S&B Tree Services

# ARBORICULTURAL IMPACT ASSESSMENT

## 51 Redman Road,
## Dee Why NSW 2099

**Version 2**

**Prepared for:**

## G.J. Gardner Homes

**December 2019**

All trees have been assessed based on the observations from the site inspection and information presented by the client or relevant parties at the time of inspection. No responsibility can be taken for incorrect or misleading information provided by the client or other parties.

Trees are living organisms. As such, their health and structure may alter, they will grow and their environmental circumstances may change from the time of the site inspection upon which this assessment is based. Trees, as with all living things, pose some level of risk.

Trees fail in ways that the arboricultural community are yet to fully understand. There is no guarantee expressed or implied that failure or deficiencies may not arise of the subject trees in the future. No responsibility is accepted for damage to property or injury/death caused by the nominated trees.

Tree reports are valid for 12 months after the date of inspection, unless otherwise stated. Any significant change to the subject tree(s) or surrounding environment, including significant or catastrophic storm/wind events will require the immediate re-inspection and assessment of the tree(s).

# Document information

| | |
|---|---|
| **Title:** | 51 Redman Road, Dee Why |
| **Report type:** | Arboricultural Impact Assessment |
| **Prepared by:** |  <br>Lex Atkins - Consulting Arborist<br>Diploma of Arboriculture (AQF 5)<br>AA / QTRA-Adv. / SRA-ANZ |
| **Contact details:** | **0422 205 726**<br>**lexatkins@outlook.com** |
| **Date:** | 9 December 2019 |

# Document status

| Document status | Date | Revision description |
|---|---|---|
| Version 1 | 28/07/19 | Final |
| Version 2 | 09/12/19 | Report amended to reflect new development design |

# Abbreviations

| Abbreviation | Description |
|---|---|
| AQF | Australian Qualifications Framework |
| AS | Australian Standards |
| DBH | Diameter at Breast Height |
| Id | Identification |
| m | Metre |
| mm | Millimetre |
| NDE | Non-Destructive Excavation |
| NO | Number |
| NSW | New South Wales |
| SP | Species |
| SRZ | Structural Root Zone |
| TPZ | Tree Protection Zone |
| VTA | Visual Tree Assessment |

# Contents

# 1 Background

## 1.1 Introduction

S & B Tree Services was commissioned by C.J. Gardner Homes to prepare an arboricultural impact assessment of a proposed development located at 51 Redman Road, Dee Why (the site). The site falls within the Northern Beaches Council Local Government Area (LGA).

The purpose of this report is to:

- Identify trees within the study area that are likely to be affected by the proposed works.
- Assess the current overall health and condition of the subject trees.
- Evaluate the significance of the subject trees and assess suitability for retention.

## 1.2 The proposal

Key features of the proposal likely to affect the subject tree is summarised as follows:

- Demolition of existing structures.
- Site preparation works, including minor grade changes.
- Construction of granny flat, workshop and main house structures.
- Construction of concrete driveway.
- Installation of below ground services and associated landscaping works.

## 1.3 The subject trees

The subject trees were inspected on 19th July 2019. Further information, observations and measurements specific to the subject trees can be found in **Chapter 3** and **Appendix II**.

## 1.4 Documents and plans referenced

The conclusions and recommendations of this report are based on the *Australian Standard, AS 4970-2009, Protection of Trees on Development Sites*, the findings from the site inspections and analysis of the following documents/plans:

- *G.J. Gardner Homes: New Dwelling; DA Issue – Rev E: Job No. 230250, Dated 28.06.2019.*
- *Warringah Council: Development Control Plan (DCP) 2011.*
- *Northern Beaches Council: Exempt Species List.*
- *State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017.*

*CG.J. Gardner Homes: New Dwelling; sheet A03-Site Plan* has been used as a base map for **Appendix I** and **III.**

## 1.5 Council tree preservation

Subject trees **1, 5-8, 10-14, 17, 19 & 21** are **protected** under the conditions prescribed within the *Warringah Council - DCP 2011.*

Subject trees **2-4, 9, 15, 16, 18 & 20** are **exempt** under the conditions prescribed within the *Warringah Council - DCP 2011.*

# 2 Method

## 2.1 Visual tree assessment

The subject trees were assessed in accordance with a stage one visual tree assessment (VTA) as formulated by Mattheck & Breloer (1994)[1], and practices consistent with modern arboriculture.

The following limitations apply to this methodology:

- Trees were inspected from ground level, without the use of any invasive or diagnostic tools and testing.
- Trees within adjacent properties or restricted areas were not subject to a complete visual inspection (i.e. defects and abnormalities may be present but not recorded).
- Tree heights, canopy spread and diameter at breast height (DBH) was estimated, unless otherwise stated.
- Tree identification was based on broad taxonomical features present and visible from ground level at the time of inspection.

## 2.2 Retention value

The retention value of a tree or group of trees is determined using a combination of environmental, cultural, physical and social values.

- **Low:** These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
- **Medium:** These trees are moderately important for retention. Their removal should only be considered if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
- **High:** These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by *Australian Standard AS4970 Protection of trees on development sites*.

This tree retention assessment has been undertaken in accordance with the Institute of Australian Consulting Aboriculturalists (IACA) Significance of a Tree, Assessment Rating System (STARS). The system uses a scale of High, Medium and Low significance in the landscape. Once the landscape significance of a tree has been defined, the retention value can be determined. Each tree must meet a minimum of three (3) assessment criteria to be classified within a category. Further details and the assessment criteria are in **Appendix II.**

[1] VTA is an internationally recognised practice in the visual assessment of trees as formulated by Mattheck & Breloer (1994). Principle explanations and illustrations are contained within the publication, Field Guide for Visual Tree Assessment by Mattheck, C., and Breloer, H. Arboricultural Journa1, Vol 18 pp 1-23 (1994).

## 2.3 Impact assessment

- **Tree protection zone (TPZ):** The TPZ is the optimal combination of crown and root area (as defined by AS 4970-2009) that requires protection during the construction process so that the tree can remain viable. The TPZ is an area that is isolated from the work zone to ensure no disturbance or encroachment occurs into this zone. Tree sensitive construction measures must be implemented if work is to proceed within the Tree Protection Zone.
- **Structural root zone (SRZ):** The SRZ is the area of the root system (as defined by AS 4970-2009) used for stability, mechanical support and anchorage of the tree. Severance of structural roots (>50 mm in diameter) within the SRZ is not recommended as it may lead to the destabilisation and/or decline of the tree.
- **Root investigation:** When assessing the potential impacts of encroachment within the TPZ, consideration will need to be given to the location and distribution of the roots, including above or below ground restrictions affecting root growth. Location and distribution of roots may be determined through non-destructive excavation (NDE) methods such as hydro-vacuum excavation (sucker truck), air spade and manual excavation. Root investigation is used to determine the extent and location of roots within the zone of conflict. Root investigation does not guarantee the retention of the tree.

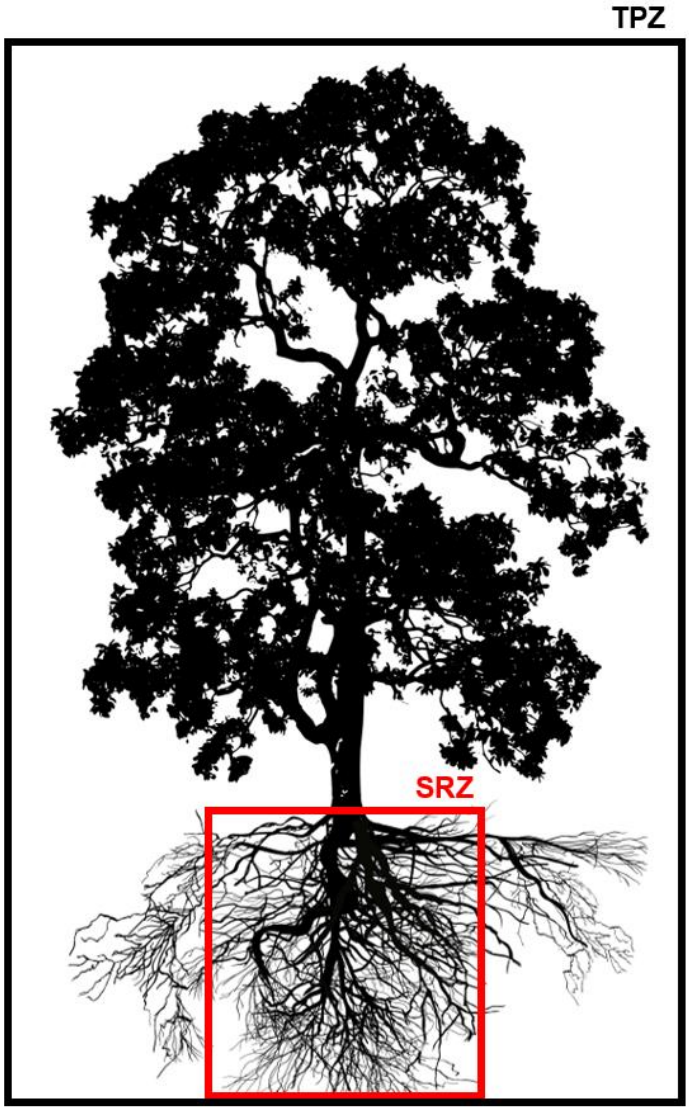



**Figure 1: Indicative TPZ and SRZ**

## 2.4 Impacts within the TPZ

- **No impact (0%):** No likely or foreseeable encroachment within the TPZ.
- **Low impact (<10%):** If the proposed encroachment is less than 10% (total area) of the TPZ, and outside of the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and be contiguous with the TPZ.
- **Medium impact (<20%):** If the proposed encroachment is between 10% and 20% of the TPZ, the project arborist must demonstrate that the tree(s) remain viable. The area lost to this encroachment should be compensated for elsewhere and be contiguous with the TPZ. All work within the TPZ must be carried out under the supervision of the project arborist.
- **High impact (>20%):** If the proposed encroachment is greater than 20% of the TPZ the SRZ may be impacted. Tree sensitive construction techniques may be used for minor works within this area providing no structural roots are likely to be impacted, and the project arborist can demonstrate that the tree(s) remain viable. Root investigation by non-destructive methods is essential for any proposed works within this area.

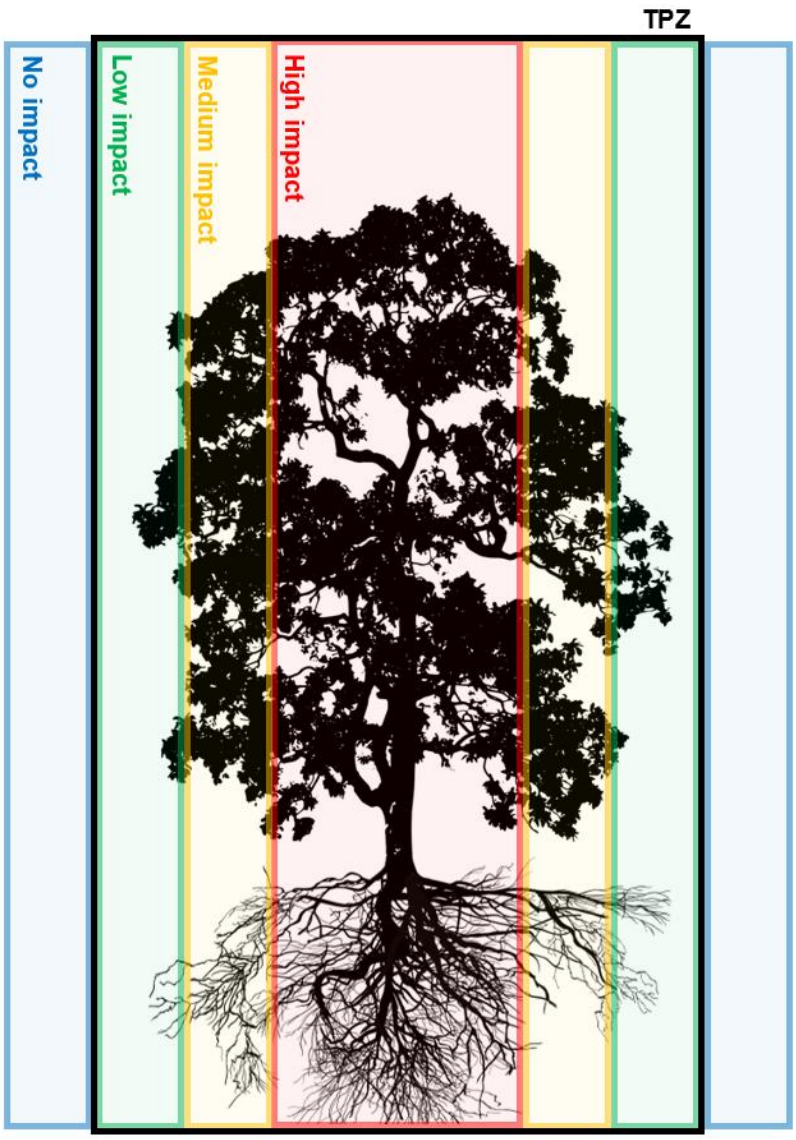



**Figure 2: Indicative zones of impact within the TPZ**

## 2.5 Mitigation measures

Encroachment within the TPZ must be compensated with a range of mitigation measures to ensure that impacts to the subject tree(s) are reduced or restricted wherever possible. Mitigation must be increased relative to the level of encroachment within the TPZ to ensure the subject tree remain viable. The table below outlines requirements under AS 4970-2009, and mitigation measures required within each category of encroachment. These mitigation measures will only apply if trees are proposed to be retained.

