

Arboriculture - Botany - Ecology - Eucalypt Research

Demolition Report: 79-89 Mary St & 58-62 Arthur St, Unley, SA

Arboricultural assessment of five controlled trees in relation to proposed demolition works



Arboricultural report requested by Simon Cross on behalf of *Chasecrown Nominees*, on the 27th of May 2022.

Arboricultural report prepared by Dean Nicolle following a site inspection and tree assessments on the 27th of May 2022.

Report dated the 21st of June 2022.

CONTENTS

1.0	BACKGROUND	3
2.0	METHODOLOGY	3
3.0	STRUCTURAL ROOT ZONE (SRZ) – Generic information	5
4.0	TREE PROTECTION ZONE (TPZ) – Generic information	5
5.0	TREE ASSESSMENTS	7
5.1	<i>TREE 1</i>	7
5.2	<i>TREE 2</i>	9
5.3	<i>TREE 3</i>	11
5.4	<i>TREE 4</i>	13
5.5	<i>TREE 5</i>	15
6.0	SUMMARY	18

1.0 BACKGROUND

The demolition of structures and other artificial infrastructure on land at 79-89 Mary Street and 58-62 Arthur Street in Unley, South Australia, has the potential to impact on trees that occur on and immediately adjacent to the subject site (see Figure 1).

This report addresses the demolition of structures and other artificial infrastructure from the site, and its impact on all controlled trees identified both on the site and within 15 metres of the site. The report details what demolition is required with the Structural Root Zones and Tree Protection Zones for all controlled trees and outlines the methods required to minimize the impact of the demolition on these trees.

2.0 METHODOLOGY

The location and numbering of the five controlled trees is indicated in Figure 1. Assessed trees were not physically marked or labelled in the field.

This tree assessment was conducted in accordance with Australian Standard *AS4970-2009 Protection of Trees on Development Sites* (2009), which provides best practices for the planning and protection of trees on development sites. The Standard provides guidance on how to determine which trees are appropriate for retention, and on the means of protecting those trees during construction.

Structural Root Zones (SRZs) and Tree Protection Zones (TPZs) have been calculated using methods which conform to *AS 4970*, as detailed in Section 3 (*Structural Root Zones – Generic information*) and Section 4 (*Tree Protection Zones – Generic information*) and of this report. Information and recommendations provided in the report concerning variations to the calculated TPZs and allowable encroachments within the SRZs and TPZs are in accordance with the guidelines provided in the Australian Standard (*AS 4970*).



Figure 1. The subject site (superimposed blue polygon), indicating the approximate location of the five controlled trees identified on, or within 15 metres of, the subject site.

3.0 STRUCTURAL ROOT ZONE (SRZ) – Generic information

The Structural Root Zone (SRZ) relates to the *roots of the tree*, and is the area required to *maintain the stability of the tree* during and following any development of the site.

The SRZ is effectively an ‘exclusion zone’ for all activities and development, as it defines the area around the tree in which major structural (anchorage) roots are likely to occur.

The SRZs has been calculated as recommended in the *Australian Standard for the Protection of Trees on Development Sites (AS 4970)*. This is a formula-based method which uses the diameter of the tree at above the root buttress (effectively at ground level in most trees) multiplied by a non-linear factorial (the calculated SRZ tapers-off with larger diameter trees, and varies from a minimum of 1.5 metres radius from the centre of the tree to a maximum of around 5 metres radius from the centre of the tree, depending on trunk diameter).

Activities that should be excluded from the SRZ include any mechanical soil removal (excavation), deposition (storage of fill) or cultivation (disturbance) associated with the proposed development, whether for earthworks, trenching, landscaping, or other associated works, and *including* non-linear fence or pylon footings (i.e. bored pier/post holes and screw-pile piers), *unless it can be demonstrated that the design and construction techniques do not interfere with the roots of the tree where within the SRZ (in accordance with AS 4970-2009)*.

4.0 TREE PROTECTION ZONE (TPZ) – Generic information

The Tree Protection Zone (TPZ) also relates to the *root system of the tree*, and is necessary to *maintain the health of the tree* during and following the proposed development of the site, by limiting construction activities and machinery access within the TPZ. The TPZ also ensures that the development does not compromise the stability of the tree through structural root damage.

