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For

William Ross Architects Pty Ltd

Site location

Sacred Heart Girls College Warrigal Road Hughesdale

Report type

Arboricultural Construction Impact Assessment

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1. Summary

This report was commissioned by Ms. Peggy Teo of William Ross Architects Pty Ltd to assess the condition of sixteen trees located on or adjacent to Sacred Heart Girls College, Warrigal Road, Hughesdale 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 the naturestrip along Latrobe Street, adjacent to the subject site (Tree 13 to 17). All works are shown as being outside of the Tree Protection Zones of these trees and it is unlikely that these trees will be impacted by the proposed development.
- Eleven trees are located on the subject site.
 - There are no trees of high retention value within the area of the proposed development.
 - Five of the assessed trees are of moderate retention value.
 - Three of these trees are shown as being removed as part of the proposed development (Trees 1, 5 and 10).
 - Two of these trees are shown as being retained. The proposed development will have a low-level impact on these trees (Trees 3 and 4).
 - Six of the assessed trees are of low retention value.
 - Five of these trees are shown as being removed on the plans of the proposed development (Tree 2, 7, 9, 11 and 12).
 - One of these trees is shown as being retained (Tree 8). The proposed development will have a low impact on this tree.

2. Document control

File reference	File type	Modifications	Date
6245 210721	CIR	Original document. Construction impact assessment for sixteen trees.	21/07/2021
6245 210803	CIR	Tree 2 shown as removed.	03/08/2021

3. Introduction

This report was commissioned by Ms. Peggy Teo of William Ross Architects Pty Ltd to assess the condition of sixteen trees located on or adjacent to Sacred Heart Girls College, Warrigal Road, Hughesdale 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 Monday, 19 July 2021.

4. Documents reviewed

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

Date	Title	Author	Company
04/06/2021	Feature and Level Survey (Sheet 2 of 2)	HL	Cardno TMG
08/07/2021	Sacred Heart Girls' College Latrobe Street Wing Extension – Landscape Concept Plan (Issue C)	Not stated	MDG Landscape Architects
30/07/2021	Existing Site Plan TP01	Not stated	William Ross
30/07/2021	Demolition Plan TP02	Not stated	William Ross
30/07/2021	Proposed site Plan & Design Response TP03.	Not stated	William Ross
30/07/2021	Existing & Proposed Elevations TP08.	Not stated	William Ross
30/07/2021	Existing & Proposed Elevations TP09.	Not stated	William Ross

5. Scope

Only those trees as specified by Ms. Peggy Teo of William Ross Architects were assessed as part of this report. An additional street tree was assessed to the north of the existing crossover on Latrobe Street was also assessed as this tree may be impacted by construction activities on the subject site.

6. Site context

This site is located within a General Residential Zone – Schedule 3 (GRZ3) within the municipal area of Monash.

There are no town planning overlays are applicable to this site that affect vegetation.

7. Notes

1. Trees 6, 18, 19, 20 and 21 were shown on the site and feature survey but were not found at the time of the site inspection.
2. The plans used for this report showed differing trees identified for removal. Most plans had notation referring to the Landscape Plan for tree removal and therefore those trees shown as being removed on the landscape plans are those identified for removal in this report.
3. The column label “ID” is used in all the tables throughout this report. This refers to the tree identification number and to the tree numbering found on the “Site plan”. This number is the same as the “Tree ID” found in the “Tree data” section of the report.

