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Arboricultural Impact Assessment and Tree Management Plan

350 Antill Street Watson ACT

Report Reference No. 9840

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12th and 13th September 2022

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Brief

The author has been asked to conduct a site visit to carry out an arboricultural assessment of the trees on the southern end of the property and prepare an *Arboricultural Impact Assessment*.

This report aims to provide information on tree health, size, condition, quality and regulated status. The report also aims to advise on the likely impact any encroachment will have on the groups of trees indicated in the circled sections on the supplied plans (see Table 1) and give recommendations for the proposed development to proceed.

Background

Redevelopment plans have been drafted and include the demolition of the current building. Several smaller buildings are planned as a replacement, utilising a higher percentage of the property. Sections of the block are part of the threatened woodland area, which is likely to be impacted by the new development. This report has been comprised using information found in plans supplied to the author by the client

Methods (and limitations)

The site was visited and inspected on the 12th and 13th of September 2022.

A limited Visual Tree Assessment (VTA)¹ was performed from the ground on all trees and only includes what was visible at the time of inspection.

No fruit trees that make up the current orchard have been inspected.

Health has been determined using the information found in table 2 (Appendix Five)

The condition has been determined using the matrix provided in table 3 (Appendix Five)

The quality has been determined using the information provided in table 4 (Appendix Five)

The circumference was measured at 1.4 metres above ground level, with the sum being taken for multiple stems. The Diameter at Breast Height (DBH) and the Diameter at Ground Level (DGL) was then calculated from this figure.

The Tree Protection Zone (TPZ) for all trees been calculated at DBH x 12 metres, as per the method described in the *AS4790-2009 Protection of trees on development sites*.

The Indicative Structural Root Zone (ISRZ) has been calculated using the formula $R_{srz} = (DGL \times 50)^{0.42} \times 0.64$ as indicated in *AS4790-2009 Protection of trees on development sites*.

The identifications made have been based on the broad features visible from the ground at the time of assessment and not on full taxonomical inspections.

Observations

A southern section of approximately half the overall block is the specified area of concern. A total of 97 trees are growing in this section which is likely to be affected. Forty-six are native species. Fifty-one are an introduced species. A total of twenty-two trees on-site are of regulated size as per the guidelines outlined in the *Tree Protection ACT 2005*. See the Tree Survey table (table 1) attached as **Appendix Five** for complete details.

Discussion

All trees of regulated size as described in the *Tree Protection Act 2005* that may be affected by the development must have approval from the Tree Protection Unit to remove or if retained will require the establishment of Tree Protection Zones (TPZ) if the proposed development is to proceed.

Based on the supplied plans and calculating the radius of the ITPZ for all trees at DBH x 12 metres, as per the method described in the *AS4790-2009 Protection of trees on development sites*. The proposed development will have the following encroachments.

The areas designated as the threatened woodland extend from the southeast corner along the southern property boundary, then along the western property boundary to the northwest corner of the property. **Trees 32-73** are endemic species and are located within this area.

Building and driveway encroachments

Tree removal

If the proposed development proceeds as per supplied plans, the retention of the following trees is not possible. **Trees: 2,3, 6-21, 24, 25, 28-37, 47-50, 82-85, 91 and 95-97**, a total of 43 trees will need to be removed.

Trees: **24, 32, 36, 47 and 50** are of a regulated size and will require approval from the Tree Protection Unit for removal. All of these trees are species endemic to the area and are within the threatened woodland area.

Major encroachments

The following encroachments are in the "major" incursion threshold as per *AS4970-2009 Protection of trees on development sites*.

- **Tree 1:** The encroachment from the proposed house is calculated at **14.2%** or **9.6m²**
- **Tree 54:** The encroachment from the proposed building is calculated at **11.3%** or **12.8m²**
- **Tree 59:** The encroachment from the proposed building is calculated at **17.3%** or **23.4m²**
- **Tree 60:** The encroachment from the proposed house is calculated at **24.4%** or **15.3m²**

Although the proposed structure will have a "major" encroachment on these trees, no incursion into any SRZ will occur. When taking these factors, the age, apparent health and condition into account, with the ability to offset part of the encroachment with the available space in the area around the trees. The likely stress and the impact are reduced to a level more tolerable by the trees.

Minor encroachments

The following encroachments are in the “minor” incursion threshold as per *AS4970-2009 Protection of trees on development sites*.

- **Tree 38:** The encroachment from the proposed building is calculated at **9.8%** or **33.9m²**
- **Tree 86:** The encroachment from the proposed house is calculated at **0.9%** or **6.1m²**

The encroachment on tree 86 is so minimal that it is unlikely to have an effect on the tree. Considering the age, health, and condition of tree 38 and the existing offset to the south of the tree, the impact of this encroachment will be reduced.

No encroachments

Trees 4, 5, 22, 23, 26, 27, 39-46, 51-53, 55-58, 61-85, 87-89 and 91-94: The building will have no direct encroachment on any of these trees. Trees 23, 39, 41, 42, 43, 58, 63, 67 and 68 are of a regulated size and require the implementation of tree protection measures.

Tree protection

Damage to trees can occur in several ways during developmental work. This damage may be visible such as; broken branches, wounds/ other damage to the trunk. Or direct damage to the roots through trenching or excavation etc.

Other damage may not be as visible; sealing, adding extra fill around the root plate, and compaction of the soil above and around the roots can limit the amount of water and oxygen available to the roots and inhibit normal root activity. This non-visible damage creates the most concern and has a potentially greater long-term effect on the tree. Establishing an exclusion zone around the tree is the best method of protection, also known as the Tree Protection Zone (TPZ).

There will be occasions when it is necessary to work within or access the TPZ; in this situation, it is crucial to minimise the damage to the root zone. Simply having repetitive pedestrian action is enough to cause soil compaction, resulting in damaged roots. A surface that can load-share or full load-bear must be put in place to mitigate this damage.

The simplest method of creating a load-sharing surface is to spread a load of mulch over the root plate area and place sheets of plywood on top to disperse the weight. This method also aids weed suppression, increases microbial soil content, improves fungal/root associations and better water retention.

Damage or wounding to the trunk is also undesirable. Wounds can reduce the flow upwards of water and solutes and the downwards flow of photosynthates, as well as provide an entry point for disease to enter the tree. Over time this may become a significant defect, potentially affecting the health and vigour of the tree or its structural integrity.

When a TPZ exclusion zone is in place, there is no need for trunk protection. However, if machinery needs to pass through the TPZ, appropriate measures of trunk protection must occur. The best type of protection is high-density foam with timber boards on the outside, with steel strapping screwed to the boards to hold them in place.

The canopy is usually the least affected part of the tree during construction. The damage is predominately broken branches/limbs due to impact from machinery and poor or over-pruning to obtain clearance for structures. An observer when machinery is in motion and having all pruning work carried out by an appropriately qualified arborist as per the guidelines in AS 4373-2007 can reduce the likelihood of damage.

Root systems

When development occurs adjacent to trees, the impact on roots caused by excavation is the most critical issue. It is relevant to understand the root system to understand this impact. Roots all start as pioneer roots pushing through the soil to take advantage of soil moisture and solutes. This push is a product of the cells dividing and elongating at the tip, an area known as the Zone of Elongation. This area is typically 100 mm or less in length.

