# Arboricultural Assessment and Management Plan


## 4-18 Doncaster Avenue, Kensington

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**Dated:** November, 2018

# Table of Contents

## 1. Summary

1.1 This assessment provides information in relation to the trees located in and adjacent to the documented property. This will detail the trees health, biological potential, structural integrity and location in relation to the proposed construction.

1.2 The proposed development will involve the demolition of the existing three (3) residential blocks to allow for the construction of the proposed multi level student accomodation. This will require the removal of twenty two (22) trees to allow the proposed works to occur. There are an additional twenty (20) trees located outside the construction impact zone that have been recommended for removal due to poor species characteristics.

1.3 The remaining seven (7) trees are located outside the construction impact zone and will be recommended for retention throughout the works to maintain the site's arboricultural amenity contribution. This will be done with the implementation of the following tree preservation recommendations. These have been based on our current standard for the Protection of Trees on Development Sites AS4970-2009.

1.4 The proposed development is a significant alteration to the existing land use and will provide a broad range of social benefits within the local community. The proposed development recognises the significance of the site's largest tree, a Eucalyptus saligna, or Sydney Blue Gum (Tree 42).

1.5 The proposed development will however require the removal of several semi mature and relatively significant trees. These include the semi mature Banksia integrifolia, or Coastal Banksia (Tree 22), a Melaleuca quinquenervia, or Paperbark (Tree 23), as well as a mature Magnolia soulangeana, or Tulip tree (Tree 27). These all have moderate retention values, but are within the proposed construction footprint.

1.6 As noted, the remainder of the trees documented for removal are located outside the construction impact zone and have been recommended for removal based on poor species characteristics, health or structure. These would be recommended for removal irrespective of the proposed works.

## 2. Background

2.1 The existing site comprises three (3) semi detached townhouses and a free standing residence on a block of approximately 4000 square meters and located adjacent to the Randwick Race Course. This has recently been purchased by the current owner who is proposing to facilitate the increased demand for residential space that will occur as part of the CBD and South East Light Rail network.

2.2 The proposed Light Rail Network will stop at the Royal Randwick Racecourse on Alison Road, Randwick and increase demand for space and facilities in this area. A portion of the land adjacent to this site has been allocated for train parking and support facilities.

2.3 The existing properties are in varying degrees of disrepair and currently house multiple itinerant workers and travellers.

## 3. Aims

3.1 The aims of this report are to;

- Review Council Policies for applicable conditions regarding the site and documented trees;

- Conduct a visual assessment of the documented trees and their growing environment;
- Provide a detailed list of Tree Preservation Recommendations aimed at preserving those trees documented for preservation.

3.2 There is no warranty or guarantee, expressed or implied that health, pests, disease, deficiencies, decay or any structural failures may occur at any time following documentation. Information contained in this report covers only the documented trees and reflects their health and condition at the time of inspection.

## 4. Methodology

4.1 A Visual Tree Assessment (VTA) was performed from ground level and consideration was given to the overall health of each tree, percentage of canopy, epicormic growth, deadwood, and form for this species. The tree heights and canopy spreads have been estimated and where relevant the orientation of the canopy spread noted. The trunk diameters of each tree has been estimated at breast height of 1.4meters (DBH) and measured with a diameter tape where required to calculate Tree Protection Zones (TPZ). The site was inspected by consulting arborist George Palmer in November, 2018.

## 5. Tree Data

5.1 The planting on site is predominantly semi mature, exotic tree species planted on both the northern and southern boundaries. There are also a number of native and locally native trees that will have been planted in their current locations. As mature as the largest of the *Eucalyptus saligna,* or Sydney Blue Gum (Tree 42 and 46) are, it is unlikely that they will be remnant species and are more likely to have been plant in these locations less than eighty (80) years ago. These are located on the site's northern boundary. Tree 46 is within the CIZ and is required for removal. Tree 42 has been seen as a material restraint and will be preserved.

5.2 There are however a number of semi mature to mature *Banksia integrifolia,* or Coastal Banksia and *Melaleuca quinquenervia,* or Paperbark (Trees 22 and 23) located centrally within the site and will require removal to allow construction. These are both mature and significant trees attracting a theoretical Tree Protection Zones (TPZ) of 5 and 6m respectively. Again, these trees will have been planted in their current locations less than sixty (60) years ago and will not have been part of the remnant plant community.

5.3 There are also a number of well established *Cinnamomum camphora,* or Camphor laurel trees on site. While these provide a moderate arboricultural amenity contribution, they have been recommended for removal due to poor species characteristics. These are the number 1 tree on our National Weed Registry and would be recommended for removal irrespective of the proposed development. All are located outside the proposed construction footprint.

5.4 Trees 1, 2, 47 and 49, 50 and 51 are all Council trees located on the front verge. Tree 48 is a *Lophostemon confertus* or Brush Box, while the remaining are *Schinus molle,* or Pepper Trees. These will be fenced off to ensure they are not affected by mechanical damage from delivery vehicles.

5.5 Tree 12 is a mature *Mangifera indica,* or Mango tree located on the site's eastern boundary. This tree is estimated to be 20 - 30 years old and is both a healthy and structurally sound example of the species. This tree is however located directly adjacent to the proposed construction footprint and has been recommended for removal to allow construction.

5.6 Tree 13 is a well established *Cyathea cooperi*, or Tree Fern located adjacent to the southern boundary of the existing residence. The tree is located within the proposed construction impact zone and will be removed to allow the proposed.

5.7 The *Archontophoenix cunninghamiana,* or Bangalow Palms documented as trees 14, 15, 16 and 17 are also located adjacent to this southern property boundary. These are again within the CIZ of the proposed works and are required for removal.

5.8 Tree 18 is a semi mature *Olea europaea,* or African Olive tree located outside the CIZ and recommended for removal due to poor species characteristics. Again, this would be made irrespective of the proposed development.

5.9 Trees 19 and 27 are both *Magnolia soulangeana* trees. Tree 27 is a mature example of the species. Both are located within the CIZ of the proposed development and are required for removal.

5.10 Tree 20 is a juvenile *Elaeocarpus reticulatus,* or Blue Berry Ash tree that has failed to establish and has a large section of visible surface decay. this tree is recommended for removal irrespective of the proposed development.

5.11 Tree 21 is a semi mature *Jacaranda mimosifolia,* or Jacaranda located centrally within the rear garden. The tree has developed with a co dominate trunk from 1m and there was decay noted within the tree's base. The tree does however provide a moderate arboricultural amenity contribution and is required for removal.

5.12 Tree 22 is a mature *Banksia integrifolia,* or Coastal Banksia. This tree is a well established example of this locally native tree species. The tree is both mature and significant but is not likely to be part of the remnant plant population and will have been planted in this location less than sixty (60) years ago.

5.13 Tree 23 is similarly a locally native *Melaleuca quinquenervia,* or Paperbark tree. The tree will have been planted in this location less than forty (40) years ago. This tree has a moderate arboricultural significance and is required for removal to allow the proposed construction to occur.

5.14 The largest of these Paperbarks is located on the properties eastern boundary and documented as Tree 24. This is a mature example of the species and the proposed construction allows for its preservation.

5.15 Tree 25 is a *Pytolacca americana,* or Pokeweed. A poisonous tree species and will be recommended for removal irrespective of the proposed development.

5.16 The semi mature *Populus nigra,* or Poplar on the eastern boundary has been documented as Tree 26. This is a problematic tree species due to poor wood structure, making them prone to decay. The tree is also out of character in the predominately native surrounding landscape and it will be recommended for removed to allow appropriate replanting to occur and to eliminate the hazards associated with failure.

5.17 Tree 28 is a small Bangalow Palm located on the eastern boundary. Again, this will be retained throughout the construction.

5.18 Trees 29 and 30 are both *Cinnamomum camphora,* or Camphor laurel trees located adjacent to the north eastern corner of the site. As previously noted, these are number 1 on our National Weed Registry and although Tree 30 provides a moderate arboricultural amenity, both have been recommended for removal due to their poor species characteristics and to allow more appropriate trees to be installed.

5.19 Tree 31 is a semi mature Jacaranda tree that has not established well in this location due to suppression from adjacent trees. The tree has been forced to grow out from the canopy of the Camphor documented as tree 30 and is not suitable for retention.

5.20 The two (2) *Lagerstroemia indica,* or Crape myrtles documented as Trees 32 and 34, as well as the Camellias documented as Trees 33 and 35 are all well established examples of their species that will have been planted over thirty (30) years ago.

5.21 Tree 37 is the largest of the Camphor laurels trees documented. The tree is prominently located on the properties northern boundary. The tree was considered for retention to maintain arboricultural amenity. The installation of construction infrastructure will however require its removal.

5.22 The two (2) larger *Grevillea robusta,* or Silky Oak trees documented as Trees 39 and 40 are well established trees located on the Doncaster Ave Street frontage and visually prominent. They both appear to be healthy and structurally sound examples of their species. Although close to full maturity these trees remain a fraction of their full biological potential and can be expected to continue to grow towards this in time. It is however thought that these are located too close to each other and the adjacent *E. saligna.* This will reduce their access to easily available soil moisture and nutrients and limit their growth potential. Both have been recommended for removal.

5.23 Tree 42 is the largest of the *E. saligna* trees documented on site. This is a locally native tree species that will have been planted in this location less than eighty (80) years ago. The tree is a mature and significant example of the species and will be allocated the maximum TPZ construction setback.

5.24 The area comprising the northwestern corner of the site has been over planted and allowed the establishment of self seeded "weed" species. The arboricultural amenity provided by this stand of trees visually separates the existing building from the street and will be recommended for preservation. Several of these have

however established with limited solar access. This has resulted in their form being elongated and structurally poor.

5.25 Trees 43, 44 and 45 are all *G. robusta,* or Silky Oak trees located on the Doncaster Avenue boundary. These are unlikely to have been planted here, and will more likely have self seeded from the more mature Trees 39 and 40. They are again too close and will suppress each other as they continue to grow towards full maturity in time. They have all been documented for removal to both allow the proposed construction to occur and to allow appropriate continuity in the replanting.

5.26 The remaining *Eucalyptus carnea,* or White Mahogany is documented as Tree 46. This is a less mature example of the genus again located on the Doncaster Avenue boundary. The tree is located adjacent to the proposed construction footprint and will be required for removal to allow it to occur.

5.27 Trees 52 and 53 are located within the neighbouring residence and are not required for removal to allow the proposed works to occur.

5.27 Further information on the trees documented on site can be found in **Appendix 1 Tree Table.**

## 6. Discussion

6.1 The proposed development is a significant alteration to the existing land use. The proposed works will require and recommend the removal of forty two (42) trees. Of these, eight (8) would be recommended for removal irrespective of the proposed development for the reasons outlined. The most significant of those recommended for removal are the Banksia and Melaleuca documented as Trees 22 and 23. These are locally native trees that will have been planted in their current locations and are not thought to be part of the remnant plant community.

6.2 The remaining significant trees required for removal are the Jacaranda documented as Tree 21 and the Magnolia documented as Tree 27. These are however of limited arboricultural amenity and should not be considered as being a material constraint to the development process.

6.3 The proposed works are however within the theoretical Tree Protection Zone (TPZ), as outlined within our national standard for the *Protection of Trees on Development Sites AS4970.* The mature *E. saligna* documented as tree 42. A root mapping exercise was undertaken as part of a Land and Environment Court hearing that lead to the approval of the previous application prior to the purchase of the additional properties and the expansion of the proposed CIZ as currently detailed.

6.4 No structurally significant tree roots were located in the excavation process and this line will form the edge of the proposed construction impact zone.

## 7. Tree Management Recommendations

7.1 Those trees documented for removal should be taken down in accordance with WorkCover Code of Practice for the Amenity Tree Industry and with formal approval from Randwick Council.

7.2 The remainder of the trees on and adjacent to the site should be fenced off in accordance with the following Tree Preservation Recommendations. These include Trees 1, 2 and 16.

7.3 The remainder of the trees are located within the neighbouring property and fencing them off is not considered to be appropriate. These trees should however be granted appropriate TPZ setbacks and should be mulched and irrigated according to this, and their requirements.

7.4 All roots required for pruning or removal should be cut cleanly adjacent to the edge of the proposed construction and covered with hessian to limit the spread of decay and their exposure to the atmosphere.

7.5 All stumps should be ground out to limit the affects on the adjacent soil profile and to allow excavation where practical. Any remaining trees will be subject to the following Tree Protection Measures.

7.6 The remaining Tree Protection Recommendations are generic recommendations that have been based on AS4970 Standards and should be implemented where applicable.

7.7.0 Appointment of Site Arborist
A site arborist shall be appointed prior to the commencement of work on site. The Site Arborist shall clearly mark out all trees to be removed and ensure that all trees documented for retention are preserved with the implementation of the following tree protection measures. The Site Arborist shall have a minimum qualification equivalent to a NSW TAFE Certificate Level 5 or above in Arboriculture.

7.8.1 Inspection Points
Give 5 working days notice to allow inspections to be undertaken at the following stages;

| Inspection Point | Inspection Personnel |
|---|---|
| Installation of Tree Protection Zones including Tree Protection Fencing, Silt Fencing and Signage | Site Arborist |
| Modification of the Tree Protection Zone | Site Arborist |
| Works within the Tree Protection Zone | Site Arborist |
| Completion of Construction Works | Site Arborist Site Supervisor. |

7.8.2 Education
Contractors and site workers shall receive a copy of these specifications prior to the commencement of work. Contractors and site workers undertaking any works within a TPZ shall sign the site log to confirm that they have read and understand these specifications prior to their undertaking.

7.8.3 Tree Protection Zones
Where applicable, all trees to be retained through the construction process shall be protected from mechanical damage and the indirect impacts of the construction process with the installation of Tree Protection Zones (TPZ). Unless otherwise stated, the following activities must not be carried out within a TPZ;
- modification of existing soil levels
- excavation or trenching
- cultivation of soil
- mechanical removal of vegetation
- movement of natural rock
- storage of materials, plant or equipment
- erection of site sheds
- affixing signage or hoarding to trees
- disposal of chemical waste or construction material
- any activity that may directly or indirectly affect the health of these or surrounding trees.

Note: If access to a TPZ is required as part of the approved development, prior authorisation is required by the Site Arborist.

7.8.4 Tree Protection Fencing
Tree Protection Fencing shall be installed at the perimeter of the TPZ. As a minimum the Tree Protection Fencing shall be 1.8 meters high temporary chain supported by steel stakes. This shall be fastened and supported to prevent sideways movement. The tree's woody roots shall not be damaged during the installation of this Tree Protection Fencing.
This Tree Protection Fencing shall be erected prior to the commencement of works on site and shall be maintained for the duration of the construction process.

7.8.5 Trunk and branch protection
Where TPZ fencing cannot be installed due to practical site constraints, trunk protection shall be installed around the trunk or branch to avoid mechanical damage. As a minimum, the trunk and branch protection shall consist of padding wrapped around the trunk and/or branches of affected tree. Timber panels will then need to be erected around the affected branch or trunk. See Figure X.

7.8.5 Signage
Tree Protection Signage shall be attached the the TPZ and displayed in a prominent location. These signs shall be repeated in 10m intervals or closer where the fence changes direction. These shall be a minimum of a 72 font size and each sign at-least 600 x 500mm.

7.8.6. Tree and root pruning
All tree and root pruning and removal works shall be carried out in accordance with Australian Standard 4373 - 2007 Pruning of Amenity Trees. All pruning and removal works are to be carried out by a suitable qualified arborist, in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998).
Where root pruning is required, these should cut cleanly at the edge of the construction impact zone and kept moist by covering with a hessian material or mulch, for the duration of the construction period.

7.8.7 Mulching
The area within the TPZ shall be mulched and maintained with 80mm of leaf litter mulch for the duration of the construction process. This mulch shall be spread by hand to limit the impact on underlying roots and shall be installed prior to the commencement of works on site.

7.8.8 The Site Arborist shall inspect and approve the TPZ including mulching. signage, Tree ProtectionFencing, Silt fencing and Signage prior to the commencement of works on site.

7.8.9. Ground protection
Wherever applicable pedestrian, vehicular and mechanical access shall be excluded from the TPZ. Where required access within the TPZ shall be restricted to areas where ground protection has been installed.

7.8.10 Site Management
Materials and waste storage, site sheds and temporary services shall not be located within the TPZ unless specified. Storage points shall be covered when not in use and be no greater than 2m in height.

7.8.11 Works within the TPZ
The TPZ may need to be modified during the works to allow access between the protected tree and the proposed construction. The TPZ shall remain as specified and only those works detailed in the proposed construction undertaken.

7.8.12 Completion of Works within specified TPZ
Upon the completion of works within a TPZ the protective fencing shall be reinstated as specified. Where the construction of new structures does not allow for the reinstallation of fencing the TPZ shall be modified by the Site Arborist.

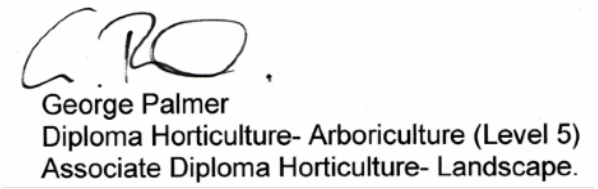

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**Figure 1** Shows the location of excavated trench in relation to the tree and existing building footprint.

**Figures 2 and 3** Shows the exposed soil profile within the trench.

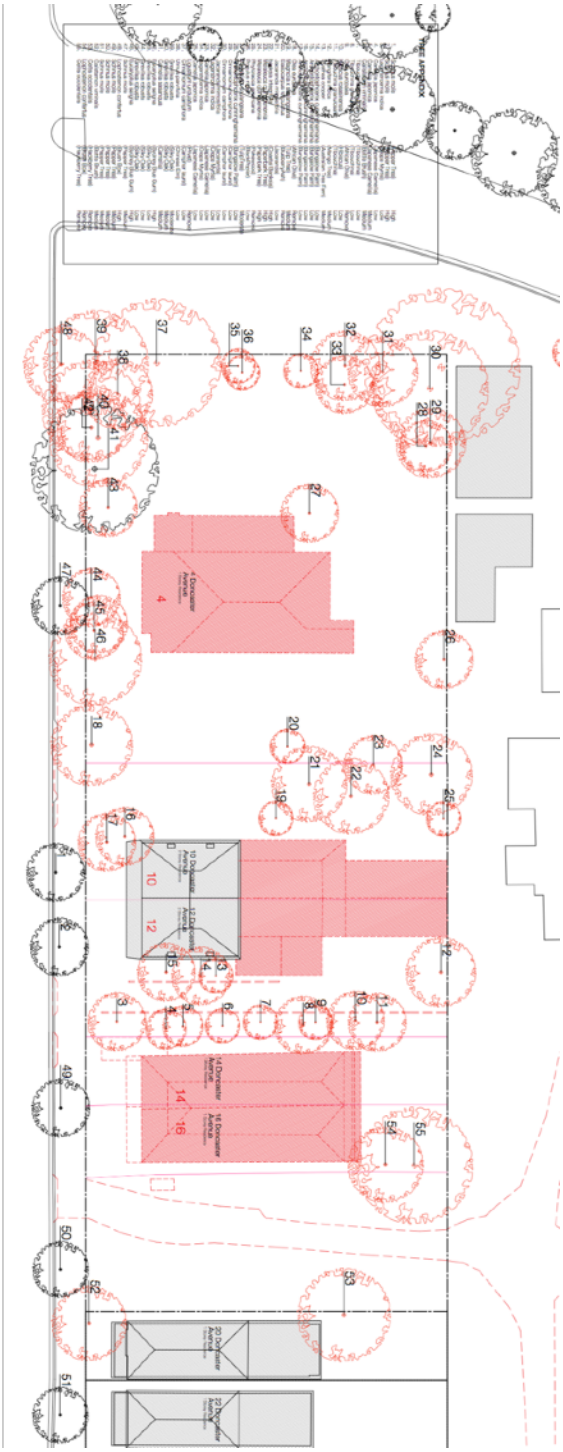


**Figure 4** Shows the existing trees in relation to the residences.

| T # | Species | Height and canopy spread | DBH | Age | Health | Crown Condition | Significance | Amenity value | Ecological Value | Form | Defects | SRZ | TPZ | Implications |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | Schinus molle (Pepper Tree) | 4 x 3 | 15cm | 5–10yrs | Fair | Fair | Low | Low | Low | Poor | D. | 2.5m | 4m | A small tree that has decay at its base. Not considered a material constraint. |
| T2 | Schinus molle (Pepper Tree) | 4 x 4 | 15cm | 5–10yrs | Fair | Fair | Low | Low | Low | Fair | | 2.5m | 4m | Part of the avenue of seme mature Pepper trees. Retain. |
| T3 | Lagerstroemia indica (Crepe myrtle) | 4 x 4 | 3 x 15cm | 15-20yrs | Good | Good | Low | Low | Low | Fair | | 2.5m | 4m | A semi mature example of the species. Located within the proposed construction footprint and required for removal. |
| T4 | Camellia sasanqua (Japanese Camellia) | 6 x 4 | 25cm | 15-20yrs | Good | Good | Low | Low | Low | Good | | 2.5m | 4m | A semi example of the species located within the proposed construction footprint and required for removal. |
| T5 | Camellia sasanqua (Japanese Camellia) | 6 x 4 | 25cm | 15-20yrs | Good | Good | Low | Low | Low | Good | | 2.5m | 4m | A semi example of the species located within the proposed construction footprint and required for removal. |
| T6 | Callistemon viminalis (Bottle Brush) | 6 x 3 | 15cm | 5–10yrs | Good | Good | Low | Low | Moderate | Fair | | 2.5m | 4m | A semi mature example of this native tree species located on the properties southern boundary and required for removal. |
| T7 | Tibouchina granulosa (Tibouchina) | 5 x 4 | 30cm | 25yrs | Good | Good | Low | Low | Low | Fair | | 2.5m | 5m | A semi mature example of the species located within the proposed construction footprint and required for removal. |
| T8 | Tibouchina granulosa (Tibouchina) | 4 x 3 | 35cm | 25yrs | Good | Good | Moderate | Low | Low | Fair | | 3m | 5m | A semi mature example of the species located within the proposed construction footprint and required for removal. |
| T9 | Olea europaea (African Olive) | 7 x 6 | 20cm | 15yrs | Good | Good | Low | Low | Low | Fair | W. | 2m | 3m | An environmental “weed” species recommended for removal irrespective of the proposed development. |

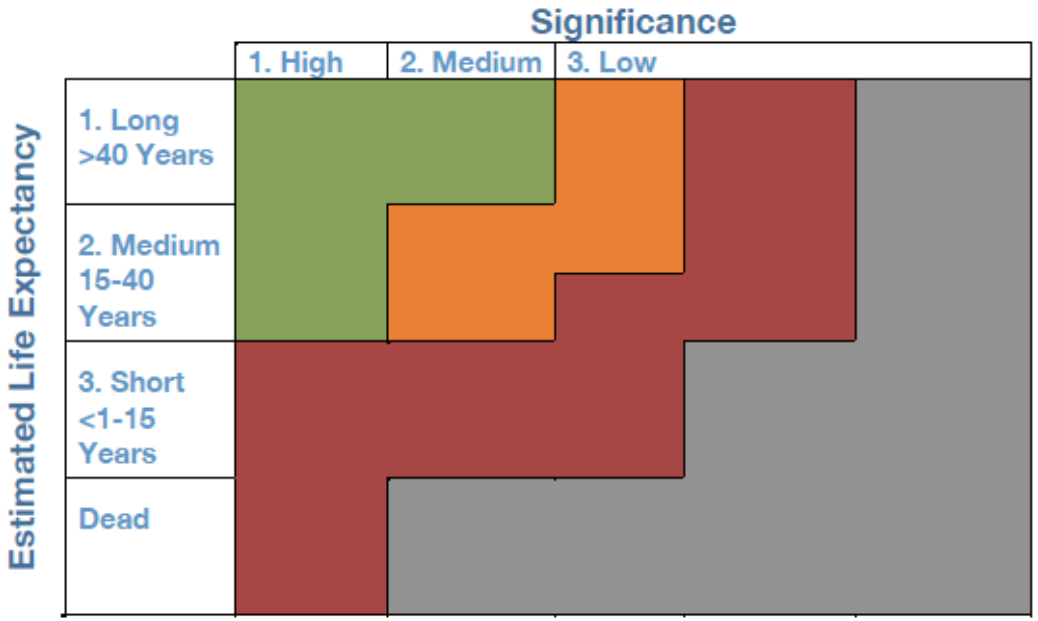
| T # | Species | Height and canopy spread | DBH | Age | Health | Crown Condition | Significance | Amenity value | Ecological Value | Form | Defects | SRZ | TPZ | Implications |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T 10 | Hibiscus rosasinensis (Hibiscus) | 7 x 4 | 30cm | 20yrs | Good | Fair | Low | Low | Low | Fair | | 3m | 5m | A semi mature example of the species located within the proposed construction footprint and required for removal. |
| T 11 | Tibouchina granulosa (Tibouchina) | 6 x 4 | 40cm | 20yrs | Good | Fair | Low | Low | Low | Fair | | 2.5 m | 5m | A semi mature example of the species located within the proposed construction footprint and required for removal. |
| T 12 | Mangifera indica (Mango tree) | 6 x 5 | 3 x 25cm | 20yrs | Good | Good | Moderate | Moderate | Moderate | Good | | 3m | 6m | A semi mature example of the species located within the proposed construction footprint and required for removal. |
| T 13 | Cyathea cooperi (Australian Tree Fern) | 6 x 2 | 25cm | 30+yrs | Good | Good | Moderate | Low | Moderate | Good | | 2.5 m | 4m | A mature native tree species located within the proposed construction footprint and required for removal. |
| T 14 | Archontophoenix cunninghamiana (Bangalow Palm) | 5 x 4 | 25cm | 25yrs | Good | Good | Moderate | Moderate | Moderate | Good | | 2m | 4m | Part of a stand of similar trees located adjacent to the properties southern boundary and required for removal. |
| T 15 | Archontophoenix cunninghamiana (Bangalow Palm) | 5 x 4 | 25cm | 25yrs | Good | Good | Moderate | Moderate | Moderate | Good | | 2m | 4m | As above. |
| T 16 | Archontophoenix cunninghamiana (Bangalow Palm) | 6 x 3 | 25cm | 25yrs | Good | Good | Moderate | Moderate | Moderate | Good | | 2m | 4m | As above. |
| T 17 | Archontophoenix cunninghamiana (Bangalow Palm) | 5 x 4 | 25cm | 25yrs | Good | Good | Moderate | Moderate | Moderate | Good | | 2m | 4m | As above. |
| T 18 | Olea europaea (African Olive) | 5 x 4 | 50cm | 35yrs | Good | Good | Low | Low | Low | Gair | W. | 3m | 6m | An environmental “weed” species recommended for removal irrespective of the proposed development. |

| T # | Species | Height and canopy spread | DBH | Age | Health | Crown Condition | Significance | Amenity value | Ecological Value | Form | Defects | SRZ | TPZ | Implications |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T 19 | Magnolia soulangeana (Tulip Tree) | 5 x 4 | 2 x 10cm | 20yrs | Good | Good | Moderate | Moderate | Moderate | Good | | 2.5 m | 4m | A semi mature example of the species located within the proposed construction footprint and required for removal. |
| T 20 | Elaeocarpus reticulatus (Blue Berry Ash) | 6 x 2 | 10cm | 20yrs | Poor | Poor | Low | Low | Low | Poor | DW. | 2m | 3m | A poorly formed tree due to suppression and limited root development. |
| T 21 | Jacaranda mimosifolia (Jacaranda) | 8 x 6 | 2 x 33 + 28cm | 30yrs | Good | Good | Moderate | Moderate | Moderate | Poor | D. | 2.5 m | 4m | A poorly formed tree with decay naked at base. Recommended and required for removal. |
| T 22 | Banksia integrifolia (Coastal Banksia) | 8 x 6 | 46cm | 40yrs | Good | Good | High | High | High | Good | | 3m | 6m | A mature and significant tree located within the proposed construction footprint and required for removal. |
| T 23 | Melaleuca quinquenervia (Papperbark) | 11 x 8 | 54cm | 30yrs | Good | Good | High | High | High | Good | | 3.5 | 10 m | A mature and significant tree located within the proposed construction footprint and required for removal. |
| T 24 | Melaleuca quinquenervia (Papperbark) | 16 x 8 | 75cm | 50yrs | Good | Good | High | High | High | Good | | 3.5 | 10 m | A mature native tree species located within the proposed construction footprint and required for removal. |
| T 25 | Phytoacca americana (Pokewood) | 3 x 3 | 10cm | 10yrs | Good | Good | Low | Low | Low | Fair | P. | 2m | 3m | A poisonous tree recommended for removal irrespective of the proposed development. |
| T 26 | Populus nigra (Black Poplar) | 16 x 8 | 55cm | 40yrs | Good | Fair | Moderate | Moderate | Moderate | Fair | D. | 3m | 6m | A mature example of this poor tree species. Covered in a climber and prone to decay. |
| T 27 | Magnolia soulangeana (Tulip Tree) | 7 x 6 | 4 x 15cm | 40yrs | Good | Good | Moderate | Moderate | Moderate | Good | | 3m | 6m | A mature example of this slow growing tree species located within the proposed construction footprint and required for removal. |

| T # | Species | Height and canopy spread | DBH | Age | Health | Crown Condition | Significance | Amenity value | Ecological Value | Form | Defects | SRZ | TPZ | Implications |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T 28 | Archontophoenix cunninghamiana (Bangalow Palm) | 7 x 3 | 20cm | 25yrs | Good | Good | Low | Low | Low | Good | | 2.5 m | 4m | Located as a single specimen within the north eastern corner of the site and within the CIZ of the proposed development,. |
| T 29 | Cinnamomum camphora (Camphor laurel ) | 8 x 6 | 25cm | 20yrs | Good | Good | Low | Moderate | Low | Good | | 3m | 6m | A semi mature example of this poor tree species recommended and required for removal. |
| T 30 | Cinnamomum camphora (Camphor laurel ) | 8 x 6 | 2 x 33 + 28cm | 35yrs | Good | Good | Low | Moderate | Low | Good | | 3m | 8m | A mature example of this poor tree species recommended for removal despite its amenity contribution. |
| T 31 | Jacaranda mimosifolia (Jacaranda) | 9 x 6 | 2 x 25cm | 25yrs | Good | Fair | Moderate | Moderate | Moderate | Good | DW. | 3m | 8m | A semi mature example of the species partially suppressed by the adjacent trees. |
| T 32 | Lagerstroemia indica (Crepe myrtle) | 5 x 2 | 15cm | 20yrs | Good | Fair | Low | Low | Low | Fair | S | 2m | 4m | A semi example of the species located adjacent to the properties northern boundary and required for removal. |
| T 33 | Camellia sasanqua (Japanese Camellia) | 4 x 3 | 15cm | 20yrs | Good | Good | Low | Low | Low | Fair | | 2m | 4m | A semi example of the species located within the proposed construction footprint and required for removal. |
| T 34 | Lagerstroemia indica (Crepe myrtle) | 4 x 3 | 15cm | 20yrs | Good | Good | Low | Low | Low | Fair | | 2m | 4m | A semi example of the species located adjacent to the properties northern boundary and required for removal. |
| T 35 | Camellia sasanqua (Japanese Camellia) | 5 x 3 | 15cm | 30yrs | Good | Good | Low | Low | Low | Fair | | 2m | 4m | A semi example of the species located within the proposed construction footprint and required for removal. |
| T 36 | Ligustrum undulatum (Privet) | 5 x 4 | 20cm | 20yrs | Good | Good | Low | Low | Low | Fair | W. | NA` | NA | An environmental “weed” species recommended for removal irrespective of the proposed development. |
| T 37 | Cinnamomum camphora (Camphor laurel ) | 7 x 6 | 54 + 59cm | 50yrs | Good | Good | Low | Moderate | Low | Good | I, DW | 3.5 m | 12 m | A mature example of this poor tree species recommended and required for removal. |

| T # | Species | Height and canopy spread | DBH | Age | Health | Crown Condition | Significance | Amenity value | Ecological Value | Form | Defects | SRZ | TPZ | Implications |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T 38 | Ulmus parvifolia (Chinese Elm) | 7 x 5 | 2 x 25cm | 25yrs | Good | Fair | Low | Low | Low | Poor | S. | 3m | 6m | A semi example of the species located adjacent to the properties northern boundary and required for removal. |
| T 39 | Grevillea robusta (Silky Oak) | 16 x 6 | 52cm | 50yrs | Good | Fair | Moderate | Moderate | Moderate | Good | DW. | 3.5 m | 8m | A mature example of the species located in the sites north western corner. Poor tree species with limited arboricultural significance. |
| T 40 | Grevillea robusta (Silky Oak) | 18 x 6 | 49cm | 50yrs | Good | Fair | Moderate | Moderate | Moderate | Good | | 3.5 m | 8m | The remaining mature Silky Oak tree located on the properties western boundary. |
| T 41 | Camellia sasanqua (Japanese Camellia) | 6 x 5 | 2 x 20cm | 35yrs | Good | Good | Moderate | Moderate | Moderate | Good | | 3m | 6m | A mature example of the species out of context with the surrounding landscape setting. |
| T 42 | Eucalyptus saligna (Sydney Blue Gum) | 17 x 8 | 1.2m | 80+yrs | Good | Good | High | High | High | Good | DW. | 4m | 12 m | The sites largest and most arboriculturally significant of those trees documented. Retain and Protect. |
| T 43 | Grevillea robusta (Silky Oak) | 8 x 3 | 20cm | 15-20yrs | Good | Good | Low | Low | Low | Fair | | 2m | 4m | A semi mature example of this problematic tree species required and recommend for removal. |
| T 44 | Grevillea robusta (Silky Oak) | 7 x 3 | 30cm | 15 – 20yrs | Good | Good | Low | Low | Low | Fair | | 2m | 4m | A semi mature example of the species located within the proposed construction footprint and required for removal. |
| T 45 | Grevillea robusta (Silky Oak) | 8 x 3 | 28cm | 15-20yrs | Good | Fair | Low | Low | Low | Fair | | 2m | 4m | A semi mature example of the species located within the proposed construction footprint and required for removal. |
| T 46 | Eucalyptus saligna (Sydney Blue Gum) | 15 x 5 | 47cm | 35yrs | Good | Good | Moderate | Moderate | Moderate | Good | DW` | 3m | 8m | A semi mature example of the species located within the proposed construction footprint and required for removal. |

| T # | Species | Height and canopy spread | DBH | Age | Health | Crown Condition | Significance | Amenity value | Ecological Value | Form | Defects | SRZ | TPZ | Implications |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T 47 | Schinus molle (Pepper Tree) | 5 x 4 | 20cm | 10yrs | Good | Fair | Moderate | Moderate | Low | Fair | | 2m | 4m | Small tree located on the properties front verge and outside the CIZ of the proposed development. |
| T 48 | Lophostemon confertus (Brush Box) | 7 x 4 | 25 + 30cm | 25yrs | Good | Fair | Moderate | Moderate | Moderate | Fair | | 3m | 5m | A semi mature example of the species located on the front verge and required for removal. |
| T 49 | Schinus molle (Pepper Tree) | 5 x 4 | 25cm | 20yrs | Good | Good | Moderate | Moderate | Moderate | Fair | | 2.5 m | 4m | Part of the avenue of semi mature Pepper trees. Retain. |
| T 50 | Callistemon viminalis (Bottle Brush) | 5 x 4 | 5 x 10cm | 35yrs | Good | Good | Moderate | Moderate | Moderate | Good | | 2.5 m | 4m | A mature tree located within the neighbouring residence and recommended for retention. |
| T 51 | Schinus molle (Pepper Tree) | 6 x 4 | 10 + 15cm | 15 – 20yrs | Good | Good | Moderate | Moderate | Moderate | Fair | | 2.5 m | 4m | Part of the avenue of seme mature Pepper trees. Retain. |
| T 52 | Celtis occidentalis (Hackberry tree) | 8 x 8 | 52cm | 20yrs | Good | Good | Low | Moderate | Low | Fair | W. | 3m | 6m | An environmental “weed” species recommended for removal irrespective of the proposed development. |
| T 53 | Lophostemon confertus (Brush Box) | 4 x 3 | 35cm | NA | Dead | NA | NA | NA | Low | NA | D. | NA` | NA | A dead tree required for removal irrespective of the proposed development. |
| T 54 | Schinus molle (Pepper Tree) | 5 x 5 | 32cm | 15 – 20yrs | Good | Good | Moderate | