THE GREEN CONNECTION

The right people for tree and plant healthcare

Arboricultural Impact Assessment

REPORT COMMISSIONED BY:
Lysterfield Lake College (Proposed)

SUBJECT SITE:
19-23 Horswood Road,
Narre Warren North Vic 3804

REPORT PREPARED BY:
John Holliday
Consulting Arborist
AQF5 Arboriculture

DATE OF ASSESSMENT:
Wednesday, December 20, 2023

DATE OF REPORT:
Monday, January 22, 2024

VERSION 4

The Green Connection Arboricultural Consultancy Services

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Contents

1 Summary

This report is concerned with thirty-nine (39) trees located within the subject site and adjoining properties. Thirty-eight (38) trees are proposed to be retained.

Development design has been adjusted in 2023 to ensure minimal impact on all subject trees and is unlikely to have a detrimental effect on said trees provided recommendations in section 9 of this document are followed.

2 Assignment

2.1 Author / Consulting Arborist

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John Holliday
Company
The Green Connection

Phone
0403 840 475
Email
admin@thegreenconnection.com.au

2.2 Client

Name
Lysterfield Lake College (Proposed)
Site Address
19-23 Horswood Road, Narre Warren North Vic 3804

Intended Audience
- The property/tree owner(s)
- The local council
- The development project manager and associated construction staff

2.3 Brief

The purpose of this report is to provide an independent arboricultural assessment of prominent trees that are located within the property or within five metres of the property boundary.

Detail has been requested in relation to the following instructions:

- To provide an objective assessment of the subject trees condition in their current state.
- To provide an objective assessment of the retention value of the subject trees.
- To determine the Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) of the subject trees.
- To determine if the subject trees are expected to remain viable as a result of the proposed development.
- To propose recommendations that are expected to ensure that the subject trees would remain viable post construction.

In addition:

- Include all trees within the adjoining road reserve.
- Review the identification of Tree 13 - ? *Eucalyptus ovata* subsp. *ovata* Swamp Gum.

3 Data collection

3.1 Site Visit

- John Holliday, of The Green Connection, most recently visited the site for an Arboricultural assessment on Wednesday the 20th of December 2023 at 4pm.

3.2 Method of data collection

- The subject trees were assessed using stage one of Visual Tree Assessment method. (Mattheck & Breloar, 1999)
- Observations were made as viewed from ground level.
- Field notes were documented and stored on a hard drive.
- A digital camera was used at ground level to gather photographic evidence.
- A circumference tape measure was used to determine the trunk dimensions of trees within the subject site.
- Dimensions of trees not within the subject site were estimated as permission to enter property was not granted prior to assessment.
- A linear tape and aerial images were used to determine the canopy dimensions.
- A Nikon Forestry Pro clinometer was used to determine the height of the trees.
- Encroachment percentages have been calculated via ArborCAD.

3.2.1 Documents viewed

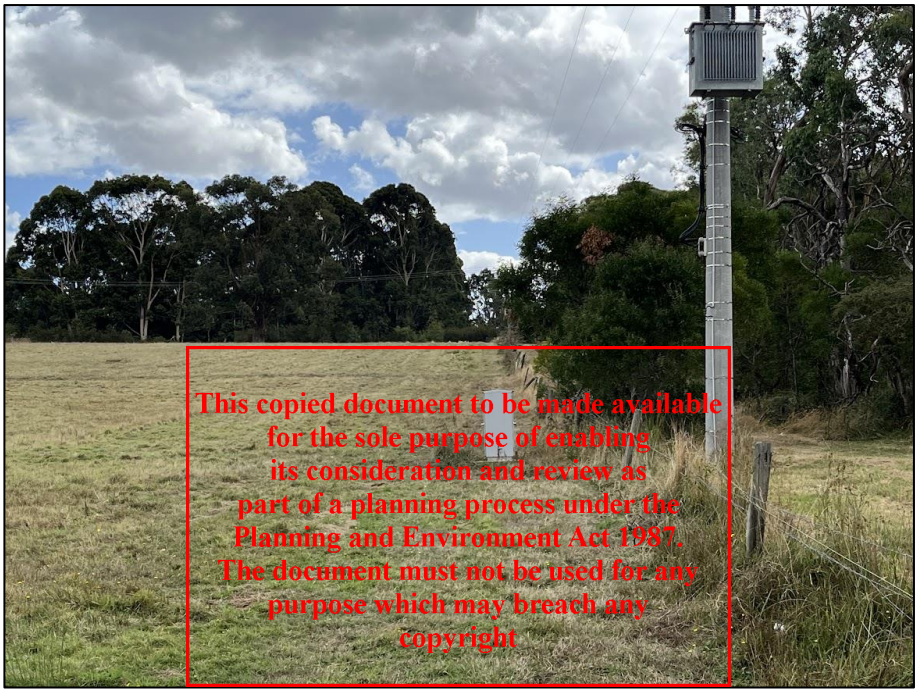
- Survey and Plans (Cullen Architects 21/09/2023)
- Email instructions from Casey City Council (via HWL Ebsworth 11/12/2023)
- Casey City Council Planning Scheme.
- Australian Standard AS4970 – 2009 ‘Protection of Trees on Development Sites’.

3.2.2 Proposed siting

- Trees have been mapped in locations as per survey.
- Trees not found on survey have been mapped in their approximate locations.

4 Site description

- The subject site is located in a Green Wedge A Zone – Schedule 4 (GWAZ4) within the Casey City Council.
- The site is a vacant lot.
- The terrain of the site appeared to slope moderately to south and east.
- The subject trees are all located within the subject site, the front nature strip, and adjoining properties (15 Reservoir Road and 13-17 Horswood Road).
- No additional prominent vegetation was observed within five metres of the site boundary lines.



Front (north) boundary as viewed from east

Side (east) boundary as viewed from north

Rear (south) boundary as viewed from west

Side (west) boundary as viewed from south

5 Tree data

Tree #	Botanical Name & Common name	Age	Origin	Height	Canopy Spread N-S E-W	DBH & DAB	Health	Structure	ULE	Amenity value	Retention value	TPZ	SRZ	Comments
1	Mixed	Mature	Mixed	5 m	N-S: 3 m E-W: 3 m	0.15 m 0.49 m 0.17 m	Fair	Fair	5 - 10 Years	Low	Parks Victoria Tree	2.0 m	1.5 m	Hedgerow under powerlines on western adjoining property (15 Reservoir road). Trees are inconsistently grouped along western boundary within 1m of fence. Comprised of multiple species including; -Leptospermum sp. -Acacia sp. -Banksia sp. Dimensions averaged over range.
2	*Eucalyptus globulus.bicostata* Victorian Blue Gum	Mature	Native	20 m	N-S: 20 m E-W: 20 m	1.44 m 4.71 m 1.58 m	Fair	Fair	20 + Years	High	High	15.0 m	4.0 m	Historically pruned to AS4373-2007.
3	*Eucalyptus globulus.bicostata* Victorian Blue Gum	Semi mature	Native	10 m	N-S: 7 m E-W: 7 m	0.63 m 2.05 m 0.74 m	Fair	Fair	20 + Years	Moderate	Other Persons Tree	7.6 m	2.9 m	Neighbouring tree located on eastern adjoining property (13-17 Horswood road).
4	*Eucalyptus brookeriana* Brooker's gum	Semi mature	Native	8 m	N-S: 12 m E-W: 12 m	0.67 m 2.28 m 0.74 m	Fair	Fair	20 + Years	Low	Other Persons Tree	8.0 m	2.9 m	Multi-stemmed at 1.5m above ground level. Stem measurements taken at 0.5m above ground level.
5	*Eucalyptus brookeriana* Brooker's gum	Semi mature	Native	5 m	N-S: 7 m E-W: 7 m	0.40 m 1.35 m 0.40 m	Fair	Fair	20 + Years	Low	Other Persons Tree	4.8 m	2.3 m	Multi-stemmed at ground level. Stem measurements taken at ground level.

Tree #	Botanical Name & Common name	Age	Origin	Height	Canopy Spread N-S E-W	DBH & DAB	Health	Structure	ULE	Amenity value	Retention value	TPZ	SRZ	Comments
6	Mixed	Semi mature	Mixed	5 m	N-S: 3 m E-W: 3 m	0.20 m 0.68 m 0.20 m	Fair	Fair	5 - 10 Years	Low	Other Persons Tree	2.0 m	1.5 m	Hedgerow located on eastern adjoining property (13-17 Horswood road). Trees are inconsistently grouped along eastern boundary within 1m of fence. Comprised of multiple species including; -Acacia sp. -Banksia sp. Dimensions averaged over range.
7	*Pinus radiata* Monterey pine	Mature	Exotic	20 m	N-S:16 m E-W:16 m	1.08 m 3.35 m 1.08 m	Fair	Fair	20 + Years	High	Other Persons Tree	13.0 m	3.4 m	Neighbouring tree located on eastern adjoining property (13-17 Horswood road). Multi-stemmed at ground level. Stem measurements taken at ground level.
8	*Pinus radiata* Monterey pine	Semi mature	Exotic	12 m	N-S: 8 m E-W: 8 m	0.48 m 1.67 m 0.57 m	Fair	Fair	20 + Years	Moderate	Other Persons Tree	5.8 m	2.6 m	Neighbouring tree located on eastern adjoining property (13-17 Horswood road). Multi-stemmed at ground level. Stem measurements taken at ground level.
9	*Eucalyptus globulus.bicostata* Victorian Blue Gum	Mature	Native	15 m	N-S: 7 m E-W: 7 m	0.80 m 2.57 m 0.91 m	Fair	Fair	20 + Years	Moderate	Other Persons Tree	9.6 m	3.2 m	Neighbouring tree located on eastern adjoining property (13-17 Horswood road).
10	*Eucalyptus globulus.bicostata* Victorian Blue Gum	Semi mature	Native	15 m	N-S: 7 m E-W: 7 m	0.81 m 2.62 m 0.91 m	Fair	Fair	20 + Years	Moderate	Other Persons Tree	9.7 m	3.2 m	Neighbouring tree located on eastern adjoining property (13-17 Horswood road).

Tree #	Botanical Name & Common name	Age	Origin	Height	Canopy Spread N-S E-W	DBH & DAB	Health	Structure	ULE	Amenity value	Retention value	TPZ	SRZ	Comments
11	*Acacia melanoxylon* Blackwood	Mature	Native	7 m	N-S: 8 m E-W: 8 m	0.40 m 1.35 m 0.48 m	Fair	Very poor	0 - 5 years	Low	Other Persons Tree	4.8 m	2.4 m	Neighbouring tree located on eastern adjoining property (13-17 Horswood road). Tree is leaning west and appears to have an unstable root plate.
12	*Acacia melanoxylon* Blackwood	Mature	Native	m	N-S: 8 m E-W: 8 m	0,56 m 1.78 m 0.61 m	Fair	Fair	10 - 20 years	Low	Other Persons Tree	6.7 m	2.7 m	Neighbouring tree located on eastern adjoining property (13-17 Horswood road). Tree is leaning west and appears to have an unstable root plate.
13	*Eucalyptus ovata* Swamp gum	Semi mature	Native	15 m	N-S: 10 m E-W: 16 m	1.00 m 3.15 m 1.00 m	Fair	Poor	10 - 20 Years	Moderate	Council Owned Tree	12.0 m	3.3 m	Council owned tree located in Horswood Road nature strip. Multi-stemmed at ground level. Stem measurements taken at ground level.
14	*Eucalyptus radiata* Narrow-leaved peppermint	Mature	Native	13 m	N-S: 10 m E-W: 7 m	0.71 m 2.32 m 0.71 m	Fair	Fair	20 + Years	Moderate	Council Owned Tree	8.5 m	2.9 m	Council owned tree located in Horswood Road nature strip. Historically pruned to clear HV power lines. Canopy is heavily weighted to north. Co-dominant stems at 1m above ground level. Stem measurements taken at ground level.

Additional Tree data (collected Dec 2023)

Tree No.	Botanical Name & Common Name	Age	Origin	Height	Canopy Spread N-S E-W	DBH CA1 DAB	Health	Structure	ULE	Amenity Value	Retention Value	TPZ Radius	SRZ Radius	Comments
15	*Eucalyptus goniocalyx* Long-leaved box	Semi Mature	Native NSW SA VIC	9.0 m	N-S 10.0 m E-W 7.0 m	0.40 m 1.26 m 0.51 m	Fair/ poor	Fair	5 - 10 years	Low	Council Owned Tree	4.8 m	2.5 m	Moderate dieback in upper canopy
16	*Eucalyptus goniocalyx* Long-leaved box	Mature	Native NSW SA VIC	13.0 m	N-S 11.0 m E-W 12.0 m	0.50 m 0.11 m (0.51 m) 1.82 m 0.35 m (2.17 m) 0.63 m	Poor	Fair/ poor	0 - 5 years	Moderate	Council Owned Tree	6.1 m	2.7 m	Codominant stems at 1.7m above grade. DBH taken at 1m above grade. Eastern stem 80% died back. Western stem 60% died back Major dieback in upper canopy
17	*Callistemon citrinus* Crimson Bottlebrush	Semi Mature	Native NSW QLD VIC	3.0 m	N-S 2.0 m E-W 2.0 m	0.20 m 0.63 m 0.20 m	Fair	Fair	10 - 20 years	Low	Council Owned Tree	2.4 m	1.7 m	Multi-stemmed at ground level. DBH & CA1 measured at ground level.
18	*Eucalyptus radiata* Narrow-leaved peppermint	Mature	Native NSW TAS VIC	14.0 m	N-S 11.0 m E-W 10.0 m	0.76 m 2.39 m 0.76 m	Fair	Fair	20 + years	Moderate	Council Owned Tree	9.1 m	2.9 m	Co-dominant stems at ground level. DBH & CA1 measured at ground level.,
19	*Eucalyptus radiata* Narrow-leaved peppermint	Mature	Native NSW TAS VIC	8.0 m	N-S 8.0 m E-W 7.0 m	0.47 m 1.54 m 0.56 m	Fair	Fair/ poor	10 - 20 years	Low	Council Owned Tree	5.6 m	2.6 m	Topped at 5m. Apical stem died back. Minor dieback in remaining canopy.
20	*Eucalyptus radiata* Narrow-leaved peppermint	Mature	Native NSW TAS VIC	12.0 m	N-S 13.0 m E-W 9.0 m	0.56 m 1.82 m 0.68 m	Fair/ good	Fair	20 + years	Low	Council Owned Tree	6.7 m	2.8 m	Tree leans north in phototropic historical reaction to former larger tree