The stimulus for this elongation of cells is water, available solutes (soluble nutrients) and a soil temperature of approximately 16°C (for most trees suited to temperate areas). After the roots have become fully elongated, fine root hairs develop and become absorbing roots, which are responsible for the uptake of almost all water and solutes used by the tree.

These absorbing roots are ephemeral: and only last a short time, often only a few weeks. However, association with beneficial fungi can increase this time. When the tree is already growing well, an assumption that the available soil solutes and temperature are satisfactory is justified. Solute absorption and fungal associations cannot occur without water. Availability of water is, therefore, the most limiting factor.

Some of these roots will survive the environmental stresses and become woody roots. These roots range in size, from less than a millimetre to hundreds of millimetres in diameter and are essentially underground branches with thick bark. This bark protects and prevents their desiccation, as the bark on branches would do. However, as a result, they are very ineffective at absorbing water and solutes.

Due to environmental damage, disease or competition, numerous young woody roots will die. However, several will become long-lived, acting as the connection between absorbing roots and the tree.

A small number of these woody roots grow directly from the trunk, providing a pathway for the transportation of water and nutrients along with structural support to the tree, both in compression and tension. These are usually thicker and stronger and have a higher content of wood (lignin) cells.

When either tensional or compressive forces are applied, these (structural) roots will put on reactive tissue resulting in an asymmetrical rather than circular shape. These roots become rapidly thinner (known as the zone of rapid taper) and more circular the further from the trunk they grow.

Most of the tree's roots are likely to occur in the first 1.2 metres of soil depth, with a higher number of those absorbing roots located 30-45cm from the surface.

Mulch

Spreading organic mulch around trees improves moisture retention, insulation against colder temperatures and weed suppression, and reduces water run-off, the reflection and reradiation of heat. A reduction of soil compaction also occurs, providing a load-sharing surface and deterrence in pedestrian traffic.

Long-term benefits of organic mulch decomposing increases concentrations of nitrogen, phosphorous, potassium, calcium, and magnesium in the soil, all of which are essential for growth and sustainable health in trees and plants. In addition, changes to pH levels and an increase in beneficial fungal/root associations and microbial content may also occur.

Conclusion

As currently proposed, the development will require the removal of 43 trees, 27 introduced species and 16 native species; five trees are regulated and require approval from the Tree Protection Unit and must be obtained to remove. These five regulated trees make up the ten total needing to be removed from the threatened woodland section at the southern end of the block, equalling a 40% reduction and significantly impacting the overall size of the woodland area.

To retain all trees in this area: substantial design changes would need to occur, including but not limited to; redesigning the layout and position of the buildings, in particular, the proposed Catholic care building and the entrance road/driveway to the carpark.

Recommendation and specifications

TPZ exclusion fences **must** be erected prior to commencement of any works. These **must** be positioned as demonstrated in the Tree Management Plan drawing (Appendix six) and **must** remain in place until the completion of works.

Should any pruning to reduce branch length be required, the location and size of any cuts made; must be specified by an arborist qualified to AQF5 (in arboriculture) and made at suitable growth points as described in *AS4373-2007 Pruning of Amenity Trees*.

General specifications

The removal of trees adjacent to those being retained must be carried out by a suitably qualified arborist holding a minimum of Certificate III (AQF3) in Arboriculture, in compliance with AS4373-2007 (section 5.5 branch lowering or dropping).

All trees to be retained must be protected during work and require the implementation of a Tree Management Plan (TMP).

Any pruning of regulated and/or retained trees, including those in neighbouring properties, **must** be undertaken in accordance with AS4373-2007 Pruning of Amenity Trees by a suitably qualified arborist holding a minimum of Certificate III (AQF3) in Arboriculture.

Prior to commencement of works

- a) A temporary fence is to be erected to form a TPZ exclusion zone. The fence is to be at least 1800mm in height, continuous mesh panels, supported by steel posts to isolate construction works.
- b) All fencing to be erected on commencement of site work and removed at the completion of construction. The fence is to remain continuous throughout the project, except where approved service installation occurs.
- c) The existing boundary fences may be utilised to form the TPZ exclusion zones.
- d) If machinery access is required through any of the TPZs an appropriate load sharing surface **must** also be utilised. If occurs, the project arborist (qualified to AQF5 in arboriculture) **must** be present to observe.

- e) Ensure adequate drainage measures are installed if constructing retaining walls. Back fill all gaps behind the retaining wall with quality topsoil, there **must** be no construction waste or 'urbic soils' used.
- f) Spread organic, green, unpasteurized mulch of mixed particle size (also known as "arborist's mulch") by hand inside the entire TPZ of the tree to a depth of 10cm.
- g) Clear and concise TPZ exclusion zone signs must be attached at eye level to every second fence panel. This will ensure all persons on site are aware of the TPZ and its criteria.
- h) A copy of the Tree Protection plan must be attached to all copies of the plans and must contain a reference on every plan or drawing "check the Tree Protection Plan (Drawing)". This is to increase the awareness of the TPP with tradespeople who may only read a plan set rather than notes.
- i) To ensure all persons on site including contractors understand the importance of tree protection, an established 'tree protection' policy document is to be included in the site induction. This awareness will reduce the likelihood of damage
- j) The project arborist is to inspect and certify that the tree protection specifications have been met and correct installation has been carried out.
- k) Should the need for any work to be carried out within the TPZ exclusion zone arise the project arborist must be notified. A minimum of 5 days' notice is to be given if the arborist is required on site.
- l) Any necessary pruning work is to be referred to the project arborist and undertaken in accordance with AS4373-2007 *Pruning of Amenity Trees* by a suitably qualified arborist holding a minimum of Certificate III (AQF3) in Arboriculture.

During works

- a) There must be no stockpiling, trenching or grade changes within the TPZ exclusion Zone, it is to remain as an excluded area.
- b) No wash down area within tree protection zones.
- c) All TPZ exclusion zone fences must stay in place until construction is complete. If a change in plan occurs requiring access to the TPZ, the project arborist must sign off these changes. The project arborist must be given 5 days' notice prior to the removal of the exclusion fences, this is to allow site inspection and confirmation no further protection is required.
- d) If any machinery is to be moved through any of the TPZ, trunk/branch protection measures must be employed where required and a load sharing surface consisting of mulch spread to no less than 100mm mulch spread by hand over designated area, with plastic road sheets or ply with a thickness exceeding 21mm placed over the top.

This is suitable for pedestrians and light machinery, should access be required for heavy machinery, a load bearing surface shall be constructed using megadecking, Durabase mats, continuous dragline or JLA bogmat etc.

Geotextile fabric may be placed under mulch to facilitate easy removal. This protection zone **must** remain in place for the duration of works.

When this occurs, an arborist qualified to Certificate V (AQF5) in arboriculture **must** be present to observe and approve.

- e) All roots 50mm or greater in diameter which are exposed, are to be excavated by hand back to the nearest undamaged section. The root is to be cut cleanly through the un-damaged portion. This cut is to be made using clean, sharp hand tools such as a hand or reciprocating saw or a small chainsaw.
- f) All cut roots are to be kept moist, through the use of wet hessian sacks or similar wrapped around end, these are to remain moist until area can be backfilled, at which time the wrapping is to be removed.
- g) The TPZ should be irrigated as required, with the water penetrating to the depth of the roots, usually the top 20-45cm of soil. Overwatering should be avoided as this can create anaerobic (without oxygen) conditions within the soil and be harmful to the tree.

Water should **only be added** if there has been **inadequate** rainfall in the previous week. During the summer months, the additional water should equate the entire shortfall whereas in the winter months this should equate to only half.

Rates of irrigation of the TPZ should be as follows;

If less than 20mm of rain has fallen in the previous week from October to March or less than 10mm of rain has fallen in the previous week from April to September.

Apply irrigation at 1 litre / square metre for every 2mm shortfall in the rainfall during the previous week.

If an irrigation system is fitted, the tap in which it is connected should be isolated to avoid being turned off or unintentional irrigation.

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Apply irrigation at 1 litre / square metre for every 2mm shortfall in the rainfall during the previous week.

Regular watering should occur, with the water penetrating to the depth of the roots, usually the top 20-45cm of soil. Overwatering should be avoided as this can create anaerobic (without oxygen) conditions within the soil and be harmful to the tree.

Post construction

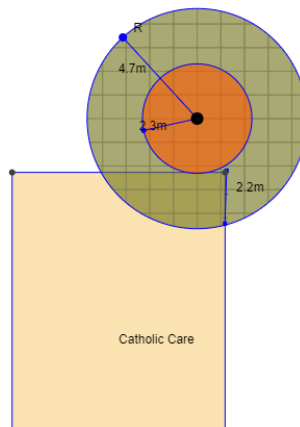
- a) On completion of the project, all trees are required to be assessed, and their condition certified by the project arborist. Any deviations from the TPP and the impact on the tree/s should be contained in this certification, along with any remedial works required. This will give compliance to AS4970-2009 (5.5.2).
- b) Quarterly site inspections should be carried out by the project arborist for at least 12 months after completion of works, to ensure the trees health and longevity. Specifications are to be given for any remedial work that may be required.
- c) Water thoroughly, if there has been inadequate rainfall, the Tree should be watered deeply once a week in warm weather, more frequently in hot, windy weather. It is not recommended to water trees daily as this discourages development of a healthy root system.

Appendix One

Encroachment calculations

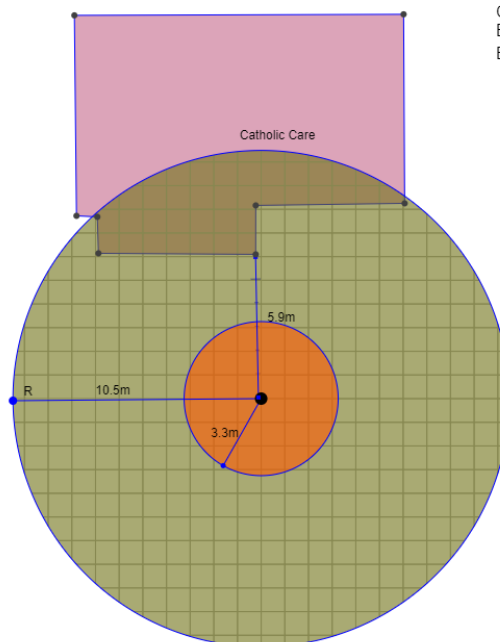
Tree 1

TPZ radius = 4.7m
TPZ area = 68.0m²
SRZ radius = 2.3m (R)
Catholic Care
Encroachment: 14.2
Encroachment area: 9.6 m²



Tree 38

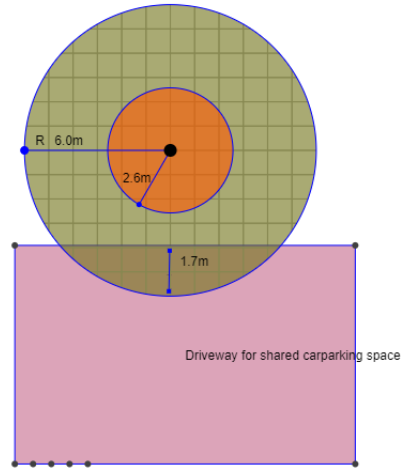
TPZ radius = 10.5m
TPZ area = 345.6m²
SRZ radius = 3.3m (R)
Catholic Care
Encroachment: 9.8
Encroachment area: 33.9 m²



Tree 54

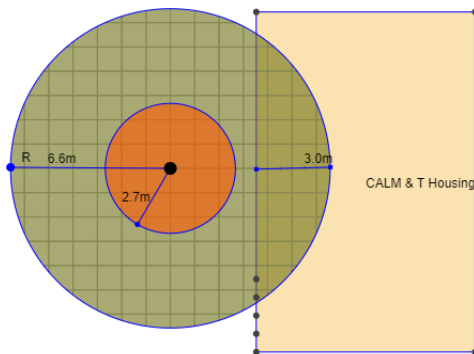
TPZ radius = 6.0m
 TPZ area = 113.1m²
 SRZ radius = 2.6m (R)

Driveway for shared carparking space
 Encroachment: 11.3
 Encroachment area: 12.8 m²



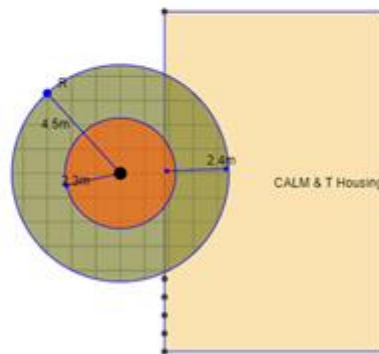
Tree 59

TPZ radius = 6.6m
 TPZ area = 135.7m²
 SRZ radius = 2.7m (R)
 CALM & T Housing
 Encroachment: 17.3
 Encroachment area: 23.4 m²



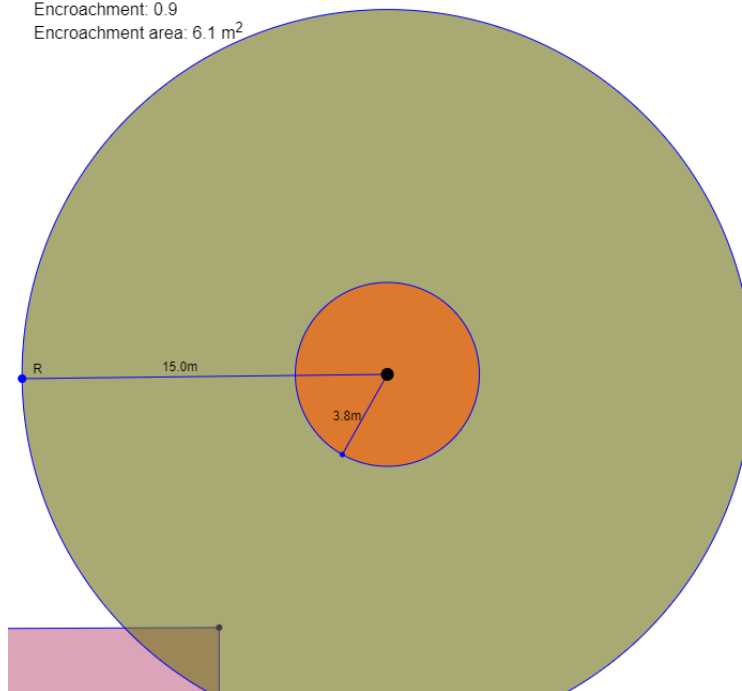
Tree 60

TPZ radius = 4.5m
 TPZ area = 62.6m²
 SRZ radius = 2.3m (R)
 CALM & T Housing
 Encroachment: 24.4
 Encroachment area: 15.3 m²



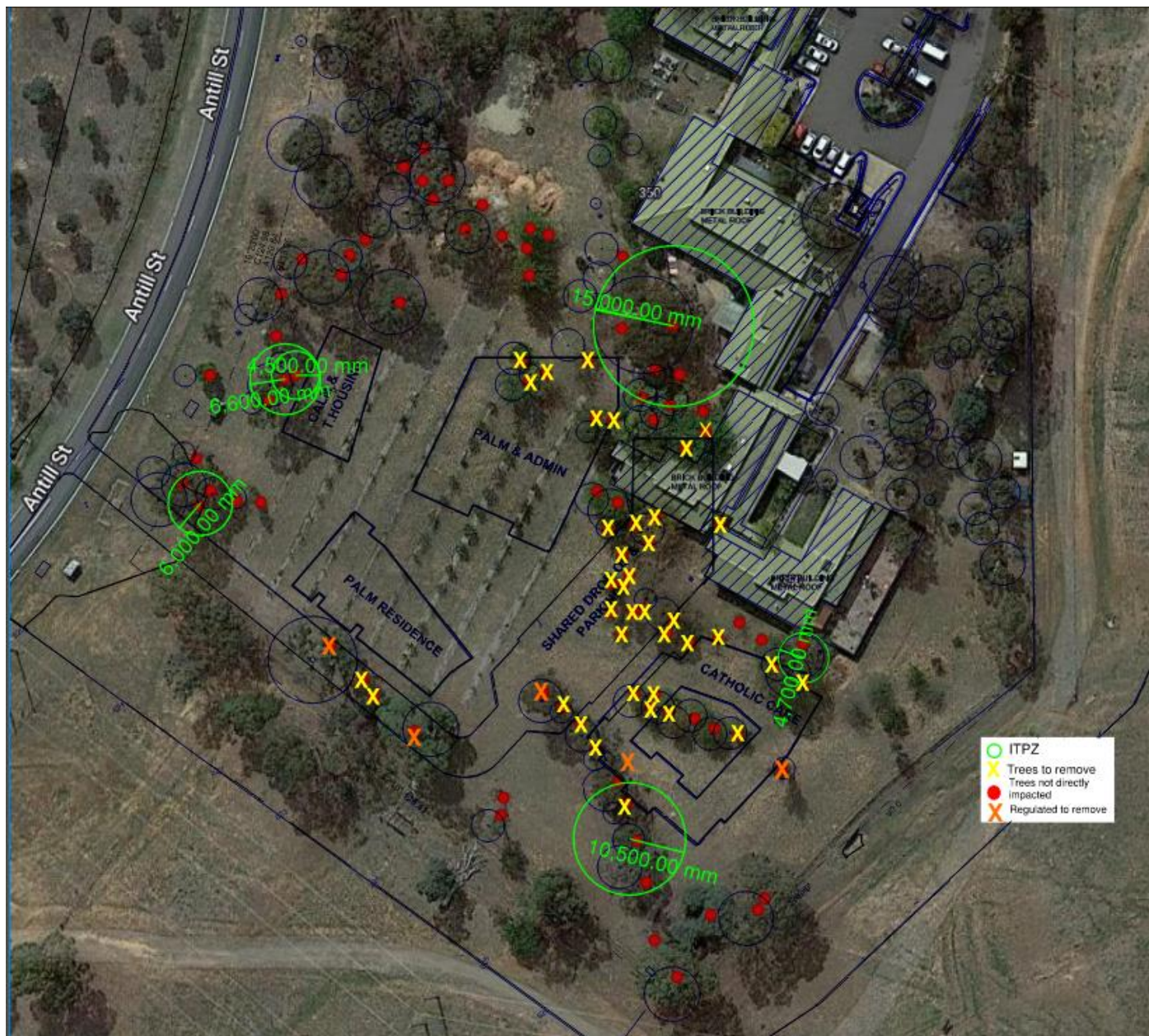
Tree 86

TPZ radius = 15.0m
 TPZ area = 708.8m²
 SRZ radius = 3.8m (R)
 S2
 Encroachment: 0.9
 Encroachment area: 6.1 m²



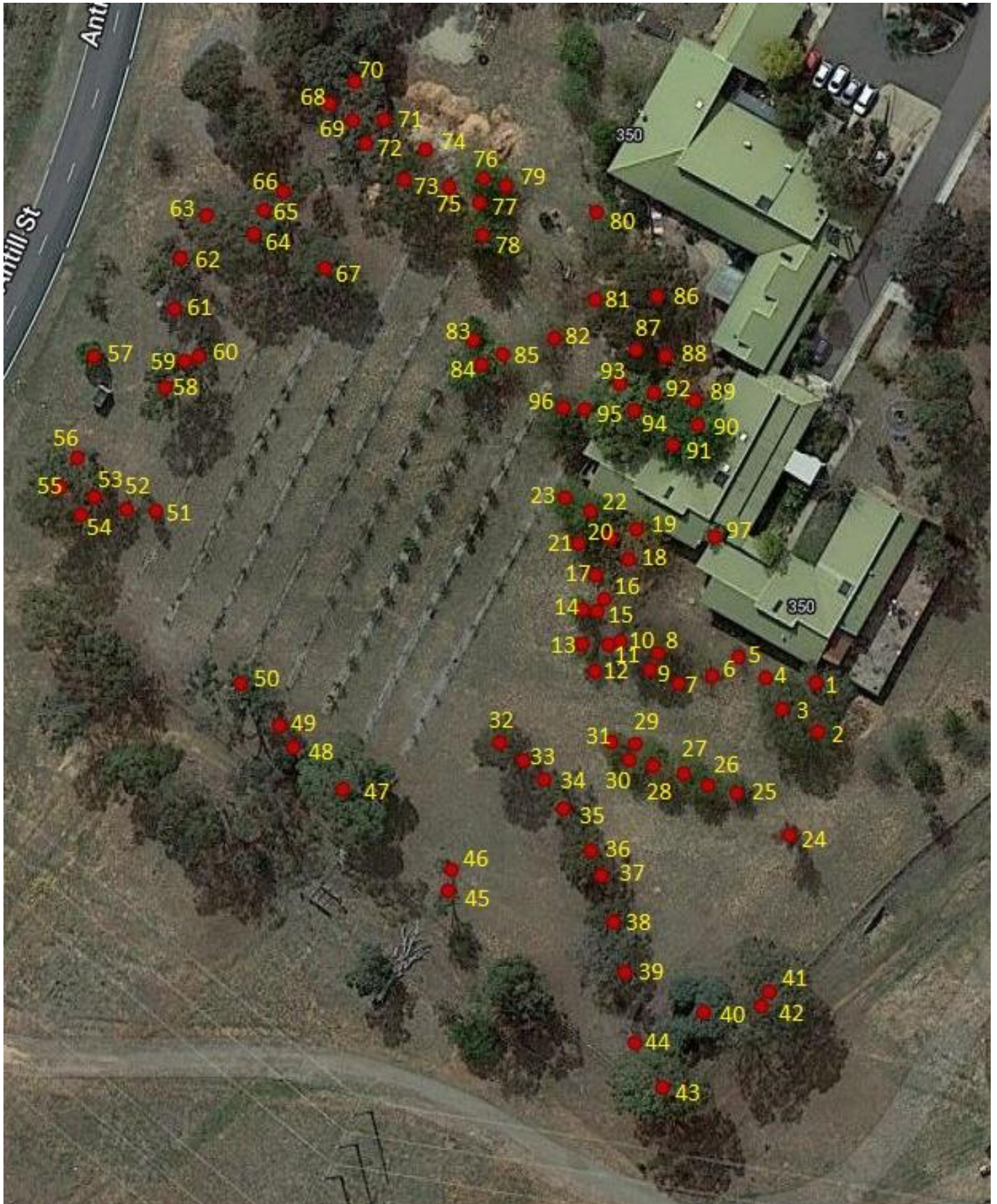
Appendix Two

TPZ and tree removal map



Appendix Three

Tree Map



Appendix Four

Tree Management Plan (Drawing)



