CIVICA | ArborSafe

Software Solutions for Tree Inventory Management

# Arboricultural Impact Assessment

Wood Marsh
St Kilda Botanic Gardens
11 Herbert Street
St Kilda VIC

17 February 2026


Assessment and report by:

James Cross BSc Environmental Science & Dip. Hort., Grad cert. (Arb) AQF Level 8


Job No: J07380

J07380

17 February 2026

Lachlan Anderson
Director
Wood Marsh
30 Beaconsfield Parade
Port Melbourne VIC 3207

**Arboricultural Impact Assessment Report regarding eight trees located within the vicinity of the proposed amenities upgrade at St Kilda Botanic Gardens, 11 Herbert Street, St Kilda**

Dear Lachlan,

We are pleased to provide the following Arboricultural Impact Assessment Report for eight trees within the grounds of the St Kilda Botanic Gardens.

Complete use of this report is authorised under the conditions limiting its use as stated in Appendix A Item 7 of "*Arboricultural Reporting Assumptions and Limiting Conditions*".

Should you have any queries relating to this report, its recommendations, or the options considered please do not hesitate to contact us on 1300 272 671.

Regards,

**James Cross**

Consulting Arborist
*BSc Environmental Science & Dip. Hort., Grad cert. (Arb)* AQF Level 8

| Version | Date | Author | Rationale |
|---|---|---|---|
| 1 | 17 February 2026 | James Cross | First Issue |

# Table of Contents

# 1 Executive summary

1.1 The following is an Arboricultural Impact Assessment Report regarding eight trees located within the grounds of the St Kilda Botanic Gardens. The subject site was identified by Wood Marsh (hereinafter referred to as the client) as possessing trees that may be impacted upon by a proposed new amenities block.

1.2 In part, the project scope was to nominate the subject trees that are suitable for retention/preservation, or require removal to facilitate the proposed development works, as well as identify and reduce potential conflicts between the subject trees and proposed site development. Accurate information on the area required for tree retention and methods/techniques suitable for tree protection during demolition and/or construction have been provided.

1.3 Eight trees were recommended for retention, with site exclusion being the main protection measure to be employed to ensure minimal long-term impacts are incurred.

1.4 Two trees, numbered 6 and 7 have specific protection measures over and above the recommended generic measures. These include project arborist involvement with restrictions on machinery use within the notional root zone (NRZ) area and enhancement of the growing environment within the NRZ area.

1.5 Tree retention status in relation to the proposed development (refer to Section 5.4 for full details of Retention Value categories):

| RV | Description | Total | Remove | | Retain | |
|---|---|---|---|---|---|---|
| | | | located within development footprint | irrespective of future development | with specific protection | with generic protection |
| A | High retention value trees | 2 | | | | 3 and 4 |
| B | Moderate retention value trees | 2 | | | | 1 and 2 |
| C | Low retention value trees | 4 | | | 6 and 7 | 5 and 8 |
| U | Trees to be removed irrespective of proposed development | 0 | | | | |

1.6 Appropriate planning and protection of trees can have a positive impact on long term tree health and retention on development sites. Any negative impacts of development design, planning, and supervision are cumulative and are easier to prevent than to remediate. In many cases, remediation is not possible. The best way to ensure the long-term retention of established trees is to follow the process outlined in this report.

## Section 1 – Arboricultural Impact Assessment

# 2 Introduction

2.1 Civica ArborSafe was engaged by Lachlan Anderson on behalf of the client to complete an Arboricultural Impact Assessment Report on eight trees located within the St Kilda Botanic Gardens at 11 Herbert Street, St Kilda.

2.2 The report has been requested as part of a Development Application (DA) that involves the proposed construction of a new amenities building across a vacant lawn area. The desired outcome is for playground users to have closer access to amenities.

2.3 The report was intended to provide information on the subject trees and how they may be impacted upon by the proposed development works. Report findings and recommendations are based upon guidance provided within the Australian Standard AS 4970:2025 *Protection of Trees on Development Sites*.

2.4 Observations and recommendations are based upon information provided by the client and an arborist site visit.

# 3 Scope

3.1 Carry out a visual assessment of the nominated trees located within the vicinity of the proposed development works.

3.2 Provide an objective appraisal of the subject trees in relation to their species, estimated age, health, structural condition, useful life expectancy (ULE) and viability within the existing landscape.

3.3 Based on the findings of the visual assessment, provide independent recommendations on the retention value of the subject trees.

3.4 Identify the subject trees that are suitable for retention or require removal to facilitate the proposed development as shown in the plans provided.

3.5 Identify and reduce potential conflicts between the retainable subject trees and the proposed site development by providing accurate information on the area required for successful tree retention and methods/techniques suitable for tree protection during demolition and/or construction.

# 4 Methodology

4.1 James Cross of Civica ArborSafe carried out a site inspection of the subject trees on 9 February 2026.

4.2 Trees that are the subject of this report were identified during discussions with the client, reviewing relevant supplied development documentation and reviewing the description of a non-exempt ‘Tree’ as identified within the Port Phillip City Council relevant documentation.

4.3 The subject trees were inspected from the ground using the initial component of Visual Tree Assessment (VTA) (Mattheck, 1994). No foliage or soil samples were taken and no aerial, underground or internal investigations were undertaken.

4.4 Tree height was measured with a Nikon Forestry Pro Hypsometer and crown widths were paced out. Trunk diameter at standard height (DSH) and trunk diameter at the root crown (DRC) were measured with a diameter tape and provided to the nearest centimetre.

4.5 Encroachment calculations were undertaken using Geographic Information System (GIS) software (QGIS). Surveyed tree locations were spatially referenced against development plans and high-resolutions aerial imagery to enable accurate spatial analysis. Notional Root Zones (NRZ) were generated in QGIS in accordance with the relevant calculation methodology, and proposed works were overlaid to assess the extent of encroachment. Measurements and encroachment areas were derived digitally using GIS measurement tools to ensure consistency and feasibility.

4.6 Environmental and heritage information was sourced from VicPlan. The source of all information in this regard has been referenced accordingly.

4.7 Data collected on site was analysed alongside the supplied development documentation and plans by James Cross, following which relevant findings and recommendations were formulated and collated into report format.

4.8 Notional root zones (NRZ) and Structural root zones (SRZ) were calculated in accordance with the Australian Standard AS 4970:2025 *Protection of Trees on Development Sites* (refer to Appendix B). It is important to note the NRZ is a theoretical calculation used as a trigger to gauge the level of arborist involvement for individual trees.

4.9 The Tree Protection Zone (TPZ) is the area above and below ground set aside for the protection of the roots and crown during development (refer to Appendix B). The TPZ is assigned by the assessing arborist and may differ from the NRZ. The TPZ can be influenced by various existing site/physical constraints, proposed development (such as buildings, drainage channels, retaining walls, etc.) and species considerations (Standards Australia, 2025).

4.10 Retention values have been determined based upon a modified version of the British Standard BS 5837:2012 *Trees in Relation to Design, Demolition and Construction*.

4.11 All photographs were taken at the time of the site inspection by James Cross and may have been altered for brightness, contrast, or have been cropped.

4.12 Plans of the existing site and of the proposed development were provided to Civica ArborSafe on 6 February 2026.

4.13 No proposed underground service locations have been reviewed in the preparation of this report.

# 5 Observations

## 5.1 Proposed construction

5.1.1 The proposed development has been reviewed and in summary consists of the construction of a new amenities building located within open space inside St. Kilda's Botanic Gardens (Figure 1).

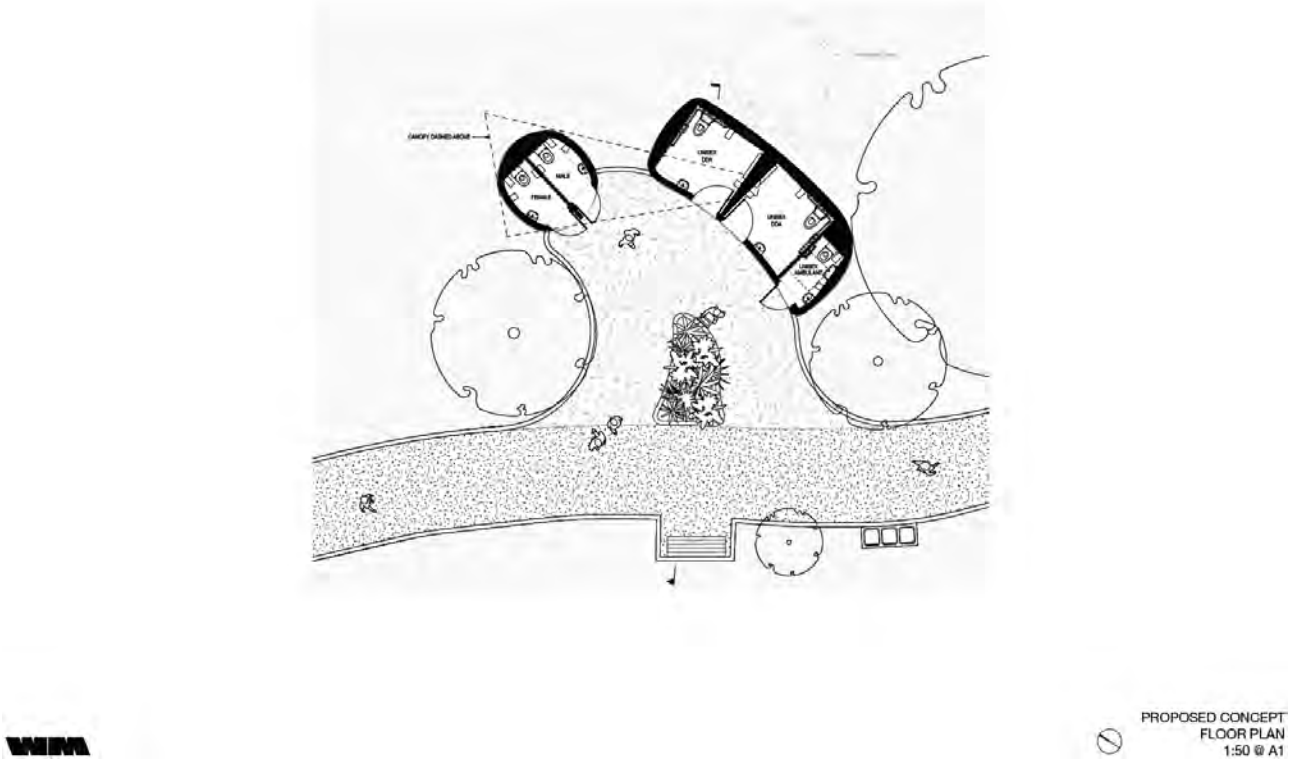



Figure 1. Excerpt from WM_398_ST-KILDA-AMENITIES_GA PLAN. WM, February 2026.