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

9.1. Existing conditions

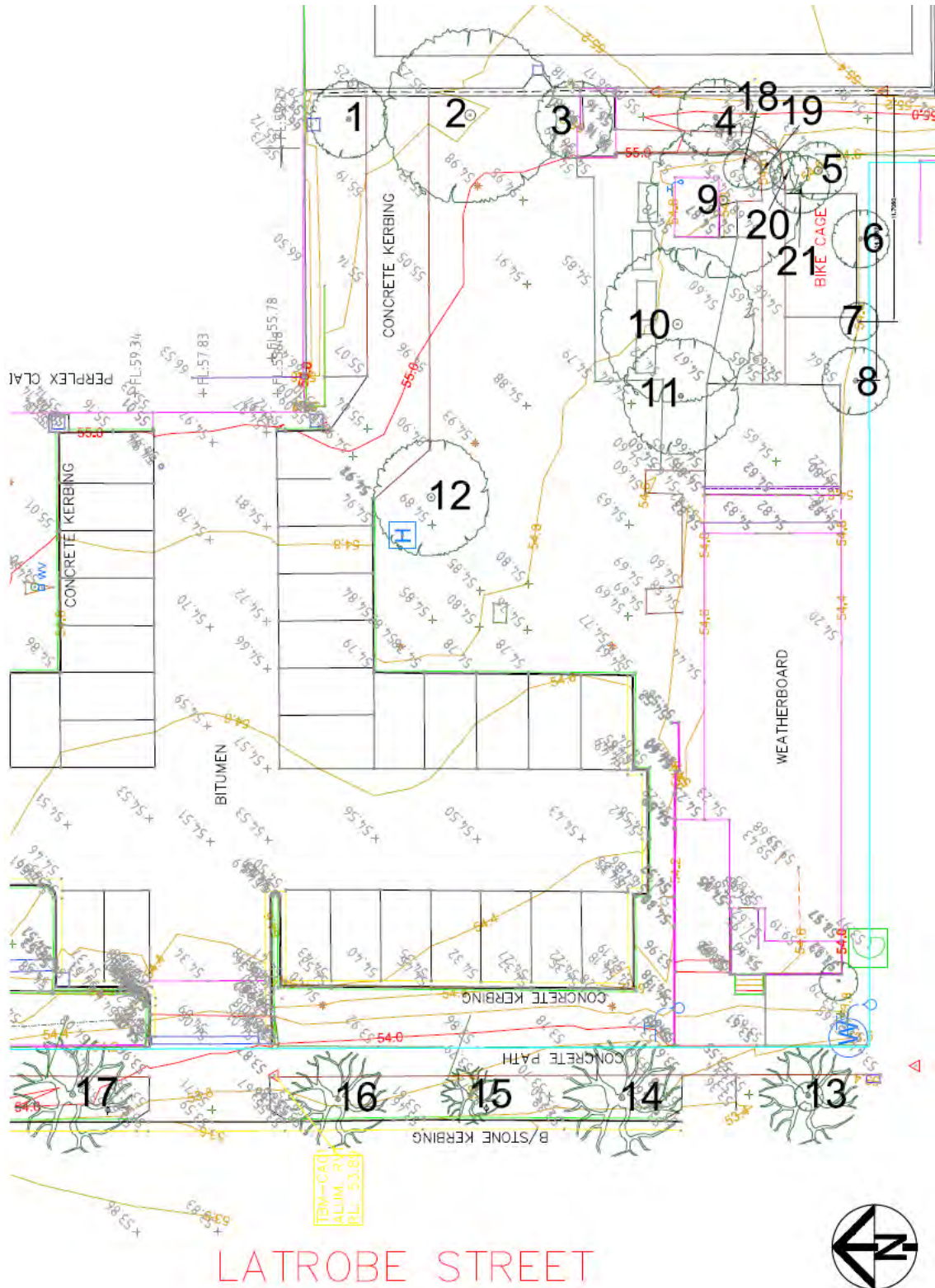


Figure 1 Tree assessment area - Existing conditions.

9.2. Demolition plan

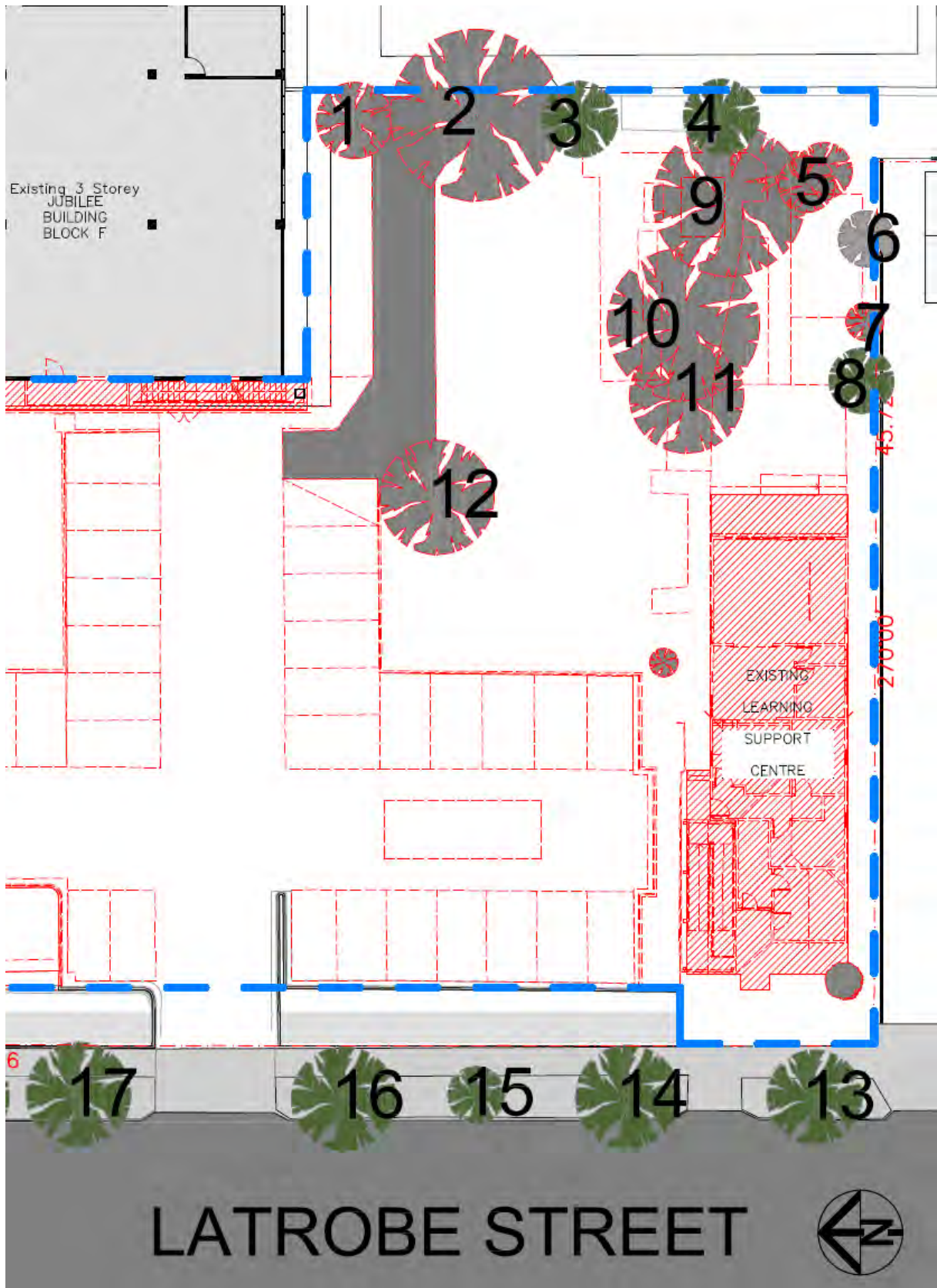


Figure 2 Tree assessment area - Demolition plan.

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	Betula pendula	Moderate	Removed	High	Site	1.7	2.8	12/72
2	Prunus sp.	Remove.	Removed	Low	Site	1.9	3.4	4/88
3	Betula pendula	Moderate	Retained	Low	Site	1.9	3.2	11/85
4	Betula pendula	Moderate	Retained	Low	Site	1.9	3.4	11/88
5	Salix sp.	Moderate	Removed	High	Site	2.1	3.8	10/101
<u>6</u>	<u>Not found</u>	Very low	Removed	None	Site	0	2	0/0
7	Viburnum tinus	Low	Removed	High	Site	1.5	2	4/22
8	Syzygium australe	Low	Retained	Low	Site	1.9	3.2	6/85
9	Pyrus calleryana	Low	Removed	High	Site	2.1	3.8	8/101
10	Ulmus procera	Moderate	Removed	High	Site	2.4	5.2	13/135
11	Ligustrum lucidum	Low	Removed	High	Site	2.3	4.6	9/119
12	Corymbia ficifolia	Low	Removed	High	Site	2.1	3.8	7/101
13	Lophostemon confertus	Low	Retained	None	Off site	1.5	2	4/31
14	Lophostemon confertus	Low	Retained	None	Off site	1.5	2.2	7/57
15	Platanus orientalis	Low	Retained	None	Off site	1.5	2	7/31

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
16	Lophostemon confertus	Low	Retained	None	Off site	1.5	2	5/38
17	Platanus orientalis	Moderate	Retained	None	Off site	1.5	2	8/53
<u>18</u>	<u>Not found</u>	Very low	Retained	None	Site	0	2	0/0
<u>19</u>	<u>Not found</u>	Very low	Retained	None	Site	0	2	0/0
<u>20</u>	<u>Not found</u>	Very low	Retained	None	Site	0	2	0/0
<u>21</u>	<u>Not found</u>	Very low	Retained	None	Site	0	2	0/0

Total number of tree/s referred to in this report(Total): 21

11. Proposed works

As part of Stage 3A of the redevelopment of the Sacred Heart Girls School, the existing Learning Support build, the carpark to the north of the Learning Support Building and the hard landscaping to the east of the Learning Support Building are to be demolished. As part of these works Trees 1, 2, 6, 7, 8, 9, 10, 11 and 12 are shown as being removed as shown on the landscape plan.

A new building is proposed on site to the west of the library. The existing car park along Latrobe Street is to be extended to the south with landscaping works occurring to the east of the proposed car park extension.

12. 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 7 tree/s are shown as Removed on the plans provided.								
1	<i>Betula pendula</i>	23	1.7	2.8	= TPZ	0.1	Moderate	Removed
5	<i>Salix sp.</i>	32	2.1	3.8	= TPZ	1.2	Moderate	Removed
7	<i>Viburnum tinus</i>	7	1.5	2.0	= TPZ	0.1	Low	Removed
9	<i>Pyrus calleryana</i>	32	2.1	3.8	= TPZ	0.1	Low	Removed
10	<i>Ulmus procera</i>	43	2.4	5.2	= TPZ	0.1	Moderate	Removed
11	<i>Ligustrum lucidum</i>	38	2.3	4.6	= TPZ	0.1	Low	Removed
12	<i>Corymbia ficifolia</i>	32	2.1	3.8	= TPZ	0.1	Low	Removed
The following 3 tree/s are shown as Retained on the plans provided.								
3	<i>Betula pendula</i>	27	1.9	3.2	= TPZ	0.3	Moderate	Retained
4	<i>Betula pendula</i>	28	1.9	3.4	= TPZ	1.8	Moderate	Retained
8	<i>Syzygium australe</i>	27	1.9	3.2	= TPZ	0.8	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): 10								

12.1. Tree 3

Tree 3 is a mature *Betula pendula* (Silver Birch) that is of moderate retention value. This tree exhibits good health and structure, and it is likely that this tree will have a useful life expectancy not exceeding 30 years.

