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**Arboricultural Impact Assessment**

**Tarilta Low-Level Crossing**



September 2023

## Draft – Arboricultural Impact Assessment Tarilta Low-Level Crossing

September 2023

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**Cover image:** Taken from eastern entrance.

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# 1. INTRODUCTION

## 1.1 Scope

Mount Alexander has engaged Practical Ecology Pty Ltd to assess existing trees in the area surrounding a proposed redevelopment of Vaughan–Tarilta Low–Level Crossing. An assessment has been undertaken to include all trees expected to be directly impacted by the proposed development.

The Study Site is located alongside the Loddon River and adjacent to a bifurcation into Fryers Creek. The existing low–level crossing is composed of rocks and substrate to form a roadway that can be used in dry conditions by all vehicles, but only four–wheel drives when inundated. The existing infrastructure is the only direct connection between Vaughan and Tarilta.

The surrounding vegetation was observed to be particularly weedy with large River Red Gums *Eucalyptus camaldulensis* making up the majority of the canopy cover of the site, along with intermittent exotic specimens (both planted and self–sown). The Study Site includes both roads entering and exiting the low–level crossing.

Any removal of any indigenous vegetation (including individual trees) is expected to trigger Clause 52.17 of the Mount Alexander Planning Scheme.

Under Clause 52.17 a permit is required to remove, destroy or lop native vegetation on sites greater than 0.4 hectares. Clause 52.17 requires a planning permit for the removal of native vegetation (exemptions apply). The purpose of the clause (amongst others) is to minimise impacts on Victoria’s biodiversity from the removal of native vegetation and to manage native vegetation to minimise land and water degradation.



**Figure 1.** Area for the proposed bridge redevelopment.

## 2. METHODOLOGY

A site assessment was undertaken on Wednesday 5<sup>th</sup> of July 2023 by Maria Koulaginis, Ramon Ciccone and Michelle Savona.

Only trees expected to be impacted by the proposed low level removal crossing project through the installation of a proposed bridge were individually assessed as part of this assessment. It is noted here also however that the current assessment covers additional trees alongside the existing roadways that lead to and from the Low–Level Crossing. This information was captured given a previous proposal to include upgrades to these roads in addition to the level crossing removal. Information on these trees has however been included as part of this report for information purposes should these roads be upgraded by Mount Alexander Shire Council in the future.

The Visual Tree Assessment that was undertaken as part of this assessment covered a total of 39, inclusive of trees expected to be impacted by the Low–Level Crossing removal project and additional trees along the roadways to and from this location as noted above.

Visual Tree Assessments (VTA) are used by qualified arborists in order to efficiently identify and health or structural defects that might be evident. They are undertaken from ground level and assess the tree from ground level, up the trunk and then into the upper branches of the canopy. Equipment used include, but are not limited to, sounding hammers, Nikon Laser Range Finder, and digital cameras.

The following information for collected trees were as follows;

- Asset ID
- Tree Species and Origin
- Location (matched to supplied survey plan)
- Individual Photograph
- Health and Structure
- Tree Height x Canopy Width (m)
- Diameter at breast height (DBH)
- Diameter at base (DAB)
- Useful Life Expectancy (ULE)
- Retention Value

For further information and descriptions of collected values as part of the current assessment, refer to Appendix 1.

### 2.1 Other Documents

The following documents have been reviewed and considered as part of preparation of this report,

- Tarilta Low–Level Crossing– Flora and Fauna Assessment and Native Vegetation Impact Assessment– Practical Ecology, August 2023.
- Planning Property Report May 2023, VicPlan, Victorian State Government.
- Site Survey, Vaughan–Tarilta Road Bridge (REF AB 9112–19–01), Adrian Cummins & Associates Consulting Surveyors, 15 November 2019.

- Survey and Civil Works Design Plan (Drawing no. ML17237–C001), Pitt & Sherry, 25 June 2018.

## 2.2 Assumptions and Limitations

- All assessments and impacts have been calculated based on the latest plans provided drawings. Practical Ecology Pty Ltd are not responsible if the drawings submitted as part of the Planning Permit application differ from those provided at the time our assessment was completed and this report prepared.
- Practical Ecology assumes all provided documentation/legal description is accurate and correct.
- Any alteration to the provided report, unless undertaken by Practical Ecology Pty Ltd, will invalidate all provided information.
- All assessments are taken from ground level.
- As per AS4970, root distribution is considered symmetrical unless otherwise described.

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### 3. TREE SUMMARY

A total of 39 trees were assessed.

The majority of trees are indigenous to Mount Alexander Shire and are typical of the EVC deemed to best represent the vegetation on site: Creekline Grassy Woodland (EVC 68) of the Goldfield Bioregion.

The majority of assessed trees were observed to be in 'Fair' to 'Good' condition and providing important habitat components of the Loddon River vegetation corridor. Trees located within adjacent residential properties have also been individually assessed.



Figure 2. Trees located adjacent to the domestic zone.

#### 3.1 Root Locations

Multiple roots were observed to be located under the existing gravel leading to and from the existing Low–Level Crossing. Roots are expected to be located throughout this road corridor due to the size and proximity of surrounding vegetation. All works within the Tree Protection Zones (TPZs) of trees to be retained are to be completed sensitively and with roots remaining intact.



**Figure 3.** Large roots located under roadway



**Figure 4.** Large structural roots located under the existing roadway

## 3.2 Retention value

The retention of trees should be considered prior to the design phase of any new development. Trees provide an important contribution to landscape amenity as well as environmental and heritage values. These values have been considered and balanced with the existing condition (longevity, health and structure) when assigning retention values to individual specimens.

Assigning retention values to trees expected to be impacted by works allows for trees to be prioritised appropriately in the development process. All efforts should be made to retain ‘Very High’ and ‘High’ values trees throughout the design process.

Retention Value	Number of Trees	Tree ID
Very High	3	Trees 1, 9, 14
High	3	Trees 16, 20, 25
Medium	17	Trees 2–5, 6, 7, 15, 17–19, 21, 26–28, 35–38.
Low	13	Trees 5, 8, 10–13, 22–24, 32–34, 39
Third Party Ownership	10	Trees 29–31

### 3.2.1 Very High and High Value

Six trees were assessed as having ‘Very High’ or ‘High’ retention value. These trees are all large, mature naturally occurring River Red Gums located along the southeastern entrance of the Low–Level Crossing. These trees have a high landscape contribution and are located within close proximity of the proposed road renewal.





**Figure 5.** Large River Red Gums with ‘Very High’ to ‘High’ retention values.

### 3.2.2 Medium Value

17 trees have been assessed as having a ‘Medium’ retention value. These trees comprise of specimens that are either moderately sized specimens in good condition or larger specimens in ‘Fair’ condition with health or structural defects. Trees assessed as being of ‘Medium’ retention should be considered for retention, where practical, during the design process.

