucalyptus ovata	Low	Removed	High	Off site	2	3.5	9/91
23	Eucalyptus ovata	Moderate	Removed	High	Off site	2.3	4.7	15/123
24	Eucalyptus ovata	Moderate	Removed	High	Off site	2.8	7.3	13/192

Total number of tree/s referred to in this report(Total): 24

11. Construction impact

The following trees are regarded as being suitable for retention and are located within close proximity to elements of the proposed development. The successful retention of those trees that are proposed to be retained may require additional care and the adoption of the following recommendations.

Note: **Construction Proximity** of 0.1 indicates construction over or immediately adjacent to the tree.

ID	Genus / species	DBH	SRZ	TPZ	TPZ	ConP	Ret Value	Retained?
The following 13 tree/s are shown as Removed on the plans provided.								
7	<i>Pittosporum undulatum</i>	9	1.5	2.0	= TPZ	0.1	Low	Removed
8	<i>Eucalyptus ovata</i>	10	1.5	2.0	= TPZ	0.1	Moderate	Removed
9	<i>Eucalyptus ovata</i>	51	2.6	6.1	= TPZ	0.1	High	Removed
12	<i>Acacia mearnsii</i>	10	1.5	2.0	= TPZ	0.1	Low	Removed
14	<i>Eucalyptus ovata</i>	109	3.4	13.1	= TPZ	0.1	High	Removed
15	<i>Acacia baileyana</i>	38	2.3	4.6	= TPZ	0.1	Low	Removed
18	<i>Eucalyptus ovata</i>	110	3.4	13.2	= TPZ	0.1	Moderate	Removed
19	<i>Eucalyptus ovata</i>	29	2	3.5	= TPZ	0.1	Moderate	Removed
20	<i>Acacia mearnsii</i>	29	2	3.5	= TPZ	0.1	Low	Removed
21	<i>Eucalyptus ovata</i>	31	2	3.7	= TPZ	0.1	Moderate	Removed
22	<i>Eucalyptus ovata</i>	29	2	3.5	= TPZ	0.1	Low	Removed
23	<i>Eucalyptus ovata</i>	39	2.3	4.7	= TPZ	0.1	Moderate	Removed
24	<i>Eucalyptus ovata</i>	61	2.8	7.3	= TPZ	0.1	Moderate	Removed
The following 3 tree/s are shown as Retained on the plans provided.								
2	<i>Lophostemon confertus</i>	43	2.4	5.2	= TPZ	3.3	Moderate	Retained
5	<i>Acacia mearnsii</i>	8	1.5	2.0	= TPZ	1.3	Low	Retained
13	<i>Melaleuca armillaris</i>	26	1.8	3.1	= TPZ	0.1	Low	Retained
SRZ: Structural Root Zone. TPZ: Tree Protection Zone. mTPZ: Tree Protection Zone.(Canopy) ConP: Construction Proximity.								
Number of trees in this section (total): 16								

11.1. Proposed development

The existing building on the subject site is to be demolished. As part of the demolition works on site, all trees within the property boundaries are to be removed.

A car wash facility is proposed on the subject site. The proposed works will require changes to the existing soil grade and the installation of retaining walls. The entry for the car wash will be from Station Street with vehicles exiting onto the Warburton Highway.

11.2. Tree 2

Tree 2 is a mature *Lophostemon confertus* (Queensland Brush Box) that exhibits good health and fair structure. It is likely that this tree will have useful life expectancy exceeding 30 years and the tree has a moderate retention value.

This tree is located in the road reserve on Station Street, adjacent to the subject site.

The proposed dog wash will intrude onto the TPZ for Tree 2 by 4.8% and does not intrude into the SRZ for this tree (Figure 1).

Under *AS 4970 (2009) Protection of Trees on Development Sites* this is considered to be a minor intrusion and is not expected to significantly impact on the tree. This tree is expected to remain viable within the proposed development.

The removal of the existing shed and the construction of the service station will, provided adequate care is take, create a more favourable growing environment for Trees 1 & 2.

This tree will remain viable within the proposed development provided the recommendations of this report are adopted and effectively implemented.

11.3. Tree 5

This tree is a small and immature *Acacia mearnsii* (Black Wattle) that is located on the road reserve. It exhibits good health and structure and has a moderate useful life expectancy and a low retention value.

The proposed hard standing edging and hard standing will occupy approximately 15.9% of the TPZ for this tree (Figure 1).

This TPZ intrusion is likely to permanently excise the majority of the exploitable soil volume within the occupied area.

While this TPZ intrusion exceeds the 10% mandated under *AS 4970 (2009) Protection of Trees on Development Sites*, this tree is an immature specimen that will tolerate the proposed TPZ intrusion without significant reduction in the useful life expectancy.

The excavation alignment should be excavated by hand and any significant tree roots must be neatly pruned by a qualified arborist using sharp hand tools.

This tree will remain viable within the proposed development provided the recommendations of this report are adopted and effectively implemented.

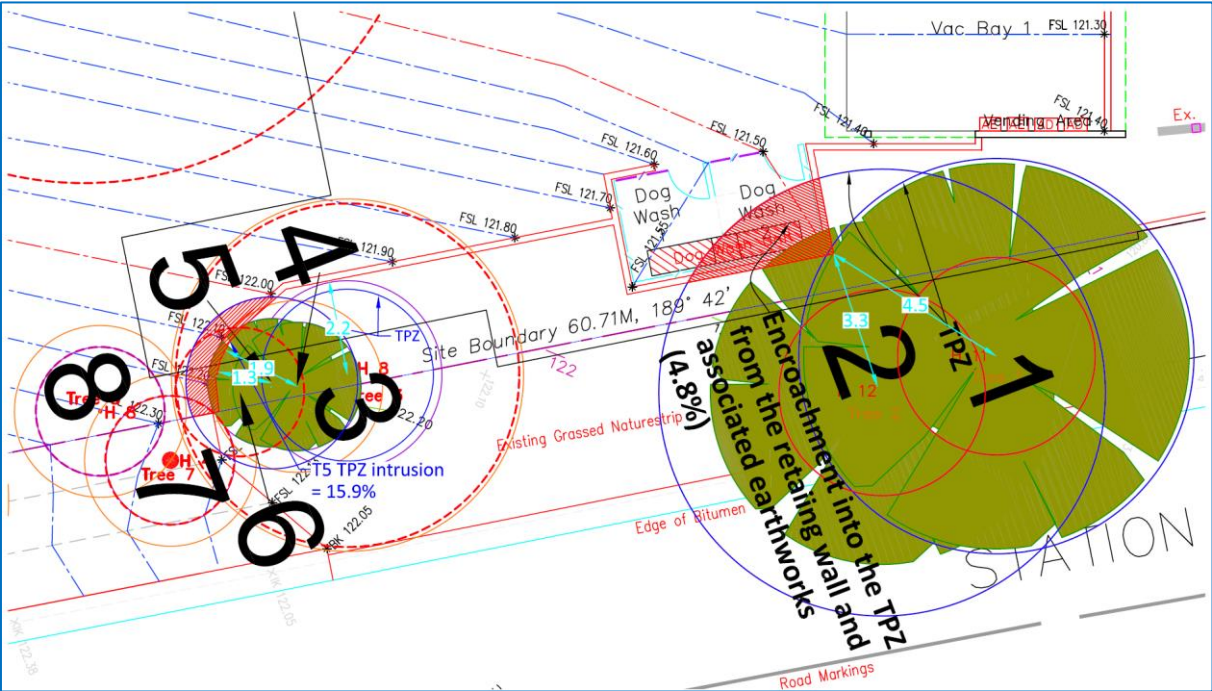


Figure 1 Trees 2 & 5 TPZ intrusions

11.1. Tree 13

Tree 2 is a mature *Melaleuca armillaris* (Giant Honey Myrtle) that exhibits fair health and poor structure. It is likely that this tree will have useful life expectancy exceeding 5 years and the tree has a moderate retention value.