Areas in green are where TPZ fencing is to be placed

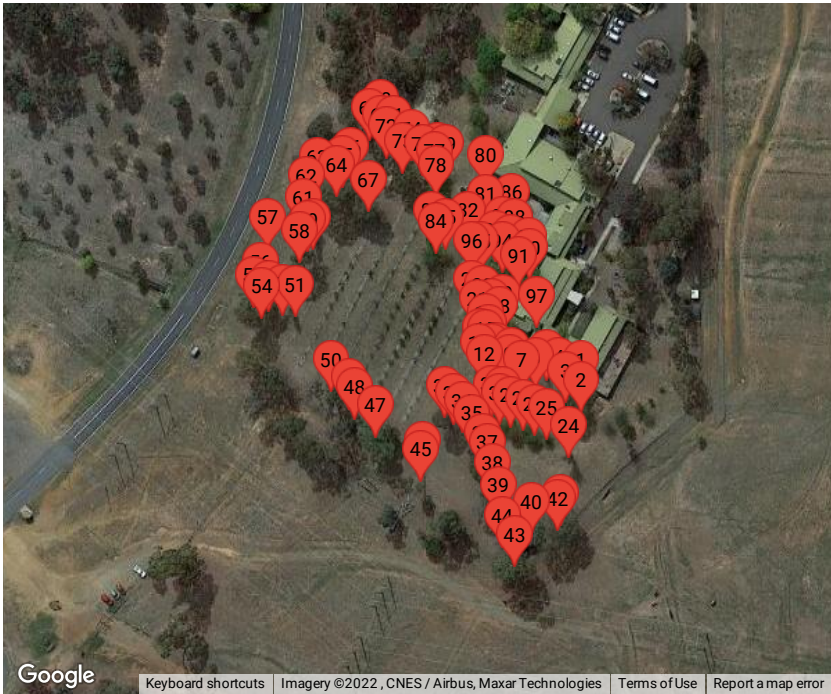
Appendix Five

Tree survey

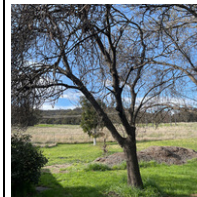
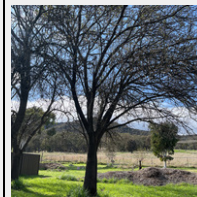
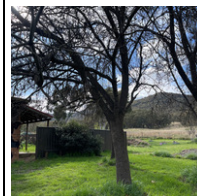


Preliminary Assessment Report





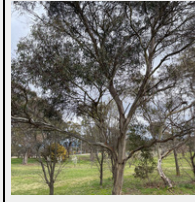


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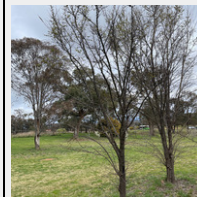
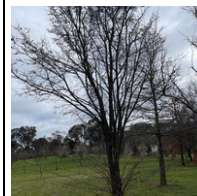


Preliminary Assessment Report

Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
1	Fraxinus 'Raywood' - Claret Ash		Good	Good	High	123	no					39.1719745223	43.0891719745	4.70063694268	2.32371038108		
2	Fraxinus 'Raywood' - Claret Ash		Reasonable	Good	High	141	no					44.9044585987	49.3949044586	5.38853503185	2.46089950376		
3	Fraxinus 'Raywood' - Claret Ash		Reasonable	Good	High	104	no					33.1210191083	36.4331210191	3.97452229299	2.16558808795		
4	Gleditsia triacanthos - Honey locust		Good	Good	High	15	no					4.77707006369	5.25477707006	0.573248407643	0.960240855877		
5	Fraxinus 'Raywood' - Claret Ash		Reasonable	Good	Medium	34	no					10.8280254777	11.9108280255	1.29936305732	1.3540758626	Young tree with lots of basal suckers	



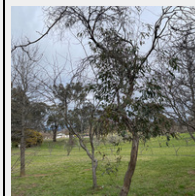


Preliminary Assessment Report

Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
6	Gleditsia triacanthos - Honey locust		Good	Good	High	45	no					14.3312101911	15.7643312102	1.71974522293	1.5232497207		
7	Gleditsia triacanthos - Honey locust		Good	Fair	Medium	25	no					7.96178343949	8.75796178344	0.955414012739	1.19002656158		
8	Eucalyptus sp. - Gum Tree		Reasonable	Good	High	95	no					30.2547770701	33.2802547771	3.63057324841	2.08480656332		
9	Ulmus sp. - Elm		Good	Good	High	97						30.8917197452	33.9808917197	3.70700636943	2.10312932867	Circumference is the sum of 4 stems	
10	Eucalyptus sp. - Gum Tree		Reasonable	Good	High,Medium	67	no					21.3375796178	23.4713375796	2.56050955414	1.80041767785	Same as tree 8	




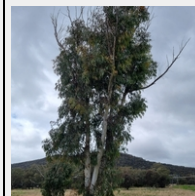

Preliminary Assessment Report

Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
11	Eucalyptus sp. - Gum Tree		Reasonable	Good	High,Medium	13	no					4.14012738854	4.55414012739	0.496815286624	0.904228225354		
12	Ulmus sp. - Elm		Reasonable	Good	High	48	no					15.2866242038	16.8152866242	1.83439490446	1.56510389077		
13	Ulmus procera - English elm		Good	Good	High	119	no					37.898089172	41.6878980892	4.54777070064	2.29166733884		
14	Quercus palustris - Pin Oak		Reasonable	Good	High	69	no					21.974522293	24.1719745223	2.63694267516	1.8227976898		
15	Ulmus procera - English elm		Moderate	Fair	Medium	44	no					14.0127388535	15.4140127389	1.68152866242	1.50894001474	Dieback of the main stem	






Preliminary Assessment Report

Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
16	Ulmus procera - English elm		Good	Good	Medium,Poor											Self sown sucker with multiple stems forming a shrub like form	
17	Gleditsia triacanthos - Honey locust		Reasonable	Good	High,Medium	67	no					21.3375796178	23.4713375796	2.56050955414	1.80041767785	Sum of circ.	
18	Eucalyptus sp. - Gum Tree		Moderate	Fair	Medium	41	no					13.0573248408	14.3630573248	1.56687898089	1.46484297014	Dieback and chlorosis of leaves	
19	Gleditsia triacanthos - Honey locust		Reasonable	Good	High	88	no					28.025477707	30.8280254777	3.36305732484	2.01885242424		
20	Gleditsia triacanthos - Honey locust		Reasonable	Good	High,Medium	55	no					17.5159235669	19.2675159236	2.10191082803	1.65719716232		



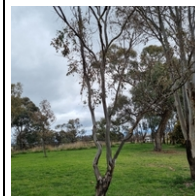
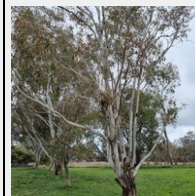