### 3.2.3 Low Value

13 trees were assessed as being ‘Low’ retention value. Trees are smaller in size or in ‘Poor’ condition with reduced amenity value. Trees are not worthy of a redesign to facilitate their retention.

### 3.2.4 Third Party Value

Three trees have been assessed as being Third Party owned. These trees are located within front gardens of neighbouring residential properties. These trees must be retained throughout development works.

## 3.3 Tree Species

River Red Gums were observed to be the dominant species on site, typical of the location being a river of permanent, intermittent or season flow. Manna Gums *Eucalyptus viminalis* were also observed on site located further from the creek line, typical of this species and these individuals are expected to be self-sown. All other recorded species are expected to be planted (e.g. Lombardy Poplar *Populus nigra ‘Italica’*) or self-sown weeds that have been established due to the free-flowing river (Weeping Willow *Salix babylonica*).

Scientific Name	Common name	Origin	Species Count	Occurrence	
				Planted Specimens	Non-Planted Specimens
<i>Acacia melanoxylon</i>	Blackwood	Indigenous	8	0	8
<i>Eucalyptus camaldulensis</i>	River Red Gum	Indigenous	17	0	17
<i>Eucalyptus viminalis</i>	Manna Gum	Indigenous	2	0	2
<i>Salix babylonica</i>	Weeping Willow	Exotic–Weedy	2	0	2
Various planted Garden Species	Various planted Garden Species	Exotic	10	10	0
<b>Grand Total</b>				<b>29</b>	

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## 4. PROPOSED DEVELOPMENT

It is proposed to upgrade the existing Low-Level Crossing with a new bridge that will connect the Vaughan and Tarilta Townships. It is currently serving as a four-wheel drive only track that is only accessible in the dry season.

The proposed bridge is to be located largely within the footprint of the existing Low-Level Crossing, noting that batters will likely extend beyond it as per Figure 6 below. This bridge is to be constructed above the existing water level and include four beams that will support a raised platform. In combination with works proposed to lower the existing substrate, it is understood that the works will alter the existing water levels allowing flows beneath the bridge all year.

As noted above, although works for road upgrade works have not been confirmed, they have been included within this report to be considered in future works. All tree protection measures along access paths must still be incorporated throughout all development stages to allow access for construction vehicles while still ensuring surrounding trees are not adversely impacted.

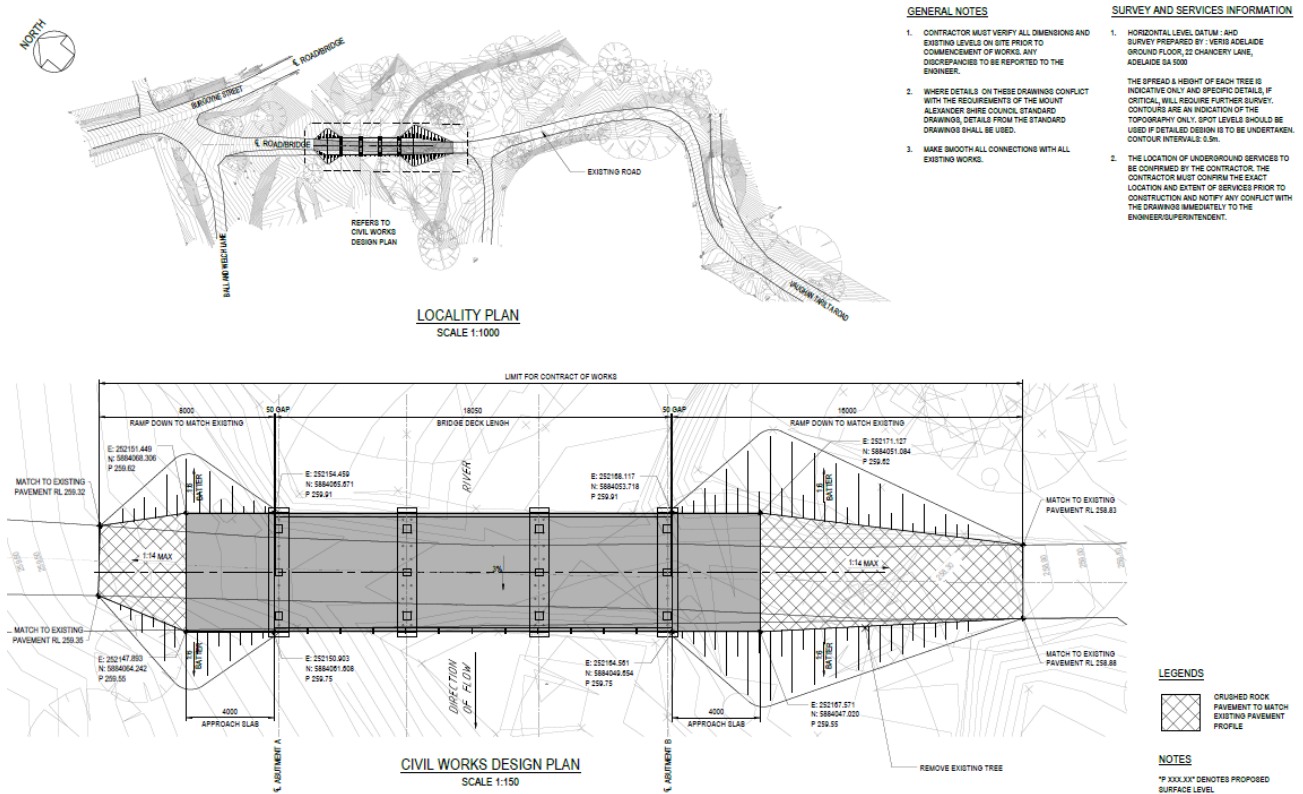


Figure 6. Proposed road bridge redevelopment

## 5. CONSTRUCTION IMPACT ASSESSMENT

All impacts have been calculated and described as specified in *Australia Standard 4970–2009–Protection of Trees on Development Sites*. They are based off the percentage encroachment from the proposed design into the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) of trees. See Appendix 2 for further details.

As noted above, this includes impacts to trees associated with the Low–Level Crossing redevelopment that is to occur in the near future, and trees that may be impacted by future road upgrades leading to and from the bridge. Impacts have been based on design plans for these works provided at the time of writing.

All trees are expected to be retained through sensitive construction measures and arborist supervision.

**Table 1.** Encroachment Summary

Impact	Recommendation	Reasoning	Trees (Tree IDs) Low Level Crossing	Potential Road Upgrade works
Major Impact	Removal	Trees are not expected to tolerate proposed works and will require removal to facilitate the proposed design	Trees 22 and 23	–
	Retain	Trees are expected to be retained with sensitive construction measures/specialised protection techniques	Trees 21 and 38	19 Trees (Tree IDs 1–4, 6–16, 18, 19, 29, and 33).
Minor Impact	Retain	Expected to remain viable with standard tree protections measures and/or compensation for area lost.	–	7 Trees (Tree IDs 17, 24, 28, 30 31, 35 and 37).
No Impact	Retain	Expected to remain viable with standard tree protection measures	–	9 Trees (Tree IDs 5, 20, 25–27, 32, 34, 36, and 39)
<b>Total</b>			<b>39</b>	

- 23 Trees incur a Major Encroachment (>10% TPZ and/or SRZ encroachment) from the proposed design;
  - Trees 22 and 23 are **not expected to tolerate** the proposed Low–Level Crossing redevelopment.

- Tree 22 is located within the existing waterway and is not expected to tolerate the proposed works due to extent of the bridge construction zone and required battering. Battering for bridge redevelopment is proposed within 1 metre of the trunk.
- Tree 23 is a small Acacia and is located within the footprint of proposed bridge redevelopment works. Tree 23 is of 'Low' retention value and is not worthy of a redesign to facilitate its retention.
- The remaining 21 trees with a Major Impact **are expected to tolerate** the proposed works. These trees are impacted by the proposed bridge upgrade and the associated road upgrades.
  - Trees 21 and 38 are impacted by the proposed **Low-level Crossing redevelopment**.
    - Tree 21 is currently located on an existing river bank and is expected to remain viable with standard Tree Protection Measures (see Appendix 3 and Appendix 4).
    - Tree 38 is expected to remain viable given battering for the proposed road bridge development should be located at least 2.4 metres (outside the SRZ) from the centre of trunk.
  - 19 trees (Trees 1–4, 6–16, 18, 19, 29, 33, and 38) will be impacted by the proposed future **road upgrade works** based on current design plans.
    - Trees 1, 9 and 14 are of Very High retention value and are large, mature specimens. All road upgrades works within the TPZs of these trees must be under direct supervision of the project arborist. Road width is to remain at **3 metres** as shown on the provided plans within the TPZs of Trees 9 and 14.
    - Road upgrade works are to be located within the footprint of the existing roadway and at grade with no further excavation.
- 7 Tree (Tree IDs 17, 24, 28, 30 31, 35 and 37) incur a **Minor Encroachment** (<10% TPZ and no SRZ encroachment) and are expected to remain viable with standard tree protection measures and compensation to area lost. Locations for tree protection measures are seen within the attached Tree Protection Plan (see page 31) and further described in Appendix 3.
- 9 Trees (Trees 5, 20, 25–27, 32, 34, 36, and 39) have **No Encroachment**, these trees are expected to remain viable with standard tree protection measures. Locations for tree protection measures are seen within the attached Tree Protection Plan (see page 31) and further described in Appendix 3.

### Permit Requirements.

All indigenous vegetation requires a permit for removal under Clause 52.17 due to being located with a patch of native vegetation as per *The Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017).

Trees proposed for removal	Permit Requirement	Exemptions
Tree 22	No- Exotic tree, is not covered by any overlays.	N/A
Tree 23	Yes- Indigenous tree that is not expected to be planted, covered by Clause 52.17	NO - No Exemptions apply however tree is of 'Low' retention value and should be considered for removal to facilitate development works

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## 6. RECOMMENDATIONS/DISCUSSION

The following is recommended in order to ensure trees proposed for retention remain viable:

1. Any future road development works must be redesigned to show works within the footprint of the existing road and/or outside the TPZs of trees to be retained. Final road upgrade designs will need to be reviewed by the Project Arborist prior to the development commencing.
  - a. All road upgrade works within the TPZs of trees to be retained (within the existing road footprint) are to be completed at grade with no further excavation.
  - b. Any expansion of the existing road required within the TPZ of Tree 1 is to be completed north east of the existing footprint towards the TPZs of Trees 26 and 27.
  - c. The proposed road width is to remain at **3 metres** as shown on the provided plans within the TPZs of Trees 9 and 14.
  - d. The Project Arborist is to be advised once the final design has been produced (inclusive of construction machinery access requirements). The Project Arborist is to advise if further tree protection measures or tree removals are required.
2. Tree 23 is to be removed prior to commencement of development works.
3. Although Tree 22 is not expected to remain viable through development works, it is recommended to be retained in the landscape as much as is feasible and without being immediately removed. Tree 22 is a large extending Weeping Willow that is expected to be adversely impacted by proposed Low–level Crossing redevelopment works. Even in a deteriorating state, this large specimen plays an important role in erosion control of the surrounding river bank and its complete removal would have an adverse impact on sediment downstream as well as displacement of other native vegetation within the riverbank. Allowing this specimen to naturally degrade is not expected to have an adverse impact and may provide habitat value for native fauna within the immediate area.
  - a. Tree 22 is recommended for pruning of all branches that may impact the proposed roadway and bridge. Pruning of Tree 22 is not required meet the requirements outlined in *AS4373 Pruning of Amenity Trees*.
4. Standard tree protection measures are to be installed as outlined in the attached Tree Protection Plan (see Appendix 4).
  - a. Tree Protection Fencing (TPZ) is to be installed to protect all trees proposed for retention throughout development works.
  - b. Ground protection is to be installed along the existing roadway during the demolition and construction of the proposed bridge (with the assumption of bridge development works occurring prior to road upgrade works).

- i. Ground protection is to be installed as per the attached TPP and as described in Appendix 4
  - ii. Ground protection must only be removed during construction of the proposed road upgrade. Ground protection is to be removed in sections to ensure trees are not impacted during this stage of the development. All work within these areas is to be completed at ground level with no further excavation
  - iii. Construction machinery on bare ground (where ground protection is required to be removed) is to not exceed 10 tonnes in weight.
5. Underground services such as electricity, telecommunications are to be installed outside the TPZs of trees to be retained. Where TPZs cannot be avoided, an underground services plan is to be provided to the Project Arborist for review prior to any excavation works.
6. Any landscaping works within the TPZs of trees to be retained, are to be completed at ground level with no further excavation.
7. Any required changes and/or alterations are to be approved by the project arborist prior to works commencing.