Tree No.	Botanical Name & Common Name	Age	Origin	Height	Canopy Spread N-S E-W	DBH CA1 DAB	Health	Structure	ULE	Amenity Value	Retention Value	TPZ Radius	SRZ Radius	Comments
21	*Acacia melanoxylon* Blackwood	Semi Mature	Native NSW QLD SA TAS VIC	5.0 m	N-S 4.0 m E-W 4.0 m	0.30 m 0.94 m 0.30 m	Fair	Fair	10 - 20 years	Low	Council Owned Tree	3.6 m	2.0 m	Multi-stemmed at ground level. DBH & CA1 measured at ground level.,
22	*Eucalyptus cephalocarpa* Mealy stringybark	Mature	Native NSW VIC	10.0 m	N-S 7.0 m E-W 7.0 m	0.65 m 2.10 m 0.74 m	Fair	Poor	5 - 10 years	Moderate	Council Owned Tree	7.8 m	2.9 m	Historically topped at 5m above grade. Single remaining scaffold on supports entire canopy. Moderate dieback and suckers.
23	*Eucalyptus radiata* Narrow-leaved peppermint	Mature	Native NSW TAS VIC	15.0 m	N-S 10.0 m E-W 12.0 m	0.65 m 0.12 m 0.12 m (0.67 m) 2.14 m 0.38 m 0.38 m (2.89 m) 0.87 m	Fair/ good	Fair	20 + years	Low	Council Owned Tree	8.1 m	3.1 m	Multi-stemmed at ground level. Second largest stem has failed (5 years +). Largest stem leans moderately to north.
24	*Leptospermum sp.* Tea Tree	Mature	Native	4.0 m	N-S 4.0 m E-W 3.0 m	0.25 m 0.79 m 0.28 m	Fair	Fair	10 - 20 years	Low	Council Owned Tree	3.0 m	1.9 m	Multi-stemmed at ground level. DBH & CA1 measured at ground level.,
25	*Eucalyptus radiata* Narrow-leaved peppermint	Semi Mature	Native NSW TAS VIC	12.0 m	N-S 8.0 m E-W 12.0 m	0.40 m 0.25 m (0.47 m) 1.32 m 0.82 m (2.14 m) 0.63 m	Fair/ good	Fair	20 + years	Moderate	Council Owned Tree	5.7 m	2.7 m	Co-dominant stems at ground level. Tree leans north in phototropic reaction to larger tree.

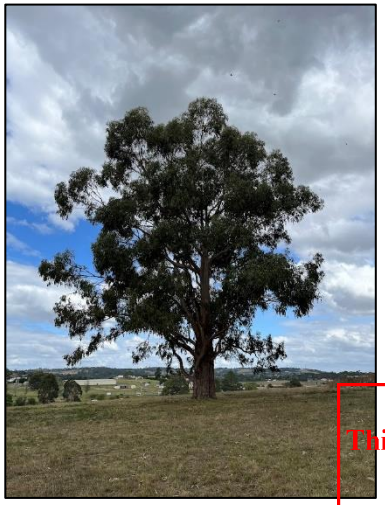
Tree No.	Botanical Name & Common Name	Age	Origin	Height	Canopy Spread N-S E-W	DBH CA1 DAB	Health	Structure	ULE	Amenity Value	Retention Value	TPZ Radius	SRZ Radius	Comments
26	*Eucalyptus cephalocarpa* Mealy stringybark	Semi Mature	Native NSW VIC	10.0 m	N-S 8.0 m E-W 10.0 m	0.30 m 0.25 m (0.39 m) 1.01 m 0.82 m (1.82 m) 0.50 m	Fair/ good	Fair	20 + years	Moderate	Council Owned Tree	4.7 m	2.5 m	Co-dominant stems at ground level.,
27	*Pittosporum undulatum* Sweet Pittosporum	Semi Mature	Native NSW QLD VIC	6.0 m	N-S 8.0 m E-W 9.0 m	0.30 m 0.94 m 0.30 m	Fair/ good	Fair/ good	20 + years	Low	Council Owned Tree	3.6 m	2.0 m	Multi-stemmed at ground level. DBH & CA1 measured at ground level.,
28	*Eucalyptus cephalocarpa* Mealy stringybark	Mature	Native NSW VIC	13.0 m	N-S 11.0 m E-W 10.0 m	0.50 m 0.24 m (0.55 m) 1.03 m 0.82 m (2.45 m) 0.76 m	Fair	Fair	20 + years	Moderate	Council Owned Tree	6.7 m	2.9 m	Co-dominant stems at ground level. Tree leans moderately to north
29	*Eucalyptus cephalocarpa* Mealy stringybark	Semi Mature	Native NSW VIC	9.0 m	N-S 10.0 m E-W 7.0 m	0.28 m 0.94 m 0.40 m	Fair/ good	Fair/ good	20 + years	Moderate	Council Owned Tree	3.4 m	2.3 m	
30	*Exocarpos cupressiformis* Native cherry	Semi Mature	Native NSW QLD SA TAS VIC	5.0 m	N-S 4.0 m E-W 4.0 m	0.17 m 0.17 m (0.24 m) 0.85 m 0.35 m	Fair	Fair	10 - 20 years	Low	Council Owned Tree	2.9 m	2.1 m	Two small trees 1m apart
31	*Eucalyptus radiata* Narrow-leaved peppermint	Mature	Native NSW TAS VIC	15.0 m	N-S 10.0 m E-W 16.0 m	0.75 m 2.36 m 0.86 m	Fair	Fair	20 + years	High	Council Owned Tree	9.0 m	3.1 m	Moderate dieback in upper canopy. Hazard beam fracture in southern portion of apical stem.

Tree No.	Botanical Name & Common Name	Age	Origin	Height	Canopy Spread N-S E-W	DBH CA1 DAB	Health	Structure	ULE	Amenity Value	Retention Value	TPZ Radius	SRZ Radius	Comments
32	*Eucalyptus radiata* Narrow-leaved peppermint	Semi Mature	Native NSW TAS VIC	9.0 m	N-S 8.0 m E-W 11.0 m	0.32 m 0.31 m (0.44 m) 1.57 m 0.57 m	Poor	Fair	5 - 10 years	Low	Council Owned Tree	5.3 m	2.6 m	Codominant stems at 1m above ground level.
33	*Eucalyptus radiata* Narrow-leaved peppermint	Semi Mature	Native NSW TAS VIC	10.0 m	N-S 12.0 m E-W 9.0 m	0.37 m 1.23 m 0.48 m	Fair	Fair	20 + years	Moderate	Council Owned Tree	4.4 m	2.4 m	
34	*Acacia melanoxylon* Blackwood	Semi Mature	Native NSW QLD SA TAS VIC	4.0 m	N-S 10.0 m E-W 6.0 m	0.28 m 0.91 m 0.36 m	Fair/ poor	Poor	5 - 10 years	Low	Council Owned Tree	3.4 m	2.2 m	Stem grows parallel to ground.
35	*Eucalyptus radiata* Narrow-leaved peppermint	Mature	Native NSW TAS VIC	13.0 m	N-S 12.0 m E-W 10.0 m	0.48 m 0.30 m (0.54 m) 1.48 m 0.97 m (2.45 m) 0.72 m	Fair	Fair	10 - 20 years	Moderate	Council Owned Tree	6.5 m	2.9 m	Co-dominant stems at ground level. Minor dieback in upper canopy
36	*Eucalyptus ovata* Swamp gum	Mature	Native NSW SA TAS VIC	17.0 m	N-S 14.0 m E-W 16.0 m	0.60 m 1.95 m 0.72 m	Fair	Fair/ good	10 - 20 years	High	Council Owned Tree	7.2 m	2.9 m	Moderate dieback throughout canopy.
37	*Acacia implexa* Lightwood	Semi Mature	Native ACT NSW QLD VIC	5.0 m	N-S 3.0 m E-W 3.0 m	0.15 m 0.47 m 0.17 m	Fair	Fair	10 - 20 years	Low	Council Owned Tree	2.0 m	1.6 m	Group of 5 small trees clustered around tree 13

Tree No.	Botanical Name & Common Name	Age	Origin	Height	Canopy Spread N-S E-W	DBH CA1 DAB	Health	Structure	ULE	Amenity Value	Retention Value	TPZ Radius	SRZ Radius	Comments
38	*Acacia implexa* Lightwood	Semi Mature	Native ACT NSW QLD VIC	5.0 m	N-S 3.0 m E-W 3.0 m	0.15 m 0.47 m 0.17 m	Fair	Fair	10 - 20 years	Low	Council Owned Tree	2.0 m	1.6 m	Group of 10 small trees clustered around tree 37
39	*Acacia implexa* Lightwood	Semi Mature	Native ACT NSW QLD VIC	5.0 m	N-S 3.0 m E-W 3.0 m	0.15 m 0.47 m 0.17 m	Fair	Fair	10 - 20 years	Low	Council Owned Tree	2.0 m	1.6 m	Group of 6 small trees clustered along boundary fence south of Tree 36