The Tree Protection Zone does not indicate the root extent (root spread) of the tree, as the root extent is usually greater than the TPZ in most trees. The TPZ merely designates the area in which soil disturbance must be minimised (and therefore root damage minimised) in order to maintain the health, longevity and stability of the tree.

A Tree Protection Zone is not a ‘sterile zone’ or an ‘exclusion zone’ for all activities and development, but instead defines the area around the tree in which tree-sensitive design and construction techniques *must* be employed, in order to maintain the health, longevity and structure of the tree.

The TPZ has been calculated using a method that conforms to the *Australian Standard for the Protection of Trees on Development Sites (AS 4970)*. The Australian Standard allows for the use of species-specific data to modify the factorial (up or down) to be more specific to the tree being assessed; i.e. relating to the tolerance of the species to root disturbance.

Encroachment of up to 10% of the area of the TPZ is acceptable provided the encroached area of TPZ is gained elsewhere on the subject site and adjoining the outer edge of the TPZ. Encroachment within more than 10% of the area of the recommended TPZ may detrimentally affect the health of the tree by extensively severing or otherwise damaging the root system of the tree. Pre-existing developed areas within the calculated TPZ radius are also exempt from the effective TPZ area.

Activities that should be excluded from the TPZ include any mechanical soil removal (excavation), deposition (storage of fill) or cultivation (disturbance) associated with the proposed development, whether for earthworks, trenching, landscaping, or other associated works.

Non-linear fence or pylon footings (i.e. bored pier/post holes and screw-pile piers) are acceptable within the TPZ. As such, structures constructed using pier and beam footings are possible within the TPZ. Other structures and construction activities within the TPZ (such as residential driveways, footpaths, roadways, built-form structures, etc.) may be acceptable in some cases, provided tree-sensitive design and construction methods are employed, which may include:

- 1) Laying services within piping or conduits under the TPZ using directional under-boring.
- 2) Construction of hard surfaces (including roadways, driveways, footpaths and floors) over existing soil levels (to avoid the excavation of natural soil) and using structural soil as fill and open-sealed or permeable paving where necessary.
- 3) Pier & beam or screw-pile constructed structures that do not require area-excitation (cut) or linear-excitation (trenching) of soil.
- 4) Hand excavation in association with other root-sensitive excavation (e.g. a soil vacuum) to enable larger-sized roots to be retained in-situ. Such excavation is usually used as an exploratory method to ascertain the location and depth of larger-sized roots, which may dictate the required levels/positions of infrastructure.
- 5) Like-for-like replacement of any exiting surfaces or structures in the TPZ with new surfaces or structures constructed in the same position where within the TPZ.

5.0 TREE ASSESSMENTS

5.1 TREE 1



Figure 2. Tree 1, looking approximately west-south-west (left image) and west (right image) from the subject site.

Location: On the subject site (see Figures 1 and 2).

Species: *Corymbia citriodora* (lemon-scented gum).

Key reference: Nicolle (2016). *Taller Eucalypts for Planting in Australia – Their Selection, Cultivation and Management*. Pp. 64–65.

Legal Status: **Regulated** as defined by the *Planning, Development and Infrastructure Act 2016*.

- **Species:** *Corymbia citriodora*
- **Trunk circ. at one metre:** 2.53 metres
- **Distance to dwelling/pool:** >10 metres
- **Bushfire Risk:** Excluded area
- **Living/dead status:** Currently alive
- **Exemptions:** No generic exemptions

Structural Root Zone: 3.1 metres radius from the centre of the tree.

This SRZ is based on the tree having a buttress trunk diameter of 0.859 metres – SRZ formula calculation: $((0.859 \times 50)^{0.42}) \times 0.64 = 3.1$ metres.

Demolition in SRZ: Removal of concrete kerbing and bitumen surface of carpark on site.

Tree Protection Zone: 7.2 metres radius from the centre of the tree.

This TPZ is based on the species having a *high* tolerance to soil disturbances = multiplying factor of nine. Thus: 0.796 (trunk diameter at breast height) x 9 = 7.2 metres.

Existing structures and fully-sealed surfaces within the calculated TPZ are excluded from the *effective* TPZ to the depth of the subject structure/footing/surface (i.e. down to natural soil level).

Demolition in TPZ: Removal of concrete kerbing and bitumen surface of carpark on site. Removal of light pole including its footing.

Recommendations:

1. Protective fencing and access

It is recommended that the entire Tree Protection Zone on the subject site (7.2 m radius from centre of tree) be temporarily fenced as an exclusion zone during the demolition phase of the development. No wheeled or tracked vehicles or machinery to enter the temporary fenced TPZ any stage during the demolition process.

2. kerb and bitumen removal

The concrete kerb and bitumen surface may be removed from within the TPZ and SRZ using an excavator sited outside of the TPZ perimeter. Temporary fencing may be removed only during this process, to allow the kerb and bitumen to be scrapped back to outside of the TPZ. Natural soil beneath the kerb and bitumen surface should not be disturbed.

3. light pole removal

The light pole, including its footing, may be removed using a crane and/or excavator sited outside of the TPZ perimeter. The footing should be 'plucked' from the ground using an excavator located outside of the TPZ perimeter, and not excavated around to enable its removal. All decommissioned conduits, cables, and other services within the TPZ (except for in the light pole and its footing) must remain in place.

5.2 TREE 2



Figure 3. Tree 2, looking approximately north (left image) and north-west (right image) from the subject site.

Location: Adjacent allotment of 87 Mary Street Unley (see Figures 1 and 3).

Species: *Eucalyptus camaldulensis* subsp. *camaldulensis* (river red gum).

Key reference: Nicolle (2013). *Native Eucalypts of South Australia*. Pp. 44–45.

Nicolle (2016). *Taller Eucalypts for Planting in Australia – Their Selection, Cultivation and Management*. Pp. 56–59.

Legal Status: **Regulated** as defined by the *Planning, Development and Infrastructure Act 2016*.

- *Species:* *Eucalyptus camaldulensis*
- *Trunk circ. at one metre:* Estimated 2.6 metres
- *Distance to dwelling/pool:* Not applicable to this species
- *Bushfire Risk:* Excluded area
- *Living/dead status:* Currently alive
- *Exemptions:* No generic exemptions

Structural Root Zone: 3.2 metres radius from the centre of the tree.

This SRZ is based on the tree having a buttress trunk diameter of 0.891 metres – SRZ formula calculation: $((0.891 \times 50)^{0.42}) \times 0.64 = 3.2$ metres.

Demolition in SRZ: Removal of concrete kerbing and bitumen surface of carpark on site.

Tree Protection Zone: 7.4 metres radius from the centre of the tree.

This TPZ is based on the species having a *high* tolerance to soil disturbances = multiplying factor of nine. Thus: 0.828 (trunk diameter at breast height) x 9 = 7.4 metres.

Existing structures and fully-sealed surfaces within the calculated TPZ are excluded from the *effective* TPZ to the depth of the subject structure/footing/surface (i.e. down to natural soil level).

Demolition in TPZ: Removal of concrete kerbing and bitumen surface of carpark on site.

Recommendations: **1. Protective fencing and access**

It is recommended that the entire Tree Protection Zone on the subject site (7.4 m radius from centre of tree) be temporarily fenced as an exclusion zone during the demolition phase of the development. No wheeled or tracked vehicles or machinery to enter the temporary fenced TPZ any stage during the demolition process.

2. kerb and bitumen removal

The concrete kerb and bitumen surface may be removed from within the TPZ and SRZ using an excavator sited outside of the TPZ perimeter. Temporary fencing may be removed only during this process, to allow the kerb and bitumen to be scrapped back to outside of the TPZ. Natural soil beneath the kerb and bitumen surface should not be disturbed.

5.3 TREE 3



Figure 4. Tree 3, looking approximately south-west from the subject site.

Location: On the subject site (see Figures 1 and 4).

Species: *Corymbia citriodora* (lemon-scented gum).

Key reference: Nicolle (2016). *Taller Eucalypts for Planting in Australia – Their Selection, Cultivation and Management*. Pp. 64–65.

Legal Status: **Significant** as defined by the *Planning, Development and Infrastructure Act 2016*.

- *Species:* *Corymbia citriodora*
- *Trunk circ. at one metre:* 1.61 + 1.48 = 3.09 metres
- *Distance to dwelling/pool:* >10 metres
- *Bushfire Risk:* Excluded area
- *Living/dead status:* Currently alive
- *Exemptions:* No generic exemptions

Structural Root Zone: 3.1 metres radius from the centre of the tree.