The hard standing edge and hard standing intrude into the TPZ for Tree 13 by 7.4% but does not intrude into the SRZ for this tree.

Under AS 4970 (2009) *Protection of Trees on Development Sites* this is considered to be a minor intrusion and is not expected to significantly impact on the tree. This tree is expected to remain viable within the proposed development.

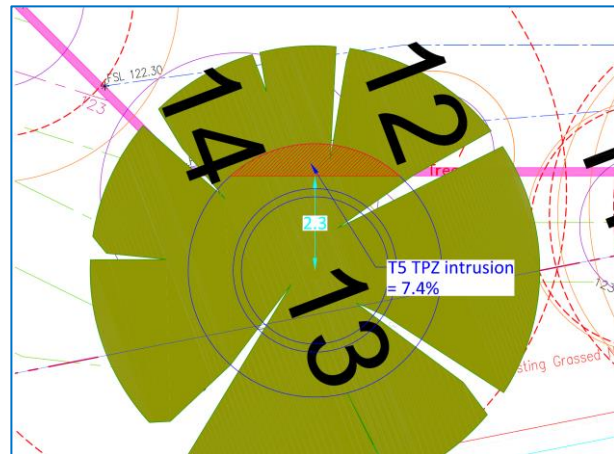


Figure 2 Tree 13 TPZ intrusion

This tree will remain viable within the proposed development provided the recommendations of this report are adopted and effectively implemented.

11.2. Demolition in the area of Trees 1 & 2

The east wall of the existing building is located along the property boundary and within the TPZ and SRZ for Trees 1 & 2. The floor of the existing building is located at a lower elevation than the top of the soils in the naturestrip along Station Street. It is likely that the wall and slab of the existing building have acted as a root barrier and prevented roots from Trees 1 and 2 from extending into the subject site. The existing building was constructed before Trees 1 and 2 were planted and it is also likely the soil below the existing building would provide unfavourable conditions for root growth due to the likely poor soil conditions below the slab of the existing building.

It has been previously observed that when a wall of a building that has acted as a root barrier has been demolished, that the tree roots can grow hard up against the wall. Tree roots can also have a higher proliferation of roots located along the wall. It is therefore recommended that when the existing building is demolished, that these works are supervised by a qualified arborist (minimum Level 5) for demolition works near Trees 1 and 2. If a significant root mass is exposed during the demolition works, the attending arborist should prune any roots that have extended below the slab of the existing building and preserve any roots located parallel to the wall of the existing building. If roots are located hard against the wall of the existing building, then the position of the proposed retaining wall should be moved by 100mm to the west of the position as shown on the plans of the proposed development.

All other works should be avoided within the naturestrip along Station Street for 6.5 metres to the north of Tree 1 and 6.5 metres to the south of Trees 1 and 2. This area should be fenced off prior to the commencement of demolition works.

There should be no new services located within the TPZs of Trees 1 and 2.

Provided that adequate care is taken during the demolition of the existing building then it is highly likely that Trees 1 and 2 can be successfully retained.

12. Recommendations

The following recommendations should be adopted to ensure the successful retention of those trees that are proposed to be retained.

A tree management plan and services plan should be created for this project prior to the commencement of works to ensure that the trees are protected through the construction of this project and that additional arboricultural impacts are avoided from the installation of services.

12.1. Trees 1 and 2

1. The demolition of the existing building must be supervised by a qualified arborist (minimum Level 5) for demolition works within the TPZ for Trees 1 and 2.
 - a. If a significant root mass is exposed during the demolition works, the attending arborist should prune any roots that extend within the design footprint of the proposed works.
2. All other works should be avoided within the area between the dog wash / vending area and the property boundary for 6.5 metres to the north of Tree 1 and 6.5 metres to the south of Tree 2.
 - a. This area should be fenced off prior to the commencement of demolition works.
3. There should be no new services located within the TPZs of Trees 1 and 2 other than within the area of the dog wash area.

13. Construction – no impact

The following trees are regarded as being suitable for retention and are unlikely to suffer any significant impact from the proposed development.

While significant care may be required to successfully retain these trees, no modification of the plans or special precautions are likely to be required to ensure this outcome. If these trees are to be retained then they should be protected during construction as outlined in Section 19 - Tree Protection Guidelines.

ID	Genus / species	DBH	SRZ	TPZ:	mTPZ	ConP:	Ret Value	Retained
The following 4 tree/s are shown as Retained on the plans provided.								
1	<i>Lophostemon confertus</i>	38	2.3	4.6	= TPZ	4.5	Moderate	Retained
4	<i>Acacia mearnsii</i>	9	1.5	2.0	= TPZ	1.9	Low	Retained
16	<i>Eucalyptus radiata</i>	82	3.1	9.8	= TPZ	12.1	High	Retained
17	<i>Pittosporum undulatum</i>	9	1.5	2.0	= TPZ	5.2	Low	Retained
SRZ: Structural Root Zone. TPZ: Tree Protection Zone. mTPZ: Tree Protection Zone.(Canopy) ConP: Construction Proximity.								
Number of trees in this section Total):		4						

14. Trees shown as removed

The following trees are shown as removed on the plans provided.

ID	Genus / species	Common name	ULE	Ret value
The retention value for the following 2 tree/s is High				
9	<i>Eucalyptus ovata</i>	Swamp Gum	30 - 60	High
14	<i>Eucalyptus ovata</i>	Swamp Gum	15 - 30	High
The retention value for the following 5 tree/s is Low				
7	<i>Pittosporum undulatum</i>	Sweet Pittosporum	15 - 30	Low
12	<i>Acacia mearnsii</i>	Black Wattle	15 - 30	Low
15	<i>Acacia baileyana</i>	Cootamundra Wattle	5 - 15	Low
20	<i>Acacia mearnsii</i>	Black Wattle	15 - 30	Low
22	<i>Eucalyptus ovata</i>	Swamp Gum	5 - 15	Low
The retention value for the following 6 tree/s is Moderate				
8	<i>Eucalyptus ovata</i>	Swamp Gum	> 60	Moderate
18	<i>Eucalyptus ovata</i>	Swamp Gum	5 - 15	Moderate
19	<i>Eucalyptus ovata</i>	Swamp Gum	15 - 30	Moderate
21	<i>Eucalyptus ovata</i>	Swamp Gum	30 - 60	Moderate
23	<i>Eucalyptus ovata</i>	Swamp Gum	30 - 60	Moderate
24	<i>Eucalyptus ovata</i>	Swamp Gum	30 - 60	Moderate
The retention value for the following 3 tree/s is Remove.				
3	<i>Acacia mearnsii</i>	Black Wattle	0	Remove.
10	<i>Melaleuca armillaris</i>	Giant Honey Myrtle	1 - 5	Remove.
11	<i>Melaleuca armillaris</i>	Giant Honey Myrtle	1 - 5	Remove.
Number of tree/s in this section (Total): 16				

15. Trees recommended for removal

The following trees are recommended for removal generally on the basis of poor, or worse, health and/or structure.