5.1.2 Plans of the existing site and of the proposed development were provided to Civica ArborSafe on 6 February 2026 and include (but are not limited to):

- Proposed Concept Plan, WM_398_ST-KILDA-AMENITIES_GA PLAN

## 5.2 Location

5.2.1 The site was located within the grounds of the St Kilda Botanic Gardens (Figure 2), which formed part of the Port Phillip City Council Local Government Area (LGA).

5.2.2 The subject site where the subject trees were located was an open space, lawn area within the parkland with scattered tree plantings adjacent to the proposed build. A granitic sand pathway guided foot traffic from north to south to the south-west of the subject site.

Figure 2. Whole site image (location). Red lines delineate the site and area containing the subject trees that may be impacted by the proposed development works. Nearmap, 2026.

## 5.3 The subject trees

5.3.1 The subject trees (Figure 3) have been numbered sequentially from number 1 to 8. Trees have not been tagged as the asset belongs to a local government authority.

5.3.2 The subject trees were considered to consist of planted material, with no remnant specimens or species indigenous to the area observed. The subject trees were made up of a comparatively even mixture of exotic and Australian native species, which were predominantly semi-mature in age.

5.3.3 Five species were identified across the site with the most prevalent being *Quercus palustris* (Pin Oak), *Brachychiton acerifolius* (Illawarra Flame Tree) and *Brachychiton discolor* (Lacebark Kurrajong).

5.3.4 None of the subject trees were species indigenous to the local area, with five being native to Australia and the remaining three being exotic species.

5.3.5 The tree population was well established with five (62.5%) of the existing surveyed trees rated as Semi-mature and one tree (12.5%) being in the Young/Juvenile category. Two trees (25.0%) were rated as Mature examples of their species.

5.3.6 Trees 1 (Figure 5) and 2 were established *Quercus palustris* (Pin Oak), in good health and of good structure with sound prospects for longevity within the current site context. These two trees were attractive providing autumn colour and dense shade when in full leaf.

5.3.7 The most significant of the subject trees was Tree 3, a mature example of *Eucalyptus cladocalyx* (Sugar Gum) (Figure 4). The Australian native displayed significant size, with tree height measured at 22 metres and crown spread spanning 25 metres. This tree had reached a mature size, dominating the adjacent landscape.

5.3.8 The other mature specimen observed was Tree 4, a mature example of *Celtis australis* (European Nettle Tree). This exotic deciduous species presented in good health displayed by a dense crown, along with a healthy foliage colour and size. Although minor hanging branches were observed throughout the crown, the structure was rated as good due to the ideal tree form and branching framework.

5.3.9 The remaining surveyed population consisted of younger examples of *Brachychiton* sp. (Kurrajongs). These specimens were planted along the path side to create an avenue. All of these trees were of modest dimensions and could be transplanted if required/desired.


Figure 3. Site map showing the subject trees. Note that icon colour indicates a tree's current risk rating (not Retention Value). Tree attributes can be obtained from Appendix F – Tree Assessment Data. ArborSafe, February 2026.

Figure 4. An image showing the growing environment around Trees 3, 4, 5 and 6 (right to left). James Cross, February 2026.

Figure 5. An image showing the growing environment around Trees 1 (left) and 7 (right). James Cross, February 2026.

## 5.4 Tree retention values

5.4.1 Tree retention values have been determined based upon a modified version of the British Standard BS 5837:2012 *Trees in Relation to Design, Demolition and Construction*. This standard categorises tree retention value, based upon an assessment of a tree's quality (health and structure) and useful life expectancy, into one of four categories – A, B, C and U. Refer to Appendix C for further details.

5.4.2 Other criteria such as a tree's physical dimensions, age class, location and its amenity, heritage and/or environmental significance and potential replacement time were also considered. A breakdown of the attributes required for classification in each category can be obtained from Appendix C.

| Category | Tree numbers |
|---|---|
| A – High | 3 and 4 |
| B – Moderate | 1 and 2 |
| C – Low | 5, 6, 7 and 8 |
| U – Nil | |

## 5.5 Heritage status

5.5.1 The proposed development sits within a designated Heritage Overlay area. (Victoria State Government, 2026).

5.5.2 The site was within the grounds of St. Kilda Botanic Gardens, which was considered to have significant heritage value, however the landscape/trees were not specifically listed within the listing description (6). The HO344 (Figure 6) is listed within the Port Phillip Heritage Inventory as identified below:

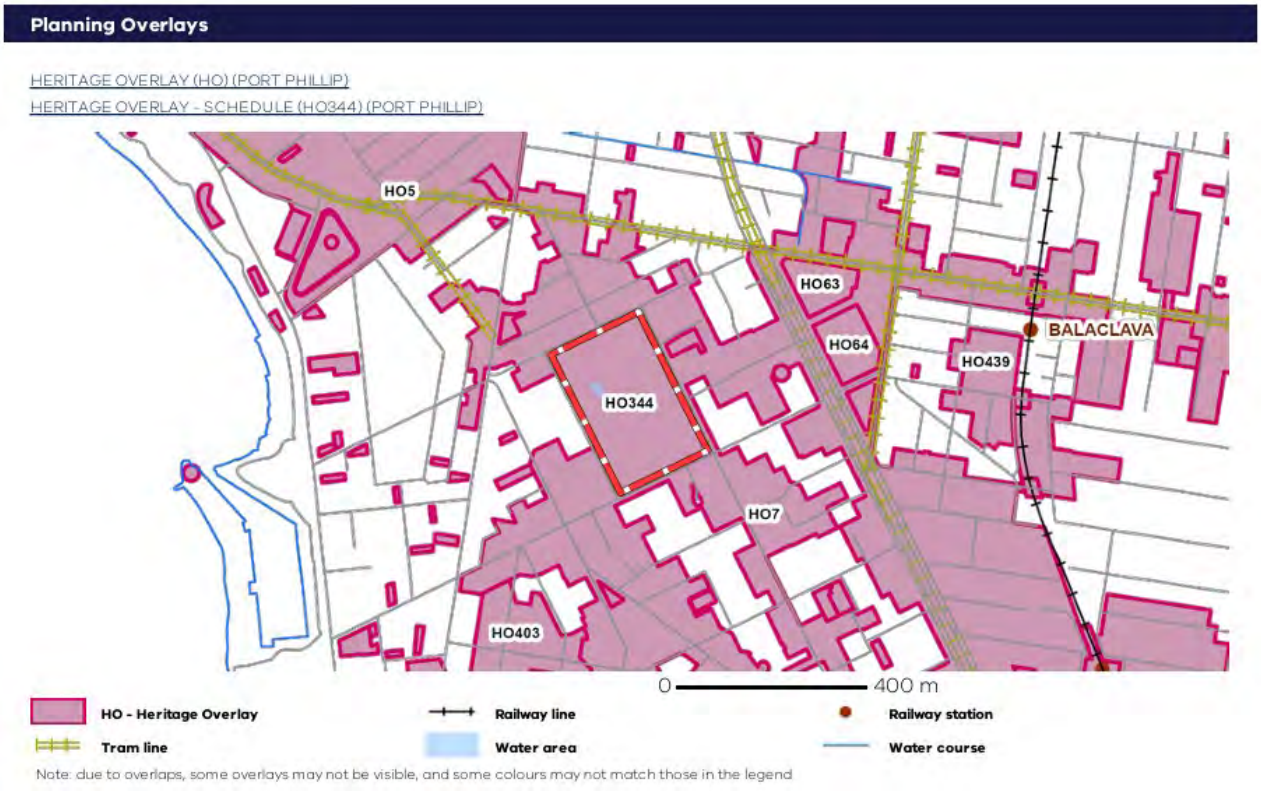



Figure 6. Heritage overlay. VicPlan, February 2026.

## 5.6 Botanical and environmental status

5.6.1 The subject trees were considered to be common species within the local area and as such held limited botanical significance.

5.6.2 A review of VicPlan for the subject site returned no mapped overlay areas regarding tree protection and/or significant plant communities.

5.6.3 A review of a VicPlan Planning Property Report indicated the proposed development work does not sit within any area designated as a Significant Landscape Overlay (Victoria State Government, 2026) (Figure 7).

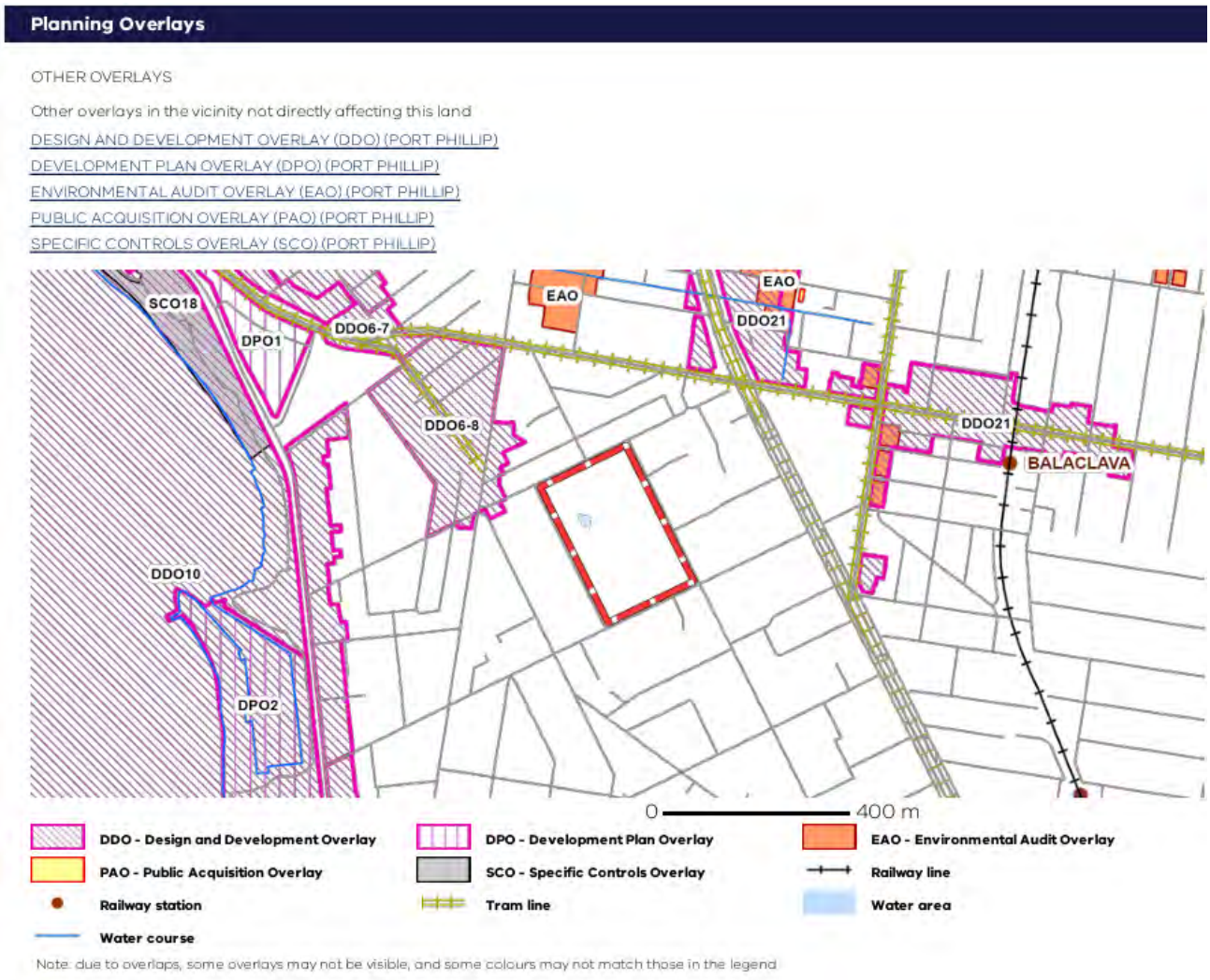



Figure 7. Image of Planning Overlays. VicPlan, 2026.