This SRZ is based on the tree having a buttress trunk diameter of 0.859 metres – SRZ formula calculation: $((0.859 \times 50)^{0.42}) \times 0.64 = 3.1$ metres.

Demolition in SRZ: Removal of concrete kerbing and bitumen surface of carpark on site.

Tree Protection Zone: 7.2 metres radius from the centre of the tree.

This TPZ is based on the species having a *high* tolerance to soil disturbances = multiplying factor of nine. Thus: 0.802 (trunk diameter at breast height) x 9 = 7.2 metres.

Existing structures and fully-sealed surfaces within the calculated TPZ are excluded from the *effective* TPZ to the depth of the subject structure/footing/surface (i.e. down to natural soil level).

Demolition in TPZ: Removal of concrete kerbing and bitumen surface of carpark on site.

Recommendations: **1. Protective fencing and access**

It is recommended that the entire Tree Protection Zone on the subject site (7.2 m radius from centre of tree) be temporarily fenced as an exclusion zone during the demolition phase of the development. No wheeled or tracked vehicles or machinery to enter the temporary fenced TPZ any stage during the demolition process.

2. kerb and bitumen removal

The concrete kerb and bitumen surface may be removed from within the TPZ and SRZ using an excavator sited outside of the TPZ perimeter. Temporary fencing may be removed only during this process, to allow the kerb and bitumen to be scrapped back to outside of the TPZ. Natural soil beneath the kerb and bitumen surface should not be disturbed.

3. Other vegetation

Retain all other trees and woody shrubs where within the TPZ of the tree (7.2 m radius from centre of tree).

5.4 TREE 4



Figure 5. Tree 4, looking approximately south-west from the subject site.

Location: On the subject site (see Figures 1 and 5).

Species: *Corymbia maculata* (spotted gum).

Key reference: Nicolle (2016). *Taller Eucalypts for Planting in Australia – Their Selection, Cultivation and Management*. Pp. 118–119.

Legal Status: **Regulated** as defined by the *Planning, Development and Infrastructure Act 2016*.

- *Species:* *Corymbia maculata*
- *Trunk circ. at one metre:* 2.35 metres
- *Distance to dwelling/pool:* >10 metres
- *Bushfire Risk:* Excluded area
- *Living/dead status:* Currently alive
- *Exemptions:* No generic exemptions

Structural Root Zone: 3.1 metres radius from the centre of the tree.

This SRZ is based on the tree having a buttress trunk diameter of 0.828 metres – SRZ formula calculation: $((0.828 \times 50)^{0.42}) \times 0.64 = 3.1$ metres.

Demolition in SRZ: Removal of concrete kerbing and bitumen surface of carpark on site.

Tree Protection Zone: 6.6 metres radius from the centre of the tree.

This TPZ is based on the species having a *high* tolerance to soil disturbances = multiplying factor of nine. Thus: 0.732 (trunk diameter at breast height) x 9 = 6.6 metres.

Existing structures and fully-sealed surfaces within the calculated TPZ are excluded from the *effective* TPZ to the depth of the subject structure/footing/surface (i.e. down to natural soil level).

Demolition in TPZ: Removal of concrete kerbing and bitumen surface of carpark on site.

Recommendations: **1. Protective fencing and access**

It is recommended that the entire Tree Protection Zone on the subject site (6.6 m radius from centre of tree) be temporarily fenced as an exclusion zone during the demolition phase of the development. No wheeled or tracked vehicles or machinery to enter the temporary fenced TPZ any stage during the demolition process.

2. kerb and bitumen removal

The concrete kerb and bitumen surface may be removed from within the TPZ and SRZ using an excavator sited outside of the TPZ perimeter. Temporary fencing may be removed only during this process, to allow the kerb and bitumen to be scrapped back to outside of the TPZ. Natural soil beneath the kerb and bitumen surface should not be disturbed.

3. Other vegetation

Retain all other trees and woody shrubs where within the TPZ of the tree (7.2 m radius from centre of tree).

5.5 TREE 5



Figure 6. Tree 5, looking approximately south (left image) and north (right image) from the subject site.