ID	Genus / species	Common name	ULE	Reason:	Ref value
The following 3 tree/s are shown as Removed on the plans provided.					
3	<i>Acacia mearnsii</i>	Black Wattle	0	Structure ULE.	Remove.
10	<i>Melaleuca armillaris</i>	Giant Honey Myrtle	1 - 5	Structure ULE.	Remove.
11	<i>Melaleuca armillaris</i>	Giant Honey Myrtle	1 - 5	Structure ULE.	Remove.
Number of tree/s in this section (Total): 3					

16. Works required

No works are recommended on the trees to be retained on this site.

17. Weed species

The following trees are regarded by authorities as being environmental weeds (Muyt, 2001) (Yarra Ranges, 2004). Consideration should be given to the removal of these trees on the basis of their potential to contribute to environmental weed problems within the local area.

Trees located on adjoining properties are not included in this list.

ID	Genus / species	Common name	ULE	Ref value
7	<i>Pittosporum undulatum</i>	Sweet Pittosporum	15 - 30	Low
15	<i>Acacia baileyana</i>	Cootamundra Wattle	5 - 15	Low
Number of tree/s in this section (Total): 2				

18. References

- Coder, K.D 1996, Construction Damage Assessments, University of Georgia.
<http://www.forestry.uga.edu/warnell/service/library/for96-039a/index.html>
- Harris, R.W., Clark, J.R. & Matheny, N.P. 2004, *Arboriculture: Integrated management of landscape trees, shrubs and vines*, 4th edn., Prentice Hall, New Jersey, USA.
- Hitchmough, J. D. 1994, *Urban Landscape Management*, Inkata Press, Chatswood, NSW.
- Society for Growing Australian Plants Maroondah, 1991, *Flora of Melbourne, a guide to the indigenous plants of the greater Melbourne area*, Society for Growing Australian Plants, Maroondah.
- Mattheck, C., Bethge, K. & Weber, K., 2015, *The body language of trees*, Karlsruhe Institute of Technology – Campus North, KS Druck GmbH, Germany.
- Standards Australia, 2009, *AS 4970 - 2009 Protection of trees on development sites*, Standards Australia, Sydney.

19. Appendix 1 - Tree protection guidelines

The following tree protection guidelines should be observed as appropriate. Where it is not possible to comply with these recommendations alternative arrangements should be decided with a qualified arborist.

1. A site specific Tree Protection Report should be commissioned prior to the commencement of construction to guide construction activity around any retained trees on or adjacent to the site.
2. Clearly marked as being retained on the site to avoid confusion during the tree removal phase.
3. The stumps of removed trees should be ground out rather than pulled to avoid injury to adjacent trees.
4. Construction specifications should include the plan location of those trees that are to be retained.
5. Penalties should be included in the construction specifications for damage to trees that are to be retained.
6. The trees to be retained should be enclosed with a 1.8 meter high chain link fence supported on steel posts driven 0.6 meters into the ground.
 - 6.1. Tree protection fencing should be established as shown.
 - 6.1.1. If tree protection fencing is not detailed in the report it should enclose, at a minimum, the entire **Structural Root Zone** and as much of the **Tree Protection Zone** as possible.
 - 6.2. Access should be provided by a single gate that should be kept locked at all times except when required for tree inspection or maintenance.
 - 6.3. Tree protection fencing should be installed following the removal of trees and prior to any other works being commenced.
 - 6.4. The area inside the fence should be mulched to a depth of 0.15 meters with general arboricultural wood chip mulch or similar.

7. Where construction clearance is required and areas of the Tree Protection Zone cannot be fenced the ground in these areas should be protected from compaction with **Ground Protection**.
 - 7.1. **Ground Protection** can consist of any constructed platform that prevents point loads on the soil within the Tree Protection Zone. These could include:
 - 7.1.1. Industrial pallets joined together to form a platform.
 - 7.1.2. 12 mm plywood joined together to form a platform.
 - 7.1.3. Planks of timber joined together to form a platform.
 - 7.2. **Ground Protection** should be constructed with sufficient strength to allow it to survive the entire construction process.
 - 7.3. **Ground Protection** should be installed following the removal of trees and prior to any other works being commenced.
8. Excavation within the **Structural Root Zone** should be avoided unless absolutely necessary.
 - 8.1. Any excavation within the **Structural Root Zone** should be performed by hand.
 - 8.2. Any excavation within or tunnelling under the **Structural Root Zone** should be supervised by a qualified arborist.
 - 8.3. Any roots encountered from the retained trees should be pruned carefully and cleanly, preferably back to a branch root.
 - 8.4. Before any roots are pruned the effect of such pruning on the health and structural stability of the tree should be evaluated by a qualified arborist.
9. Excavation within the **Tree Protection Zone** should be avoided where possible.
 - 9.1. Any excavation within the **Tree Protection Zone** should be performed carefully to minimise root injury.
 - 9.2. Any roots encountered from the retained trees should be pruned carefully and cleanly, preferably back to a branch root.
 - 9.3. Before any excavation occurs the effect of such excavation on the health and structural stability of the tree should be evaluated by a qualified arborist.
10. Concrete and other washout or waste disposal areas should be kept well away from trees to be retained.
11. Where automatic irrigation systems are installed the amount of irrigation that is applied should be checked against the requirements of the existing trees on the site.
12. Any pruning works that are required to facilitate construction should be performed by a qualified arborist.

Adapted from Harris, Clark and Matheny (2004)

21. Appendix 2 - Tree data

Note: Where **Retention value** = "Remove" only the arboricultural attributes of the tree (i.e. health, structure and ULE) are considered. Other factors that may affect the decision to retain or remove the tree are not considered.

- Where the 'Construction Proximity' is larger than the 'Tree Protection Zone (TPZ)' it is probable that the development will have **no significant impact on the health and longevity** of the tree.
- Where the 'Construction Proximity' is larger than the 'Structural Root Zone (SRZ)' it is probable that the development will have **no significant impact on the stability** of the tree.
- The following information should be read in conjunction with the 'Explanation of Terms' and the 'Glossary / Notes' sections found later in this report.

SRZ (m):	AS 4970-2009 Protection of trees on development sites. (Radius)	Total Number of trees
TPZ (m):	AS 4970-2009 Protection of trees on development sites (Radius)	23
mTPZ (m):	Modification to TPZ as required to protect canopy	
Construction Proximity:	0.1 indicates construction over or immediately adjacent to the tree	

Tree ID: 1

Genus / species: *Lophostemon confertus*
 Evergreen Queensland Brush Box
Height (m): 11 **Structure:** Fair
Width (m): 9 **Health:** Good
DBH (cm): 38 Measured **Maturity:** Mature
Origin: Australian **ULE (years):** 30 - 60
Retained?: Retained **Form:** Good
Retention Value: Moderate
Removal / retention reason: Road reserve.
Amenity value: Moderate
Works Required: N/A.

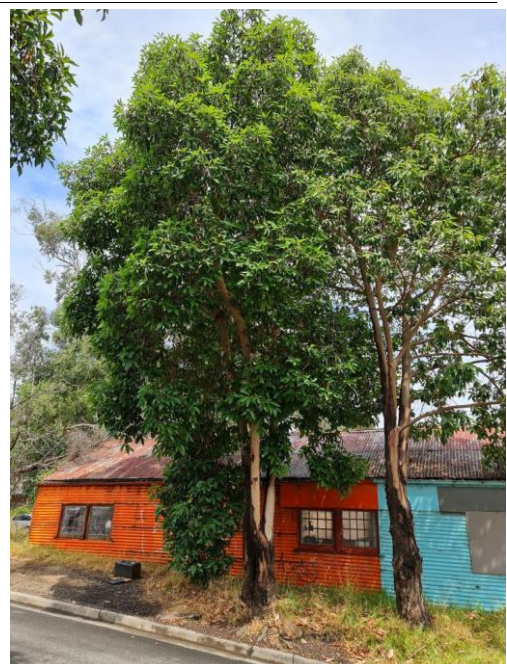
SRZ (m): 2.3 **Works priority:** N/A
TPZ (m): 4.6 **Construction Proximity:** 4.5
mTPZ (m): = TPZ



Tree ID: 2

Genus / species: *Lophostemon confertus*
 Evergreen Queensland Brush Box
Height (m): 12 **Structure:** Fair
Width (m): 8 **Health:** Good
DBH (cm): 43 Measured **Maturity:** Mature
Origin: Australian **ULE (years):** 30 - 60
Retained?: Retained **Form:** Good
Retention Value: Moderate
Removal / retention reason: Road reserve.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): 2.4 **Works priority:** N/A
TPZ (m): 5.2 **Construction Proximity:** 3.3
mTPZ (m): = TPZ



Tree ID: 3

Genus / species: *Acacia mearnsii*
 Evergreen Black Wattle
Height (m): 8 **Structure:** Very poor
Width (m): 8 **Health:** Very poor
DBH (cm): 34 Measured **Maturity:** Over mature
Origin: Melbourne **ULE (years):** 0
Retained?: Removed **Form:** Very poor
Retention Value: Remove.
Removal / retention reason: Structure ULE.
Amenity value: Very low
Works Required: N/A.

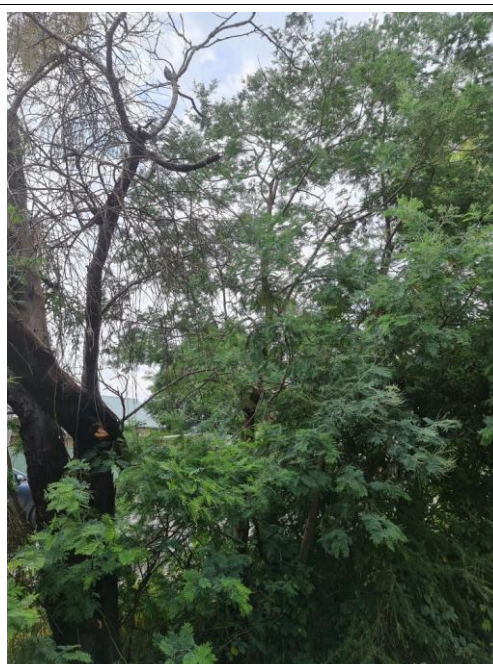
SRZ (m): 2.2 **Works priority:** High
TPZ (m): 4.1 **Construction Proximity:** 2.2
mTPZ (m): = TPZ



Tree ID: 4

Genus / species: *Acacia mearnsii*
 Evergreen Black Wattle
Height (m): 6 **Structure:** Good
Width (m): 3 **Health:** Good
DBH (cm): 9 Measured **Maturity:** Immature
Origin: Melbourne **ULE (years):** 15 - 30
Retained?: Retained **Form:** Good
Retention Value: Low
Removal / retention reason: N/A.
Amenity value: Low
Works Required: N/A.

SRZ (m): 1.5 **Works priority:** N/A
TPZ (m): 2.0 **Construction Proximity:** 1.9
mTPZ (m): = TPZ



Tree ID: 5

Genus / species: *Acacia mearnsii*
 Evergreen Black Wattle
Height (m): 6 **Structure:** Good
Width (m): 3 **Health:** Good
DBH (cm): 8 Measured **Maturity:** Immature
Origin: Melbourne **ULE (years):** 15 - 30
Retained?: Retained **Form:** Good
Retention Value: Low
Removal / retention reason: N/A.
Amenity value: Low
Works Required: N/A.

SRZ (m): 1.5 **Works priority:** N/A
TPZ (m): 2.0 **Construction Proximity:** 1.3
mTPZ (m): = TPZ



Tree ID: 7

Genus / species: *Pittosporum undulatum*

Evergreen Sweet Pittosporum

Height (m): 4 **Structure:** Fair
Width (m): 3 **Health:** Good
DBH (cm): 9 Measured **Maturity:** Immature
Origin: Victorian **ULE (years):** 15 - 30
Retained?: Removed **Form:** Fair

Retention Value: Low
Removal / retention reason: Road reserve.

Amenity value: Low

Works Required: N/A.

SRZ (m): 1.5 **Works priority:** N/A
TPZ (m): 2.0 **Construction Proximity:** 0.1
mTPZ (m): = TPZ



Tree ID: 8

Genus / species: *Eucalyptus ovata*

Evergreen Swamp Gum

Height (m): 8 **Structure:** Fair
Width (m): 3 **Health:** Good
DBH (cm): 10 Measured **Maturity:** Immature
Origin: Melbourne **ULE (years):** > 60
Retained?: Removed **Form:** Good

Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: Low

Works Required: N/A.

SRZ (m): 1.5 **Works priority:** N/A
TPZ (m): 2.0 **Construction Proximity:** 0.1
mTPZ (m): = TPZ



Tree ID: 9

Genus / species: *Eucalyptus ovata*

Evergreen Swamp Gum

Height (m): 18 **Structure:** Good
Width (m): 11 **Health:** Good
DBH (cm): 51 Measured **Maturity:** Mature
Origin: Melbourne **ULE (years):** 30 - 60
Retained?: Removed **Form:** Good

Retention Value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: N/A.

SRZ (m): 2.6 **Works priority:** N/A
TPZ (m): 6.1 **Construction Proximity:** 0.1
mTPZ (m): = TPZ



Tree ID: 10

Genus / species: *Melaleuca armillaris*

Evergreen Giant Honey Myrtle

Height (m): 6 **Structure:** Poor

Width (m): 10 **Health:** Fair

DBH (cm): 40 Estimated **Maturity:** Mature

Origin: Victorian **ULE (years):** 1 - 5

Retained?: Removed **Form:** Poor

Retention Value: Remove.

Removal / retention reason: Structure ULE.

Amenity value: Low

Works Required: N/A.

SRZ (m): 2.4 **Works priority:** Low

TPZ (m): 4.8 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



Tree ID: 11

Genus / species: *Melaleuca armillaris*

Evergreen Giant Honey Myrtle

Height (m): 5 **Structure:** Poor

Width (m): 6 **Health:** Poor

DBH (cm): 26 Measured **Maturity:** Mature

Origin: Victorian **ULE (years):** 1 - 5

Retained?: Removed **Form:** Poor

Retention Value: Remove.

Removal / retention reason: Structure ULE.

Amenity value: Low

Works Required: N/A.

SRZ (m): 1.8 **Works priority:** Low

TPZ (m): 3.1 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



Tree ID: 12

Genus / species: *Acacia mearnsii*

Evergreen Black Wattle

Height (m): 7 **Structure:** Good

Width (m): 3 **Health:** Good

DBH (cm): 10 Measured **Maturity:** Immature

Origin: Melbourne **ULE (years):** 15 - 30

Retained?: Removed **Form:** Good

Retention Value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: N/A.

SRZ (m): 1.5 **Works priority:** N/A

TPZ (m): 2.0 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



Tree ID: 13

Genus / species: *Melaleuca armillaris*

Evergreen Giant Honey Myrtle

Height (m): 13 **Structure:** Poor
Width (m): 11 **Health:** Fair
DBH (cm): 26 Measured **Maturity:** Mature
Origin: Victorian **ULE (years):** 5 - 15
Retained?: Retained **Form:** Fair

Retention Value: Low

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: Remove vine.

SRZ (m): 1.8 **Works priority:** Moderate

TPZ (m): 3.1 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



Tree ID: 14

Genus / species: *Eucalyptus ovata*

Evergreen Swamp Gum

Height (m): 19 **Structure:** Fair
Width (m): 16 **Health:** Fair
DBH (cm): 109 Measured **Maturity:** Mature
Origin: Melbourne **ULE (years):** 15 - 30
Retained?: Removed **Form:** Good

Retention Value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: > 50mm dead wood, Further assessment, Remove vine.

SRZ (m): 3.4 **Works priority:** Low

TPZ (m): 13.1 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



Tree ID: 15

Genus / species: *Acacia baileyana*

Evergreen Cootamundra Wattle

Height (m): 8 **Structure:** Fair
Width (m): 7 **Health:** Fair
DBH (cm): 38 Measured **Maturity:** Mature
Origin: Australian **ULE (years):** 5 - 15
Retained?: Removed **Form:** Fair

Retention Value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: > 50mm dead wood, Remove hanging limbs.

SRZ (m): 2.3 **Works priority:** Moderate

TPZ (m): 4.6 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



Tree ID: 16

Genus / species: *Eucalyptus radiata*

Evergreen Narrow Leaf Peppermint

Height (m): 21 **Structure:** Fair
Width (m): 14 **Health:** Fair
DBH (cm): 82 Measured **Maturity:** Mature
Origin: Melbourne **ULE (years):** 15 - 30
Retained?: Retained **Form:** Fair
Retention Value: High

Removal / retention reason: Road reserve.

Amenity value: High

Works Required: N/A.

SRZ (m): 3.1 **Works priority:** N/A
TPZ (m): 9.8 **Construction Proximity:** 12.1
mTPZ (m): = TPZ



Tree ID: 17

Genus / species: *Pittosporum undulatum*

Evergreen Sweet Pittosporum

Height (m): 3 **Structure:** Fair
Width (m): 3 **Health:** Good
DBH (cm): 9 Measured **Maturity:** Immature
Origin: Victorian **ULE (years):** 15 - 30
Retained?: Retained **Form:** Fair
Retention Value: Low

Removal / retention reason: Road reserve.

Amenity value: Low

Works Required: N/A.

SRZ (m): 1.5 **Works priority:** N/A
TPZ (m): 2.0 **Construction Proximity:** 5.2
mTPZ (m): = TPZ



Tree ID: 18

Genus / species: *Eucalyptus ovata*

Evergreen Swamp Gum

Height (m): 18 **Structure:** Poor
Width (m): 17 **Health:** Fair
DBH (cm): 110 Measured **Maturity:** Mature
Origin: Melbourne **ULE (years):** 5 - 15
Retained?: Removed **Form:** Fair
Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: High

Works Required: > 50mm dead wood, Aerial inspection.

SRZ (m): 3.4 **Works priority:** Moderate
TPZ (m): 13.2 **Construction Proximity:** 0.1
mTPZ (m): = TPZ



Tree ID: 19

Genus / species: *Eucalyptus ovata*

Evergreen Swamp Gum

Height (m): 12 **Structure:** Fair

Width (m): 9 **Health:** Good

DBH (cm): 29 Measured **Maturity:** Mature

Origin: Melbourne **ULE (years):** 15 - 30

Retained?: Removed **Form:** Fair

Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): 2 **Works priority:** N/A

TPZ (m): 3.5 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



Tree ID: 20

Genus / species: *Acacia mearnsii*

Evergreen Black Wattle

Height (m): 7 **Structure:** Fair

Width (m): 7 **Health:** Good

DBH (cm): 29 Measured **Maturity:** Mature

Origin: Melbourne **ULE (years):** 15 - 30

Retained?: Removed **Form:** Good

Retention Value: Low

Removal / retention reason: N/A.

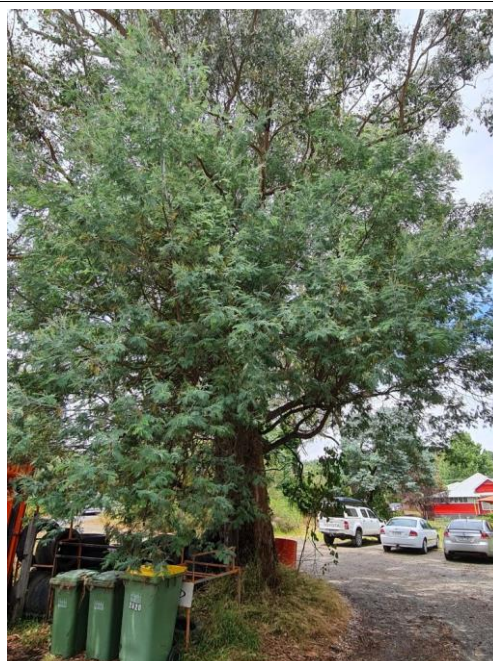
Amenity value: Low

Works Required: N/A.

SRZ (m): 2 **Works priority:** N/A

TPZ (m): 3.5 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



Tree ID: 21

Genus / species: *Eucalyptus ovata*

Evergreen Swamp Gum

Height (m): 14 **Structure:** Good

Width (m): 8 **Health:** Good

DBH (cm): 31 Measured **Maturity:** Mature

Origin: Melbourne **ULE (years):** 30 - 60

Retained?: Removed **Form:** Good

Retention Value: Moderate

Removal / retention reason: Adjoining property.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): 2 **Works priority:** N/A

TPZ (m): 3.7 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



Tree ID: 22

Genus / species: *Eucalyptus ovata*

Evergreen Swamp Gum

Height (m): 9 **Structure:** Poor
Width (m): 9 **Health:** Fair
DBH (cm): 29 Measured **Maturity:** Mature
Origin: Melbourne **ULE (years):** 5 - 15
Retained?: Removed **Form:** Poor

Retention Value: Low

Removal / retention reason: Adjoining property.

Amenity value: Low

Works Required: N/A.

SRZ (m): 2 **Works priority:** N/A

TPZ (m): 3.5 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



Tree ID: 23

Genus / species: *Eucalyptus ovata*

Evergreen Swamp Gum

Height (m): 15 **Structure:** Fair
Width (m): 9 **Health:** Good
DBH (cm): 39 Measured **Maturity:** Mature
Origin: Melbourne **ULE (years):** 30 - 60
Retained?: Removed **Form:** Good

Retention Value: Moderate

Removal / retention reason: Adjoining property.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): 2.3 **Works priority:** N/A

TPZ (m): 4.7 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



Tree ID: 24

Genus / species: *Eucalyptus ovata*

Evergreen Swamp Gum

Height (m): 13 **Structure:** Fair
Width (m): 9 **Health:** Good
DBH (cm): 61 Measured **Maturity:** Mature
Origin: Melbourne **ULE (years):** 30 - 60
Retained?: Removed **Form:** Good

Retention Value: Moderate

Removal / retention reason: Adjoining property.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): 2.8 **Works priority:** N/A

TPZ (m): 7.3 **Construction Proximity:** 0.1

mTPZ (m): = TPZ



21. Appendix 3 – Arboricultural information

The following sections are presented to provide an introduction to the process of tree root system protection. A trees root system is the critical element to be protected during the development process and if the trees roots are adequately protected then the rest of the tree will generally survive without significant injury.

21.1. Root plate estimation

One of the primary purposes of this report is to estimate the impact of the development on the trees on this site. This is mainly achieved by estimating the extent of the root plate area of the trees that are proposed to be retained and the proportion of this area that is likely to be excised or affected during the construction process.

In this report two elements of the tree root area are described. These are:

21.1.1. Structural Root Zone

This is an estimate of the radius that is likely to encompass the major scaffold roots of the tree. These roots are critical to anchoring the tree and damage to these roots will increase the risk of entire tree failure (i.e. uprooting). This radius is based on AS 4970-2009.

21.1.2. Tree Protection Zone

This is an estimate of the radius that is likely to encompass enough of the smaller absorbing roots to allow the tree to obtain sufficient nutrients and water to allow it to survive in the long term. This radius is based on AS 4970-2009 and is based on the size of the tree.

Estimation of the likely root plate radius for both methods are based on the DBH (Diameter at Breast Height) of each tree. This is usually measured but where the tree is inaccessible or has numerous trunks a visual estimation may be used. Whether the DBH is estimated or measured is noted within the "Tree Data" section of the report.

The two elements of each trees' root zone is transposed over the site survey and building footprint and the degree of root injury is calculated from this.

21.2. Tree rooting patterns

Contrary to common belief, trees usually have a broad flat plate of roots that may extend 1.5 – 3 times the radius of the canopy (Harris, Matheny & Clark, 1999; Coder, 1996; Hitchmough, 1994). Relatively few trees have deep roots and Harris, Matheny and Clark (2004) note that most tree roots will be found in the top 1.0 metre of the soil profile.

While the models used to approximate the size of tree root plates assume a uniformly radial root system, in highly disturbed urban soils root systems often develop in a highly asymmetric manner (Matheny & Clarke, 2004). This may require the modification of the models used where it is likely that the root system is asymmetric.

21.3. Construction impacts

Construction in the vicinity of trees can have several negative impacts on their health, longevity and structural stability. Harris, Matheny and Clark (2004) note that some level of tree root injury or root zone change is almost inevitable during construction around trees and maintain that the goal of tree preservation is to reduce the injury or change to a level that will enable the long term preservation of the retained trees.

Negative impacts can include:

- Root severance from trenching and grading activities. Damage to the transport and absorbing root system may deprive the tree of the ability to absorb nutrients and water and damage to the structural scaffold roots that support the tree may result in instability and uprooting. Depending on the percentage of the root plate affected and proximity to the tree, the affects can range from minor degradation of health through to total root plate failure (i.e. uprooting).
- Compaction and root injury. Most trees require a well aerated and friable soil to allow normal physiological processes to occur and to allow root growth. Soil compaction from pedestrian or vehicular traffic can result in direct injury to the roots, indirect injury through soil drainage changes, reduced soil aeration or decreased soil penetrability. If severe enough soil compaction can lead to a rapid decline in many tree species and may eventually result in instability and uprooting.
- Changes in drainage patterns. Changes in drainage patterns may result from hard surfacing, trenching, land shaping and other construction activities. These can result in either drought stress or waterlogging, both of which can cause a rapid decline in trees and may result in instability and uprooting.

22. Appendix 4 - AS 4970 -2009

This report generally conforms to *AS 4970 – 2009 Protection of Trees on Development Sites* except in the following areas.

1. AS 4970 notes that the project arborist should verify the accuracy of feature survey for the subject site.
 - a. This is generally not feasible and the feature survey is taken as being an accurate representation of the features of the site.
 - b. However if trees are found on the site that are not represented in the feature survey then these trees will be added to the report plans based on a visual estimation of their location.
 - i. Accordingly the location of these trees may not be sufficiently accurate for the purposes of the report.
 - ii. The location of these trees should be verified by a qualified surveyor where appropriate.
2. *AS 4970-2009 Protection of Trees on Development Sites* makes no differentiation between the Tree Protection Zone (TPZ) derived from the trees DBH and the modified TPZ derived from the trees canopy where it extends past the DBH derived TPZ. As the two forms of TPZ are independent a differentiation between the two forms of TPZ needs to be made. In this report:
 - a. “TPZ” refers to the DBH derived Tree Protection Zone (12 x DBH) and “mTPZ” pertains to the TPZ where it is modified to account for a canopy that extends beyond the DBH derived TPZ.
 - b. The modified Tree Protection Zone (mTPZ) for all trees is taken as being identical to the Tree Protection Zone (TPZ) except where the canopy of the tree extends beyond the TPZ. Where this is the case the TPZ is shown on the site plans and any tree canopy impacts are addressed as required within the report. Otherwise the mTPZ is recorded within this report as “= TPZ”.

23. Appendix 5 - Explanation of terms

The assessment of Health, Structure, Condition, U.L.E. (Useful Life Expectancy), Origin, Maturity, Form and Retention value are based on the following definitions. In the case of health and structure these definitions encompass only the more common indicators for these assessments. Other indicators not included in these definitions may lead to the ascribing of a particular health or structure category.

23.1. Origin

The notation of "Origin" is based on the following categories.

➤ Category	Description
➤ Melbourne	Native to the greater Melbourne metropolitan area as defined by Flora of Melbourne (S. G. A. P. M., 1991).
➤ Victorian	Native to Victoria but not the greater Melbourne Metropolitan area.
➤ Australian	Native to Australia but not Victoria.
➤ Exotic	Not native to Australia.

23.2. Maturity

The notation of "Maturity" is based on the following categories.

➤ Category	Description
➤ Immature	Less than 20% of the life expectancy for that tree.
➤ Mature	20 – 80% of the life expectancy for that tree.
➤ Over mature	> 80% of the life expectancy for that tree.

23.3. Works required

The works required listed in this report are of a general nature only and should be reviewed following the completion of any works on the site.

Where a tree is recommended for removal (Recommendation) it is not listed in the Works required section of the report.

23.4. Priority

The priority accorded particular works is based on a projected increased site usage following the completion of a development on the site. The priority is of a general nature only and should be reviewed following the completion of any works on the site.

“Priority” is based on the following categories.

<u>Category</u>	<u>Description</u>
➤ N/A.	No tree works are required
➤ Very low	Tree works are optional and could be performed at any time..
➤ Low	Works should be performed within five years.
➤ Moderate	Works should be performed within 3 years.
➤ High	Works should be performed within 12 months.
➤ Urgent	Works should be performed immediately.

23.5. Retention value (RV)

The Retention value ascribed to each tree in this report is not definitive and should be used as a guide only. Many factors influence the comparative value of a tree and a number of these factors are outside the scope of arboricultural assessment. These factors cannot therefore be addressed in a single rating system.

Retention value is comprised of two parts. These are the Amenity Value of the tree rated as Very Low to Very high and the Useful Life Expectancy (ULE) of the tree.

The Amenity Value of the tree relates to the contribution of the tree to the aesthetic amenity of the area. The primary determinants of amenity value are tree health, size and form.

The Amenity Value is then modified by the ULE of the tree with short ULE values reducing the RV of the tree and long ULE values increasing the RV of the tree.

Trees that are listed on a register of heritage or significant trees are not accommodated within this rating system as these values are often independent from the arboricultural attributes of the tree. Heritage and significant trees may be ascribed a very low retention value despite their listing on any register. Where known, any heritage or significant register listing it will be noted in the report.

RV is assessed on each tree as a single entity. The value of a group of trees is not considered in this context and each tree within the group will be assessed as an individual.

Amenity value is based on the following categories and is ascribed an Amenity Value Value (AVV) ranging from 2 - 10.

<u>Category</u>	<u>Example</u>	<u>AVV</u>
➤ Very high	Generally a very large tree that exhibits excellent health and/or form or a tree that is listed on a heritage or significant tree register.	10
➤ High	Generally a large tree that exhibits good health and/or form.	8
➤ Medium	Generally a medium tree that exhibits good health and/or form. May be a large tree that exhibits fair health and/or form.	6
➤ Low	Generally a small tree that exhibits good health and/or form. May be a large or medium tree that exhibits fair or poor health and/or form.	4
➤ Very low	Generally a small tree that exhibits poor health and/or form. May be a large or medium tree that exhibits poor, or worse, health and/or form.	2

U.L.E. is based on the following categories each of which have a modifier (ULEM) ranging from 0 – 12.

<u>Category</u>	<u>Example</u>	<u>ULEM</u>
➤ 0	The tree is dead or almost dead or constitutes an immediate and unacceptable hazard.	0
➤ 0 – 5	The tree is unlikely to provide useful amenity for longer than 5 years. The tree is in serious decline, poses an unacceptable hazard and/or requires a level of maintenance disproportionate with its' value.	4
➤ 5 – 15	The tree is unlikely to provide useful amenity for longer than 15 years. The tree may be in serious decline, be a very short lived species, present a moderately elevated hazard and/or require high levels of maintenance.	7
➤ 15 – 30	The tree is unlikely to provide useful amenity for longer than 30 years. The tree may be in moderate decline, a short lived species, present a slightly elevated hazard and/or require moderate levels of maintenance.	10

➤ 30 – 60	The tree is likely to provide useful amenity for up to 60 years. The tree may be in fair to good condition, have a moderate life-span, present a low to moderate level of hazard and/or require moderate levels of maintenance.	11
➤ > 60	The tree is likely to provide useful amenity for greater than 60 years. The tree may be in good to excellent condition, a long lived species, present a low level of hazard and/or require low levels of maintenance.	12

RV is then derived from the multiplication of AVV by ULEM and the resulting score is categorised as Very high to Very low.

<u>Category</u>	<u>Example</u>	<u>RV value</u>
➤ Very high	Every effort should be made to preserve trees in this category	96 - 120
➤ High	These trees should be retained if at all possible	72 - 95
➤ Moderate	These trees should be retained if they do not overly constrain development on the site.	48 - 71
➤ Low	These trees should not create a material constraint on development of the site. These trees should be removed where they conflict with development of the site.	24 - 47
➤ Very low	Generally a small tree that exhibits poor health and/or form. May be a large or medium tree that exhibits poor, or worse, health and/or form. These trees should generally be removed.	1 – 23
➤ Remove	These trees are not suitable for retention within the site and are recommended to be removed.	0

23.6. Health

Pertains to the health and growth potential of the tree.

The notation of "Health" is based on the following categories.

<u>Category</u>	<u>Example</u>
➤ Good	<p>Crown full, with good foliage density. Foliage is entire with average colour, minimal or no pathogen damage. Above average growth indicators such as extension growth, leaf size and canopy density. Little or no canopy die-back. Generally no dead wood on the perimeter of the canopy. Good wound wood development.</p> <p>Tree exhibits above average health and no works are required.</p>
➤ Fair	<p>Tree may have more than 30% dead wood, or may have minor canopy dieback. Foliage density may be slightly below average for the species. Foliage colour may be slightly lower than average and some discolouration may be present. Typical growth indicators, e.g. extension growth, leaf size, canopy density for species in location. Average wound wood development.</p> <p>The tree exhibits below average health and remedial works may be employed to improve health.</p>
➤ Poor	<p>Tree may have more than 30% dead wood and canopy die back may be present. Leaves may be discoloured and/or distorted, often small, and excessive epicormic growth may be present. Pathogens and/or stress agents may be present that could lead, or are leading to, the decline of tree. Poor wound wood development.</p> <p>The tree exhibits low health and remedial works or removal may be required.</p>
➤ Very poor	<p>The tree has more than 30% dead wood. Extensive canopy die back is present. Canopy is very sparse. Pathogens and/or stress agents are present that are leading to the decline of the tree. Very poor wound wood development.</p> <p>The tree exhibits very low health and remedial works or removal are required.</p>
➤ Dead	<p>Tree is dead and generally should be removed.</p>

23.7. Structure

Pertains to the physical structure of the tree including the main scaffold branches and roots. Structure includes those attributes that may influence the probability of major trunk, root or limb failure.

The notation of “Structure” is based on the following categories.

<u>Category</u>	<u>Example</u>
➤ Good	<p>The tree has a well-defined and balanced crown. Branch unions appear to be strong with no defects evident in the trunk or the branches. The tree is unlikely to suffer trunk or branch failure under normal conditions.</p> <p>The tree is considered a good example of the species with a well-developed form.</p>
➤ Fair	<p>The tree has some minor problems in the structure of the crown. The crown may be slightly out of balance and some branch unions may exhibit minor structural faults or have the potential to create faults. If the tree is single trunked, this may be on a slight lean or be exhibiting minor defects.</p> <p>These defects are not likely to result in catastrophic trunk or branch failure although some branch failure may occur under normal conditions.</p>
➤ Poor	<p>The tree has significant problems in the structure of the scaffold limbs or trunk. It may be lop-sided or have few branches on one side or have large gaps in the crown. Large branches may be rubbing or crossing over. Branch unions may be poor, and faults at the point of attachment or along the branches may be evident. The tree may have a substantial lean. The tree may have suffered significant root damage. The tree may have some degree of basal or trunk damage.</p> <p>These defects may predispose the tree to major trunk or branch failure.</p>
➤ Very poor	<p>The tree has some very significant problems in the structure of the crown. It may be lop-sided or have few branches on one side or have large gaps in the crown. Branches may be rubbing or crossing over and causing damage to each other. Branch unions may be poor, and faults at the point of attachment or along the branches may be evident. The tree may have a substantial lean. The tree may have suffered major root damage. The tree may have extensive basal or trunk damage.</p> <p>These defects are likely to predispose the tree to trunk or scaffold limb failure.</p>

23.8. U.L.E. (Useful Life Expectancy)

U.L.E. pertains to the span of time that the tree might reasonably be expected to provide useful amenity value with an acceptable level of safety at an acceptable cost. Depending on the situation, available financial resources and other factors, two identical trees may be accorded different longevity ratings.

The notation of U.L.E. is based on the following categories.

<u>Category</u>	<u>Example</u>
➤ 0	The tree is dead or almost dead or constitutes an immediate and unacceptable hazard. The tree should generally be removed unless other considerations require its' retention.
➤ 0 – 5	The tree is unlikely to provide useful amenity for longer than 5 years. The tree is in serious decline, poses an unacceptable hazard and/or requires a level of maintenance disproportionate with its' value. The tree should generally be removed unless other considerations require its' retention.
➤ 5 – 15	The tree is unlikely to provide useful amenity for longer than 15 years. The tree may be in serious decline, be a very short lived species, present a moderately elevated hazard and/or require high levels of maintenance. The tree could be retained or removed depending on the situation.
➤ 15 – 25	The tree is unlikely to provide useful amenity for longer than 25 years. The tree may be in moderate decline, be a short lived species, present a slightly elevated hazard and/or require moderate levels of maintenance. The tree should generally be retained unless other factors dictate its' removal.
➤ 25 – 50	The tree is likely to provide useful amenity for up to 50 years. The tree may be in fair to good condition, have a moderate life-span, present a low to moderate level of hazard and/or require moderate levels of maintenance. The tree should generally be retained unless other factors dictate its' removal.
➤ > 50	The tree is likely to provide useful amenity for greater than 50 years. The tree may be in good to excellent condition, a long lived species, present a low level of hazard and/or require low levels of maintenance. The tree should generally be retained unless other factors dictate its' removal.

24. Form

The notation of “Form” pertains to the aesthetic qualities of the trees live canopy. Generally good form is indicative of a symmetrical, well-balanced canopy although this is dependent on the particular species. Some species naturally develop an asymmetric canopy and in this case a highly irregular canopy might be described as good.

The form of a tree is considered assuming that the tree stands in isolation from any surrounding trees. This may mean that a group of trees that exhibit good form as a group, may be described as having poor form as individuals.

The notation of “Form” is based on the following categories.

<u>Category</u>	<u>Example</u>
➤ Very good	<p>An outstanding specimen of that species.</p> <p>Generally a very evenly balanced and symmetrical canopy with no deformation.</p> <p>If the development of that species is naturally irregular then an outstanding specimen of that species.</p>
➤ Good	<p>A good specimen of that species.</p> <p>Generally a well balanced and symmetrical canopy with minor deformation.</p> <p>If the development of that species is naturally irregular then a good specimen of that species.</p>
➤ Fair	<p>An average specimen of that species.</p> <p>Generally a balanced canopy with some minor to moderate asymmetry.</p> <p>If the development of that species is naturally irregular then an average specimen of that species.</p>
➤ Poor	<p>A below average specimen of that species.</p> <p>Generally a moderate to high degree of asymmetry.</p> <p>If the development of that species is naturally irregular then a poor specimen of that species.</p>
➤ Very poor	<p>A very poor specimen of that species.</p> <p>Generally a high to extreme degree of asymmetry.</p> <p>If the development of that species is naturally irregular then a very poor specimen of that species.</p>

25. Glossary / notes

<u>Tree Protection Zone (TPZ)</u>	Is based on AS 4970-2009 <i>Protection of trees on development sites</i> and defines the soil volume that is likely to be required to encompass enough of the trees absorbing root system to ensure the long term survival of the tree. The radius specified as the TPZ is an estimate of the minimum distance from the tree that excavation or other activities that might result in root damage should occur to avoid negative impacts on the health and longevity of the tree. AS 4970 states that intrusion of up to 10% of the surface area of the TPZ may occur without further assessment or analysis.
<u>Structural Root Zone (SRZ)</u>	<p>Is based on AS 4970-2009 (Protection of trees on development sites) and defines the likely spread of the trees scaffold root system. These roots are the primary anchoring roots for the tree and damage to these roots may render the tree liable to uprooting.</p> <p>SRZ is based on measurement of the trunk above the root flair (AS 4970) However in this report SRZ is based on the measured or estimated DBH and there should be taken as an estimate only. Additional measurement may be required if construction near the SRZ is expected to occur.</p>
<u>Modified Tree Protection Zone (mTPZ)</u>	Is based on the TPZ and includes any requirement to protect the above ground parts of the tree that project beyond the TPZ. However generally the mTPZ will be equal to the TPZ. TPZ extension beyond the TPZ to protect the tree canopy will be shown on the site plan but will not be reflected in the TPZ radius measurements quoted in this report.
<u>DBH (Diameter at Breast Height)</u>	Is the diameter of the tree at approximately 1.4 meters above ground level. Where a trunk is divided at or near 1.4 meters above ground the DBH is generally measured at the narrowest point of the trunk between ground level and 1.4 meters. Alternatively, where a higher level of accuracy is required with multi stemmed trees, DBH is derived from the combined cross sectional area of all trunks. The DBH of all accessible trees is measured unless otherwise stated in the Tree Data section of this report. The DBH of trees on adjoining properties is measured where access can be readily gained to the property, otherwise it is estimated.
<u>Measured</u>	Indicates whether the DBH has been measured or estimated. DBH may be estimated for small low value multi stem trees or trees that are inaccessible.
<u>Retained?</u>	Indicates whether the tree is shown as being removed or retained on the plans provided. This is generally derived from the site plans provided but the removal or retention of trees might be communicated by other means.

Recommendation reason Pertains to the reason that removal or retention or other works are recommended. Other than trees on adjoining properties or road reserves a reason for retention is usually not given. In this case N/A is used.

Height & width Tree height is generally measured for moderate, high and very high value trees and is measured with an Impulse Laser infrared range finder. The height of low and very low value trees is usually estimated. Canopy width is estimated unless otherwise stated.

Genus / species The identification of trees is based on accessible visual characteristics and given that key identifying features are often not available at the time of assessment the accuracy of identification is not guaranteed. Where the species of any tree is not known, **sp.** is used.

26. Practice Note VCAT 2 — Expert Evidence

26.1. Name & address of consultant

Daniel van Kollenburg of 2 Webbs Road, Ferny Creek, Victoria, 3786.

26.2. Qualifications & experience

Daniel van Kollenburg has the following qualifications and experience:

- Diploma of Applied Science (Horticulture).
- Over 12 years experience in arboriculture.
 - 2.5 years as a contract climber with a range of companies.
 - 10 years as a consulting arborist.

26.3. Area of expertise

Daniel van Kollenburg provides specialist technical advice in the field of arboriculture. This includes the provision of technical expertise relating to problem diagnosis, management programs, tree appraisal and valuation and the relationship between trees and built structures.

26.4. Expertise to report

Daniel van Kollenburg has, by training, education, experience and research, considerable knowledge relating to the care, maintenance and management of trees in a wide variety of contexts.

Significant areas of operation and expertise include the provision of tree and built structure conflict reports, hazard assessment, tree condition appraisal and broad scale tree inventories.

Considerable effort is expended in research to remain current with the latest advances in all areas relating to tree care.

26.5. Declaration

“I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld from the Tribunal.”

27. Assumptions & limiting conditions

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 - 9.2. Our inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee, express or implied, that even if they were not present during our inspection, problems or defects in plants or property examined may not arise in the future.
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Yours sincerely,



Daniel van Kollenburg
Dip. App. Sci. (Hort).