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## 7. TREE DETAILS

Table 2. Individual Tree Assessments

Tree_ID *	Species	Height x Width	Health	Structure	Maturity	Retention	ULE	*DBH (combined)	**DBH-Largest Stem	TPZ	SRZ	Recommend	Impact	Habitat Zone/Scattered Tree	Origin	Comment
1	<i>Eucalyptus camaldulensis</i>	25x12	Fair	Fair	Mature	Very High	+40 years	134.0	134	15.0	3.9	Retain	Major	Large Tree- Habitat Zone 1	Indigenous	Multiple roots extending into roadway drainage
2	<i>Eucalyptus camaldulensis</i>	17x10	Fair	Fair	Mature	Medium	10-20 years	72.7	60	8.7	3.2	Retain	Major	Habitat Zone 1a	Indigenous	Grown over adjacent tree. Borer present
3	<i>Eucalyptus camaldulensis</i>	14x8	Good	Fair	Mature	Medium	20-40 years	45.0	45	5.4	2.5	Retain	Major	Habitat Zone 1a	Indigenous	
4	<i>Eucalyptus camaldulensis</i>	14x6	Good	Fair	Mature	Medium	20-40 years	35.0	35	4.2	2.3	Retain	Major	Habitat Zone 1a	Indigenous	
5	<i>Eucalyptus camaldulensis</i>	7x3	Poor	Fair	Semi-mature	Low	6-10 years	12.0	12	2.0	1.6	Retain	No Impact	Habitat Zone 1a	Indigenous	
6	<i>Acacia melanoxylon</i>	10x6	Good	Fair	Semi-mature	Medium	20-40 years	24.0	24	2.9	1.9	Retain	Major	Habitat Zone 1a	Indigenous	Dead small tree adjacent
7	<i>Acacia melanoxylon</i>	15x7	Good	Good	Mature	Medium	20-40 years	31.0	31	3.7	2.3	Retain	Major	Habitat Zone 1a	Indigenous	
8	<i>Eucalyptus camaldulensis</i>	15x3	Very Poor	Poor	Semi-mature	Low	0 years	24.0	24	2.9	1.9	Retain	Major	Habitat Zone 1a	Indigenous	Estimated basal due to fence material at base
9	<i>Eucalyptus camaldulensis</i>	26x15	Good	Fair	Mature	Very High	+40 years	88.0	88	10.6	3.3	Retain	Major	Large Tree- Habitat Zone 1a	Indigenous	Decay at base but reactive growth present, roots under road. Estimated DAB due to vegetation
10	<i>Acacia melanoxylon</i>	11x9	Good	Poor	Mature	Low	6-10 years	34.5	18	4.1	2.1	Retain	Major	Habitat Zone 1a	Indigenous	Estimated basal due to multi stem. Previous lopped regrowth
11	<i>Eucalyptus camaldulensis</i>	13x3	Good	Good	Semi-mature	Low	+40 years	22.0	22	2.6	1.9	Retain	Major	Habitat Zone 1a	Indigenous	
12	<i>Acacia melanoxylon</i>	7x6	Fair	Fair	Semi-mature	Low	6-10 years	17.0	17	2.0	1.8	Retain	Major	Habitat Zone 1a	Indigenous	Pruned for power line clearance
13	<i>Eucalyptus camaldulensis</i>	10x2	Very Poor	Poor	Semi-mature	Low	0 years	22.0	22	2.6	1.9	Retain	Major	Habitat Zone 1a	Indigenous	
14	<i>Eucalyptus camaldulensis</i>	27x25	Good	Fair	Mature	Very High	+40 years	133.0	133	15.0	3.8	Retain	Major	Large Tree - Habitat Zone 1a	Indigenous	
15	<i>Acacia melanoxylon</i>	8x4	Good	Fair	Semi-mature	Medium	20-40 years	16.0	16	2.0	1.7	Retain	Major	Habitat Zone 1a	Indigenous	
16	<i>Eucalyptus camaldulensis</i>	26x10	Good	Fair	Mature	High	20-40 years	68.0	68	8.2	3.0	Retain	Major	Habitat Zone 1a	Indigenous	
17	<i>Eucalyptus camaldulensis</i>	16x7	Poor	Poor	Semi-mature	Medium	6-10 years	22.0	22	2.6	2.1	Retain	Minor	Habitat Zone 1a	Indigenous	Deadwood
18	<i>Eucalyptus camaldulensis</i>	17x15	Fair	Poor	Mature	Medium	10-20 years	45.0	45	5.4	2.7	Retain	Major	Habitat Zone 1a	Indigenous	Borer, decay
19	<i>Eucalyptus camaldulensis</i>	24x12	Fair	Fair	Mature	Medium	20-40 years	84.0	84	10.1	3.3	Retain	Major	Large Tree- Habitat Zone 1a	Indigenous	Estimated basal due to dead stem adjacent. Multiple previous failures roadside
20	<i>Eucalyptus camaldulensis</i>	27x13	Good	Fair	Mature	High	+40 years	80.0	80	9.6	3.2	Retain	No Impact	Large Tree- Habitat Zone 1a	Indigenous	