Location: On the subject site (see Figures 1 and 6).

Species: *Eucalyptus cladocalyx* subsp. *crassa* (sugar gum).

Key reference: Nicolle (2013). *Native Eucalypts of South Australia*. Pp. 32–33.

Nicolle (2016). *Taller Eucalypts for Planting in Australia – Their Selection, Cultivation and Management*. Pp. 66–67.

Legal Status: **Significant** as defined by the *Planning, Development and Infrastructure Act 2016*.

- *Species:* *Eucalyptus cladocalyx*
- *Trunk circ. at one metre:* Estimated 3.21 metres
- *Distance to dwelling/pool:* Not applicable to this species
- *Bushfire Risk:* Excluded area
- *Living/dead status:* Currently alive
- *Exemptions:* No generic exemptions

Structural Root Zone: 3.5 metres radius from the centre of the tree.

This SRZ is based on the tree having a buttress trunk diameter of 1.146 metres – SRZ formula calculation: $((1.146 \times 50)^{0.42}) \times 0.64 = 3.5$ metres.

Demolition in SRZ: Removal of existing dwelling including footings. Removal of bitumen surface of access roadway/carpark on site. Removal of internal fencing.

Tree Protection Zone: 11.8 metres radius from the centre of the tree.

This TPZ is based on the species having a *moderate* tolerance to soil disturbances = multiplying factor of twelve. Thus: 0.987 (trunk diameter at breast height) $\times 12 = 11.8$ metres.

Existing structures and fully-sealed surfaces within the calculated TPZ are excluded from the *effective* TPZ to the depth of the subject structure/footing/surface (i.e. down to natural soil level).

Demolition in TPZ: Removal of existing dwelling including footings. Removal of bitumen surface of access roadway/carpark on site. Removal of internal fencing. Removal of large tree stump west of tree (see Figure 7).

Recommendations:

1. Protective fencing and access

It is recommended that the entire Tree Protection Zone on the subject site (11.8 m radius from centre of tree) be temporarily fenced as an exclusion zone during the demolition phase of the development, *except* where the existing dwelling on the site does not allow for fencing. No wheeled or tracked vehicles or machinery to enter the temporary fenced TPZ any stage during the demolition process, *except* where within the footprint of the existing residential dwelling being demolished.

2. Dwelling demolition and removal

The existing dwelling may be demolished and removed from within the TPZ and SRZ using an excavator sited *outside* of the TPZ perimeter and/or sited *within* the dwelling footprint. Natural soil adjacent to and beneath the dwelling footings should not be disturbed where within the TPZ.

3. Bitumen surfaces removal

The bitumen surfaces may be removed from within the TPZ and SRZ using an excavator sited *outside* of the TPZ perimeter (or from within the footprint of the dwelling to be demolished). Temporary fencing may be removed only during this process, to allow the bitumen to be scrapped back to outside of the TPZ. Natural soil beneath the bitumen surface should not be disturbed.

4. Fencing removal

Internal fencing, including posts, may be removed using an excavator sited *outside* of the TPZ perimeter (or from within the footprint of the dwelling to be demolished). Fence posts should be ‘plucked’ from the ground using an excavator located outside of the TPZ perimeter, and not excavated around to enable their removal.

5. Tree stump removal

The large dead tree stump located west of tree (but within the TPZ) may be removed by being ‘plucked’ from the ground using an excavator located outside of the TPZ perimeter (or from within the footprint of the dwelling to be demolished), and not excavated around to enable its removal. If the tree stump cannot be removed by plucking it with an excavator, it should be retained during the demolition phase and instead removed using a stump grinder.



Figure 7. Tree 5, looking approximately north-west from the subject site. Note the proximity of the tree to structures requiring demolition. Also note the large dead tree stump (ringed yellow) west of the tree.

6.0 SUMMARY

With respect to the five controlled trees subject of this report, I am supportive of the proposed demolition of structures and hard surfaces from the site, *provided* the demolition recommendations made for each of the trees in this report can be conditioned and enforced.

I thank you for the opportunity to provide this arboricultural assessment and report. If you require further information or clarification please contact me for assistance.



Dean Nicolle
OAM, BAppSc Natural Resource Management, BSc Botany (Hons), Ph.D