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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
21	Quercus palustris - Pin Oak		Reasonable	Good	High	72	no					22.9299363057	25.2229299363	2.75159235669	1.85567321819		
22	Quercus palustris - Pin Oak	11.6	Good	Good	High	86	no					27.3885350318	30.127388535	3.28662420382	1.99945300472		
23	Quercus palustris - Pin Oak	13.2	Reasonable	Good	High	81	yes					25.7961783439	28.3757961783	3.09554140127	1.94977976671		
24	Eucalyptus mannifera - Red Spotted Gum		Reasonable	Fair	Medium	161	yes					51.2738853503	56.4012738854	6.15286624204	2.601888726	Two stems, tip dieback previous stress	
25	Quercus palustris - Pin Oak		Reasonable	Good	High	59	no					18.7898089172	20.6687898089	2.25477707006	1.70678845387		

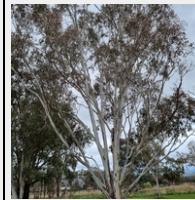


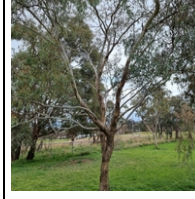
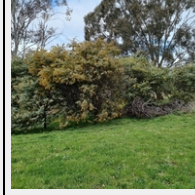
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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
26	Quercus palustris - Pin Oak		Reasonable	Good	High	65	no					20.7006369427	22.7707006369	2.48407643312	1.77764674179		
27	Quercus palustris - Pin Oak		Reasonable	Good	High	65	no					20.7006369427	22.7707006369	2.48407643312	1.77764674179		
28	Quercus palustris - Pin Oak		Good	Fair	High,Medium	56	no					17.8343949045	19.6178343949	2.14012738854	1.66978602787	Bark included union at approximately 2m in height	
29	Quercus palustris - Pin Oak		Good	Good	High	68	no					21.6560509554	23.821656051	2.59872611465	1.81165540784		
30	Quercus palustris - Pin Oak		Reasonable	Fair	High,Medium	39	no					12.4203821656	13.6624203822	1.49044585987	1.43439573862		


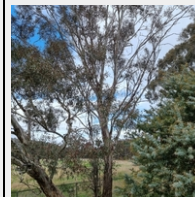
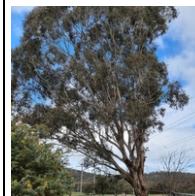


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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
31	Quercus palustris - Pin Oak		Reasonable	Good	High	56	no					17.8343949045	19.6178343949	2.14012738854	1.66978602787		
32	Eucalyptus blakelyi - Red Gum		Moderate	Fair	Medium	162	yes					51.5923566879	56.7515923567	6.19108280255	2.60866407565	Evidence of psyllid infestation, bark included union with elephant ears	
33	Eucalyptus blakelyi - Red Gum		Moderate,Poor	Fair,Poor	Medium,Poor	103	no					32.8025477707	36.0828025478	3.93630573248	2.15681793259	Sparse canopy, die back and psyllid infestation	
34	Eucalyptus blakelyi - Red Gum		Moderate	Fair	Medium	199	no					63.3757961783	69.7133757962	7.6050955414	2.84406909733	Circumference sum of 3 main leaders. Psyllids.	
35	Eucalyptus blakelyi - Red Gum		Poor	Poor	Poor	70	no					22.2929936306	24.5222929936	2.67515923567	1.83384670036	Dieback, scraggly form and psyllids. Circumference sum of two leaders	


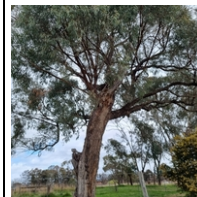


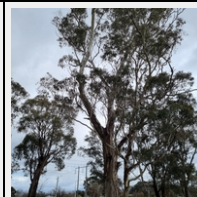
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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
36	Eucalyptus blakelyi - Red Gum		Moderate	Good	High,Medium	175	yes					55.7324840764	61.3057324841	6.68789808917	2.69462187969	Circumference sum of two main leaders	
37	Eucalyptus blakelyi - Red Gum		Reasonable	Fair	Medium	105	no					33.4394904459	36.7834394904	4.0127388535	2.174309468		
38	Eucalyptus blakelyi - Red Gum		Reasonable	Good	High	275	yes					87.5796178344	96.3375796178	10.5095541401	3.2579287546	Circumference sum of 5 leaders	
39	Eucalyptus melliodora - Yellow Box		Good	Good	High	173	yes					55.0955414013	60.6050955414	6.61146496815	2.68164456714		
40	Acacia baileyana - Cootamundra Wattle		Reasonable	Good	High		no									Group of 5 trees	

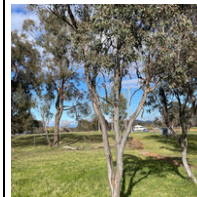
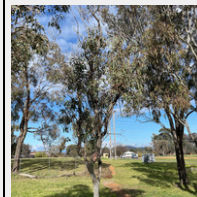
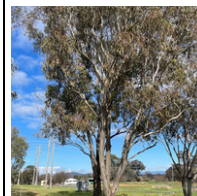
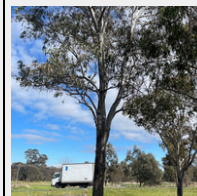
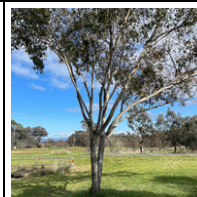
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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
41	Eucalyptus melliodora - Yellow Box		Reasonable	Fair	High	176	yes					56.050955414	61.6560509554	6.72611464968	2.70107828744	Phototropic lean	
42	Eucalyptus melliodora - Yellow Box		Reasonable	Fair	High	134	yes					42.6751592357	46.9426751592	5.12101910828	2.40882842131		
43	Eucalyptus melliodora - Yellow Box		Good	Good	High	270	yes					85.9872611465	94.5859872611	10.3184713376	3.23291757612		
44	Eucalyptus blakelyi - Red Gum		Moderate	Fair	Medium		no										
45	Eucalyptus blakelyi - Red Gum		Reasonable	Fair	Medium	80						25.4777070064	28.025477707	3.05732484076	1.93963336413	Previously failed main stem	




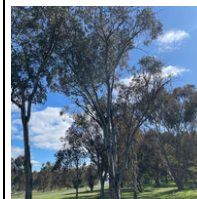
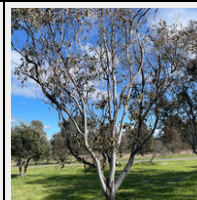
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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
46	Eucalyptus blakelyi - Red Gum		Poor	Poor	Poor	44	no					14.0127388535	15.4140127389	1.68152866242	1.50894001474	Severe Psyllid infestation, high percentage of leaves necrotic.	
47	Eucalyptus bridgesiana - Apple Box		Reasonable	Fair	Medium	315	yes					100.318471338	110.350318471	12.0382165605	3.44915160564	Wound from previous branch failure, good wound wood development. Previous failure of main stem	
48	Acacia baileyana - Cootamundra Wattle		Reasonable	Good	High	57	no					18.152866242	19.9681528662	2.17834394904	1.68224517278		
49	Acacia baileyana - Cootamundra Wattle		Reasonable	Good	High	34	no					10.8280254777	11.9108280255	1.29936305732	1.3540758626		
50	Eucalyptus melliodora - Yellow Box		Moderate	Fair,Poor	Medium											Root dieback extending up the trunk to both main leaders, larger deadwood present.	