This tree is located in the subject site to the west of the basketball court.

A wooden ramp, fence and garden bed are to be demolished within the Structural Root Zone (SRZ) and Tree Protection Zone (TPZ) of Tree 3. Provided that these works are performed with care and with minimal soil disturbance then it is unlikely that structure of Tree 3 will be impacted by the proposed development.

Soil disturbance within the SRZ and TPZ of Tree 3 should be limited to the removal of the garden edge, fence posts, footing of the ramp and the removal of mulch. If fill is applied within the SRZ and TPZ of Tree 3, then the depth of fill should not exceed 100 millimetres.

The posts of the proposed fence should occupy the same footprint as the existing fence posts.

A section of turf is proposed within the SRZ and TPZ of Tree 3. Provided that the above recommendations for Tree 3 are implemented, then it is unlikely that Tree 3 will be impacted by the establishment of lawn within its TPZ.

The successful retention of Tree 3 is highly likely.

12.2. Tree 4

Tree 4 is a mature *Betula pendula* (Silver Birch) that is of moderate retention value. This tree exhibits good health and structure, and it is likely that this tree will have a useful life expectancy not exceeding 30 years.

This tree is located in the subject site to the west of the basketball court.

A garden bed, concrete paving, a bike shed, and a fence are to be demolished in the SRZ and TPZ of Tree 4. Provided that the demolition of the garden bed, concrete paving and the fence is done with care, then it is unlikely that Tree 4 will be impacted by the proposed demolition works. All soil disturbance should be avoided in the SRZ and TPZ of this tree.

Tree 9 to the west of Tree 4 is to be removed. The stump of Tree 9 should be ground out rather than pulled out to prevent damage to the roots of Tree 4.

Landscaping works and a fence are proposed within the SRZ and TPZ of Tree 4. A section of lawn, paving and a hedge planting are shown in the SRZ and TPZ of Tree 4.

A fence, lawn and hedge planting are shown within the SRZ of Tree 4 (Figure 4). Provide that there are no soil disturbances in the SRZ of this tree, then it is unlikely that the establishment of the lawn will impact on the structure of Tree 4. If topsoil is required for the establishment of the lawn, then the depth of the topsoil should not exceed 100 millimetres.

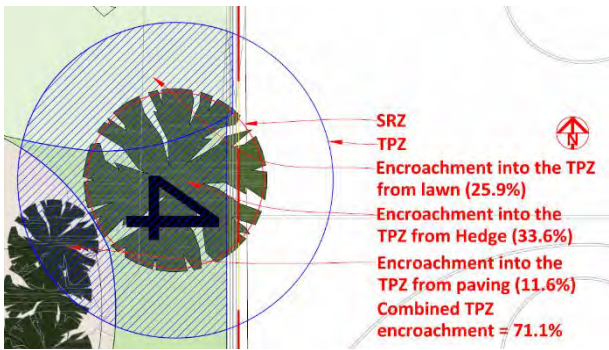


Figure 4 Tree 4 - SRZ and TPZ encroachments.

The hedge planting within the SRZ is likely to have minimal impact on the Structure of Tree 4. Any vegetation planted within the SRZ of Tree 4 should be hand dug. If roots with a diameter of 30 millimetres or greater are exposed, then these roots should be preserved, and the vegetation should be planted in holes where there are no roots with a diameter of 30 millimetres or greater.

Where fence posts are required within the SRZ of Tree 4, then the fence posts should occupy the same post hole locations as the posts of the existing fence.

The lawn, fence, hedge planting and concrete paving will occupy 71.1% of the TPZ of Tree 4 (Figure 4). This level of TPZ encroachment is considered to be excessive under AS 4970. It is likely however that Tree 4 will tolerate this level of TPZ encroachment and the majority of the proposed works in the TPZ are of low impact.

The lawn area will occupy 25.9% of the TPZ of Tree 4 (Figure 4). The proposed lawn will occupy an area that currently either paved with concrete or garden beds. Provided that the existing concrete paving is removed with care and without disturbing the soil and that the

garden bed is also removed with care then it is unlikely that the establishment of lawn within the TPZ of Tree 4 will impact this tree.

The hedge area will occupy 33.6% of the TPZ of tree 4 (Figure 4). The hedge area will occupy a similar area as the existing garden bed. Provided that the soil disturbance (outside of the SRZ) is limited to the planting of new vegetation, then it is unlikely the establishment of hedging plants in the TPZ of Tree 4 will impact on the health and longevity of this tree.