**Table 1: Mitigation measures**

| AS 4970-2009 | Requirements Under AS 4970-2009 | Impact | Mitigation Measures |
|---|---|---|---|
| **No encroachment** (0%) | • N/A | **No impact** (0%) | • N/A |
| **Minor encroachment** (<10%) | • The area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ.<br>• Detailed root investigations should not be required. | **Low impact** (<10%) | • The area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ.<br>• Tree protection must be installed. |
| **Major encroachment** (>10%) | • The project arborist must demonstrate the tree(s) would remain viable.<br>• Root investigation by non-destructive methods may be required.<br>• Consideration of relevant factors including: Root location and distribution, tree species, condition, site constraints and design factors.<br>• The area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ. | **Medium impact** (<20%) | • The project arborist must demonstrate the tree(s) would remain viable.<br>• The area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ.<br>• The project arborist will be required to supervise any works within the TPZ.<br>• Tree protection must be installed. |
| | | **High impact** (>20%) | • The project arborist must demonstrate the tree(s) would remain viable.<br>• The area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ.<br>• Non-destructive root investigation may be required for any trees proposed for retention.<br>• The project arborist will be required to supervise any works within the TPZ.<br>• Tree protection must be installed. |

# 3 Discussion

## 3.1 Results of arboricultural assessment

A total of **20** individual trees and one group of **5** trees were assessed during the site inspection, of these:

- **6** trees are of high retention value.
- **3** trees are of medium retention value.
- **11** individual trees and **1** group of **5** trees are of low retention value.

Further information, observations and measurements specific to the subject trees can be found in **Appendix II**.

## 3.2 Trees on adjacent properties

**Subject tree 21** is located within the adjacent Council nature strip. Trees which are located within adjacent land must be considered for retention and protected throughout the development.

## 3.3 Exempt species

Subject trees **2-4, 9, 15, 16, 18 & 20** are **exempt** under the conditions prescribed within the *Warringah Council - DCP 2011.* These trees do not require approval from the consent authority prior to their removal.

## 3.4 Total encroachment (100%)

**Subject tree 11** (*Cupressus sempervirens*) is in fair condition and vigour, displays form typical of the species, however, the subject tree has a large slit at the stem junction which has failed to occlude and as such, has a short useful life expectancy. The tree is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a minor contribution to the visual character of the local amenity.

The subject tree is located wholly within the construction footprint of the proposed dwelling structure.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 13** (*Citharexylum spinosum*) is in fair condition and vigour, displays form atypical of the species, due to a canopy conflict with the adjacent subject trees 6 and 8. The tree is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a minor contribution to the visual character of the local amenity.

The subject tree is located wholly within the construction footprint of the proposed driveway.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 15** (*Ligustrum sinense*) is in good condition and vigour, displays form typical of the species. The trees are not visible from surrounding properties, as obstructed by other vegetation and structures when viewed from the street.

*Ligustrum sinense* is **exempt** under the conditions prescribed within the *Warringah Council - DCP 2011.*

The subject tree is located wholly within the construction footprint of the proposed workshop structure.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 19** (*Unknown species*) is in poor condition and vigour, displays atypical form. The tree is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a minor contribution to the visual character of the local amenity.

The subject tree is located wholly within the construction footprint of the proposed granny flat structure.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 20** (*Ligustrum lucidum*) is in good condition and vigour, displays form typical of the species. The trees are not visible from surrounding properties, as obstructed by other vegetation and structures when viewed from the street.

*Ligustrum lucidum* is **exempt** under the conditions prescribed within the *Warringah Council - DCP 2011.*

The subject tree is located wholly within the construction footprint of the proposed workshop structure.

### 3.5 High impact (>20%)

**Subject tree 1** (*Cotoneaster glaucophyllus*) is in fair condition and vigour, displays form typical of the species. The tree is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a moderate contribution to the visual character of the local amenity.

Excavation activities are required within the TPZ for the proposed driveway. This excavation (more than 10% of total TPZ) is likely to have a significant impact on the subject tree's ability to store carbohydrates and use stored carbohydrates in times of stress. Loss of woody transport and fine absorbing roots due to root severance, will inhibit the production of new roots as well as the absorption of water and solutes, the loss of root material, is likely to have a significant impact on the health and condition of the tree.

The subject tree is a mature specimen, which, although has reached dimensions to be protected by the local Tree Preservation Order, can be easily replaced to recover a net increase in canopy cover within a short period of time.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 6** (*Cedrus deodara*) is in fair condition and vigour, displays form typical of the species. The tree is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a moderate contribution to the visual character of the local amenity.

Excavation activities are required within the TPZ for the proposed dwelling structure. This excavation (more than 10% of total TPZ) is likely to have a significant impact on the subject tree's ability to store carbohydrates and use stored carbohydrates in times of stress. Loss of woody transport and fine absorbing roots due to root severance, will inhibit the production of new roots as well as the absorption of water and solutes, the loss of root material, is likely to have a significant impact on the health and condition of the tree.

The subject tree is a mature specimen, which, although has reached dimensions to be protected by the local Tree Preservation Order, can be easily replaced to recover a net increase in canopy cover within a short period of time.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 7** (*Brachychiton acerifolius*) is in fair condition and vigour, displays form atypical of the species, due to a canopy conflict with the adjacent subject trees 6 and 8. The tree is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a minor contribution to the visual character of the local amenity.

Excavation activities are required within the TPZ for the proposed dwelling structure. This excavation (more than 10% of total TPZ) is likely to have a significant impact on the subject tree's ability to store carbohydrates and use stored carbohydrates in times of stress. Loss of woody transport and fine absorbing roots due to root severance, will inhibit the production of new roots as well as the absorption of water and solutes, the loss of root material, is likely to have a significant impact on the health and condition of the tree.

The subject tree is a semi-mature specimen, which, although has reached dimensions to be protected by the local Tree Preservation Order, can be easily replaced to recover a net increase in canopy cover within a short period of time.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 8** (*Juniperus species*) is in fair-poor condition and vigour, displays form atypical of the species, due to a canopy conflict with the adjacent subject trees 7 and 9. The tree is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a minor contribution to the visual character of the local amenity.

Excavation activities are required within the TPZ for the proposed dwelling structure. This excavation (more than 10% of total TPZ) is likely to have a significant impact on the subject tree's ability to store carbohydrates and use stored carbohydrates in times of stress. Loss of woody transport and fine absorbing roots due to root severance, will inhibit the production of new roots as well as the absorption of water and solutes, the loss of root material, is likely to have a significant impact on the health and condition of the tree.