5.1 Photographic evidence

Tree 1



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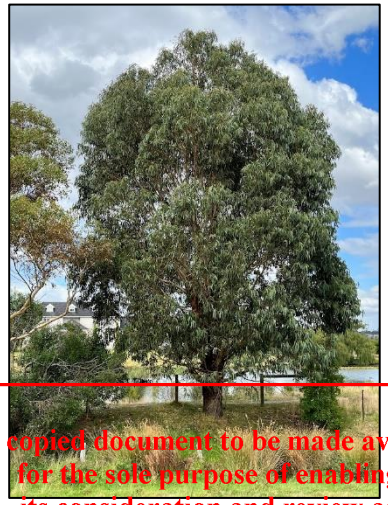


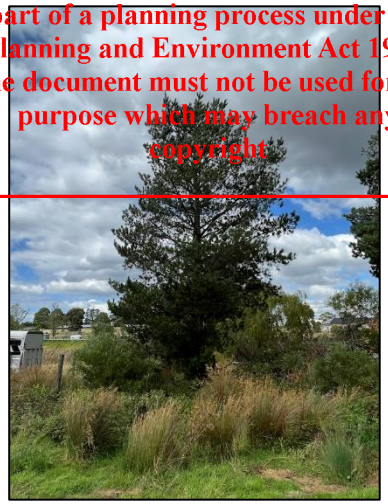
Tree 3

Tree 4

Tree 5

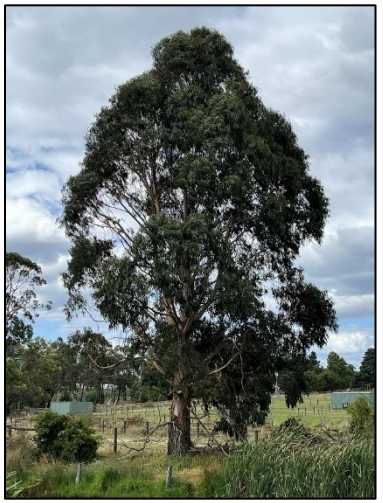
Tree 6

Tree 7



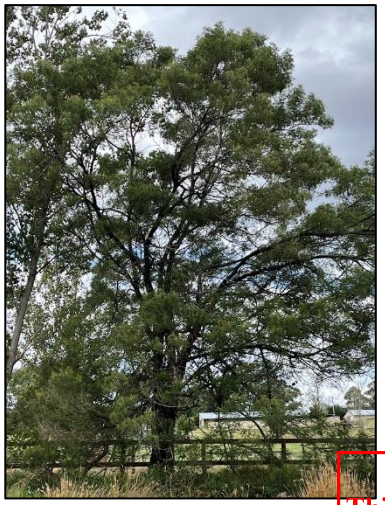
Tree 8

Tree 9



Tree 10

Tree 11



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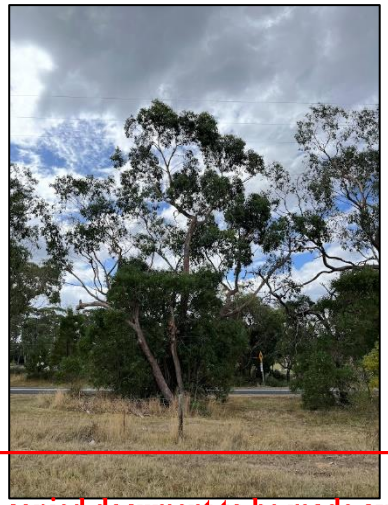


Tree 13

Tree 14

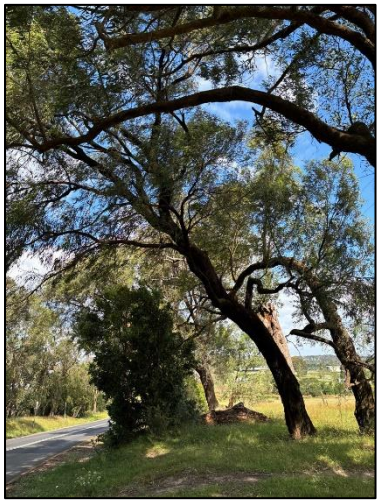
Tree 15

Tree 16

Tree 17

Tree 18

Tree 19



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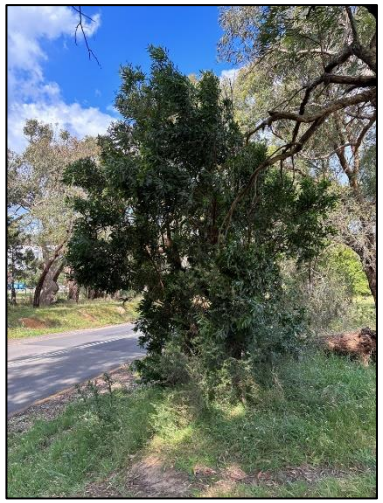

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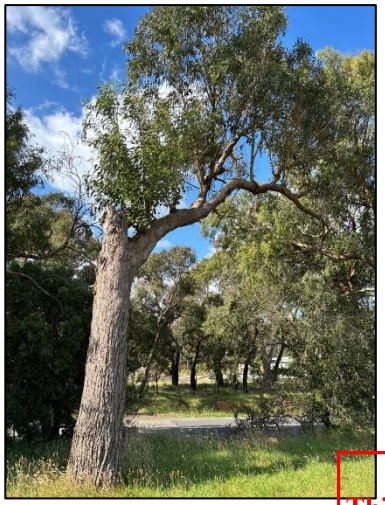
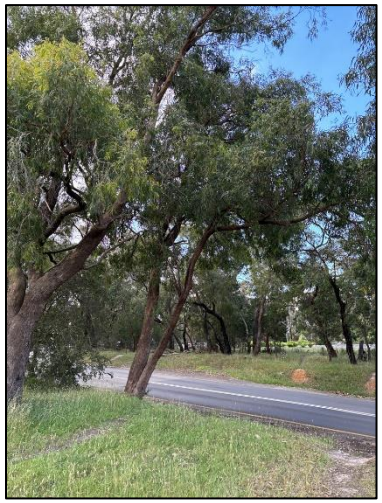


Tree 22

Tree 23

Tree 24



Tree 25

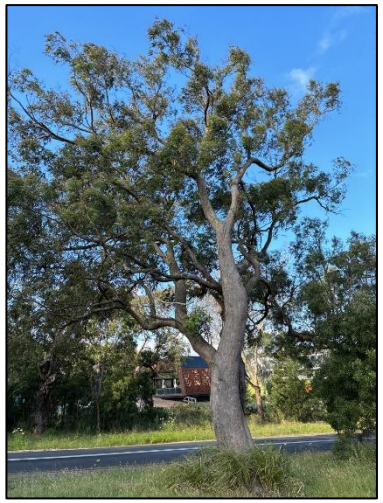
Tree 26

Tree 27

Tree 28

Tree 29

Tree 30



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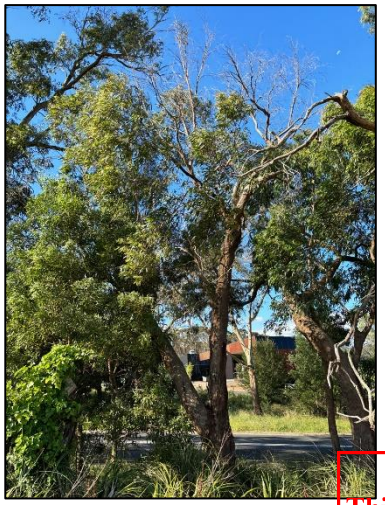