The proposed concrete paving will occupy 11.6% of the TPZ of Tree 4 (Figure 4). The concrete paving will mostly be located in an area that is currently paved. The proposed paving will occupy an area that is small than the area that is currently paved with concrete. Provided that the existing concrete paving is removed with care and that the proposed concrete paving is installed without excavation, then it is unlikely that the concrete paving will impact on the health and longevity of Tree 4.

The successful retention of Tree 4 is highly likely.

12.3. Tree 8

Tree 8 is a mature *Syzygium australe* (Bush Cherry, Lilly Pilly) that is of low retention value. This tree exhibits good health and fair structure. It is likely that this tree will have a useful life expectancy not exceeding 30 years.

This tree is located in the subject site between the existing bike shed and the Learning Support Building.

A section of concrete tile paving and a garden bed are to be demolished in the SRZ and TPZ of Tree 8. Provided that the demolition of the garden bed and concrete tile paving is undertaken with care, then it is unlikely that Tree 8 will be impacted by the proposed demolition works. All soil disturbance should be avoided in the SRZ and TPZ of this tree. The concrete pavers within the SRZ of Tree 8 should be removed by hand.

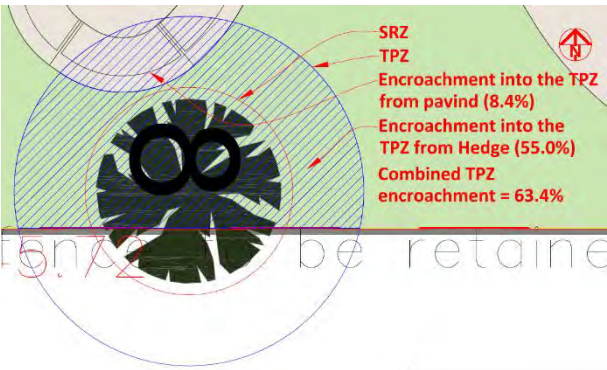


Figure 5 Tree 8 - SRZ and TPZ encroachments.

The hedge planting will occupy the entirety of those parts of the SRZ of Tree 8 that are located within the subject site (Figure 5). The hedge planting within the SRZ is likely to have minimal impact on the Structure of Tree 5. Any vegetation planted within the SRZ of Tree 5 should be hand dug. If roots with a diameter of 30 millimetres or greater are exposed during excavation, then these roots should be preserved, and the vegetation should be planted in holes where there are no roots with a diameter of 30 millimetres or greater.

A section of paving and a hedge planting will occupy 63.4% of the TPZ of Tree 8 (Figure 5). This level of TPZ encroachments significantly exceeds that considered to be acceptable under AS 4970.

The paving will occupy 8.4% of the TPZ of Tree 8 (Figure 5). The proposed paving will occupy the same footprint as existing paving and it is unlikely that the construction of the paving will impact on the health and longevity of Tree 8.

The hedge will occupy 55% of the TPZ of Tree 8 (Figure 5). The hedge area will occupy a similar area as the existing garden bed. Provided that the soil disturbance (outside of the SRZ) is limited to the planting of new vegetation, then it is unlikely the establishment of hedging plants in the TPZ of Tree 5 will impact on the health and longevity of this tree.

The successful retention of Tree 8 is highly likely.

13. Recommendations

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

1. A services plan should be created for this site and this construction impact report should be revised as required to ensure that services installation impacts on retained trees are avoided.
2. A Tree Management Plan should be created for this site to inform tree management guide construction within the Tree Protection Zones for retained trees.

13.1. Tree 3

1. The ramp, fence and garden bed should be removed with care to avoid soil disturbances.
2. Soil disturbance within the SRZ and TPZ of Tree 3 should be limited to the removal of the garden edge, fence posts, footing of the ramp and the removal of mulch.
3. If topsoil is applied within the SRZ and TPZ of Tree 3 for the lawn, then the depth of fill should not exceed 100 millimetres.
4. The posts of the proposed fence should occupy the same footprint as the existing fence posts.

13.2. Tree 4

1. All soil disturbance should be avoided in the SRZ and TPZ of this tree.
2. The demolition of the garden bed, concrete paving and the fence should be undertaken with care.
3. The stump of Tree 9 should be ground out rather than pulled out to prevent damage to the roots of Tree 4.
4. If topsoil is required for the establishment of the lawn, then the depth of the topsoil should not exceed 100 millimetres.
5. Any vegetation planted within the SRZ of Tree 4 should be hand dug.
 - a. If roots with a diameter of 30 millimetres or greater are exposed, then these roots should be preserved, and the vegetation should be planted in holes where there are no roots with a diameter of 30 millimetres or greater.
6. Where fence posts are required within the SRZ of Tree 4, then the fence posts should occupy the same post hole locations as the posts of the existing fence posts.
7. The existing concrete paving should be removed with care and without disturbing the soil.
8. Any soil disturbance outside of the SRZ should be limited to the planting of new vegetation.