The subject tree is a semi-mature specimen, which, although has reached dimensions to be protected by the local Tree Preservation Order, can be easily replaced to recover a net increase in canopy cover within a short period of time.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 9** (*Erythrina crista-galli*) is in fair-poor condition and vigour, displays form atypical of the species, due to a canopy conflict with the adjacent subject trees 8 and 10. The tree is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a minor contribution to the visual character of the local amenity.

*Erythrina crista-galli* is **exempt** under the conditions prescribed within the *Warringah Council - DCP 2011.*

Excavation activities are required within the TPZ for the proposed granny dwelling. This excavation (more than 10% of total TPZ) is likely to have a significant impact on the subject tree's ability to store carbohydrates and use stored carbohydrates in times of stress. Loss of woody transport and fine absorbing roots due to root severance, will inhibit the production of new roots as well as the absorption

of water and solutes, the loss of root material, is likely to have a significant impact on the health and condition of the tree.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 10** (*Cotoneaster glaucophyllus*) is in fair condition and vigour, displays form typical of the species. The tree is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a moderate contribution to the visual character of the local amenity.

Excavation activities are required within the TPZ for the proposed dwelling structure. This excavation (more than 10% of total TPZ) is likely to have a significant impact on the subject tree's ability to store carbohydrates and use stored carbohydrates in times of stress. Loss of woody transport and fine absorbing roots due to root severance, will inhibit the production of new roots as well as the absorption of water and solutes, the loss of root material, is likely to have a significant impact on the health and condition of the tree.

The subject tree is a mature specimen, which, although has reached dimensions to be protected by the local Tree Preservation Order, can be easily replaced to recover a net increase in canopy cover within a short period of time.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 12** (*Pittosporum undulatum*) is in fair condition and vigour, displays form typical of the species. The tree is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a moderate contribution to the visual character of the local amenity.

Excavation activities are required within the TPZ for the proposed driveway structure. This excavation (more than 10% of total TPZ) is likely to have a significant impact on the subject tree's ability to store carbohydrates and use stored carbohydrates in times of stress. Loss of woody transport and fine absorbing roots due to root severance, will inhibit the production of new roots as well as the absorption of water and solutes, the loss of root material, is likely to have a significant impact on the health and condition of the tree.

The subject tree is a mature specimen, which, although has reached dimensions to be protected by the local Tree Preservation Order, can be easily replaced to recover a net increase in canopy cover within a short period of time.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 14** (*Unknown species*) is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a moderate contribution to the visual character of the local amenity.

The subject tree is located wholly within the construction footprint of the proposed dwelling structure.

The subject tree is a mature specimen, which, although has reached dimensions to be protected by the local Tree Preservation Order, can be easily replaced to recover a net increase in canopy cover within a short period of time.

**Under the current proposal, this tree cannot be successfully retained.**

**Subject tree 16** (*Howea species x5*) is in good condition and vigour, displays form typical of the species. The trees are not visible from surrounding properties, as obstructed by other vegetation and structures when viewed from the street.

*Howea species* is **exempt** under the conditions prescribed within the *Warringah Council - DCP 2011.*

The subject tree is located wholly within the construction footprint of the proposed granny flat structure.

**Under the current proposal, these trees cannot be successfully retained.**

**Subject tree 17** (*Unknown species*) is in poor condition and vigour. The tree is visible from surrounding properties, although not visually prominent as obstructed by other vegetation and structures when viewed from the street, providing a minor contribution to the visual character of the local amenity.

Excavation activities are required within the TPZ for the proposed main house structure and is located within close proximity to the main sewer line. This excavation (more than 10% of total TPZ) is likely to have a significant impact on the subject tree's ability to store carbohydrates and use stored carbohydrates in times of stress. Loss of woody transport and fine absorbing roots due to root severance, will inhibit the production of new roots as well as the absorption of water and solutes, the loss of root material, is likely to have a significant impact on the health and condition of the tree.

The subject tree is a semi-mature specimen, which, although has reached dimensions to be protected by the local Tree Preservation Order, can be easily replaced to recover a net increase in canopy cover within a short period of time.

**Under the current proposal, this tree cannot be successfully retained.**

### 3.6 Minor excavation (<10%)

**Subject tree 5** will be subject to a minor encroachment (<10%) of the TPZ. Minor encroachments are considered acceptable under the *Australian Standard, AS 4970-2009, Protection of Trees on Development Sites* and

Construction activities are required within the TPZ for the proposed drive way and workshop structure. These works (less than 10% of total TPZ) are unlikely to have a significant impact on the subject tree's ability to store carbohydrates, use stored carbohydrates in times of stress and are unlikely to have a significant impact on the health, condition and/or stability of the tree long term.

**Under the current proposal, these trees can be successfully retained.**

### 3.7 No impact

**Subject trees 2, 3, 4, 18 & 21** are located outside of the proposed area of disturbance and there are no foreseeable impacts to these trees.

U**nder the current proposal, these trees can be successfully retained.**

# 4 Recommendations

## 4.1 Trees proposed for removal

**Total encroachment (100%): Subject trees 11, 13, 15, 19 & 20** are located wholly within the development footprint. Under the current proposal, these trees cannot be successfully retained.

**Major encroachment (>10%): Subject trees 1, 6, 7, 8, 9, 10, 12, 14, 16, & 17** will be subject to a High impact (>20%) of the TPZ. Under the current proposal, these trees cannot be successfully retained.

**Minor encroachment (<10%): Subject tree 5** will be subject to a minor encroachment (<10%) of the TPZ. This tree is proposed for removal regardless of development impacts for land scaping purposes.

**No encroachment (0%): Subject trees 2, 3 & 4** will not be subject to an encroachment of the TPZ. These trees are proposed for removal due to their low retention rating.

## 4.2 Trees proposed for retention

**No encroachment (0%): Subject trees 18 & 21** will not be subject to an encroachment of the TPZ. Under the current proposal, these trees can be successfully retained. The following mitigation measure will be required:

- The tree protection plan (**Appendix III**) and tree protection specifications (**Appendix IV**) must be implemented.

## 4.3 Offsetting

Offset replacement planting to compensate for the loss of trees (which are protected by the *Warringah Council: Development Control Plan (DCP) 2011*) as part of this development should be such, that a net increase of canopy cover is ascertained within a 5-year time period. Species selection should be in co-ordination with Northern Beaches Council and consist of tree species which are endemic to the local area.

## 4.4 Tree work

- All pruning and/or tree removal work is to be carried out by an arborist with a minimum AQF Level 3 qualification in Arboriculture.
- All pruning must be in accordance with AS 4373-2007, Pruning of Amenity Trees.
- All pruning and/or tree removal work is to be carried out in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998).
- Permission must be granted from the relevant consent authority, prior to removing or pruning of any of the subject trees.

## 4.5 Hold points, inspections and certification

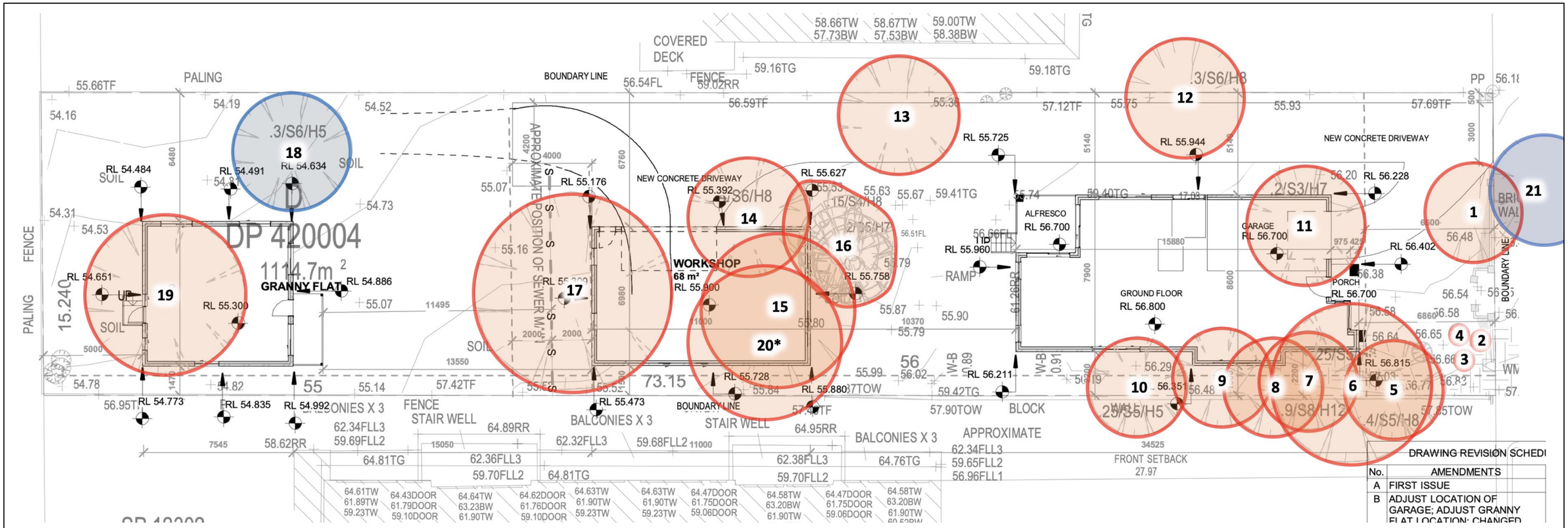
The approved tree protection plan must be available onsite prior to the commencement of works, and throughout the entirety of the project. To ensure the tree protection plan is implemented, hold points have been specified in the schedule of works (**Table 2**). It is the responsibility of the principle contractor to complete each of the tasks.

Once each stage is reached, the work will be inspected and certified by the project arborist and the next stage may commence. Alterations to this schedule may be required due to necessity, however, this shall be through consultation with the project arborist only.

**Table 2: Schedule of works**

| | |
|---|---|
| Pre-construction | Prior to demolition and site establishment indicate clearly (with spray paint on trunks trees marked for removal only (if applicable). |
| | Tree protection (for trees that will be retained) shall be installed prior to demolition and site establishment, this will include mulching of areas within the TPZ. |
| During Construction | Inspection of trees by the project arborist should be undertaken monthly during the construction period. |
| | Inspection of trees by project arborist after all major external construction has ceased, following the removal of tree protection measures. |
| Post Construction | Final inspection of trees by project arborist. |

# Appendix I - Impact Assessment




**Appendix I - Legend:**

- Trees proposed for retention represented in **BLUE,**
- Trees proposed for removal represented in **RED**

**Indicative tree location only*

# Appendix II – Results of Arboricultural Assessment

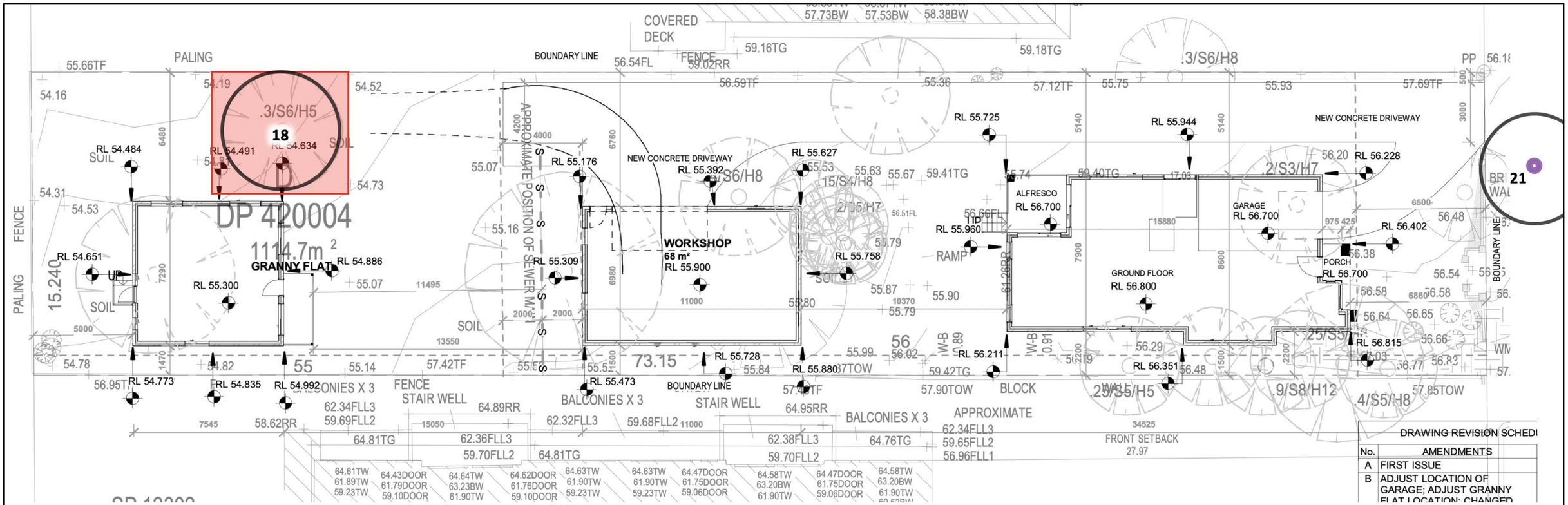
| Id. | Botanical name | Height (m) | Spread (m) | Health | Structure | Age class | Tree significance | Useful life expectancy | Priority for retention | DBH (mm) | TPZ (m) | SRZ (m) | Impact | Other notes | Proposal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | *Cotoneaster glaucophyllus* | 6 | 6 | Fair | Poor | Mature | Medium | Medium | High | 250 | 3 | 1.9 | **High** | • Ivy vine growing on main stem - possible ring bark | **Remove** |
| 2 | *Olea africana* | 6 | 6 | Fair | Fair | Semi-mature | Low | Short | Low | 150 | 2 | 1.5 | **None** | • Phototropic lean,<br>• Exempt species | **Remove** |
| 3 | *Lagerstroemia indica* | 6 | 2 | Fair | Fair | Mature | Medium | Medium | Low | 150 | 2 | 1.5 | **None** | • Deciduous tree - no foliage present at time of inspection<br>• Exempt species | **Remove** |
| 4 | *Lagerstroemia indica* | 6 | 2 | Fair | Fair | Mature | Medium | Medium | Low | 100 | 2 | 1.5 | **None** | • Deciduous tree - no foliage present at time of inspection<br>• Exempt species | **Remove** |
| 5 | *Juniperus sp.* | 8 | 4 | Good | Fair | Mature | Medium | Short | Medium | 300 | 3.6 | 2 | **Low** | • Canopy conflict with tree 6 | **Remove** |
| 6 | *Cedrus deodara* | 14 | 8 | Fair | Good | Mature | Medium | Medium | High | 800 | 9.6 | 3 | **High** | • Sparse canopy density | **Remove** |