# 6 Discussion

6.1 Established trees of good health and structure represent an asset to any development. Trees may be retained for their health benefits to people, their ecological benefits, their aesthetic features, the shade they provide, the scale that they will give to new building, or their historical value.

6.2 Trees are living organisms that require appropriate environmental conditions to maintain their value as an asset. If the value of trees is to be retained, all reasonable steps should be taken to ensure that damage to trees on a development site is avoided. This means that trees should be considered and protected at every development step, from planning to completion.

## 6.3 Background biology

### 6.3.1 General

6.3.2 Trees consist of three main parts: the root system, the trunk and woody stems, and the crown of leaves supported by smaller branches. Each part carries out specific functions necessary for the tree's survival. A tree is in a state of physiological equilibrium between the above-ground and below-ground sections. If one of these sections is damaged, the entire tree will suffer, and symptoms can appear in any part of the tree.

### 6.3.3 Roots

6.3.4 The main functions of roots include the uptake of water and solutes, anchorage, storage of carbohydrate reserves and the production of some plant hormones. Roots require oxygen to function. The root system of trees consists of several types of roots. Roots often extend beyond the crown projection (Figure 7). Because roots are not readily seen, their importance is easily misunderstood or ignored. Damage to the root system is the most common injury during development. The impact of root damage can lead to the decline or death of a tree.

6.3.5 Root growth is responsive to favourable soil conditions. The most limiting factor for root growth is often water. Soil compaction impacts the availability of water and oxygen. Roots extend downwards and outward from the trunk and occupy irregularly shaped volumes. Roots can extend from the trunk to two or more times the height of the tree. Depths of the roots can also be variable based on a range of factors.

6.3.6 Root systems consist of three main parts:

- the structural roots (anchorage, storage and transport)
- woody roots (storage, transport, support of absorbing roots, and hormone production)
- absorbing (non-woody) roots (absorption of water and solutes, hormone production).

6.3.7 Root density declines with soil depth in most species of trees on slower-draining soils. On faster-draining soils, the roots of many species will be deeper. The vast majority of these roots are small, woody and absorbing (non-woody) roots. Absorbing roots are typically at their highest density towards the outside the crown projection of the tree and, in some soils, closest to the surface. These smaller roots are delicate and very vulnerable to injury.

### 6.3.8 Trunks and branches

6.3.9 Trunks and branches are composed of specialised tissues, including the following:

- bark (protection)
- phloem (transport of carbohydrates up and down the tree)
- vascular cambium (secondary thickening of the woody parts of the tree (trunk, stems, branches and roots); formation of new phloem)
- sapwood (physical support; transport of water and solutes from the roots; containing living cells as axial and radial parenchyma)
- heartwood (waste storage; additional structural support).

6.3.10 Damage to branches or trunks could allow infection by plant pathogens (disease-causing organisms such as decay fungi), disrupt the movement of vital materials and structurally weaken the tree.

### 6.3.11 Foliage

6.3.12 The main function of a tree's foliage is the production of carbohydrates (photosynthesis) and the transpiration stream (driving water movement and the tree's cooling process). These carbohydrates are the 'food' used by trees and provide all the energy required for the tree to function. Anything that directly or indirectly damages the foliage will interfere with photosynthesis.

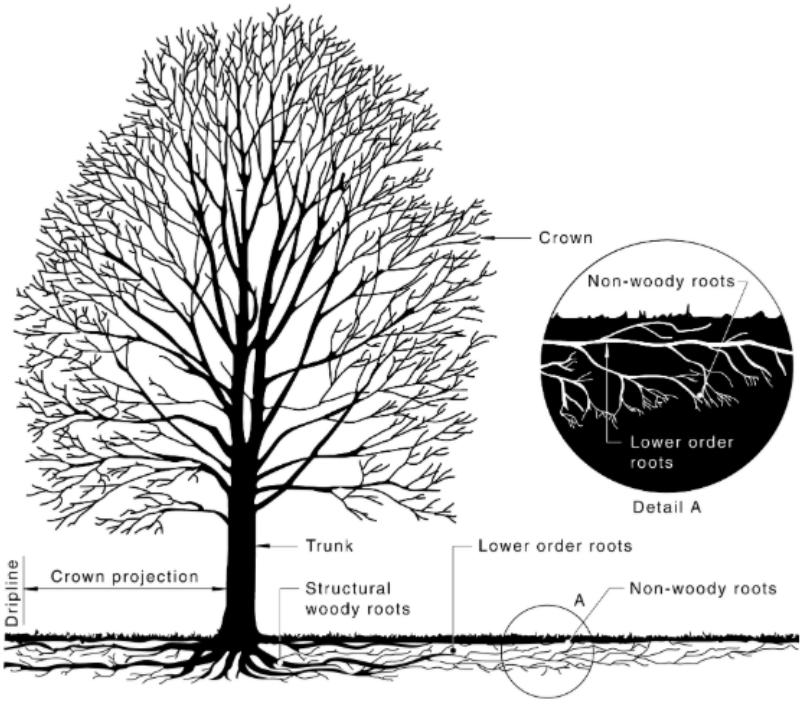



Figure 8. Structure of a tree in a normal growing environment. AS4970:2025, May 2025.

## 6.4 Potential adverse effects of development on trees

6.4.1 Injury to any part of the tree can detrimentally affect its heath or structural stability. The following clauses consider the potential impact of stress on the functioning of each main section of the tree and highlight the specific protective measures that should be undertaken to avoid this.

### 6.4.2 Crown damage

6.4.3 Foliage and branches are often lost or damaged on development sites by pruning or mechanical injury caused by construction equipment. Removing foliage reduces the level of photosynthesis and inhibits the production of carbohydrates. This may reduce the tree's capacity to function normally and to withstand stresses imposed by a change in its environment.

6.4.4 Incorrect pruning techniques, such as lopping or flush cutting, cause greater damage than properly made cuts, as detailed in AS 4373:2007 *Pruning of Amenity Trees*. Similarly, mechanical damage to branches by machinery, etc., will also create wounds. Any wound places an additional risk of complication on trees that could be stressed during construction.

### 6.4.5 Trunk damage

6.4.6 Trunks of trees can be wounded by machinery and mechanical equipment during demolition and construction work. This not only predisposes a tree to potential decay, but it also interferes with the transport of water, solutes and storage of carbohydrates. Over time, large wounds can decay and structurally weaken the tree.

### 6.4.7 Root damage

6.4.8 Root damage is the most common cause of damage to trees on development sites. Roots can be damaged in the following ways:

- removal during grading, excavation and trenching
- mechanically wounded, crushed or torn
- soil compaction limiting water and gas exchange
- soil build-up, causing a soil interface (perched water table)
- using impermeable materials over the surface
- chemical contamination of the soil by solvents and other waste products, such as fuel, oil, diesel, herbicides, paint, cement wash out etc.
- changes in soil moisture levels through alteration of drainage patterns and surface water flow.

6.4.9 Apart from the actual removal of roots during excavation or trenching, soil compaction is one of the major causes of root damage on development sites. Compaction is defined as the loss of large pore spaces (macropores) within the soil with a net loss of total pore space. Macropores are essential for the exchange of gases between the soil air and the atmosphere (aeration), the movement of water into the soil (percolation) and the removal of excess water from the soil (drainage).

6.4.10 Compaction results from loads applied to the soil. Foot traffic and vehicle movements can compact soils. Vehicles can cause significant compaction to depths of 15 to 20 centimetres (the soil in which many absorbing roots are located). The degree of compaction will depend on the pressure exerted, the number of movements, soil moisture levels and clay content.

6.4.11 Soil compaction can also reduce aeration (oxygen levels decrease) and cause a reduction in beneficial soil organisms (including mycorrhizal fungi).

6.4.12 The effects of root loss or damage by any means could include the following:

- loss of stability if structural woody roots are cut
- reduction in water and solute uptake
- reduced leaf size or loss of leaves, resulting in reduced photosynthesis
- decay caused by wounding
- predisposition to soil-borne pathogens.

6.4.13 Root damage can cause instability, decline and death of a tree.

## 6.5 Determining NRZ encroachment

6.5.1 **Major encroachment**. As per the Australian Standard AS 4970:2025 *Protection of Trees on Development Sites*, a major encroachment into the NRZ of any tree is considered to occur when it is beyond 20 percent of the NRZ or inside the SRZ.

6.5.2 Trees subject to major encroachment may require removal or, in certain instances, may be retained with specific protection requirements throughout the construction stage.

6.5.3 **Moderate encroachment**. Under the aforementioned standard, a moderate encroachment is considered to be greater than 10 percent and less than or equal to 20 percent of the area of the NRZ and is outside of the SRZ (Figure 9).

6.5.4 Trees subject to moderate encroachment may require removal or may be retained, provided that specific or general protection measures are implemented throughout the construction phase. In such cases, a clear and justified demonstration must be provided to confirm the tree's viability during and after development.

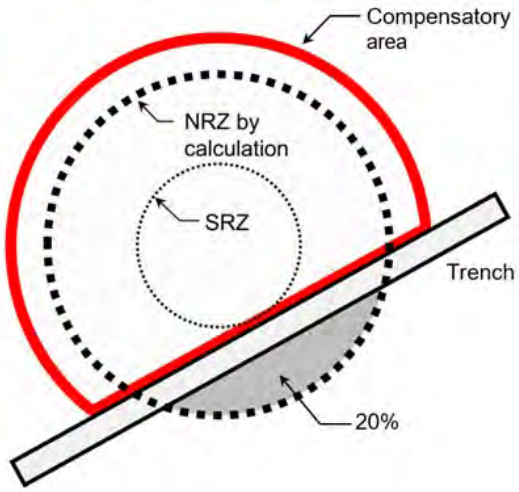
6.5.5 **Minor encroachment**. Under the aforementioned standard, a proposed encroachment is considered minor if it is less than or equal to 10 percent of the area of the NRZ, has not had recent NRZ encroachments and is outside of the SRZ.

6.5.6 Trees subject to minor encroachment may be retained with specific, generic or no protection requirements throughout the construction stage.

6.5.7 **No encroachment**. Trees with no encroachment may be retained with generic or no protection requirements throughout the construction stage.

6.5.8 For the purposes of this report, trees to be removed or retained have been identified as those:

- Requiring removal due to a level of encroachment into their NRZ that would likely result in a detrimental impact upon their future health and/or stability.
- Retainable and requiring specific crown and/or root protection requirements throughout the development cycle (i.e. generic requirements plus a combination of arborist supervision and careful construction methods within their NRZ).
- Retainable and requiring generic tree protection measures only (i.e. protective fencing and restriction of activities within the NRZ).




Sample (not to scale) of moderate encroachment. AS4970:205, May 2025.

## 6.6 Impact of proposed development

6.6.1 A review of the proposed design has been undertaken in the context of tree retention and removal across the site.

6.6.2 The main development impact which affects trees, but not necessarily to the point of requiring immediate removal, is significant root damage/severance due to major NRZ encroachment. Root damage/severance largely occurs due to two main impacts – soil compaction (compacting existing site soil to build on or installing additional fill to raise soil levels) and/or direct root severance (excavation for service installation or lowering surface levels).

6.6.3 Negative tree impacts can manifest as either a reduction in health and/or vigour due to root loss (absorption and/or woody roots) resulting in a reduction in water and nutrient absorption capability or on tree stability if larger structural roots are impacted. Ultimately, the outcome for the trees depends on a number of variable factors including species, age, current health, NRZ encroachment percentage, soil type, topography, previous site use and the proposed design and construction methodology.

6.6.4 Trees 6 and 7 are likely to incur major excavation/compaction inside their calculated NRZ's due to the proposed pathway cutting across the surface of their southern and northern NRZs respectively, within the root absorption area, therefore potentially affecting the health, as opposed to the stability, of the trees. The encroachment equates approximately to 22 and 25 percent (respectively) of their NRZ (Figure 10), which is considered a major encroachment. However, mitigating factors are abundant, such as available compensatory area on the northern aspect of Tree 6 and the eastern and southern aspects of Tree 7 provide the ability to enhance the unaffected soil by means of composted mulch, irrigation and soil nutrient additives. Both trees have a compacted granitic sand pathway to the west of their trunks; therefore, it is assumed that root development in these younger specimens would have opted to grow towards the east in the more favourable, grassed environment.


Figure 10. An image of the NRZ calculation for Trees 6 and 7 with the orange showing the proposed impacts to NRZs. Civica ArborSafe, February 2026.

6.6.5 The assumption of allowable encroachment and minimal long-term health or structural impacts to trees rely on a combination of the following being used – minimal excavation within the NRZ to limit root severance (i.e. construction placed outside the NRZ where possible), root sensitive construction methods being adhered to within the NRZ, fill rather than excavation utilised to affect level changes where possible (i.e. to minimise root severance and allow the tree's root system time to adjust), no construction occurring within the SRZ, compensatory area being available around the unimpacted aspects of the trees, and the enhancement of the existing NRZ area (i.e. mulched, soil conditioning and irrigation when required).

6.6.6 Trees 6 and 7 will incur major encroachment and will require specific protections throughout the proposed works (Figure 11).

6.6.7 The remaining six trees are set to incur no NRZ encroachment and can therefore be successfully retained with generic protections.

### 6.7 Tree removal

6.7.1 Zero trees would require removal, based on the supplied design proposal, to facilitate the development.

# Section 2 – Tree protection specifications

## 7 Introduction

7.1 This section of the report provides the Tree Protection Specifications (TPS) on all trees deemed retainable post development. The protection specifications will be broken up into recommendations to be undertaken before, during and after the proposed construction works. These include:

- pre-construction activities
- demolition/construction activities
- post construction activities.

7.2 All the recommendations made within the TPS are congruent with the Australian Standard AS 4970:2025 *Protection of Trees on Development Sites* and as such it would be beneficial if all parties involved with the management of this project obtain a copy of, and are familiar with, this document.

### 7.3 Tree retention

7.3.1 Eight trees were recommended for retention and generic, and in some cases specific, protection measures during construction to ensure they remain viable following the completion of works.

| Recommendation | Qty | Tree numbers |
|---|---|---|
| Retain with specific protection requirements | 2 | 6 and 7 |
| Retain with generic protection requirements | 6 | 1, 2, 3, 4, 5 and 8 |

7.3.2 Refer to Appendix G – Tree protection plan for location and details of retained trees.


Figure 11. Site map showing retained trees requiring specific protection measures (pink dots) and generic protection measures (green dots). ArborSafe, February 2026.

### 7.4 Project arborist

7.4.1 A project arborist must be commissioned to oversee all tree protection measures, approved works within TPZ's (where necessary) and complete regular monitoring and compliance certification.

7.4.2 The project arborist must be suitably experienced and competent in arboriculture, having acquired through training, a minimum qualification in this field under the Australian Qualification Framework (AQF) of Level 5, or an equivalent.

7.4.3 Regular site inspections are to be conducted by the project arborist at several, key points during the project to ensure all tree protection recommendations are being adhered to during demolition and/or construction. Such inspections will also allow for any alterations in tree health and/or additional tree protection or remediation measures to be identified and addressed.

### 7.5 Project milestones

7.5.1 The following visits and milestones are recommended as a guide as to when on-site inspections by the project arborist are required:

| Item | Purpose of Visit | Timing of Visit(s) | Prerequisites |
|---|---|---|---|
| 1 | Pre-construction site set up | Sign-off as per section 8.2.12.<br>Contractor to provide a minimum of five days' advance notice for this visit. | Prior to commencement of works and post site establishment. |
| 2 | Pre demolition / construction inductions | Contractor to provide a minimum of five days' advance notice for this visit. | All parties involved in the project to attend. |
| 3 | Supervision of works in TPZ's, including all regrading and excavations | Whenever there is work planned to be performed within the TPZ's. Contractor to provide a minimum of five days' advance notice for such visits. | |
| 4 | Regular site inspections | Minimum frequency monthly for the duration of the project. | The checklist must be completed by the project arborist at each site inspection and be signed by both parties. |
| 5 | Final sign off | Following completion of all works. | Practical completion of works and prior to tree protection removal. |

### 7.6 Compliance reporting

7.6.1 Following each site inspection, the project arborist is to prepare a report detailing the health and structural condition of the subject trees designated for retention. These reports should certify whether the works are being undertaken in accordance with the consent/conditions relating to tree protection and management.

7.6.2 These reports should contain photographic evidence (where applicable) to demonstrate that all tree protection and management recommendations are being carried out as specified.

7.6.3 Matters to be monitored and contained in these reports must include tree health and structural condition, the appropriateness and effectiveness of tree protection measures and any potential impact(s) on retained subject trees relating to conducted works which may arise from changes to the endorsed plans.

7.6.4 After completion, the reports shall be submitted to the project manager (as well as the clients' nominated representative where required).

7.6.5 If any tree protection conditions are found to have been breached, clear remedial action specifications must be specified, and the responsible authority notified.

### 7.7 Specific protection measures

7.7.1 Trees 6 and 7 have proposed construction works with a portion of their NRZ.

7.7.2 Excavation within the NRZ of Trees 6 and 7 is to be carried out by hand via shovel or spade to minimise impacts to roots and achieve desired compacted ground and proposed path edging within theoretical NRZ. Arborist supervision isn't required, due to the low retention value of both trees.

7.7.3 It is recommended that any proposed excavation commence at the outer extent of the NRZ and move inwards to minimise root damage/severance to the subject trees.

7.7.4 Roots discovered are to be treated with care and minor roots (less than 30–40 millimetres in diameter) pruned with a sharp, sterile handsaw or secateurs to the edge of the excavated area.

7.7.5 All significant roots (greater than 30–40 millimetres in diameter) are to be preserved/protected from desiccation, recorded, photographed and reported to the project arborist for review. At the discretion of the project arborist they may decide that retention of such roots is required for the sake of future tree health or may determine such roots can be pruned without any significant impact on future health.

# 8 Pre-construction activities

## 8.1 Arboricultural works

8.1.1 No subject tree has proposed development within any portion of its crown. No pruning or crown raising is therefore required to facilitate development.

## 8.2 Preparation of Tree Protection Zones (TPZ)

8.2.1 Tree protection fencing must be erected for each subject tree to protect their above and below ground structures. The positioning of tree protection fencing may need to be modified, as specified in the tree protection plan (TPP) and/or specific protection section, for all the subject trees to accommodate boundary fencing, roads and the designated construction zone.

8.2.2 Tree protection fencing must be made from sturdy materials such as chain and mesh panels or plywood hoarding and posts and should be permanent, locked/eliminate access by contractors and be incapable of being readily moved or adjusted once erected. Any holes that need to be dug to support the fencing where possible should be located outside of the TPZ, otherwise such holes should be hand dug under the supervision of the project arborist. Materials such as rope or orange para webbing must not be used.

### 8.2.3 TPZ signs

8.2.4 Signs must be placed on the tree protection fencing on each aspect adjacent to each subject tree and is to display at a minimum that the area is a tree protection zone and should not be accessed and the contact phone numbers of the site manager and the project arborist.

### 8.2.5 Temporary irrigation

8.2.6 Temporary irrigation is not seen as necessary for the subject trees as they would ordinarily not be receiving additional water over hot and/or dry weather. It is considered that the trees will be excluded from any compaction or other root damage during demolition and as such will be maintained as normal.

8.2.7 Monitoring of soil moisture levels during hot and/or dry weather should be done by the project arborist during construction and additional water added to the TPZ when required as directed by them should soil moisture levels been deem inadequate.

### 8.2.8 Site sheds and storage areas

8.2.9 All site sheds and storage areas must be located outside of the NRZ of all subject trees. This will serve to negate excessive soil compaction of their root zones and root damage/severance that may occur as a result of the installation of temporary services for the sheds (such as water and electricity etc) and excessive use around the sheds. In this regard the carpark area west of the building would be considered a suitable location for site sheds to be positioned.

### 8.2.10 Arborist's inspection

8.2.11 After all tasks listed in Section 8.1 and 8.2 have been completed, the project arborist is to be called to the site to approve of the pruning works and the TPZ set up including their location and the materials from which they are made.

8.2.12 If there is non-compliance with the TPS, the TPP or consent conditions, the project arborist shall specify the remedial works where required and a timeframe for rectification works.

8.2.13 Requirements for any alterations and/or additions to the TPZ's must be discussed with the site manager at this time. Where stipulated in the consent conditions, the relevant authority shall be notified of non-compliance issues.

# 9 Construction/demolition activities

## 9.1 Project arborist

9.1.1 The project arborist is to be commissioned to conduct pre-start inductions in relation to the TPS and TPP as specified in section 7.5.

9.1.2 Also during this stage, the project arborist should monitor the site for compliance with the TPS, TPP and consent conditions, as relevant. Attention should be given to the impacts of proposed demolition, bulk earthworks, and installation of temporary infrastructure, including bunding, sediment control works and drainage.

9.1.3 Monitoring reports and certification should be prepared by the project arborist. These should be provided to the project manager and, where so conditioned, to the relevant authority. These certifications should reference the TPS, TPP and consent conditions, as relevant.

9.1.4 The project arborist may need to attend site at other times during the project at the request of Wood Marsh and/or the Port Phillip City Council. These requests may be to provide further guidance related to the trees, if there are potential impacts upon the trees that need to be discussed and agreed upon, if there has been a breach of the TPS, attendance at site meetings etc.

9.1.5 The project arborist is to make at a minimum monthly visits to the site to ensure that all tree protection measures are being complied with. A site inspection checklist form is to be completed by the project arborist at the time of each inspection and signed by the project arborist and the project manager/foreman. Should there be any breaches of or changes to the TPMP, these are to be documented within a site inspection checklist form and signed off by both the Project Arborist and the site/project manager. Port Phillip City Council is to be notified of any changes to this TPS.

9.1.6 Port Phillip City Council must be notified within 24 hours of any breach of the TPS or where damage has occurred to any tree. Should such an event(s) occur the project arborist is to be immediately contacted and requested to attend site and to document the event in the checklist and provide guidance on the course of action.

## 9.2 Generic protection and reporting measures

9.2.1 All subject trees designated for retention require generic protection during the demolition and/or construction stage. Tree protection measures (Appendix D) include a range of:

- Activities restricted within the TPZ
- Protective fencing
- Trunk and ground protection
- Tree protection signage

## 9.3 Site hygiene

9.3.1 Before any demolition and/or construction related vehicles enter the site they are to be washed down thoroughly to remove all soil from upon and under them. This is to ensure that no vehicle can transfer soil borne plant diseases onto the site, particularly the destructive soil borne fungus *Phytophthora cinnamomi* (Cinnamon Fungus) which is known to cause root rot in a wide range of species.

9.3.2 After working at the St Kilda Botanic Gardens site, vehicles that visit other work sites must be washed down prior to their re-entry to the St Kilda Botanic Gardens site.

### 9.4 Demolition guidelines

9.4.1 Any demolition and construction operations being undertaken within or adjacent to an NRZ shall be carried out in such a way as to minimize the impact on the health of the trees that are to be retained.

9.4.2 The consent conditions and the TPS should be checked to compile a list of the critical stages. Critical stages typically include the installation of services, footings and slabs, scaffolding works within the TPZ and the completion of building works.

9.4.3 Hand excavation (by shovel) is the preferred method of demolition within TPZ's. If large machinery must be used around the trees, spotters must assist to help guide and direct operations. Large machinery should be positioned outside the TPZ and move carefully toward to the tree to minimise root/canopy conflict.

### 9.5 Underground service installation

9.5.1 The installation of underground services (including drainage) must not encroach within the TPZ of any of the subject trees unless authorised by the project arborist in which case underground boring will invariably be recommended. As per the Port Phillip City Council Tree Retention and Removal Policy, the boring of services is to occur at a minimum depth of 800 millimetres (top of pipe) below the existing grade for trees with a trunk DBH of less than 100 centimetres, 950 millimetres for trees with a trunk DBH of 100–150 centimetres and 1100 millimetres for trees with a trunk DBH of greater than 150 centimetres. To minimise soil disturbance associated with service installation communal service lines must be used where appropriate. The entry and exit pits for boring must be positioned outside the designated TPZ for each tree.

### 9.6 Landscape work

9.6.1 The landscape documentation should conform to the TPS, TPP and consent conditions, as relevant. Towards the end of the building works, the staged removal of protection measures may require approval from the project arborist in order for landscape works to begin. Approved works within the TPZ should be supervised as specified in the TPS, the consent conditions, or both.

9.6.2 Monitoring should be recorded and provided to the project manager and, where required, to the relevant authority

### 9.7 Practical completion

9.7.1 Practical completion assumes that all construction and landscaping works are finished. At practical completion, all remaining tree protection measures should be removed.

9.7.2 The project arborist should assess the condition of the tree(s), document the extent of compliance with the tree protection requirements and, if required, specify ongoing care or remedial works. This documentation shall be recorded and provided to the project manager and, where required, to the relevant authority.

# 10 Post-construction

## 10.1 Defects liability period

10.1.1 Any rectification works within the defects liability period shall be assessed by the project arborist to assess their impact on retained trees. If required, the project arborist should specify any tree protection measures to be implemented during the works.

## 10.2 Final certification

10.2.1 An assessment of the condition of the trees and the impact of the development should be conducted by the project arborist.

10.2.2 Following the final inspection and the completion of any remedial works, the project arborist may certify (as appropriate) that the completed works have been carried out in conformance with the approve TPS and consent conditions.

10.2.3 Certification should include a statement on the condition of the retained trees, as well as details of any deviations from the approved TPS or consent conditions, and their impacts on trees. Copies of monitoring documentation should be available on request.

## 10.3 Plant health care for Tree 6 and 7

10.3.1 Maintenance schedules may include (but not be limited to) watering (weekly soaking), mulching crown extent to a depth of ~100mm (woodchip), staking, guarding and formative pruning.

# 11 References


- Mattheck, C. a. B. H., 1994. *The Body Language of Trees: A Handbook for Failure Analysis.* H. M. Stationery Office: University of Michigan.
- Standards Australia, 2007. *AS 4373:2007 Pruning of Amenity Trees,* GPO Box 476 Sydney NSW 2001: Standards Australia.
- Standards Australia, 2025. *AS 4970:2025 Protection of Trees on Development Sites,* GPO Box 476 Sydney NSW 2001: Standards Australia.
- The British Standards Institution, 2012. *BS 5837:2012 Trees in Relation to Design, Demolition and Construction,* London: BSI Standards Limited.
- Urban, J., 2008. *Up By Roots - Healthy Soils and Trees in the Built Environment.* Champaign (Illinois): International Society of Arboriculture.
- Victoria State Government, 2026. *VicPlan.* [Online]
  Available at: https://mapshare.vic.gov.au/vicplan/
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## Appendix A. Arboricultural reporting assumptions and limiting conditions

1. Any legal description provided to the consultant is assumed to be correct. Any titles and ownership of any property are assumed to be good. No responsibility is assumed for matters legal in character.

2. It is assumed that any property/project is not in violation of any applicable codes, ordinances, statutes or other government regulations.

3. Care has been taken to obtain all information from reliable sources. All data has been verified in so far as possible, however, the consultant can neither guarantee nor be responsible for the accuracy of the information provided by others.

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

5. Loss or alteration of any part of this report invalidates the entire report.

6. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by anyone but the person to whom it is addressed, without the prior written consent of the consultant.

7. Neither all nor any part of the contents of this report, nor any copy thereof, shall be used for any purpose by anyone but the person to whom it is addressed, without the written consent of the consultant. Nor shall it be conveyed by anyone, including the Client, to the public through advertising, public relations, news, sales or other media, without the written consent of the consultant.

8. This report and any values expressed herein represent the opinion of the consultant and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.

9. Sketches, diagrams, graphs and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise.

10. Information contained in this report covers only those items that were examined and reflect the condition of those items at the time of inspection.

11. Inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee expressed or implied that the problems or deficiencies of the plants or property in question may not arise in the future.

## Appendix B. Explanation of tree assessment terms

**Tree number:** Refers to the individual identification number assigned within the ArborSafe software to each assessed tree on the site and the number which appears on the tree's tag.

**Tree location:** Refers to the easting and northing coordinates assigned to the location of the tree as obtained from the geo-referenced aerial image within the ArborSafe software.

**Tree species:** Provides the botanic name (genus, species, sub-species, variety and cultivar where applicable) in accordance with the International Code of Botanical Nomenclature (ICBN), and the accepted common name.

**Trees in group:** The number of trees encompassing a collective assessment of more than one tree. Typically grouped trees have similar attributes that can be encompassed within one data record.

**Height:** The estimated range in metres attributed to the tree from its base to the highest point of the canopy. Where required height will be estimated to the nearest metre.

**Diameter at Standard Height (DSH):** Refers to the tree's estimated trunk diameter measured 1.4m from ground level for a single trunked tree. These estimates increase in 50 millimetre increments. Where required DSH will be measured to give an accurate measurement for single trunked trees, trees with multiple trunks, significant root buttressing, bifurcating close to ground level or trunk defects and will be measured as per the Australian Standard AS 4970:2025 *Protection of Trees on Development Sites*.

**Notional Root Zone (NRZ)**: Encroachment into the NRZ is the primary trigger for arboricultural input on a development site. NRZ is a theoretical calculation which is a specified area above and below ground at a given distance measured radially away from the centre of the tree's trunk. The radius of the NRZ is calculated by multiplying the tree DSH by 12. NRZ radius = DSH × 12. (Note "Standard Height" is nominally measured as 1.4m from ground level). (Standards Australia, 2025).

**Tree Protection Zone (TPZ)**: The TPZ is a specified area, above and below ground, set aside to provide protection of the roots and crown to enable the ongoing viability and stability of a retained tree where it is potentially subject to damage during development.

The TPZ may differ from the NRZ as it considers relevant factors such as:

- Location and distribution of the roots.
- Potential loss of root mass resulting from the encroachment (number of roots and diameter of roots).
- Tree species and tolerance to root disturbance.
- If the works will result in a temporary (e.g. service trench) or permanent (e.g. basement car park) loss of available soil volume.
- Age, health, current size and projected size of the tree.
- Presence of other trees with overlapping NRZ or grafted roots.
- Proposed staging and timing of excavation or root cutting.
- Proposed tree maintenance and tree care activities.

**Structural Root Zone (SRZ)**: The area close to the base of a tree required for the tree's anchorage and stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. A larger area is required to maintain a viable tree. The SRZ shall be calculated when major encroachment (greater than 20%) into an NRZ is proposed.

Many factors affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). Natural or built structures, such as rocks and footings, can also influence the SRZ. An indicative SRZ radius can be determined from the trunk diameter measure immediately above the root buttress using the following formula. Root investigation can provide more information on the extent of these roots.

SRZ Radius = $(D \times 50)^{0.42} \times 0.64$, where D equals the trunk diameter measured above the root buttress flare.

**Crown spread**: The estimated range in metres attributed to the spread of the tree's canopy on its widest axis. Where required crown spread will be estimated to the nearest metre.