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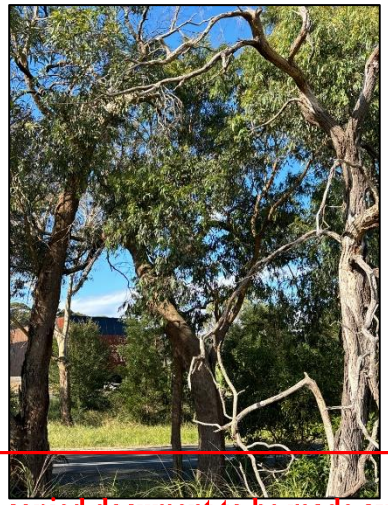
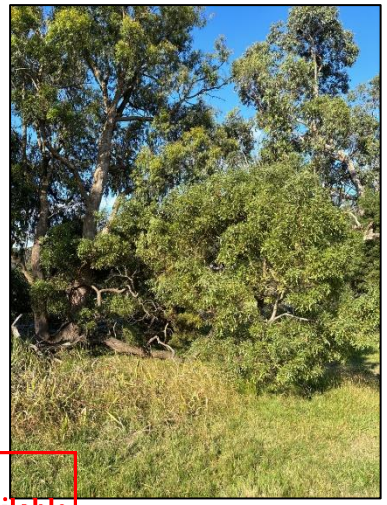


Tree 33



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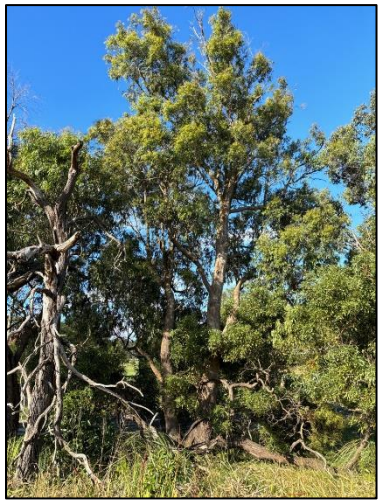
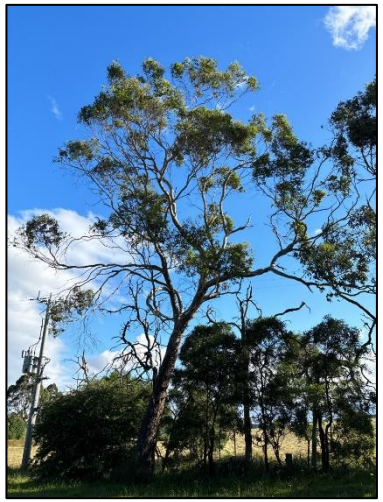
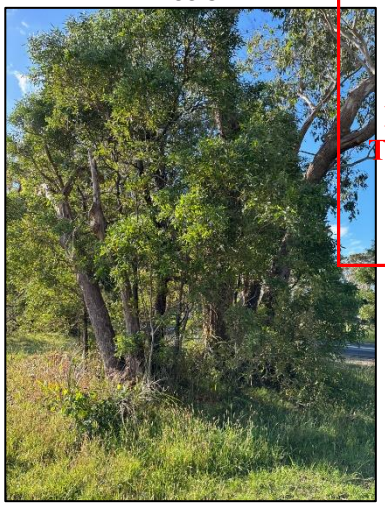


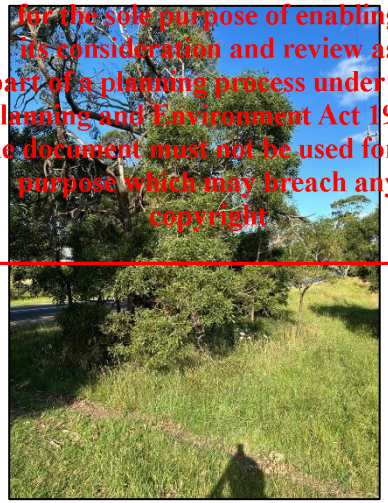
Tree 35



Tree 36



Tree 37



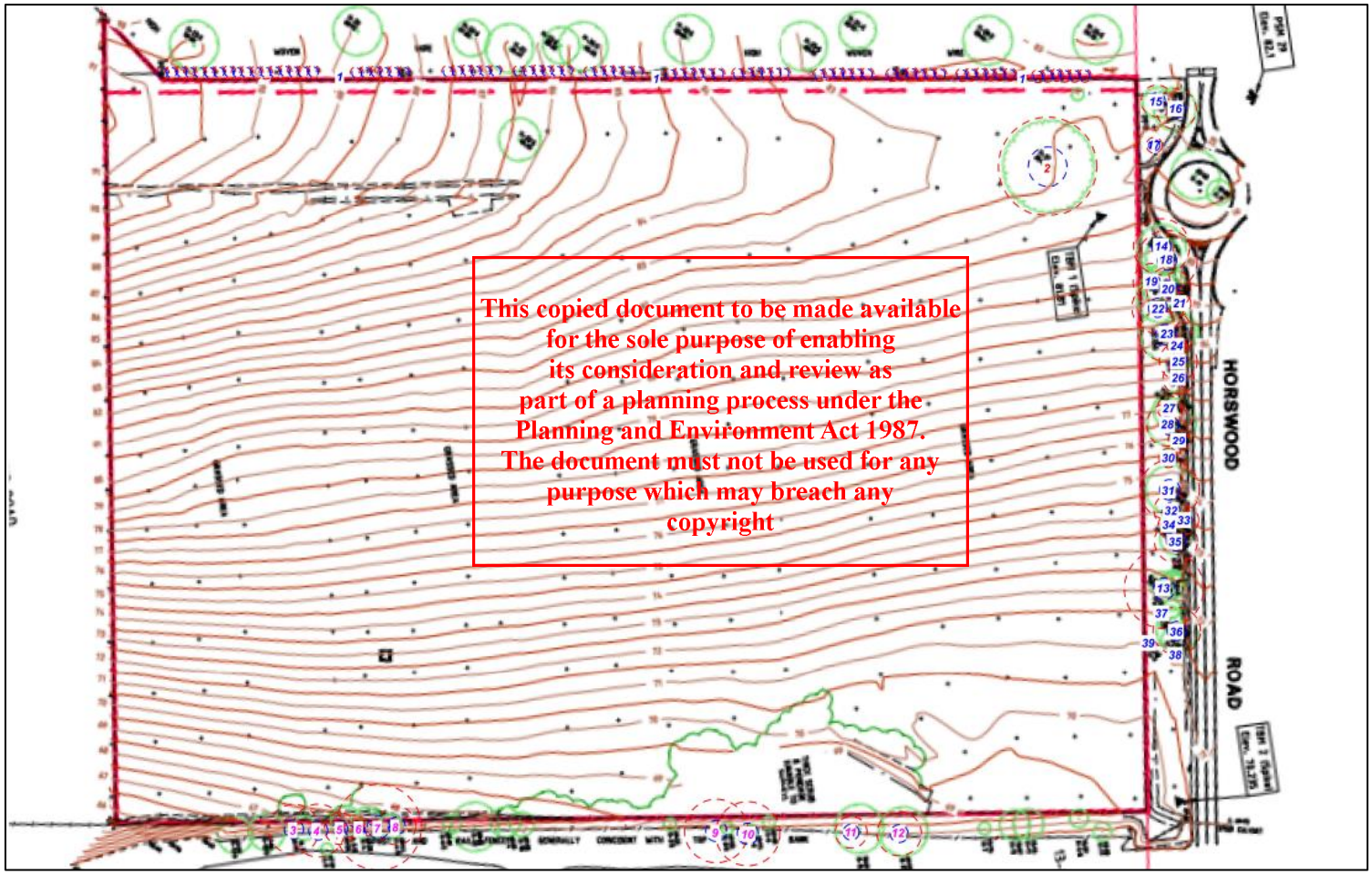
Tree 38

Tree 39

6 Site maps

6.1 Existing conditions

The following map indicates the approximate tree locations in relation to the existing conditions:



LEGEND

- LOW RETENTION VALUE
- MODERATE RETENTION VALUE
- HIGH RETENTION VALUE
- OTHER PERSON'S TREE
- COUNCIL OWNED TREE
- PROPOSED ENCROACHMENT
- TREE PROTECTION ZONE
- STRUCTURAL ROOT ZONE

6.2 Proposed plan

The following map indicates the approximate tree locations in relation to the proposed plans:

7 Discussion

7.1 Tree Protection zone

The tree protection zone is determined by multiplying the trunk diameter of the tree at breast height, 1.4m from ground level, by 12. A 10% encroachment on one side of this zone is acceptable without investigation into root distribution or offset of the lost area.

Section 3.2 of the Australian Standard AS4970 – 2009 Protection of Trees on Development Sites states that the TPZ of Palms, other monocots, cycads and tree ferns should not be less than 1 m outside the crown projection.

7.2 Structural root zone

The structural root zone (SRZ) is the setback required to avoid damage to stabilising structural roots. The loss of roots within the SRZ must be avoided. The SRZ is determined by applying the following formula: $(D \times 50)^{0.42} \times 0.64$ where D = trunk diameter in metres.

7.3 Designing Around Trees

It may be possible to encroach into or make variations to the TPZ of the trees that must be retained. Encroachment includes excavation, compacted fill and machine trenching.

The following is referenced from section 3.3.3 of the Australian Standards AS4970 – 2009 Protection of Trees on Development Sites:

7.3.1 Minor encroachment

If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.

7.3.2 Major encroachment

If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ the project arborist must demonstrate that the trees would remain viable. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods.

7.3.3 Root investigation

Where it is proposed that development is considered to be a major encroachment, a non-destructive root exploratory investigation may be required within the alignment of the proposed encroachment.

By undertaking a non-destructive root exploratory investigation, the extent of roots within that particular area may be determined. If a negligible amount of roots are required to be removed or damaged in order to construct the proposed development, the tree may remain viable. If a significant amount of roots are proposed to be removed or damaged in order to construct the proposed development, the tree may not remain viable.

Obstructions (paving, vegetation, structures) within the alignment of proposed encroachments may be required to be removed prior to the non-destructive root exploratory investigation occurring.

The non-destructive root exploratory investigation report should:

- Be undertaken by a suitably qualified Arborist (AQF Level 5 Arboriculture).
- Detail the total distance of each excavation line.
- Detail the closest distance from the trunk centre to the excavation line.
- The size (diameter) and number of roots discovered and the depth of roots (where relevant).
- Include photographs of the subject tree(s) trenches and roots.
- Include a discussion of the findings of the root investigation and the impact of the proposed works on the long-term health/ structural stability of the tree(s).

8 Conclusion

8.1 Tree retention value

8.1.1 Council owned trees

The following trees belong to Casey City Council:

- Tree 13
- Tree 14
- Tree 15
- Tree 16
- Tree 17
- Tree 18
- Tree 19
- Tree 20
- Tree 21
- Tree 22
- Tree 23
- Tree 24
- Tree 25
- Tree 26
- Tree 27
- Tree 28
- Tree 29
- Tree 30
- Tree 31
- Tree 32
- Tree 33
- Tree 34
- Tree 35
- Tree 36
- Tree 37
- Tree 38
- Tree 39

8.1.2 Parks Victoria owned trees

The following trees belong to Parks Victoria:

- Tree 1

8.1.3 Other person's trees

The following trees do not belong to the property owner:

- Tree 3
- Tree 4
- Tree 5
- Tree 6
- Tree 7
- Tree 8
- Tree 9
- Tree 10
- Tree 11
- Tree 12

8.1.4 High retention value

The following tree is considered to be of high retention value:

- Tree 2

8.2 Permit requirements

8.2.1 Significant Landscape Overlay – Schedule 1 (SLO1)

This site is subject to the Significant Landscape Overlay – Schedule 1 (SLO1) which states the following:

Any application to construct a building or works must include the following information:

- A comprehensive site analysis plan with an emphasis on visual matters show the key influences on the site and the relationship of the proposed development to its immediate surroundings, giving consideration, where appropriate, to:
  - Access, driveway connection points and main roads.
  - Vegetation including indigenous species, exotic species and specimen trees.
  - Topography including contours, drainage, orientation/solar access, highpoints, ridge lines and valleys.
  - Services including easements, transmission lines, electricity and gas water mains.
  - Visual access including filtered views to and from the site, internal views, vistas/views from public viewing points and visually exposed areas.
  - Adjoining land uses.
  - Open space connections.
  - Fences and boundaries.
  - Notable features.
  - Microclimate.
  - Contaminated soils and filled areas.
- A professionally prepared landscape and management plan that demonstrates how the subject land can be revegetated over time, giving consideration, where appropriate, to:

  – A plant schedule including botanic name, common name, height and spread, quality and a key/legend.

  – Revegetation of slopes greater than 1-in-5 (20 per cent), drainage lines, hill tops and visually exposed areas.

  – Species that existed pre settlement.

  – Provision for fencing off a section land for revegetation.

  – Enhancement of existing and proposed public space areas and vegetation corridors.
- Development envelopes based on site analysis findings. In areas of high visual exposure proposals need to demonstrate that buildings within the proposed envelopes will be fully screened from external view, in particular from sensitive view corridors and points.

8.2.2 Trees that require a permit

No subject trees require a permit to remove, lop or destroy under SLO1.

The following tree is a Parks Victoria owned tree and must only be maintained by Parks Victoria staff or contractors:

- Tree 1

The following trees are Casey City Council owned trees and must only be maintained by Council staff or Council contractors:

- Tree 13
- Tree 14
- Tree 15
- Tree 16
- Tree 17
- Tree 18
- Tree 19
- Tree 20
- Tree 21
- Tree 22
- Tree 23
- Tree 24
- Tree 25
- Tree 26
- Tree 27
- Tree 28
- Tree 29
- Tree 30
- Tree 31
- Tree 32
- Tree 33
- Tree 34
- Tree 35
- Tree 36
- Tree 37
- Tree 38
- Tree 39

8.3 Impact assessment

The following table represents the encroachments of the proposed development:

Tree No.	Encroachment	TPZ encroachment	SRZ encroachment	Encroachment category	Proposed retention
1	NA	0%	0%	NA	Retain
2	Gravel paths	31.7%	0%	Major	
	Shed	1.8%	0%	Minor	
	TOTAL	**33.5%**	**0%**	**Major**	**Retain**
3	NA	0%	0%	NA	Retain
4	NA	0%	0%	NA	Retain
5	NA	0%	0%	NA	Retain
6	NA	0%	0%	NA	Retain
7	NA	0%	0%	NA	Retain
8	NA	0%	0%	NA	Retain
9	NA	0%	0%	NA	Retain
10	NA	0%	0%	NA	Retain
11	NA	0%	0%	NA	Retain
12	NA	0%	0%	NA	Retain
13	Crossover	23.5%	0%	Major	Retain
14	NA	0%	0%	NA	Retain
15	NA	0%	0%	NA	Retain
16	NA	0%	0%	NA	Retain
17	NA	0%	0%	NA	Retain
18	NA	0%	0%	NA	Retain
19	NA	0%	0%	NA	Retain
20	NA	0%	0%	NA	Retain
21	NA	0%	0%	NA	Retain
22	NA	0%	0%	NA	Retain
23	NA	0%	0%	NA	Retain
24	NA	0%	0%	NA	Retain
25	NA	0%	0%	NA	Retain
26	NA	0%	0%	NA	Retain
27	NA	0%	0%	NA	Retain
28	NA	0%	0%	NA	Retain
29	NA	0%	0%	NA	Retain
30	NA	0%	0%	NA	Retain
31	NA	0%	0%	NA	Retain
32	NA	0%	0%	NA	Retain
33	NA	0%	0%	NA	Retain
34	NA	0%	0%	NA	Retain
35	Crossover	34.0%	12.7%	Major	Remove
36	NA	0%	0%	NA	Retain
37	NA	0%	0%	NA	Retain
38	NA	0%	0%	NA	Retain
39	NA	0%	0%	NA	Retain

Note: encroachment calculations are approximate and do not consider over excavation

8.3.1 No Encroachment

The proposed development does not encroach into the TPZ or SRZ of the following trees:

- Tree 1
- Tree 3
- Tree 4
- Tree 5
- Tree 6
- Tree 7
- Tree 8
- Tree 9
- Tree 10
- Tree 11
- Tree 12
- Tree 14
- Tree 15
- Tree 16
- Tree 17
- Tree 18
- Tree 19
- Tree 20
- Tree 21
- Tree 22
- Tree 23
- Tree 24
- Tree 25
- Tree 26
- Tree 27
- Tree 28
- Tree 29
- Tree 30
- Tree 31
- Tree 32
- Tree 33
- Tree 34
- Tree 36
- Tree 37
- Tree 38
- Tree 39

The proposed development is not expected to compromise the health and/or structural integrity of the above-mentioned trees.

Less invasive construction measures or development redesign is therefore not required to ensure that these trees remain viable post construction.

8.3.2 Major encroachment

The proposed development is considered to be a major encroachment according to section 3.3 of the Australian Standard AS4970-1 - The Protection of Trees on Development Sites of the following trees:

- Tree 2

Tree 2

Gravel paths

- The estimated footprint of the internal pathways is considered to be a major encroachment (7.3.2) of 31.7% of the TPZ and 0% of the SRZ.
- The construction of the gravel paths has the potential to compromise the tree's long-term viability.

Shed

- The shed is proposed to be a minor encroachment (7.3.1) of 1.8% of the TPZ and 0% of the SRZ.
- The shed field individually, is not expected to compromise tree's long-term viability.

Overview

- This tree is a high retention tree.
- This tree is proposed to be retained.
- The total encroachment of the internal pathways and sports field is 33.5% of the TPZ and 0% of the SRZ which is considered to be major (7.3.2).
- The construction of the proposed development has the potential to compromise the tree's long-term viability.
- Less invasive construction measures (9.3) and tree protection measures (9.4) are required to ensure that this tree would remain viable post construction of the proposed internal pathways and sports field.

Tree 13

- The estimated footprint of the proposed crossover is considered to be a major encroachment (7.3.2) of 23.5% of the TPZ and 0% of the SRZ.
- This is a council owned tree.
- This tree is proposed to be retained.
- The construction of the proposed development has the potential to compromise the tree's long-term viability.
- Less invasive construction measures (9.3) and tree protection measures (9.4) are required to ensure that this tree would remain viable post construction.

Tree 35

- The estimated footprint of the proposed crossover is considered to be a major encroachment (7.3.2) of 23.5% of the TPZ and 0% of the SRZ.
- This is a council owned tree.
- This tree is proposed to be removed.
- In the event of removal, less invasive construction measures or development redesign is not required.

9 Recommendations

9.1 Tree retention

The following trees are proposed to be retained.

- Tree 1
- Tree 2
- Tree 3
- Tree 4
- Tree 5
- Tree 6
- Tree 7
- Tree 8
- Tree 9
- Tree 10
- Tree 11
- Tree 12
- Tree 13
- Tree 14
- Tree 15
- Tree 16
- Tree 17
- Tree 18
- Tree 19
- Tree 20
- Tree 21
- Tree 22
- Tree 23
- Tree 24
- Tree 25
- Tree 26
- Tree 27
- Tree 28
- Tree 29
- Tree 30
- Tree 31
- Tree 32
- Tree 33
- Tree 34
- Tree 36
- Tree 37
- Tree 38
- Tree 39

In the event of tree retention, the following is recommended in order to ensure that retained trees are adequately protected:

- Comply with construction measures (9.3)
- Comply with tree protection measures (9.4)

9.2 Tree removal

The following tree is proposed to be removed:

- Tree 35

In the event of tree removal, the following is recommended:

- Tree removal should be undertaken prior to construction commencing (including demolition).
- Written consent from the responsible authority must be obtained prior to tree removal (if required).

9.3 Less invasive construction measures

Gravel paths

Option 1

- Limit any excavation to surface scraping for levelling purposes only within the TPZ of Tree 2, unless stated otherwise by a suitably qualified arborist (AQF Level 5).
- Engage a suitably qualified arborist (AQF Level 5) to supervise any surface scraping for the gravel paths within the TPZ of Tree 2.
- Construct gravel paths via permeable materials of pH neutral composition which allows water to penetrate through the surface and into the soil profile within the TPZ of Tree 2.

Option 2

- Engage suitably qualified Arborist (AQF Level 5) to perform a non-invasive root investigation (7.3.3) along the alignment of the proposed gravel paths within the TPZ of Tree 2.
- Adhere to the recommendations suggested in the accompanying root investigation report.

Option 3

- Redesign so that the proposed gravel paths does not encroach into the TPZ of Tree 2 by greater than 10% and does not encroach into the SRZ, unless a root investigation (7.3.3) determines that the tree would remain viable post construction.

Crossover

Option 1

- Ensure that the crossover is outside the SRZ and does not encroach more than 10% into the TPZ of Tree 13.

Option 2

If the proposed crossover is within the SRZ or encroaches the TPZ by more than 10%, the following is recommended:

- Engage suitably qualified arborist (AQF Level 5) to perform a root investigation (7.3.3) along the alignment of the proposed crossover within the TPZ of Tree 13.
- Adhere to the recommendations suggested in the accompanying root investigation report.

9.4 Tree Protection Measures

9.4.1 Pruning

- Pruning of trees that are proposed to be retained (9.1) is not required for clearance purposes and should therefore not be undertaken.

9.4.2 Tree protection fencing

- Tree protection fencing (TPF) should be installed for Tree 2, Tree 13, Trees 15 – 39.
- TPF should be installed as close to the TPZ as practically possible provided that it does not encroach onto the road, footpath, crossover or proposed works.
- The existing site perimeter fencing may be used as TPF for other Council Owned trees and neighbouring trees.
- TPF should be erected prior to machinery being brought onsite for the demolition of the existing dwelling.
- TPF should be a minimum 1.8m high and comprised of wire mesh (or similar) supported by concrete feet (or similar).
- TPF should remain intact for the duration of the project.
- TPF should only be removed or shifted with the approval of the Project Arborist and the Responsible Authority.

9.4.3 Tree protection signage

- The signage on the TPF should be placed on TPZ fencing at regular intervals so that it is visible from any angle outside the TPZ.
- Signage should state ‘Tree Protection Zone, No Access’ or similar.
- Signage should be greater than 600mm X 400mm in size.

9.4.4 Ground protection

- In the event that ground protection is recommended by the project arborist it should consist of a layer of permeable membrane such as geotextile fabric beneath a 100mm thick layer of mulch or single-grade (no fines) crushed rock, then cover the mulch or crushed rock with a layer of strapped rumble boards.

9.4.5 Prohibitions within the TPZ

The following activities are prohibited within the TPZ:

- Machine excavation including trenching (unless approved by the Project Arborist, Arborist supervision may be required)
- Cultivation
- Storage
- Preparation of chemicals, including cement products
- Parking of vehicles
- Refuelling
- Dumping of waste
- Wash down and cleaning of equipment
- Placement of fill
- Lighting of fires
- Physical damage to the tree
- Pruning or damaging of roots greater than 30mm in diameter.

9.4.6 Scaffolding

- When scaffolding must be erected within Tree Protection Zones, cover the ground with a 10cm layer of mulch, and then cover this with boards and plywood to prevent soil compaction.

9.4.7 Drains and services

In the event that any drains or services are included in a greater than 10% encroachment into the TPZ or encroach into the SRZ of trees that are proposed to be retained, the following should be undertaken:

- Drains or services should be installed by non-root destructive means such as horizontal boring at greater than 1100mm in depth **or** by low pressure hydro-excavation to ensure that the bark of the roots remain intact unless a root investigation determines that the tree(s) would remain viable.

Note: encroachment calculations must consider additional encroachments e.g. site cuts, retaining walls, building footprint.

9.4.8 Site storage

- A designated storage area where building materials, chemicals etc. can be stored should be located outside the TPZ of retained trees.

10 Limitation of Liability

The Green Connection and their employees are tree specialists who use their qualifications, education, knowledge, training, diagnostic tools and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of this assessment and report.