| Id. | Botanical name | Height (m) | Spread (m) | Health | Structure | Age class | Tree significance | Useful life expectancy | Priority for retention | DBH (mm) | TPZ (m) | SRZ (m) | Impact | Other notes | Proposal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | *Brachychiton acerifolius* | 8 | 4 | Fair | Good | Semi-mature | Medium | Short | Low | 150 | 2 | 1.5 | **High** | • Canopy conflict with adjacent trees 6 and 8 | **Remove** |
| 8 | *Juniperus sp.* | 6 | 2 | Fair | Poor | Semi-mature | Low | Short | Low | 100 | 2 | 1.5 | **High** | • Suppressed canopy, canopy conflict between adjacent trees 7 and 9 | **Remove** |
| 9 | *Erythrina crista-galli* | 8 | 6 | Fair | Fair | Mature | Medium | Medium | Medium | 200 | 2.4 | 1.7 | **High** | • Canopy conflict with adjacent tree 8<br>• Exempt species | **Remove** |
| 10 | *Cotoneaster glaucophyllus* | 8 | 6 | Poor | Poor | Mature | Low | Short | Low | 200 | 2.4 | 1.7 | **High** | • Main stem dead, epicormic growth present | **Remove** |
| 11 | *Cupressus sempervirens* | 12 | 4 | Fair | Poor | Mature | Medium | Short | Low | 300 | 3.6 | 2 | **High** | • Included stem junction, actively failing | **Remove** |
| 12 | *Pittosporum undulatum* | 10 | 4 | Fair | Fair | Semi-mature | Medium | Medium | High | 300 | 3.6 | 2 | **High** | • Codominant seems, epicormic growth | **Remove** |
| 13 | *Citharexylum spinosum* | 16 | 6 | Good | Fair | Mature | Medium | Long | High | 350 | 4.2 | 2.1 | **High** | • Codominant stems | **Remove** |

| Id. | Botanical name | Height (m) | Spread (m) | Health | Structure | Age class | Tree significance | Useful life expectancy | Priority for retention | DBH (mm) | TPZ (m) | SRZ (m) | Impact | Other notes | Proposal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | *Unknown species* | 16 | 8 | Good | Fair | Mature | Medium | Long | High | 550 | 6.6 | 2.6 | **High** | • - | **Remove** |
| 15 | *Ligustrum lucidum* | 16 | 8 | Poor | Poor | Over-mature | Low | Short | Low | 550 | 6.6 | 2.6 | **High** | • Exempt species | **Remove** |
| 16 | *Howea species x5* | 10 | 4 | Good | Fair | Mature | Medium | Long | Medium | 100 | 2 | 1.5 | **High** | • Clump of 5 varying heights 2-12m<br>• Exempt species | **Remove** |
| 17 | *Unknown species* | 12 | 6 | Poor | Fair | Mature | Medium | Short | Low | 350 | 2.1 | 4.2 | **High** | • Severe decline | **Remove** |
| 18 | *Ligustrum sinense* | 4 | 4 | Fair | Poor | Mature | Low | Short | Low | 300 | 3.6 | 2 | **None** | • Weed species<br>• Exempt species | **Retain** |
| 19 | *unknown species* | 4 | 2 | Fair | Poor | Mature | Low | Short | Low | 250 | 3 | 1.9 | **High** | • Intermodal pruning, crossing stems/branches, epicormic growth | **Remove** |
| 20 | *Ligustrum lucidum* | 14 | 6 | Fair | Fair | Mature | Low | Short | Low | 350 | 4.2 | 2.1 | **High** | • Exempt species | **Remove** |

| Id. | Botanical name | Height (m) | Spread (m) | Health | Structure | Age class | Tree significance | Useful life expectancy | Priority for retention | DBH (mm) | TPZ (m) | SRZ (m) | Impact | Other notes | Proposal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | *Lophostemon confertus* | 6 | 6 | Fair | Fair | Mature | Medium | Short | High | 350 | 4.2 | 2.1 | **None** | • Located on council nature strip, under power lines.<br>• Internodal pruning | **Retain** |

# Appendix III – Tree Protection Site Plan




**Appendix III – Legend:**

- **Subject trees proposed for retention**
- **Trunk and/or branch protection**
- **Tree protection fencing**

# Appendix IV - Tree Protection Plan Specifications

## Tree protection fencing

Tree protection fencing must be established in the locations shown in **Appendix III**. Existing fencing, site hoarding or structures (such as a wall or building) may be used as tree protection fencing, providing the TPZ remains isolated from construction footprint.

Tree protection fencing must be installed prior to site establishment and remain intact until completion of works. Once erected, protective fencing must not be removed or altered without the approval of the project arborist.


Tree protection fencing shall be:

- Enclosed to the full extent of the TPZ (or as specified in the Recommendations and Tree Protection Plan).
- Temporary mesh panel fencing (minimum height 1.8m).
- Certified and inspected by the project arborist.
- Installed prior to the commencement of works.
- Prominently signposted with 300mm x 450mm boards stating, “NO ACCESS - TREE PROTECTION ZONE”.

If tree protection fencing cannot be installed due to sloping or uneven ground, tree protection barriers must be installed as an alternative.

Specifications for tree protection barriers are as follows:

- Star pickets spaced at 2m intervals,
- Connected by a continuous high-visibility barrier/hazard mesh.
- Maintained at a minimum height of 1m.

Where approved works are required within the TPZ, fencing may be setback to provide construction access. Trunk, branch and ground protection shall be installed and must comply with *AS 4970-2009, Protection of Trees on Development Sites*. Any additional construction activities within the TPZ of the subject trees must be assessed and approved by the project arborist.