13.3. Tree 8

1. The demolition of the garden bed and concrete tile paving should be undertaken with care.
 - a. All soil disturbance should be avoided in the SRZ and TPZ of this tree.
 - b. The concrete pavers within the SRZ of Tree 8 should be removed by hand.
2. Any vegetation planted within the SRZ of Tree 5 should be hand dug.
 - a. If roots with a diameter of 30 millimetres or greater are exposed during excavation, then these roots should be preserved, and the vegetation should be planted in holes where there are no roots with a diameter of 30 millimetres or greater.
3. Soil disturbance within the TPZ (outside of the SRZ) should be limited to the planting of new vegetation.

14. 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 20 - Tree Protection Guidelines.

ID	Genus / species	DBH	SRZ	TPZ:	mTPZ	ConP	Ret Value	Retained
The following 5 tree/s are shown as Retained on the plans provided.								
13	<i>Lophostemon confertus</i>	10	1.5	2.0	= TPZ	2.7	Low	Retained
14	<i>Lophostemon confertus</i>	18	1.5	2.2	= TPZ	3.9	Low	Retained
15	<i>Platanus orientalis</i>	10	1.5	2.0	= TPZ	5.5	Low	Retained
16	<i>Lophostemon confertus</i>	12	1.5	2.0	= TPZ	5.7	Low	Retained
17	<i>Platanus orientalis</i>	17	1.5	2.0	= TPZ	11.6	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):		5						

15. 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 3 tree/s is Moderate				
1	<i>Betula pendula</i>	Silver Birch	15 - 30	Moderate
5	<i>Salix sp.</i>	Willow	15 - 30	Moderate
10	<i>Ulmus procera</i>	English Elm	30 - 60	Moderate
The retention value for the following 4 tree/s is Low				
7	<i>Viburnum tinus</i>	Viburnum	15 - 30	Low
9	<i>Pyrus calleryana</i>	Callery Pear	15 - 30	Low
11	<i>Ligustrum lucidum</i>	Privet	15 - 30	Low
12	<i>Corymbia ficifolia</i>	Flowering Gum	30 - 60	Low
The retention value for the following 1 tree/s is Remove.				
2	<i>Prunus sp.</i>	Plum	1 - 5	Remove.
Number of tree/s in this section (Total): 8				

16. 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:	Ret value
The following 1 tree/s are shown as Retained on the plans provided.					
2	<i>Prunus sp.</i>	Plum	1 - 5	Structure ULE.	Remove.
Number of tree/s in this section (Total): 1					

17. Works required

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

18. 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	Ret value
5	<i>Salix sp.</i>	Willow	15 - 30	Moderate
11	<i>Ligustrum lucidum</i>	Privet	15 - 30	Low
Number of tree/s in this section (Total): 2				

19. 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.
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- 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.

20. 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)	16
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: *Betula pendula*

Deciduous Silver Birch

Height (m):	12	Structure	Good
Width (m):	7	Health:	Good
DBH (cm):	23 Measured	Maturity:	Mature
Origin:	Exotic	ULE (years)	15 - 30
Retained?:	Removed	Form:	Good
Retention Value:	Moderate		
Removal / retention reason:	N/A.		
Amenity value:	Moderate		
Works Required:	N/A.		

SRZ (m):	1.7	Works priority:	N/A
TPZ (m):	2.8	Construction Proximity:	0.1
mTPZ (m) = TPZ			



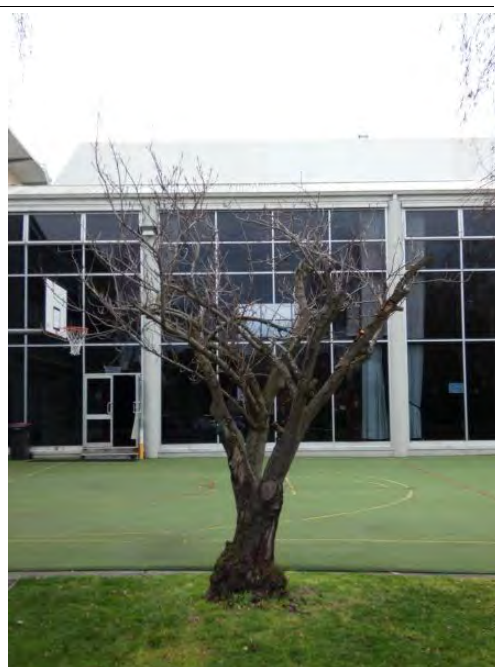
Tree ID: **2**

Genus / species: *Prunus sp.*

Deciduous Plum

Height (m):	4	Structure	Poor
Width (m):	3	Health:	Good
DBH (cm):	28 Measured	Maturity:	Over mature
Origin:	Exotic	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):	1.9	Works priority:	Low
TPZ (m):	3.4	Construction Proximity:	0.1
mTPZ (m) = TPZ			