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21	<i>Eucalyptus camaldulensis</i>	20x9	Fair	Fair	Mature	Medium	20-40 years	76.0	76	9.1	3.0	Retain	Major	Habitat Zone 1a	Indigenous	Leaning over path
22	<i>Salix babylonica</i>	14x21	Fair	Fair	Over mature	Low	20-40 years	75.5	50	9.1	4.4	Removal	Major	N/A	Exotic	Pruned for powerlines
23	<i>Acacia melanoxylon</i>	6x2	Fair	Poor	Semi-mature	Low	0 years	13.0	13	2.0	1.5	Removal	Major	Scattered Tree	Indigenous	Already impacted by logs, not worthy of retention
24	<i>Salix babylonica</i>	15x20	Poor	Fair	Over mature	Low	6-10 years	98.5	62	11.8	3.3	Retain	Minor	N/A	Exotic	Estimated DAB due to debris at base
25	<i>Eucalyptus camaldulensis</i>	22x7	Fair	Fair	Mature	High	+40 years	61.0	61	7.3	2.8	Retain	No Impact	Habitat Zone 1a	Indigenous	
26	<i>Eucalyptus viminalis</i>	25x8	Good	Good	Mature	Medium	+40 years	36.0	36	4.3	2.3	Retain	No Impact	Habitat Zone 1a	Indigenous	
27	<i>Eucalyptus viminalis</i>	25x7	Good	Good	Mature	Medium	+40 years	51.0	51	6.1	2.7	Retain	No Impact	Habitat Zone 1a	Indigenous	
28	<i>Populus nigra 'italica'</i>	26x5	Fair	Fair	Mature	Medium	10-20 years	78.0	48	9.4	3.0	Retain	Minor	Habitat Zone 1a	Exotic	Estimated basal due to multi-stemmed
29	<i>Cupressus sempervirens</i>	7x1	Good	Good	Mature	Third Party	+40 years	11.0	11	2.0	1.5	Retain	Major	N/A	Exotic	Group of 7
30	<i>Prunus cerasifera</i>	3x3	Fair	Fair	Mature	Third Party	10-20 years	11.0	11	2.0	1.5	Retain	Minor	N/A	Exotic	Group of 5
31	<i>Acacia melanoxylon</i>	7x7	Fair	Fair	Mature	Third Party	10-20 years	36.8	27	4.4	2.2	Retain	Minor	N/A (planted)	Indigenous (planted)	Canopy deadwood and decay
32	<i>Populus nigra 'italica'</i>	11x5	Fair	Fair	Semi-mature	Low	10-20 years	17.7	12	2.1	1.6	Retain	No Impact	N/A	Exotic	
33	<i>Populus nigra 'italica'</i>	16x3	Fair	Fair	Mature	Low	10-20 years	55.8	42	6.7	2.6	Retain	Major	N/A	Exotic	
34	<i>Populus nigra 'italica'</i>	17x3	Fair	Poor	Over mature	Low	10-20 years	50.2	34	6.0	2.5	Retain	No Impact	N/A	Exotic	Regrowth from very large Stump
35	<i>Populus nigra 'italica'</i>	25x3	Fair	Fair	Mature	Medium	10-20 years	56.4	42	6.8	2.6	Retain	Minor	Habitat Zone 3	Exotic	
36	<i>Acacia melanoxylon</i>	8x10	Fair	Poor	Mature	Medium	10-20 years	54.0	33	6.5	2.6	Retain	No Impact	Habitat Zone 3	Indigenous	Multi-stemmed, Poplar in between
37	<i>Populus nigra 'italica'</i>	23x6	Fair	Fair	Mature	Medium	10-20 years	61.1	38	7.3	2.7	Retain	Minor	N/A	Exotic	
38	<i>Eucalyptus camaldulensis</i>	14x4	Good	Fair	Mature	Medium	20-40 years	36.0	36	4.3	2.4	Retain	Major	Scattered Tree	Indigenous	Canopy pruned for power line clearance
39	<i>Cupressus sempervirens</i>	8x1	Good	Fair	Mature	Low	+40 years	14.0	14	2.0	1.7	Retain	No Impact	N/A	Exotic	Estimated DBH due to vegetation

\*DBH has been calculated as per AS4970, A. S. (2009). Protection of trees on development sites. See Appendix 1 for further details.

\*\*Largest stem measurements (recorded at 1.4m) have been included for ecological purposes including to define 'Large' trees.

## 8. REFERENCES

DELWP (2017) *Guidelines for the removal, destruction and lopping of native vegetation*. Department of Environment, Land, Water and Planning, Government of Victoria, Melbourne.

AS4970, A. S. (2009). Protection of trees on development sites. *Council of Australian Standards*.

AS4373, A. S. (2007). Pruning of Amenity Trees, 2007.

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## Appendix 1. Definition of terms

### Diameter at Breast Height (DBH)

DBH is measured using a diameter measuring tape. It is measured 1.4 metres or as described in AS4970 for particular circumstances in order to achieve an accurate representation of the trees Tree Protection Zone. Where a tree is multi-stemmed, the DBH has been calculated according to AS4970.

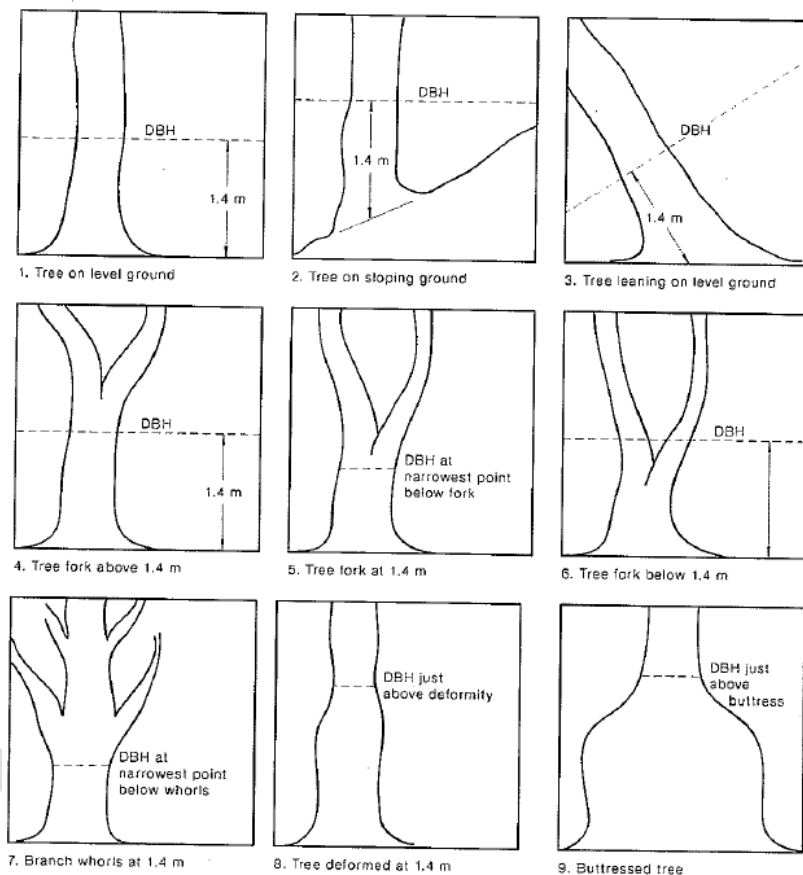


Figure 7. Examples of variation to the height of recording for DBH measurements (AS4970–2009).

### Diameter at Base (DAB)

DAB is measured using a diameter measuring tape. DAB is measured directly above the root buttress.

### Tree Height and Width

Tree height has been estimated using a digital clinometer. Where site limitations are restricting measuring tree height (such as dense stands of trees), height and canopy measurements have been estimated.

## Tree health

Good	Tree is growing well, has full canopy of foliage and negligible pest or diseases.
Fair	Trees is growing reasonably well, has an adequate canopy foliage, deadwood may be present in the crown and some minor pests and diseases.
Poor	Tree is not growing well; extension growth of the laterals is minimal; canopy may be thinning or sparse. Large amounts of deadwood may be present in the crown. Significant pest and disease problems may be evident.
Very Poor	Tree in a state of decline. The canopy may be very thin and sparse. A significant volume of deadwood may be present in the canopy or pest and disease problems may be causing a severe decline in tree health.
Dead	Tree is dead.

## Tree structure

Good	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. Major limbs are well defined. The tree is considered a good example of the species.
Fair	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 be exhibiting minor structural faults. If the tree has a single trunk, it may be on a slight lean or exhibiting minor defects.
Poor	The tree may have a poorly structured crown. The crown may be unbalanced or exhibit large gaps. Fungal fruiting bodies present on the bole/trunk. 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 root damage.
Very Poor	The tree has a poorly structured crown. The crown is unbalanced or exhibit large gaps with possibly large sections of deadwood. 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. Branches may exhibit large cracks that are likely to fail in the future. The tree may have suffered major root damage.
Failed	The tree has fallen over or the main trunk has failed.

## Retention Value

High	Tree has high amenity values such as high landscape value, shading, screening, Redesign is recommended and all efforts should be made to retain the subject tree.
Moderate	Tree may offer some amenity value such as screening and/or shading. Redesign should be considered where practical in order to retain the subject tree. If removal is required, replacement will be recommended.
Low	Tree is small in size and easily replaceable and/or has significant structural/health defects resulting in a reduced Useful Life Expectancy. Redesign for retention is not recommended and should be removed and replaced.
Third Party Ownership	Tree that is not owned by the client and must not be adversely impacted by any proposed works, regardless of condition.

## Useful Life Expectancy

Useful life expectancy is a length of time a tree is expected to continue providing amenity value as well safely remaining in the landscape. Useful Life Expectancies can be impacted by a range of factors including, but not limited to, species, location, health and/or structure. ULE predictions may change over time due to changes in health and/or surrounding conditions.

0 years	Tree is considered as having a high level of risk that is unable to be remediated with pruning and/or does not provide any amenity value. This includes dead trees.
1–5 years	Tree is in significant decline and not expected to continue to provide amenity and/or safely remain in the landscape for longer than 5 years
6–10 years	Tree has reasonable amounts of pest/disease or structural details. It is not expected to continue to provide amenity and/or safely remain in the landscape for longer than 10 years.
11–20 years	Tree is in fair condition and is expected to continue to provide amenity and safely remain in the landscape for the next 11–20 years.
20–40 years	Tree is in fair to good condition and is expect to continue to provide amenity and safely remain in the landscape for the next 20–40 years.
40+ years	Tree is identified as being a long–lived species and is not inhibited by its structure, health or location. The subject tree is expected to safely remain in the landscape and continue to provide amenity for the foreseeable future.

## Maturity

Young	Species is introduced to the area and does not occur naturally within Australia.
Semi Mature	Species is native to Australia but not indigenous to the state of Victoria, have been introduced to the area.
Mature	Tree is established and has expected size based on species and location. Tree growth rate is reduced compared to semi mature specimen.
Over mature	Tree is mature and is starting to decline. Amenity value is expected to reduce with time.

## Origin

Exotic	Species is introduced to the area and does not occur naturally within Australia.
Australia Native	Species is native to Australia but not indigenous to the state of Victoria, have been introduced to the area.
Victorian Native	Species that are native to Victoria but are not native to the local of which the assessment is being undertaken.
Indigenous	Species is indigenous to the local area of which the assessment is being undertaken.

## Habitat Zones

For further information regarding Habitat zones, please see Tarilta Flora and Fauna Assessment and Impact Analysis (Practical Ecology August 2023).

## Appendix 2. Protection of trees on Development sites

AS 4970–2009– *Protection of Trees on Development Sites* aims to provide guidance to relevant authorities in regards to

### Tree Protection Zones

A Tree Protection Zone (TPZ) is defined as a specified area above and below ground at a given distance from the trunk, the radius of this area is determined by multiplying the diameter at 1.4 metres by 12). This area is set aside for the protection of the tree’s roots and crown to provide for the viability and stability of a tree to be retained and to ensure the tree is not adversely impacted by the proposed development (AS4970–2009). Calculated TPZs cannot be below 2 metres or above 15 metres, TPZs are restricted to this ranges (AS4970–2009).

*Note: The TPZ of Monocots such as palms, cycads and tree ferns are an exception to the above calculations and should not be less than 1 metre outside the crown projection.*

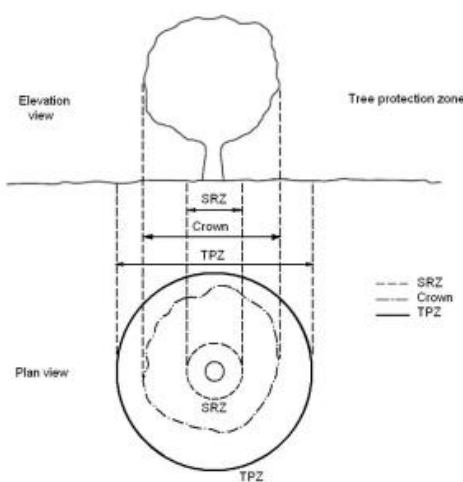


Figure 8. Tree Protection Zones (AS4970–2009)

### Structural Root Zones

The Structural Root Zone (SRZ) of a tree is required for tree stability. Disturbance within this area has the potential of significantly impacting a tree as well as leaving the tree unstable with an increased level of risk for full tree failure. Multiple factors can influence the SRZ including soil composition, natural and built structures (such as rocks and footings). An indicative SRZ can be calculated by using the diameter at base, located immediately above the root buttress. The SRZ for trees less than 0.15 metres in diameter is 1.5 metres. The calculation for an indicative SRZ as per AS4970 is calculated as follows (AS4970–2009);

$$R_{SRZ} = (D \times 50)^{0.42} \times 0.64$$

## TPZ and SRZ Encroachment Impact

The TPZ and SRZ is used to determine areas required to protected to ensure trees to be retained remain viable and are not adversely impacted by development. Minimal/monitored encroachment within these zones (see below for details) can be seen as acceptable under AS4970–2009.

### Minor Encroachment

If the proposed encroachment is less than 10% of the area of the TPZ **and** is outside the SRZ, sensitive construction and detailed root investigations will not be required. The area lost to development should be compensated for and standard tree protection measures are required.

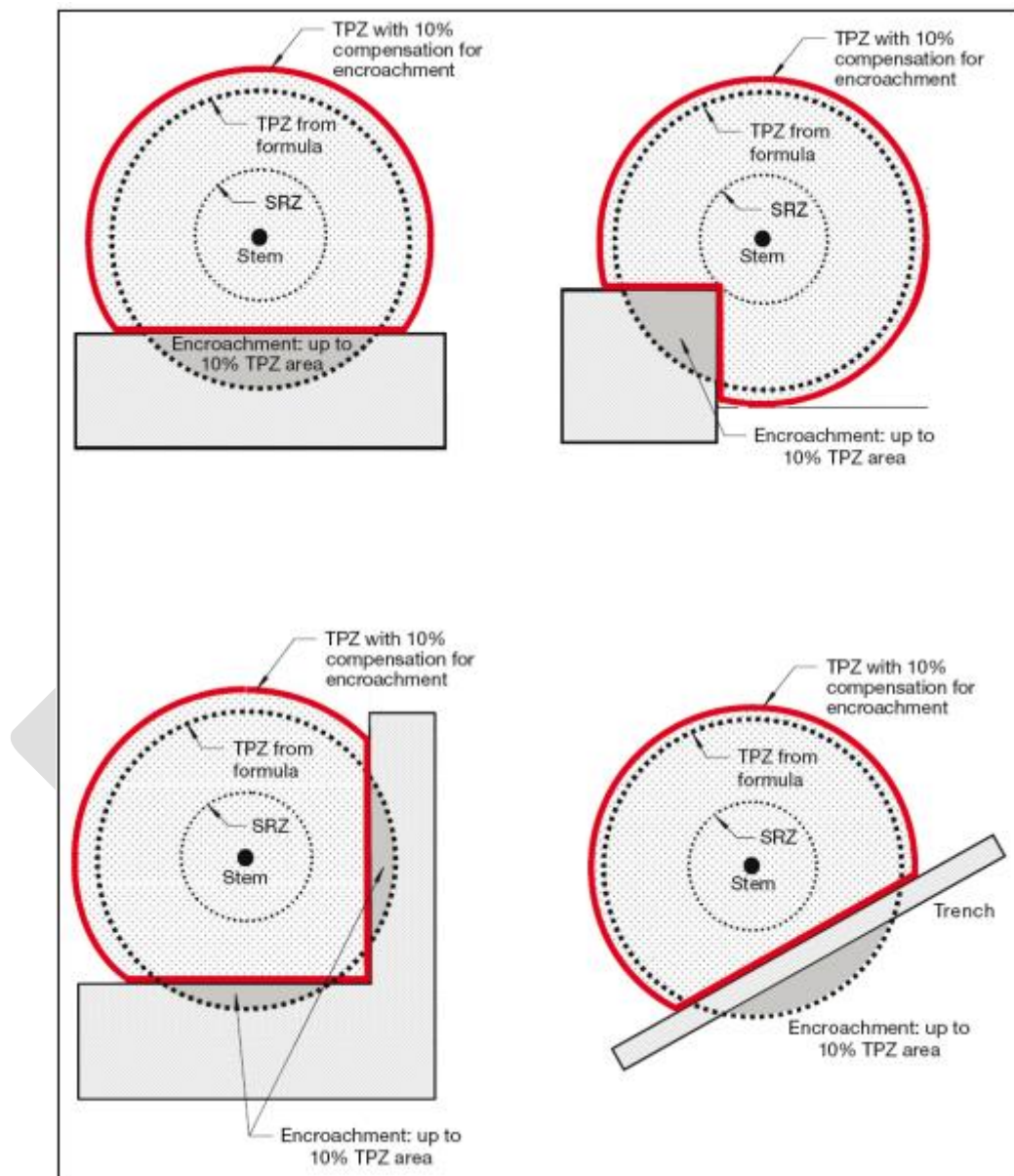


Figure 9. Examples of Minor encroachment (AS4970–2009)



## Major Encroachment

If the proposed encroachment is greater than 10% **and/or** encroaching into the SRZ of the subject tree, then it is considered a major encroachment. Further evidence must be provided by the project arborist to ensure the tree can remain viable. This includes root investigations using non-destructive methods, sensitive construction measures such as pier and beam/suspended slab construction, tree species and tolerance to root disturbance, existing structures inhibiting root growth, size of the tree etc.

## Crown Protection

Tree crowns must be protected from the proposed development including all machinery that is expected on site during demolition and construction. Crown protection may include pruning or tying back of branches. All pruning must meet all requirements outlined in AS4373.

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## Appendix 3. Tree Protection Measures

### Standard Tree Protection Measures

Standard tree protection measures are required to isolate and protect Tree Protection Zones to prevent impact due to demolition and construction processes.

#### Activities restricted within the TPZ

Activities that are restricted within the TPZ of trees to retain include but are not limited to (directly from AS4970–2009);

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

#### Tree Protection Fencing (TPF)

Tree protection fencing is to be erected as per the Tree Protection Plan (see Appendix 4) and is to follow all requirements set out in *AS 4687– Temporary Fencing and Hoardings*. Once erected, protective fencing is not to be removed or alternated without permission of the project arborist.

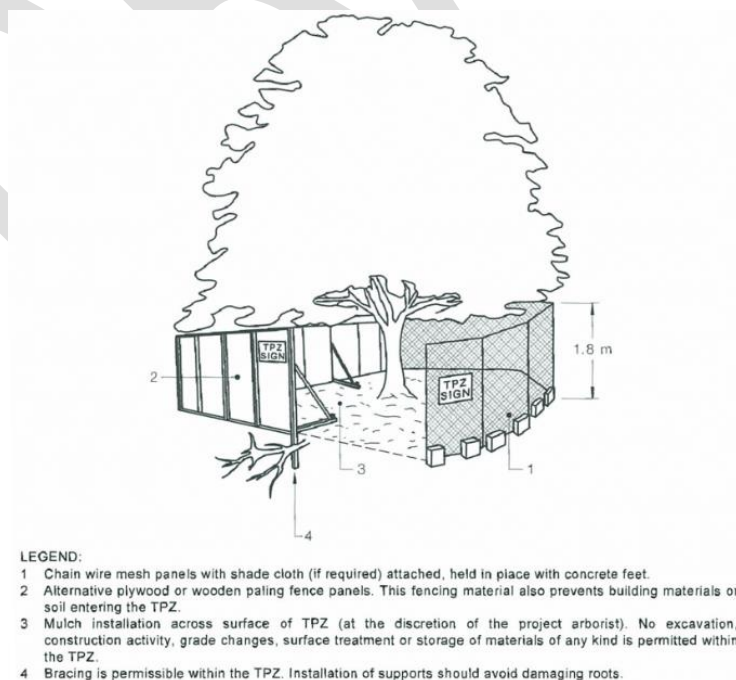
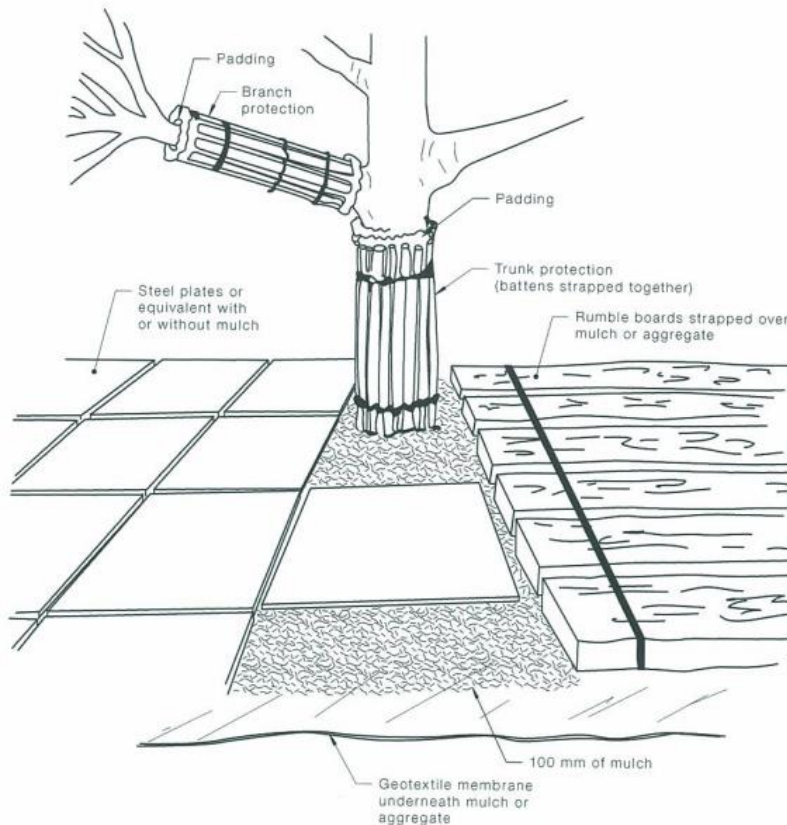


Figure 10. Example of Tree Protection Fencing (AS4970–2009)

## Ground and Trunk Protection

Ground protection is required for temporary access for construction machinery during demolition and/or construction phases of the development. The purpose of ground protection is to minimise soil compaction and root damage within the TPZ of trees to be retained. Ground protection measures may include (but are not limited to) a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards (AS4970–2009).



## Additional Tree Protection Measures

### Project Arborist Supervision

Project arborist supervision may be required for works within the TPZs of retained trees. This can include but is not limited to supervising sensitive excavation, scraping (for leveling purposes), and/or the excavation of post holes (e.g. decking post holes).

### Root Investigation: Non–destructive Digging/Hydro–excavation

Root investigation is suggested to provide evidence of the physical location of roots. If it can be demonstrated that roots are not present/not significantly impacted (to be determined by the project arborist based on size and quantity of roots) by the proposed design, exposed roots will be cleanly pruned and covered. TPZ fencing can then be adjusted to this area with compensation for area lost in other areas adjacent to the TPZ.

## Sensitive Construction measures

Sensitive construction measures can be used to reduce the overall impact to a trees TPZ. This includes methods such as pier and beam, suspended slabs, cantilevered building sections, screw piles and contiguous piling as alternatives to a standard slab installation to reduce root disturbance.

Sensitive construction measures can also be used in conjunction with Non-destructive digging, Figure 11 shows installation of services under tree roots. This may not be practical due to a range of factors such as soil composition and pipe diameter.



Figure 11. Hydro excavation used to sensitively install utility pipes. (Hydrox Root Controllers).

## Boring

Direction boring can be considered for the installation of services. The project arborist is to assess impacts of boring and bore pits on surrounding trees. Majority of tree roots are located relatively close to the surface. Boring allows majority of roots to remain undamaged if completed at the right depth.

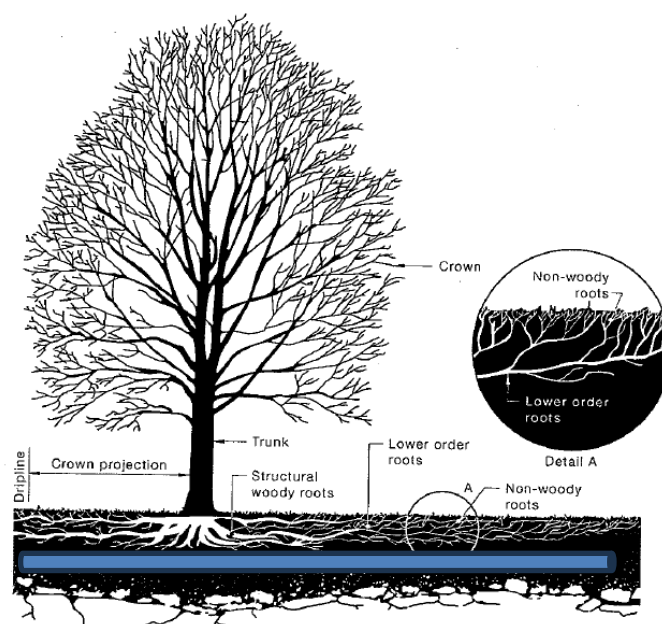


Figure 12. Example of boring under majority of roots located close to the surface (base image supplied by AS4970–2009).

## Appendix 4. Maps

Maps commence on following page.

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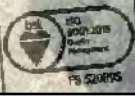


**NOTES**

284.970 (AHD) SVES  
 PRIOR TO ANY EXCAVATION OR CONSTRUCTION ON THE RELEVANT AUTHORITY SHOULD BE CHECKED

**JOB DETAILS**

DRAWN: JHOLT  
 CHECKED: A. THOMSON  
 SURVEY DATE: 15.11.2019  
 AHD / GDA



CLIENT: MT ALEXANDER SHIRE

**Disclaimer**  
 Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.



**Legend**

Trees	SRZ	TPZ	Retention
●	□	□	Very High
●	□	□	High
●	□	□	Medium
●	□	□	Low
●	□	□	Third Party

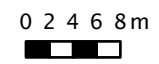
**TPZ Encroachment**

▨	Major
▨	Minor

**Details**  
 Mapping by: Ali Nia and Maria Koulaginis  
 Date: 9/08/2023  
 Version: 1  
 Aerial photography from Nearmap (June, 2023).  
 Data Source: Base layers courtesy of VicMap,  
 Copyright © State of Victoria.

**Map 1. Construction Impact Assessment**

Tarilta Low Level Crossing



Scale: 1:640 (Page size A3)



**Disclaimer**  
 Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.



**Legend**

Recommend

- + Removal
- Retain

Tree Protection Measures

- Ground Protection and Sensitive Construction
- TPZ Fencing

TPZ

**Details**  
 Mapping by: Ali Nia and Maria Koulaginis  
 Date: 9/08/2023  
 Version: 1  
 Aerial photography from Nearmap (July. 2023).  
 Data Source: Base layers courtesy of VicMap,  
 Copyright © State of Victoria.

**Map 2. Tree Protection Plan**  
**Tarilta Low Level Crossing**

0 2 4 6 8 m

N

Scale: 1:630 (Page size A3)