## Trunk protection

Where provision of tree protection fencing is impractical or must be temporarily removed, trunk protection shall be installed to avoid accidental mechanical damage.

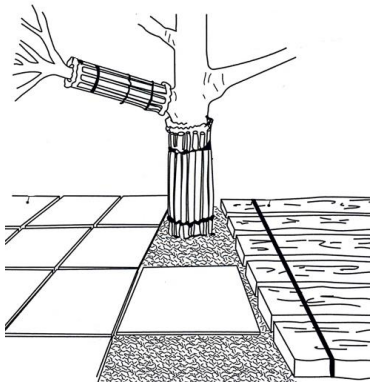
Specifications for trunk protection are as follows:

- A thick layer of carpet underfelt, geotextile fabric or similar wrapped around the trunk to a minimum height of 2m.
- 1.8m lengths of softwood timbers aligned vertically and spaced evenly around the trunk (with a small gap of approximately 50mm between the timbers).
- The timbers must be secured using galvanised hoop strap (aluminium strapping).

The timbers shall be wrapped around the trunk but not fixed to the tree, as this will cause injury/damage to the tree.

## Ground protection

If temporary access for vehicle, plant or machinery is required within the TPZ ground protection shall be installed. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Where possible, areas of existing pavement shall be used as ground protection.



Specifications for light traffic access (<3.5 tonne) are as follows:

- Permeable membrane such as geotextile fabric.
- Layer of mulch or crushed rock (at minimum depth of 100mm)

Specifications for heavy traffic access (>3.5 tonne) are as follows:

- Permeable membrane such as geotextile fabric.
- Layer of lightly compacted road base (at minimum depth of 200mm)
- Geotextile fabric shall extend a minimum 300mm beyond the edge of the road base.

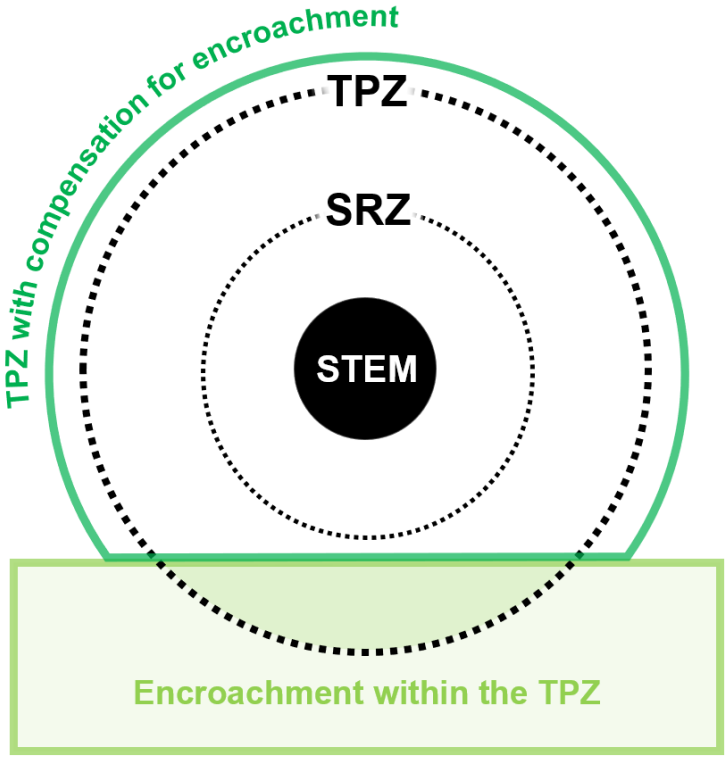
Pedestrian, vehicular and machinery access within the TPZ shall be restricted solely to areas where ground protection has been installed.