Trees are living organisms that fail in ways the arboriculture industry does not fully understand. Conditions are often hidden within trees and below ground. Unless otherwise stated, observations have been made from ground level and limited to accessible components without dissection excavation or probing. There is no guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments cannot be guaranteed.

Treatment, pruning and removal of trees may involve considerations beyond the scope of this report, such as property boundaries and ownership, disputes between neighbours, sight lines, landlord-tenant matters, and related incidents. Such issues cannot be taken into account unless complete and accurate information is given prior to or at the time of site inspection.

The author takes all reasonable care to ensure all referenced material is accurate and quoted in correct context but does not take responsibility for information quoted or supplied.

Information contained in this report covers those items that were examined and reflect the condition of those items at the time of inspection. There is no warranty or guarantee expressed or implied that the problems or deficiencies of the trees or property in question may not arise in the future. Trees can be managed, but they cannot be controlled. To live or work near a tree involves a degree of risk. The only way to eliminate all risks involved with a tree is to eliminate the tree.

All written reports must be read in their entirety, at no time shall part of the written assessment be referred to unless taken in full context of the whole written report.

The author shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including the payment of an additional fee for such services.

The author does not assume responsibility for legal matters, and assumes that legal descriptions, titles and ownerships are correct and good.

11 References

Australian Standards. (2007). Australian Standard AS4373-2007 Pruning of Amenity Trees. SAI Global.

Australian Standards. (2009). Australian Standard AS4970 – 2009 Protection of Trees on Development Sites. SAI Global.

Mattheck, C., & Breloar, H. (1999). *The Body Language of Trees.* London: The Stationary Office.

12 Definition of terms

12.1 Tree health

- Good
- Fair
- Poor
- Very poor
- Dead

Good: The tree is demonstrating good or exceptional growth for the species. The tree should exhibit a full canopy of foliage and have only minor pest or disease problems. Foliage colour size and density should be typical of a health specimen of that species.

Fair: The tree is in reasonable condition and growing well for the species. The tree should exhibit an adequate canopy of foliage. There may be some dead wood in the crown, some grazing by insect or animals may be evident, and/or foliage colour, size or density may be atypical for a healthy specimen of that species.

Poor: The tree is not growing to its full capacity. Extension growth of the laterals may be minimal. The canopy may be thinning or sparse. Large amounts of dead wood may be evident throughout the crown, as well as significant pest and disease problems. Other symptoms of stress indicating tree decline may be present.

Very poor: The tree appears to be in a state of decline, and the canopy may be very thin and sparse. A significant volume of dead wood may be present in the canopy, or pest and disease problems may be causing a severe decline in tree health.

Dead: The tree is no longer alive.

12.2 Structure

- Good
- Fair
- Poor
- Very poor
- Failed

The definition of structure is the likelihood of the tree to fail under normal condition. A tree with good structure is highly unlikely to suffer any significant failure, while a tree with poor to very poor structure is likely or very likely to fail.

Good: The tree has a well-defined and balanced crown. Branch unions appear to be strong, with no defects evident in the trunks or the branches. Major limbs are well defined. The tree would be considered a good example for the species. Probability of significant failure is highly unlikely.

Fair: The tree has some minor problems in the structure of the crown. The crown may be slightly out of balance at some branch unions or branches may be exhibiting minor structural faults. If the tree has a single trunk, this may be on a slight lean, or be exhibiting minor defects. Probability of significant failure is low.

Poor: The tree may have a poorly structured crown, the crown may be unbalanced, or exhibit large gaps. Major limbs may not be well defined; branches may be rubbing or crossing over. Branch unions may be poor or faulty at the point of attachment. The tree may have suffered major root damage. Probability of significant failure is moderate.

Very poor: The tree has a poorly structured crown. The crown is unbalanced or exhibits large gaps. Major limbs are not well defined. Branch unions may be poor or faulty at the point of attachment. A section of the tree has failed or is in imminent danger of failure. Active failure may be present, or failure is probably in the immediate future.

Failed: A significant section of the tree or the whole tree has failed.

12.3 Useful Life Expectancy (ULE)

- 0 years
- Less than 5 years
- 5 to 10 years
- 10 to 20 years
- 20 +

Useful life expectancy is approximately how long a tree can be retained usefully in the landscape providing site conditions remain unchanged and the recommended works are completed. It is based on the principals of usefulness in the landscape and should not reflect personal opinions on species suitability.

0 years: The tree may be dead or failed and/or no longer provides any amenity value.

Less Than 5 years: The tree under normal circumstances and without extra stress should be useful for a maximum of 5 years. The tree will need to be replaced in the short term. Replacement plants should be established as soon as possible if there is efficient space, or consideration should be given to the removal of the tree to facilitate replanting.

5 to 10 Years: The tree under normal circumstances and without extra stress should be useful for a maximum of 10 years. Trees in this category may require regular inspections and maintenance particularly if they are large specimens. Replacement plants should be established in the short term if there is sufficient space, or consideration should be given to the removal of the tree to facilitate replanting.

10 to 20 Years: The tree under normal circumstances and without extra stress should be useful for a maximum of 20 years. During this period, regular inspections and maintenance will be required.

20 + Years: The tree under normal circumstances and without extra stress should be useful for more than years 20 years. During this period, regular inspections and maintenance will be required.

12.4 Tree Retention Value

- High
- Moderate
- Low
- Other Person's Tree
- Council Owned Tree

High: The tree may be significant in the landscape, offer shade and other amenities such as screening. The tree may assist with erosion control, offer a windbreak or perform a vital function in the location (e.g. habitat, shade, flowers or fruit). The tree is free from structural defects and is vigorous. Consider the retention of the tree and designing the development to accommodate the tree.

Moderate: The tree may offer some screening in the landscape or serve a particular function in the location and have minor structural defects. The tree may entering the mature stage of its life cycle. The tree may be retained if it does not hamper the design intent.

Low: The tree offers very little in the way of screening or amenity and may have significant structural defects. The tree may also be mature and entering the senescent stage of its life cycle. The tree may be removed if necessary.

Other Person's Tree: The tree is located within an adjoining private property/land. The tree is to be protected unless written consent from the tree owner(s) and/or responsible authority is obtained. Consider the retention of the tree unless written consent is obtained from the tree owner and/or responsible authority.

Council Owned Tree: The tree is located within Council owned land. The tree is to be protected unless written consent from the responsible authority is obtained. Consider the retention of the tree unless written consent is obtained from the tree owner and/or responsible authority.

12.5 Age

- Young
- Semi Mature
- Mature
- Senescent

Young:	Juvenile or recently planted approximately 1-7 years.
Semi Mature:	Tree actively growing.
Mature:	Tree has reached expected size in situation.
Senescent:	Tree is over mature and has started to decline.

12.6 Amenity Value

Very Low:	Tree makes little or no amenity value to the site or surrounding areas. In some cases, the tree might be detrimental to the area's amenity value (e.g. unsightly, risk of weed spread)
Low:	Tree makes some contribution of amenity value to the site but makes no contribution to the amenity value of surrounding areas. The removal of the tree may result in little loss of amenity. Juvenile trees, including street trees are generally included in this category. However, they may have the potential to supply increased amenity in the future.
Moderate:	The tree makes a moderate contribution to the amenity of the site and/or may contribute to the amenity of the surrounding area.
High:	The tree makes a significant contribution to the amenity value of the site, or the tree makes a moderate contribution to the amenity value of the larger landscape. The amenity value rating considered the impact that the tree has on any neighbouring sites as being equally important to that supplied to the subject site. However, trees that contribute to the general area (e.g. streetscape) are given a greater weight.

12.7 Terms within tree data table

- DBH
- DAB
- CA1
- TPZ
- SRZ

DBH: Diameter at breast height (1.4m from ground level)
DAB: Diameter at base of tree
CA1: Circumference of trunk at 1m from ground level
TPZ: Tree Protection Zone
SRZ: Structural Root Zone