Tree ID: **3**

Genus / species: *Betula pendula*

Deciduous Silver Birch

Height (m): 11 **Structure** Good

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

DBH (cm): 27 Measured **Maturity:** Mature

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

Retained?: Retained **Form:** Good

Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): 1.9 **Works priority:** N/A

TPZ (m): 3.2 **Construction Proximity:** 0.3

mTPZ (m) = TPZ



Tree ID: **4**

Genus / species: *Betula pendula*

Deciduous Silver Birch

Height (m): 11 **Structure** Good

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

DBH (cm): 28 Measured **Maturity:** Mature

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

Retained?: Retained **Form:** Good

Retention Value: Moderate

Removal / retention reason: N/A.

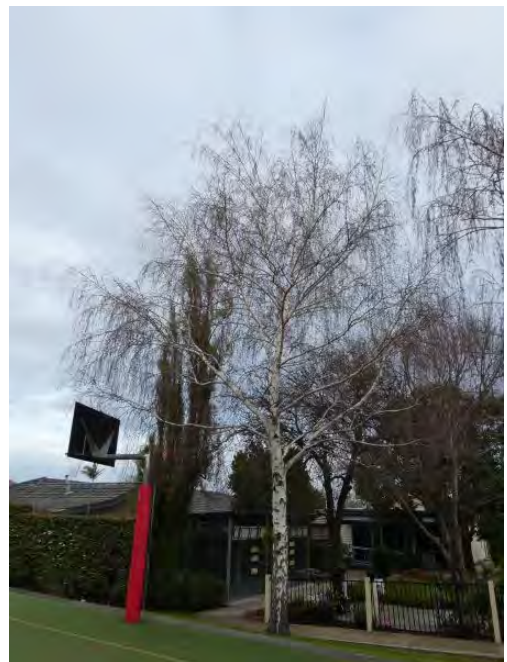
Amenity value: Moderate

Works Required: N/A.

SRZ (m): 1.9 **Works priority:** N/A

TPZ (m): 3.4 **Construction Proximity:** 1.8

mTPZ (m) = TPZ



Tree ID: **5**

Genus / species: *Salix sp.*

Deciduous Willow

Height (m): 10 **Structure** Fair

Width (m): 2 **Health:** Fair

DBH (cm): 32 Measured **Maturity:** Mature

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

Retained?: Removed **Form:** Fair

Retention Value: Moderate

Removal / retention reason: N/A.

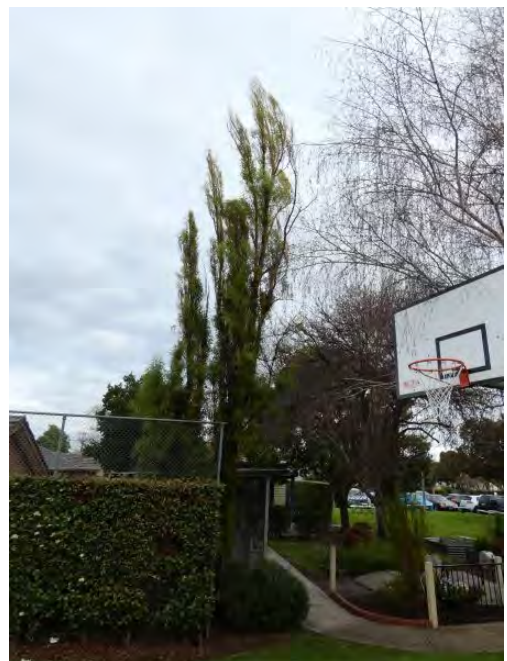
Amenity value: Moderate

Works Required: N/A.

SRZ (m): 2.1 **Works priority:** N/A

TPZ (m): 3.8 **Construction Proximity:** 1.2

mTPZ (m) = TPZ



Tree ID: 7

Genus / species: *Viburnum tinus*

Evergreen Viburnum

Height (m): 4		Structure	Good
Width (m): 3		Health:	Good
DBH (cm): 7	Measured	Maturity:	Immature
Origin:	Exotic	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: 8

Genus / species: *Syzygium australe*

Evergreen Brush Cherry

Height (m): 6		Structure	Fair
Width (m): 5		Health:	Good
DBH (cm): 27	Measured	Maturity:	Mature
Origin:	Australian	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): 1.9	Works priority:	N/A
TPZ (m): 3.2	Construction Proximity:	0.8
mTPZ (m) = TPZ		



Tree ID: 9

Genus / species: *Pyrus calleryana*

Deciduous Callery Pear

Height (m): 8		Structure	Fair
Width (m): 7		Health:	Good
DBH (cm): 32	Measured	Maturity:	Mature
Origin:	Exotic	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): 2.1	Works priority:	N/A
TPZ (m): 3.8	Construction Proximity:	0.1
mTPZ (m) = TPZ		



Tree ID: **10**

Genus / species: *Ulmus procera*

Deciduous English Elm

Height (m): 13 **Structure** Fair
Width (m): 10 **Health:** Good
DBH (cm): 43 Measured **Maturity:** Mature
Origin: Exotic **ULE (years)** 30 - 60
Retained?: Removed **Form:** Good
Retention Value: Moderate
Removal / retention reason: N/A.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): 2.4 **Works priority:** N/A
TPZ (m): 5.2 **Construction Proximity:** 0.1
mTPZ (m) = TPZ



Tree ID: **11**

Genus / species: *Ligustrum lucidum*

Evergreen Privet

Height (m): 9 **Structure** Good
Width (m): 9 **Health:** Good
DBH (cm): 38 Measured **Maturity:** Mature
Origin: Exotic **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): 2.3 **Works priority:** N/A
TPZ (m): 4.6 **Construction Proximity:** 0.1
mTPZ (m) = TPZ



Tree ID: **12**

Genus / species: *Corymbia ficifolia*

Evergreen Flowering Gum

Height (m): 7 **Structure** Good
Width (m): 7 **Health:** Good
DBH (cm): 32 Measured **Maturity:** Mature
Origin: Australian **ULE (years)** 30 - 60
Retained?: Removed **Form:** Fair
Retention Value: Low
Removal / retention reason: N/A.
Amenity value: Low
Works Required: N/A.

SRZ (m): 2.1 **Works priority:** N/A
TPZ (m): 3.8 **Construction Proximity:** 0.1
mTPZ (m) = TPZ



Tree ID: 13

Genus / species: *Lophostemon confertus*
 Evergreen Queensland Brush Box
Height (m): 4 **Structure:** Good
Width (m): 3 **Health:** Good
DBH (cm): 10 Measured **Maturity:** Immature
Origin: Australian **ULE (years)** 30 - 60
Retained?: Retained **Form:** Good
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:** 2.7
mTPZ (m) = TPZ



Tree ID: 14

Genus / species: *Lophostemon confertus*
 Evergreen Queensland Brush Box
Height (m): 7 **Structure:** Fair
Width (m): 4 **Health:** Good
DBH (cm): 18 Measured **Maturity:** Immature
Origin: Australian **ULE (years)** 30 - 60
Retained?: Retained **Form:** Good
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): 2.2 **Construction Proximity:** 3.9
mTPZ (m) = TPZ



Tree ID: 15

Genus / species: *Platanus orientalis*
 Deciduous Plane
Height (m): 7 **Structure:** Good
Width (m): 3 **Health:** Good
DBH (cm): 10 Measured **Maturity:** Immature
Origin: Exotic **ULE (years)** > 60
Retained?: Retained **Form:** Good
Retention Value: Low
Removal / retention reason: Road reserve.
Amenity value: Very low
Works Required: N/A.

SRZ (m): 1.5 **Works priority:** N/A
TPZ (m): 2.0 **Construction Proximity:** 5.5
mTPZ (m) = TPZ



Tree ID: 16

Genus / species: *Lophostemon confertus*

Evergreen Queensland Brush Box

Height (m): 5 **Structure:** Fair
Width (m): 3 **Health:** Good
DBH (cm): 12 Measured **Maturity:** Immature
Origin: Australian **ULE (years)** 30 - 60
Retained?: Retained **Form:** Good
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:** 5.7
mTPZ (m) = TPZ



Tree ID: 17

Genus / species: *Platanus orientalis*

Deciduous Plane

Height (m): 8 **Structure:** Good
Width (m): 6 **Health:** Good
DBH (cm): 17 Measured **Maturity:** Immature
Origin: Exotic **ULE (years)** > 60
Retained?: Retained **Form:** Good
Retention Value: Moderate
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:** 11.6
mTPZ (m) = TPZ



22. 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.

22.1. 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:

22.1.1. 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.

22.1.2. 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.

22.2. 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.

22.3. 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.

23. 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”.

24. 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.

24.1. 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.

24.2. 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.

24.3. 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.

24.4. 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.

24.5. 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. 11

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.

➤ **> 60** The tree is likely to provide useful amenity for greater than 60 years. 12

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.

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

24.6. 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>

24.7. 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>

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

25. 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>

26. 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>	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. 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.
<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.

27. Practice Note VCAT 2 — Expert Evidence

27.1. Name & address of consultant

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

27.2. 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.

27.3. 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.

27.4. 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.

27.5. 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.”

28. Assumptions & limiting conditions

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8. Sketches, diagrams, graphs and photographs in this report are intended as visual aids, are not to scale unless stated to be so, and must not be construed as engineering or architectural reports or as surveys.
9. Unless expressly stated otherwise:
 - 9.1. The information in this report covers only those items which were examined and reflects the condition of those items at the time of the inspection.
 - 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.
10. This agreement supersedes all prior discussions and representations between Greenwood Consulting and the client on the subject, and is the entire agreement and understanding between us.

Yours sincerely,



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