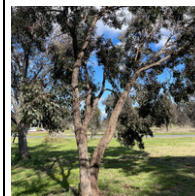
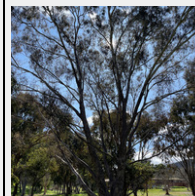

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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
51	Eucalyptus blakelyi - Red Gum		Reasonable	Fair	Medium	91	no					28.9808917197	31.8789808917	3.47770700637	2.04747796304	Circumference sum of two leaders	
52	Eucalyptus blakelyi - Red Gum		Moderate	Fair	Medium	42	no					13.3757961783	14.7133757962	1.6050955414	1.47974388299	Dieback and signs of previous stress	
53	Eucalyptus blakelyi - Red Gum		Reasonable	Good	High	117	no					37.2611464968	40.9872611465	4.47133757962	2.27541131464		
54	Eucalyptus blakelyi - Red Gum		Reasonable	Good	High	157	yes					50	55	6	2.57454036546		
55	Eucalyptus blakelyi - Red Gum		Moderate	Fair	Medium	131	no					41.7197452229	45.8917197452	5.00636942675	2.38602942709	Psyllium infestation	


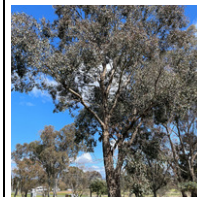
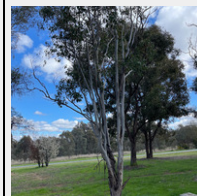
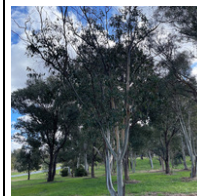
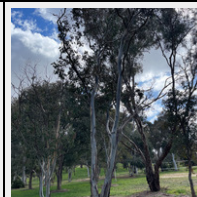
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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
56	Eucalyptus blakelyi - Red Gum		Moderate	Fair	Medium	69	no					21.974522293	24.1719745223	2.63694267516	1.8227976898		
57	Banksia integrifolia		Good	Good	High	148	no					47.1337579618	51.847133758	5.65605095541	2.51149184231	Circumference sum of 3 leaders	
58	Eucalyptus blakelyi - Red Gum	12.3	Reasonable	Good	High	85	yes					27.0700636943	29.7770700637	3.24840764331	1.98965510335		
59	Eucalyptus blakelyi - Red Gum		Reasonable	Good	High	173	yes					55.0955414013	60.6050955414	6.61146496815	2.68164456714		
60	Eucalyptus blakelyi - Red Gum		Moderate	Fair,Poor	Medium,Poor	118	no					37.5796178344	41.3375796178	4.50955414013	2.28355930263	Heavy Psyllid infestation and dieback	



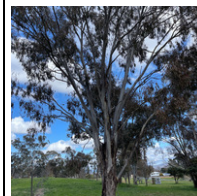
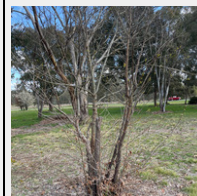
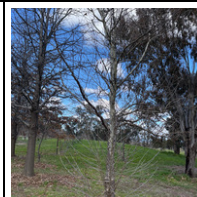
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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
61	Eucalyptus blakelyi - Red Gum		Moderate	Fair	Medium	67	no					21.3375796178	23.4713375796	2.56050955414	1.80041767785		
62	Eucalyptus blakelyi - Red Gum		Moderate	Fair	Medium	122	no					38.8535031847	42.7388535032	4.66242038217	2.31575697209		
63	Eucalyptus bridgesiana - Apple Box		Good	Good	High	160	yes					50.9554140127	56.050955414	6.11464968153	2.59508892405		
64	Eucalyptus melliodora - Yellow Box		Moderate	Fair	Medium	376						119.74522293	131.719745223	14.3694267516	3.71535867509	Circumference sum of 3 leaders	
65	Acacia baileyana - Cootamundra Wattle		Moderate	Fair	Medium	56	no					17.8343949045	19.6178343949	2.14012738854	1.66978602787		



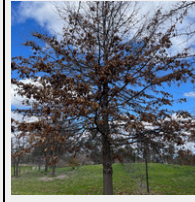

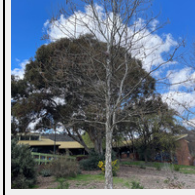
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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
66	Eucalyptus melliodora - Yellow Box	19	Reasonable	Fair	Medium	116	yes					36.9426751592	40.6369426752	4.43312101911	2.26722283399		
67	Eucalyptus polyanthemos - Red Box		Reasonable	Good	High	243	yes					77.3885350318	85.127388535	9.28662420382	3.09297554556		
68	Eucalyptus blakelyi - Red Gum		Reasonable	Good	High	183	yes					58.2802547771	64.1082802548	6.99363057325	2.74568878033		
69	Eucalyptus blakelyi - Red Gum		Moderate	Fair	Medium	139	no					44.2675159236	48.6942675159	5.31210191083	2.44617806486		
70	Eucalyptus blakelyi - Red Gum		Reasonable	Fair	High,Medium	165						52.5477707006	57.8025477707	6.30573248408	2.6288457726	Circumference sum of 2 leaders	


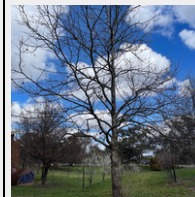
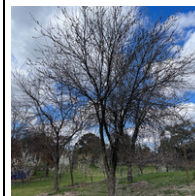
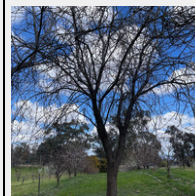
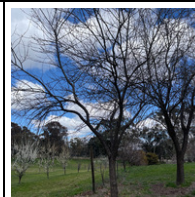
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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
71	Eucalyptus melliodora - Yellow Box		Moderate	Fair	Medium	270	yes					85.9872611465	94.5859872611	10.3184713376	3.23291757612	Signs of previous stress, tip dieback. Circumference sum of 2 leaders	
72	Eucalyptus polyanthemus - Red Box		Moderate	Fair	Medium	40	no					12.7388535032	14.0127388535	1.52866242038	1.4497297385		
73	Eucalyptus blakelyi - Red Gum		Reasonable	Good	High	202	yes					64.3312101911	70.7643312102	7.71974522293	2.86199866305		
74	Acer sp. - Maple		Moderate	Poor	Poor		no									Tree has been lopped previously leaving a group of suckers	
75	Platanus orientalis - Oriental Plane Tree		Reasonable	Good	High	60	no					19.1082802548	21.0191082803	2.29299363057	1.71887928028	Some basal suckering	



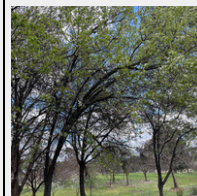

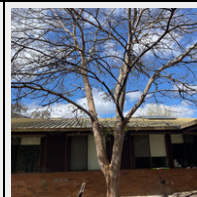
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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
76	Quercus palustris - Pin Oak		Reasonable	Fair	High	101	no					32.1656050955	35.3821656051	3.85987261146	2.13912827553	Acute angled union towards top of the tree	
77	Gleditsia triacanthos - Honey locust		Reasonable	Fair	Medium	20	no					6.36942675159	7.00636942675	0.764331210191	1.08356370516		
78	Quercus palustris - Pin Oak	12.7	Good	Good	High	121	yes					38.5350318471	42.3885350318	4.62420382166	2.30776566125		
79	Betula pendula - Silver Birch		dead	Very Poor	Poor											Tree is dead	
80	Platanus orientalis - Oriental Plane Tree		Reasonable	Good	High	68	no					21.6560509554	23.821656051	2.59872611465	1.81165540784		