**Origin**: Refers to the origin of the species and its type.

| Category | Description |
|---|---|
| **Indigenous** | Occurs naturally in the local area and is native to a given region or ecosystem. |
| **State Native** | Occurs naturally within State but is not indigenous. |
| **Australian Native** | Occurs naturally within Australia and its territories but is not a State native or indigenous. |
| **Exotic Evergreen** | Occurs naturally outside of Australia and its territories and typically retains its leaves throughout the year. |
| **Exotic Deciduous** | Occurs naturally outside of Australia and its territories and typically loses its leaves at least once a year. |

**Health**: Refers to the health and vigour of the tree.

| Category | Description |
|---|---|
| **Excellent** | Canopy full with even foliage density throughout, leaves are entire and are of an excellent size and colour for the species with no visible pathogen damage. Excellent growth indicators, e.g. seasonal extension growth. Exceptional specimen. |
| **Good** | Canopy full with minor variations in foliage density throughout, leaves are entire and are of good size and colour for the species with minimal or no visible pathogen damage. Good growth indicators, none or minimal deadwood. |
| **Fair** | Canopy with moderate variations in foliage density throughout, leaves not entire with reduced size and/or atypical in colour, moderate pathogen damage. Reduced growth indicators, visible amounts of deadwood, may contain epicormic growth. |
| **Poor** | Canopy density significantly reduced throughout, leaves are not entire, are significantly reduced in size and/or are discoloured, significant pathogen damage. Significant amounts of deadwood and/or epicormic growth, noticeable dieback of branch tips, possibly extensive. |
| **Dead** | No live plant material observed throughout the canopy, bark may be visibly delaminating from the trunk and/or branches. |

**Age**: Refers to the life cycle of the tree.

| Category | Description |
|---|---|
| **Young** | Newly planted small tree not fully established may be capable of being transplanted or easily replaced. |
| **Juvenile** | Tree is small in terms of its potential physical size and has not reached its full reproductive ability. |
| **Semi-mature** | Tree in active growth phase of life cycle and has not yet attained an expected maximum physical size for its species and/or its location. |
| **Mature** | Tree has reached an expected maximum physical size for the species and/or location and is showing a reduction in the rate of seasonal extension growth. |
| **Senescent** | Tree is approaching the end of its life cycle and is exhibiting a reduction in vigour often evidenced by natural deterioration in health and structure. |

**Structure**: Refers to the structure of the tree from roots to crown.

| Category | Description |
|---|---|
| **Good** | Sound branch attachments with no visible structural defects, e.g. included bark or acute angled unions. No visible wounds to the trunk and/or root plate. No fungal pathogens present. |
| **Fair** | Minor structural defects present, e.g. apical leaders sharing common union(s). Minor damage to structural roots. Small wounds present where decay could begin. No fungal pathogens present. |
| **Poor** | Moderate structural defects present, including bifurcations with included bark with union failure likely within 0–5 years. Wounding evident with cavities and/or decay present. Damage to structural roots. |
| **Hazardous** | Significant structural defects with failure imminent (3–6 months). Defects may include active splits and/or partial branch or root plate failures. Tree requires immediate arboricultural works to alleviate the associated risk. |

**Useful Life Expectancy (ULE)**: Useful life expectancy refers to an expected period of time the tree can be retained within the landscape before its amenity value declines to a point where it may detract from the appearance of the landscape and/or presents a greater risk and/or more hazards to people and/or property. ULE values consider tree species, current age, health, structure and location. ULE values are based on the tree at the time of assessment and do not consider future changes within the tree's location and environment which may influence the ULE value.

| Category |
|---|
| 0 Years |
| <5 Years |
| 5–10 Years |
| 10–15 Years |
| 15–25 Years |
| 25–50 Years |
| >50 Years |

**Defects**: Visual observations made of the presenting defects of the tree and its growing environment that are, or have the capacity to impact upon, the health, structural condition and/or the useful life expectancy of the tree. Defects may include adverse physical traits or conditions, signs of structural weaknesses, plant disease and/or pest damage, tree impacts to assets or soil related issues.

**Tree significance**: Includes environmental, social or historical reasons why the tree is significant to the site. The tree may also be rare under cultivation or have a rare or localised natural distribution.

**Arborist actions**: A list of arboricultural and/or plant health care works that are aimed at maintaining or improving the tree's health, structural condition or form. Actions may also directly or indirectly reduce the risk potential of the tree such as via the removal of a particular branch or the moving of infrastructure from under its canopy.

## Appendix C. Tree retention values

Based upon a modified version of the British Standard BS 5837:2012 *Trees in Relation to Design, Demolition and Construction* – Recommendations.

| Category and definition | Criteria (including sub-categories where appropriate) | | |
|---|---|---|---|
| | **1. Arboricultural qualities** | **2. Landscape qualities** | **3. Cultural and environmental values** |
| **Category A** | | | |
| Trees of High Quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years. | Trees that are particularly good examples of their species, especially if rare or unusual (in the wild or under cultivation); or those that are important components of groups or avenues. | Trees or groups of significant visual importance as arboricultural and/or landscape features. (e.g. feature and landmark trees). | Trees, groups or plant communities of significant conservation, historical, commemorative or other value (e.g. remnant trees, aboriginal scar trees, critically endangered plant communities, trees listed specifically within a Heritage statement of significance). |
| **Category B** | | | |
| Trees of Moderate Quality with an estimated remaining life expectancy of 15–25 years and of dimensions and prominence that cannot be readily replaced within 10 years. | Trees that might be included within Category A but are downgraded because of diminished condition such that they are unlikely to be suitable for retention beyond 25 years. | Trees that are visible from surrounding properties and/or the street but make little visual contribution to the wider locality. | Trees with conservation or other cultural value (trees within conservation areas or landscapes described within a statement of significance, locally indigenous species). |
| **Category C** | | | |
| Trees of Low Quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable. | Trees of very limited value or such impaired condition that they do not qualify in higher categories. | Trees offering low or only temporary/transient landscape benefits. | Trees with no material conservation or other cultural value. Trees that are exempted by the relevant consent authority. |
| **Category U** | | | |
| Trees in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than 5 years. | Trees that have a severe structural defect that are not remediable such that their failure is expected within 12 months.<br>Trees that will become unviable after removal of other Category U trees (e.g. where for whatever reason the loss of companion shelter cannot be mitigated by pruning).<br>Trees that are dead or are showing signs of significant, immediate and irreversible overall decline.<br>Trees infected with pathogens of significance to the health and or safety of other trees nearby<br>Low quality trees suppressing adjacent trees of better quality.<br>Environmental/noxious/declared/controlled weeds or species categorised as weeds within the local area.<br>Note: Category U trees can have existing or potential conservation value* which might make it desirable to preserve. | | |

* Where trees would otherwise be categorised as U, B or C but have significant identifiable conservation, heritage or landscape value even though only for the short term, they may be upgraded, although they might be suitable for retention only.

**Tree quality:**

| | | Health** | | | |
|---|---|---|---|---|---|
| | | **Excellent/ Good** | **Fair** | **Poor** | **Dead** |
| **Structure** | **Good** | A | B | C | U |
| | **Fair** | B | B | C | U |
| | **Poor** | C | C | U | U |
| | **Hazard *** | U | U | U | U |

* Structural hazard that cannot be remediated through mitigation works to enable safe retention.

** Trees of short term reduced health that can be remediated via basic, low cost plant health care works (e.g. mulching, irrigation etc.) may be designated in a higher health rating to ensure correct retention value nomination.

| | |
|---|---|
| **Category A** | Typically trees in this category are of high quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years. The tree may make significant amenity contributions to the landscape and may make high environmental contributions. In some cases, trees within this category may not meet the above criteria, however possess significant heritage or ecological value. Trees of this retention value warrant design consideration and amendment to ensure their viable retention. |
| **Category B** | Typically trees in this category are of moderate quality with an estimated remaining life expectancy of 15–25 years and prominence of size dimensions that cannot be readily replaced within 10 years. They may make moderate amenity contributions to the landscape and make low/moderate environmental contributions. Trees with this retention value warrant lesser design consideration in an attempt to allow for their retention. |
| **Category C** | Trees in this category are of low quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable, may have poor health and/or structure, are easily replaceable, or are of undesirable species and do not warrant design consideration. |
| **Category U** | Trees in this category are found to be in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than five years. These trees may be dead and/or of a species recognised as a weed that resulted in them being unretainable. |

## Appendix D. Generic protection and reporting measures

All subject trees designated for retention require generic protection during the demolition and/or construction stage. Tree protection measures include a range of:

- Activities restricted within the TPZ
- Protective fencing
- Trunk and ground protection
- Tree protection signage
- Involvement from the project arborist
- Project milestones
- Compliance reporting

**Activities prohibited within the TPZ**

- Machine excavation including trenching
- Storage
- Preparation of chemicals, including cement products
- Parking of vehicles and plant
- Refueling
- Dumping of waste
- Wash down and cleaning of equipment
- Placement of fill
- Lighting of fires
- Soil level changes
- Temporary or permanent installation of utilities and signs
- Physical damage to the tree

**Protective fencing specification**

Tree protective protection fencing is to be installed at the designated TPZ or maximum practicable extent. As a guide fencing is to be erected as per Figure 13 before any machinery or materials are brought to site and before commencement of works (including demolition).

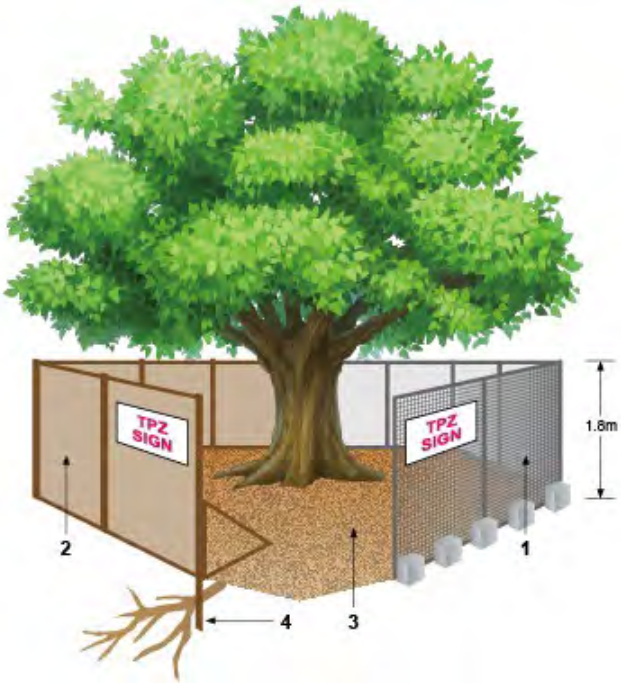
In some areas of the site (i.e. protection of trees on neighbouring properties) existing boundary fencing and/or external site fencing may be used as an alternative to protective fencing.

Once erected, tree protection fencing must not be removed or altered without approval from the project arborist and/or the responsible authority and is to be secured to restrict unauthorised access.

Tree protection fencing is to be a minimum of 1.8 metres high and mesh or wire between posts must be highly visible. Fence posts and supports should have a diameter greater than 20 millimetres and should ideally be freestanding, otherwise be located clear of tree roots.

Tree protection fencing must remain intact throughout all proposed construction works and must only be dismantled after their conclusion. The temporary dismantling of tree protection fencing must only be done with the authorisation of the project arborist and/or the responsible authority.

The subject trees themselves must also not to be used as a billboard to support advertising material. Affixing nails or screws into the trunks of trees to display signs of any type is not a recommended practice in the successful retention of trees.




Legend:

1. Chain wire mesh panels that are held in place with concrete feet.
2. Alternatively, plywood or wooden paling fence panels may be used. This fencing material also prevents building materials or soil entering the TPZ.
3. Mulch installation across surface of the TPZ(as detailed in the TPS). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ other than those indicated in the TPS.
4. Bracing may be used within the TPZ. Installation of posts or supports should avoid damaging roots.

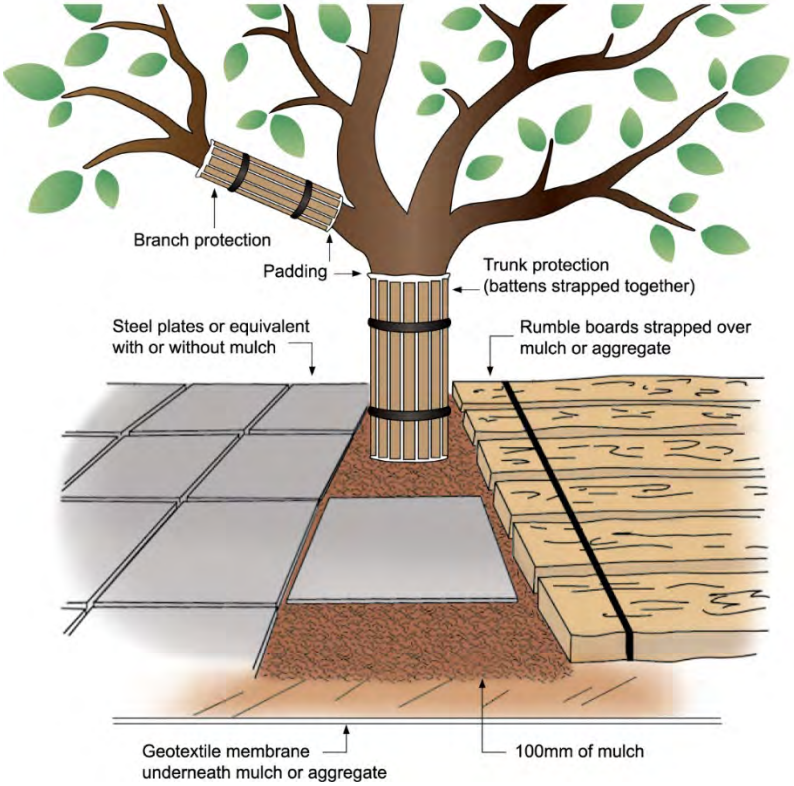
Figure 12. Depicts standard fencing techniques. AS 4970:2025, May 2025.

**Trunk and ground protection**

Where proposed works are within the TPZ of retained subject trees, standard protective fencing may not always be a viable method of protection. In these instances trunk protection and/or ground protection should be installed prior to the commencement of site establishment and remain in place until after all proposed works have been completed.

Where construction access into the TPZ of retained subject trees cannot be avoided, the root zone of each affected tree must be protected using steel plates or rumble boards strapped over mulch/aggregate until such a time as permanent, above-ground surfacing (cellular confinement system or similar) is installed.

Trunk and ground protection is to be undertaken in accordance with the Australian Standard AS 4790:2025 *Protection of Trees on Development Sites* as per Figure 14.




Notes:

1. For trunk and branch protection, boards and padding may be used to prevent damage to bark. Boards shall be joined to each other using hoop straps and screws or similar. They shall not be screwed or nailed to the tree.
2. Wide wooden boards or plastic or metal plates should be of a suitable thickness to spread the load and prevent soil compaction and root damage.

Figure 13. Depicts trunk and ground protection techniques. AS 4970:2025, May 2025.

### Tree protection signs

Signs identifying the TPZ, as per Figure 15, are to be placed at approximate 10 metre intervals around the edge of the TPZ fencing and must be visible from within the development site.


Figure 14. Depicts an example of a tree protection sign. AS 4970:2025, May 2025.

## Appendix E. Plant health care and mulching

**Guide to plant health tonics and root growth stimulants**

Considering the varying sizes of trees in common urban landscapes, it is suggested that an application volume of combined water and product solution of 80–150L for small to medium sized trees (5-10m height), 150–250L for medium to large sized trees (10-20m height) and 250–400L for large to very large sized trees (+20m height). Note: a lesser volume of total mixed product could be used if a more concentrated mix is drenched and water irrigation used to further drench the area and therefore dilute the stronger mix application.

The following product recommendations have been based on previous successful works undertaken by ArborSafe. The information provided is to be used as a general guide only, depending on your tree species, health or location. We recommend you always refer to the manufacturers label before applying any product. You may need to further consult with ArborSafe or your Project Arborist to develop a more specific program for your tree needs.

- **Soil conditioner** concentrate such as Kelpro, Seasol or similar 600–800mL/100L of water.
  A concentration of beneficial nutrients stimulating plant growth and root establishment, ideal for trees under stress.
- **Nitrogen boost** concentrate such as Nitrosol liquid plant food or similar 300mL/100L of water.
  A general-purpose fertiliser that contains a nitrogen boost (the most abundantly used element for tree growth).
  NB: Care must be taken when applying general fertiliser, particularly where plants can be affected by phosphorus toxicity e.g. many Australian native plants.
- **Root bio stimulant** concentrate such as Auxinone or similar 400mL/100L of water.
  A scientific blend of hormone root growth stimulants and vitamins assisting in the regeneration of roots.
- **Microbial formulation** concentrate such as Noculate Liquid or similar 500mL/100L of water.
  Generally containing strains of beneficial soil microorganisms, humic acid, kelp, essential amino acids, vitamins, biotin, folic acid and natural sugars designed to enhance the establishment of beneficial microbial populations.
- **Carbohydrate energy source** such as Molasses 500–800mL/100L of water.
  Molasses is the by-product of sugar refining. It contains all the nutrients from the raw sugarcane plant and is a carbohydrate energy source that feeds soil microorganisms and increases microbial activity.
- **Surfactant/wetting agent** (optional) such as Dispatch (Liquid) 200–300ml/100L of water.
  Improves the infiltration and penetration of applied water and irrigation.

We recommend you always refer to the manufacturer's label before applying any product using the above as a guide only.

**Guide to mulching and maintenance for established trees**

The benefits of correctly applying mulch are often underestimated, extending the useful life expectancy (ULE) of newly planted, young trees and established trees alike. Maintaining a soil environment that is conducive to root growth, development and function is vital in long-term tree retention and viability. This guide provides information on appropriate maintenance practices around the base of trees, including mulching, and the restriction of activities that may cause damage to tree roots and/or trunks.

**Why mulch?**

Mulching is a plant health care action which can be undertaken to improve plant and soil health (Figure 16), as well as overall landscape aesthetics. Placing an organic (or sometimes inorganic) material on the soil surface reduces the level of direct sunlight contact. Mulching should not be confused with composting which involves incorporating organic matter such as composts or manures into the soil profile. All plants in their natural ecologies (except for some arid and coastal ecologies) are naturally mulched by the falling of leaves, bark, flowers and other organic material.

This action is of great importance in successful cultivation of plants as it:

- assists in the regulation of soil moisture and temperature levels
- helps to suppress weeds
- amends and prevents soil compaction
- reduces water run-off during periods of heavy rain
- promotes soil-microbes and beneficial soil bacteria
- retains ground water content
- prevents lawn mower and vehicle damage to roots
- acts to reduce tree risk by decreasing the number of targets that pass and/or congregate under tree canopies; this in turn minimises the likelihood of injury in the event of a branch failure
- improves the visual aesthetics of the landscape.

Mulch is best comprised of organic materials such as wood chips, leaf litter, straw or hay, as these will degrade over time. Long-term mulching improves soil health and structure as it encourages the activities of earthworms, microflora and beneficial fungi. The addition of inorganic mulch may be useful for drainage qualities, load bearing surfaces, or to prevent root damage, but will not provide the ongoing improvements to soil health.

Figure 15. An excellent example of how to mulch a young tree. Lachlan Andrews, September 2015.

**How to mulch**

- Apply mulch to damp soil, as placing mulch over dry soil makes it difficult to rehydrate. Applying during the cooler months of the year is an ideal time.
- If mulching on top of a pre-existing grass area, grass or weeds must first be hand weeded and/or sprayed with a non-selective herbicide and left to wilt and die before applying mulch.
- Mulch should be applied at a uniform thickness of 75–100 millimetre and re-applied approximately every 12 months. Do not place mulch up against the trunk of a tree as the damp mulch can cause bark to decay.
- Apply over a wide area, at least as large as a tree's crown projection (preferably larger) where practical, within and outside the current root mass to encourage lateral root development and expansion.
- Wood chip mulch (such as that generated from wood chippers) is considered an ideal mulch for landscape use as it contains a wide variety of materials that are of different sizes (such as bark, foliage and timber), is relatively cheap to purchase, and can be obtained in large quantities. Stockpiling of mulch after tree contractors have conducted works at a site is a way of generating 'free' mulch and ensuring that plant material from tree pruning and/or removals is recycled on site, not imported from external suppliers, saving costs and making the site more self-sustaining.
- The use of mulch made from pine bark or red gum chips are discouraged as they seldom degrade and therefore do not add nutrition to the soil profile. The uniform particle size and resin content can provide an impervious layer to water as well as retarding gaseous exchange.
- Mulching within the canopy areas of larger trees (Figure 17) can not only improve long-term tree health but can also act to reduce tree risk by decreasing the number of targets that pass and/or congregate under their canopies. This in turn will minimise the likelihood of injury in the event of a branch failure.
- When using wood chip mulch, ensure that if it has been made from live plant material that is stored and allowed to compost for between 3 and 6 months prior to use. Never apply fresh, 'green' mulch around trees as this can induce what is called the nitrogen drawdown, which can result in the removal of nitrogen from the soil resulting in plants with nutrient deficiencies.

**Types of mulch and uses**

All mulch is beneficial however these benefits can be maximised using different mulches for specific applications. Our arborists can provide guidance on mulch for specific applications or purposes.

Coarse mulch or wood chip mulch (such as that generated from wood chippers) is considered an ideal mulch for landscape use as it contains a wide variety of materials that are of different sizes (such as bark, foliage and wood), is relatively cheap to purchase, and can be obtained in large quantities. Stockpiling of mulch after tree contractors have conducted works at a site is economical and mitigates biosecurity risks associated with importing products.

Coarse mulch high in pine bark or red gum chips interlocks together and is ideal for areas prone to wind and water erosion. The larger particles can take longer to degrade, reducing amendment to the soil profile, however, extending the lifespan of particles.

Fine mulch or re-ground mulch is wood chip which has been processed multiple times (up to three) to create a fine product. Fine mulch is more readily available for degradation and will provide soil amendments sooner. The uniform particle size provides a more aesthetic product, however, depending on particle size it can be impervious to water as well as retarding gaseous exchange.

When using wood chip mulch, ensure that if it has been made from live plant material, it is stored and allowed to compost for between 3 to 6 months prior to use. Never apply fresh, 'green' mulch around trees as this can induce what is called *nitrogen drawdown*, which can result in the removal of nitrogen from the soil, resulting in plants with nutrient deficiencies.

For further information refer to the Australian Standard AS 4454:2012 *Composts, Soil Conditioners and Mulches*.

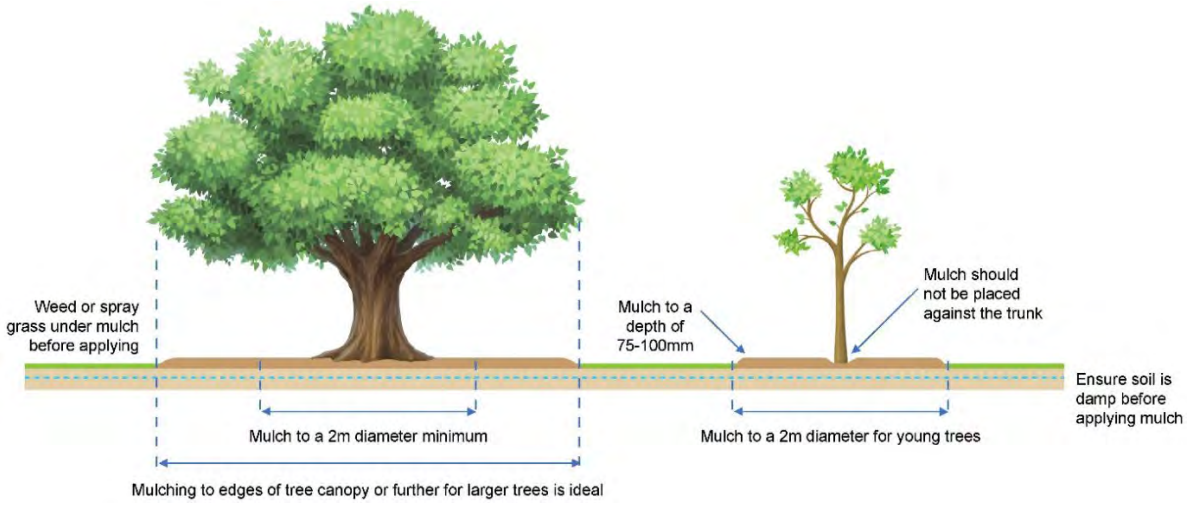



Figure 16. Mulching established and young trees. ArborSafe Australia, 2020.

**Root and trunk damage**

The function of tree roots is primarily to provide water and nutrient uptake for the tree, provide stability through structural roots that anchor it to the ground and as a means of food and nutrient storage. Damage to tree roots can lead to a reduction to any or all of these functions.

Damage to tree roots (Figure 18 and Figure 19) and the lower portion of a tree's trunk is a common and often unnecessary occurrence that can lead to the entry of decay fungi into a tree's structural framework. Once present, decay may develop in larger structural roots and/or the base of the trunk, which can result in a reduction in tree health and in severe cases even compromise stability.

Works such as trenching and excavation are often the cause of root damage to trees. Refer to ArborSafe's Guide – Tree protection during construction or the Australian Standard AS 4970:2025 *Protection of Trees on Development Sites* for things to consider when performing construction activities near trees.

Everyday activities such as grass cutting via mowing or brush cutters can result in serious root damage or wounding to the lower trunk. Young trees with their trunks damaged by machinery often need replacing, while damage to the trunks and/or surface roots of established trees is not only detrimental to tree health but can also result in costly repairs to machinery.

Another advantage to mulching around the trunk and root crown is that it limits damage to both parts from mowing equipment. This in turn reduces mechanical damage and compaction.

Figure 17. An example of damage to tree roots caused via mowing. Luke Dawson, June 2017.

Figure 18. Image showing wound caused to upper portion of surface root by mower. Luke Dawson, June 2017.

**How to avoid root and trunk damage**

The following points serve to highlight ways to avoid damage to tree roots and trunks caused via grass cutting activities:

- Mulching around young and established trees negates the need for brush cutter and/or lawn mower use around the base of a tree. Mulching therefore not only creates a barrier between tree roots and trunk that are susceptible to damage, it improves soil condition, minimises soil compaction and decreases the total area required for mowing.
- Where mulching is not feasible, raising the cutting height of mowers and maintaining grass at a greater height can avoid unnecessary 'scalping' of roots and damage to mowers/blades.
- Where surface roots are located away from the trunk and in a location where neither the application of mulch nor the raising of mower height is inappropriate, it may be possible to raise the soil grade directly around the root/s to minimise damage. It is important that the application of new material does not result in significant changes to the soil profile that may inadvertently damage roots. Material applied should be permeable and allow the development of turf which will protect the roots. Coarse sand or a planting mix with a high sand to organic matter ratio (e.g. 80/20 mix) spread at a depth of 75–100 millimetre could suitably protect the surface root from damage, while allowing turf to redevelop within the area.
- Civica ArborSafe is able to answer any questions regarding the material, depth and method of application to be used to ensure the tree/s remain viable for the long-term.

**Plant health care**

When managing a tree affected by development incursions within its TPZ, plant tonic and growth stimulant drenching may be required. Plant tonic and growth stimulant drenching is the process of adding diluted products directly to the root area of a tree to promote and assist trees to cope with loss of roots during the development process. They also assist trees to provide better resistance to sap sucking insects and fungal attack/disease and improve the establishment of beneficial microbial populations and nutrient uptake.

**Irrigation**

Regular checks are required to ensure retained trees are receiving the correct amount of water. The majority of a tree's fine water absorbing roots are located in the top 10–30 centimetres of soil. To undertake a basic soil moisture test, a small hole to a depth of approximately 40 centimetres at the dripline of the tree. If the soil is moist at this depth, water is not needed. Slow irrigation that provides an even coverage and targets the absorbing roots is the key to successful irrigation and encourages a deeper tree root system. Irrigation near the trunk is unnecessary as for most trees there are generally fewer water absorbing roots in this area. Irrigating the soil from half-way between the trunk and the dripline as well as beyond the dripline will provide water where it will most effectively be used.

Preferably, trees should be watered during the cooler evening and early morning period when temperatures are lower, humidity is higher, and the air is calmer thereby reducing water evaporation from the soil surface. Irrigation in the middle of the day is not harmful to most trees however it is less efficient.

Avoid watering trees during peak, daytime temperatures to minimise evaporation and potential foliar damage.

# Appendix F. Tree assessment data

| Tree no. | Easting (GDA94) | Northing (GDA94) | Botanic Name | Common Name | Origin | Trees in group | DSH Total (cm) | DRC (cm) | Radial NRZ (m) | TPZ area (m2) | Radial SRZ (m) | Tree Height (m) | Crown (m) | Health | Structure | Age | TLE (Yrs.) | Defects | Significance | Encroachment | % NRZ Encroachment | Tree Quality Score | Tree Retention value subcategory | Recommendation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 322786.34 | 5806559.36 | *Quercus palustris* | Pin Oak | Exotic Deciduous | 1 | 35 | 40 | **4.2** | 55.42 | **2.3** | 7 | 6 | Good | Good | Semi-Mature | 25-50 | Crossing/rubbing branches; Deadwood/stubs < 30mm; Previous failure(s); | Amenity value/shade; | Nil | 0 | B | 2 | Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ). |
| **2** | 322793.47 | 5806570.58 | *Quercus palustris* | Pin Oak | Exotic Deciduous | 1 | 41 | 47 | **4.9** | 76.05 | **2.4** | 8 | 6 | Good | Good | Semi-Mature | 25-50 | Crossing/rubbing branches; Deadwood/stubs < 30mm; Previous failure(s); | Amenity value/shade; | Nil | 0 | B | 2 | Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ). |
| **3** | 322786.34 | 5806590.31 | *Eucalyptus cladocalyx* | Sugar Gum | Australian Native | 1 | 135 | 155 | **15.0** | 706.86 | **4.0** | 22 | 25 | Good | Good | Mature | >50 | Bird browsing damage; Cavity(s); Deadwood/stubs > 100mm; Previous failure(s); Resin exudation/kino; Wound(s); | Significant due to age/size; Amenity value/shade; Attractive landscape feature; Significant habitat - nests/hollows; Dominant landscape feature; | Nil | 0 | A | 2 | Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ). |
| **4** | 322773.38 | 5806584.3 | *Celtis australis* | European Nettle Tree | Exotic Deciduous | 1 | 62 | 71 | **7.4** | 173.90 | **2.9** | 8 | 14 | Good | Good | Mature | >50 | Deadwood/stubs < 30mm; Hanger(s); Previous failure(s); Wound(s); | Amenity value/shade; Attractive landscape feature; Significant due to age/size; | Nil | 0 | A | 1,2 | Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ). |
| **5** | 322766.84 | 5806578.18 | *Brachychiton acerifolius* | Illawarra Flame Tree | Australian Native | 1 | 10 | 12 | **2.0** | 12.57 | **1.5** | 3 | 2 | Fair | Good | Juvenile | 15-25 | | | Nil | 0 | C | 2 | Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ). |
| **6** | 322774.93 | 5806570.13 | *Brachychiton acerifolius* | Illawarra Flame Tree | Australian Native | 1 | 27 | 31 | **3.2** | 32.98 | **2.0** | 7 | 5 | Fair | Good | Semi-Mature | 15-25 | | | Major | 22 | C | 2 | Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques). |
| **7** | 322781.35 | 5806560.5 | *Brachychiton discolor* | Lacebark Kurrajong | Australian Native | 1 | 25 | 29 | **3.0** | 28.27 | **2.0** | 7 | 4 | Fair | Fair | Semi-Mature | 15-25 | | | Major | 25 | C | 2 | Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques). |
| **8** | 322790.26 | 5806552.22 | *Brachychiton discolor* | Lacebark Kurrajong | Australian Native | 1 | 15 | 17 | **2.0** | 12.57 | **1.6** | 5 | 4 | Good | Fair | Semi-Mature | 15-25 | | | Nil | 0 | C | 2 | Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ). |

## Appendix G. Tree protection plan


APPENDIX __ - TREE PROTECTION PLAN

**PROJECT**
202602- AIA-J07380

**DATE**
2026-02-11

**CLIENT**
Wood Marsh

**MAP NO.**
1/1

Legend

Tree Protection Specification

- Generic protection
- Specific Protection
- Encroachment
- SRZ
- NRZ
- Tree Protection Fencing

CIVICA

1.5 0 1.5 3 m

**TREE LOCATION DISCLAIMER**
Tree locations are approximate

**DATA SOURCES**
Civica ArborPlan
WM_398_ST-KILDA-AMENITIES_GA PLAN

**COORDINATE REFERENCE SYSTEM** EPSG:28355 | GDA 2020

for further information
call 1300 272 671
www.arborsafe.com.au

CIVICA