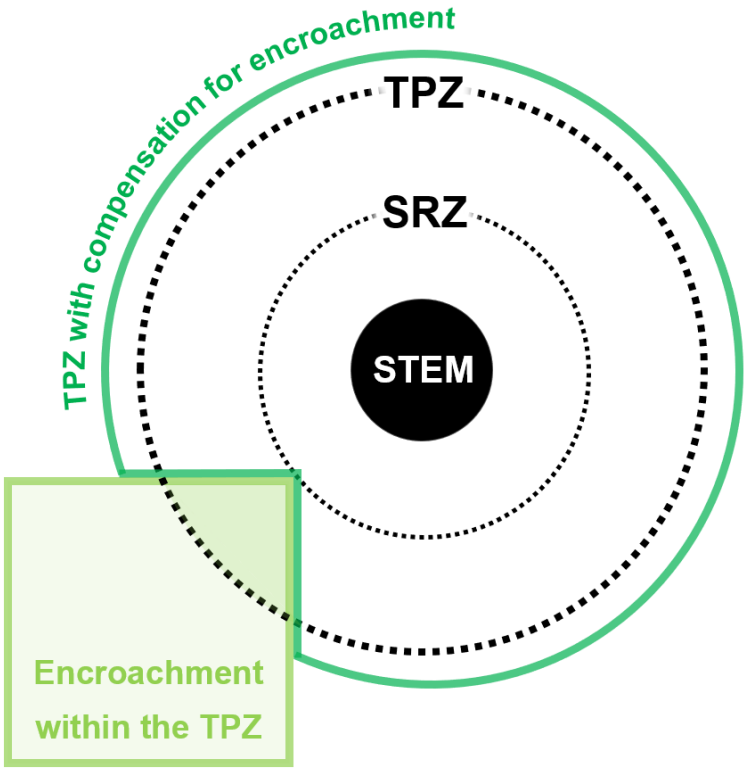
## Underground services

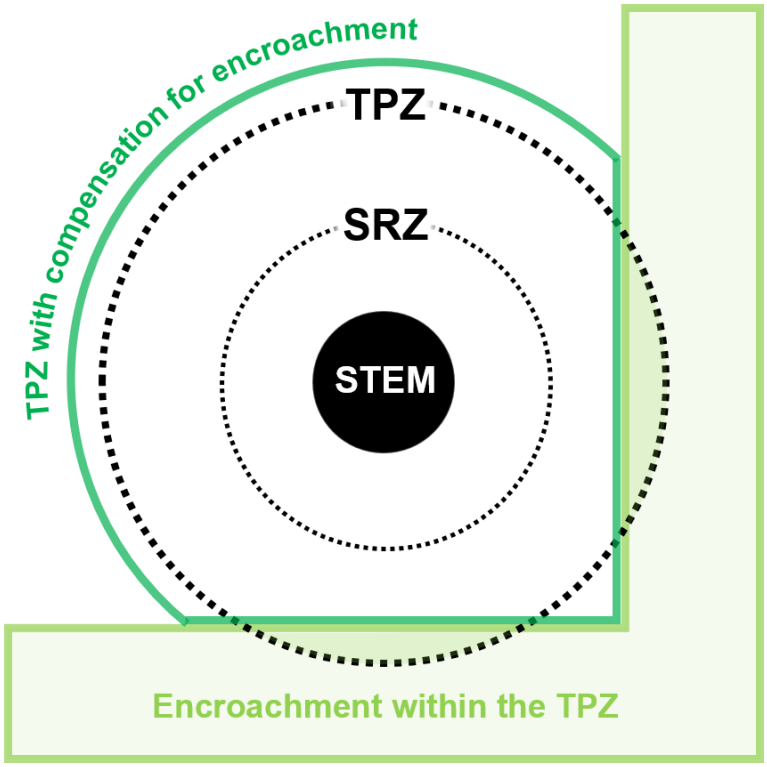
All underground services should be routed outside of the TPZ. If underground services need to be installed within the TPZ, they must be installed using tree sensitive excavation methods under supervision of the project arborist. Alternatively, boring methods such as horizontal directional drilling (HDD) may be used for underground service installation, providing the installation is at minimum depth of 800mm below grade. Excavations for entry/exit pits must be located outside the TPZ

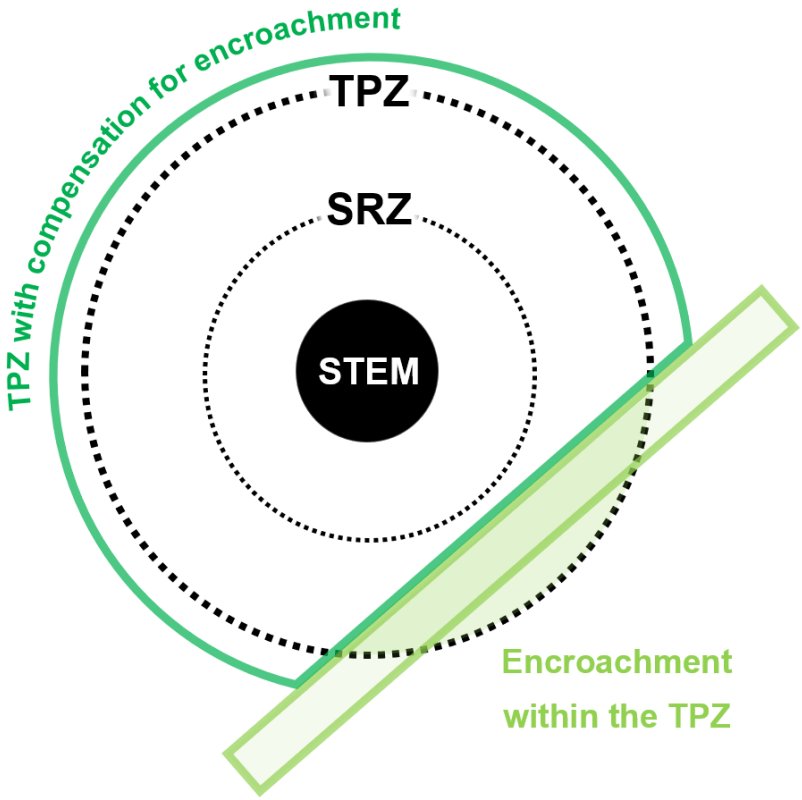
# Appendix V – Encroachment within the TPZ

The images below show how encroachment within the tree protection zone can be compensated for elsewhere.






**Reference**

Council of Standards Australia (August 2009)
AS 4970-2009 Protection of Trees on Development Sites
Standards Australia, Sydney.

# Appendix VI - STARS© assessment matrix

| Tree Significance - Assessment Criteria | | |
|---|---|---|
| **Low** | **Medium** | **High** |
| The tree is in fair-poor condition and good or low vigour.<br><br>The tree has form atypical of the species<br><br>The tree is not visible or is partly visible from the surrounding properties or obstructed by other vegetation or buildings<br><br>The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area<br><br>The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen<br><br>The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions<br><br>The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms<br><br>The tree has a wound or defect that has the potential to become structurally unsound.<br><br>The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.<br><br>The tree is a declared noxious weed by legislation | The tree is in fair to good condition<br><br>The tree has form typical or atypical of the species<br><br>The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area<br><br>The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street<br><br>The tree provides a fair contribution to the visual character and amenity of the local area<br><br>The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ | The tree is in good condition and good vigour<br><br>The tree has a form typical for the species<br><br>The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age.<br><br>The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on councils' significant tree register<br><br>The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity.<br><br>The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values.<br><br>The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions. |

| Useful Life Expectancy - Assessment Criteria | | | |
|---|---|---|---|
| **Remove** | **Short** | **Medium** | **Long** |
| Trees with a high level of risk that would need removing within the next 5 years.<br><br>Dead trees.<br><br>Trees that should be removed within the next 5 years.<br><br>Dying or suppressed or declining trees through disease or inhospitable conditions.<br><br>Dangerous trees through instability or recent loss of adjacent trees.<br><br>Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form.<br><br>Damaged trees that considered unsafe to retain.<br><br>Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.<br><br>Trees that will become dangerous after removal of other trees for the reasons. | Trees that appear to be retainable with an acceptable level of risk for 5-15 years.<br><br>Trees that may only live between 5 and 15 more years.<br><br>Trees that may live for more than 15 years but would be removed to allow the safe development of more suitable individuals.<br><br>Trees that may live for more than 15 years but would be removed during the course of normal management for safety or nuisance reasons.<br><br>Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term. | Trees that appear to be retainable with an acceptable level of risk for 15-40 years.<br><br>Trees that may only live between 15 and 40 more years.<br><br>Trees that may live for more than 40 years but would be removed to allow the safe development of more suitable individuals.<br><br>Trees that may live for more than 40 years but would be removed during the course of normal management for safety or nuisance reasons.<br><br>Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term. | Trees that appear to be retainable with an acceptable level of risk for more than 40 years.<br><br>Structurally sound trees located in positions that can accommodate future growth.<br><br>Storm damaged or defective trees that could be made suitable for retention in the long term by remedial tree surgery.<br><br>Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention. |

## Tree Significance

| Useful Life Expectancy | High | Medium | Low | | |
|---|---|---|---|---|---|
| **Long** >40 years | | | | | |
| **Medium** 15-40 years | | | | | |
| **Short** <1-15 years | | | | | |
| **Dead** | | | | | |

## Legend for Matrix Assessment

| | |
|---|---|
| | **Priority for retention (High):** These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 Protection of trees on development sites. Tree sensitive construction measures must be implemented if works are to proceed within the Tree Protection Zone. |
| | **Consider for retention (Medium):** These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with the removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted. |
| | **Consider for removal (Low):** These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention. |
| | **Consider for removal (Low):** These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention. |