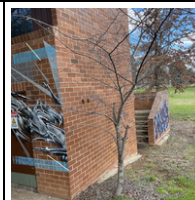
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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
81	Platanus orientalis - Oriental Plane Tree		Moderate,Poor	Fair,Poor	Medium,Poor	96	no					30.5732484076	33.6305732484	3.66878980892	2.09399562157	Dieback from roots, possible fungal infection.	
82	Platanus orientalis - Oriental Plane Tree		Reasonable	Good	High	83	no					26.4331210191	29.076433121	3.17197452229	1.96985677362		
83	Fraxinus 'Raywood' - Claret Ash		Reasonable	Good	High	127	no					40.4458598726	44.4904458599	4.85350318471	2.35515456356		
84	Fraxinus 'Raywood' - Claret Ash		Reasonable	Good	High	98	no					31.2101910828	34.3312101911	3.74522292994	2.11220858357		
85	Fraxinus 'Raywood' - Claret Ash		Reasonable	Good	High	61						19.4267515924	21.3694267516	2.33121019108	1.73085378488		


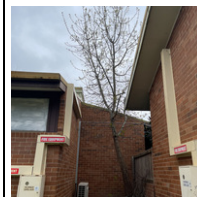
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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
86	Eucalyptus sp. - Gum Tree		Reasonable	Good	High	566	yes					180.25477707	198.280254777	21.6305732484	4.41168760855	circumference sum of 5 leaders	
87	Pyrus ussuriensis - Manchurian Pear		Good	Good	High	62	no					19.7452229299	21.7197452229	2.36942675159	1.74271496658		
88	Pyrus ussuriensis - Manchurian Pear		Good	Fair	Medium	67	no					21.3375796178	23.4713375796	2.56050955414	1.80041767785	Phototropic lean	
89	Pyrus ussuriensis - Manchurian Pear		Reasonable	Fair	High	119	no					37.898089172	41.6878980892	4.54777070064	2.29166733884		
90	Ulmus parvifolia - Chinese Elm	13.6	Reasonable	Fair	High,Medium	171	yes					54.4585987261	59.9044585987	6.53503184713	2.66857994419	25% deadwood throughout canopy height is 13.6 +1.7 method, 11.6 when +percentage and 11.4 when minus	

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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
91	Acacia sp		Good	Good	High	40	no					12.7388535032	14.0127388535	1.52866242038	1.4497297385		
92	Fraxinus 'Raywood' - Claret Ash		Reasonable	Good	High	143						45.5414012739	50.0955414013	5.46496815287	2.47550032176		
93	Fraxinus 'Raywood' - Claret Ash		Reasonable	Good	High	86	no					27.3885350318	30.127388535	3.28662420382	1.99945300472		
94	Fraxinus 'Raywood' - Claret Ash		Reasonable	Good	High	160	yes					50.9554140127	56.050955414	6.11464968153	2.59508892405		
95	Ulmus sp. - Elm		Reasonable	Fair	Medium	30	no					9.55414012739	10.5095541401	1.14649681529	1.28473270031		

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Tree ID	Species	Height	Health	Condition	Quality	Circ at 1.4m(cm)	Regulated	Spread N	Spread E	Spread S	Spread W	DBH(cm)	DGL(cm)	ITPZ(m)	ISRZ(m)	Comments	Tree Photo
96	Fraxinus 'Raywood' - Claret Ash		Reasonable	Fair	High	87	no					27.7070063694	30.4777070064	3.32484076433	2.00918504765		
97	Fraxinus 'Raywood' - Claret Ash		Reasonable	Good	Medium	61	no					19.4267515924	21.3694267516	2.33121019108	1.73085378488	Tree is self sown between two sections of building	

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Tree Health	<p>Good – In good health and appears to be free of significant faults, defects or stress factors.</p> <p>Reasonable—Tree appears to have average vigour for its species and site conditions and appears to be free of significant faults, defects or stress factors.</p> <p>Moderate – Tree presents some faults or health problems which can be managed and are unlikely to cause problems in the short term.</p> <p>Poor – Significant issues with health or structural defects with management unlikely to be adequate or appropriate.</p>
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Condition Rating	Tree Structure
Excellent	<ul style="list-style-type: none"> • Root plate undisturbed • Buttressing has normal development. • No visible trunk defects or cavities. • Branch spacing/structure and attachments are free of any defects. • Excellent form, very well-balanced crown with excellent density for species. • Trunk is sound and solid. Little to no dieback (deadwood 5% or less) • No apparent pest problems.
Good	<ul style="list-style-type: none"> • Root plate appears normal; little to no damage present. • Minor trunk defects, with good closure and wound wood development. • Good branch habit, good form and symmetry. • Minimal dieback (5-15% deadwood), with some signs of previous pruning. • Canopy density good for species and location. Minor to no pest problems.
Fair	<ul style="list-style-type: none"> • Root plate reveals previous damage or disturbance with dysfunctional roots likely, may be visible around main stem, basal wounds <50%. • Evidence of trunk damage or cavities with decay or defects present. • Less than 30% of bark sections missing on trunk. • Codominant stems with acute angles or bark inclusion may be present. Branching habit and attachments indicate poor pruning or damage, which requires moderate corrections. Moderate dieback (15-40% deadwood). • Moderate form, Asymmetric canopy. • Possible phototropic or geotropic (lean). • Obvious signs of pest problems contributing to lesser condition however, likely to be treatable. Some decay areas found in main stem and branches.
Poor	<ul style="list-style-type: none"> • Root plate disturbance and defects indicate major damage, possible girdling roots around the trunk flare, basal wounds in excess of 50% of circumference. • Trunk reveals more than 50% of bark section missing. Branch structure has poor attachments, with several structurally important dead or broken. • Canopy reveals signs of damage or previous topping or lions tailing, with major corrective actions required. • Lacking full crown, significant dieback (40-50% deadwood), especially affecting larger branches. Significant or severe pest problem Extensive decay or hollow.

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Very Poor	<ul style="list-style-type: none"> • Severe damage within the root plate, with root collar exhibiting major defects which could lead to failure or eventual death. • Branching is extremely poor or severely topped • Severe dieback in canopy (>50% deadwood) • Canopy density is extremely low, Severe decay in the trunk and major branches.
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Tree Quality Classification	
Excellent (E)	A tree or group of trees that: <ul style="list-style-type: none"> • has natural of cultural heritage importance; or • has high and aesthetic value and will contribute significantly to the surrounding landscape; or • is of outstanding form and condition and is an excellent example of the species; or • has significant scientific value, including ecological importance.
High (H)	A tree that: <ul style="list-style-type: none"> • is of good form, structure and health; • is without significant defect; and • presents a low hazard/safety risk.
Medium (M)	A tree that: <ul style="list-style-type: none"> • is of reasonable form, structure and health; and • presents a medium to low hazard/safety risk.
Poor (P)	A tree that; <ul style="list-style-type: none"> • is of poor form, structure or health is in decline; or • presents a high or very high hazard/safety risk.
Table 5. Tree Protection Act 2005 Part 4 s31 (Guidelines for Tree Management Plans)	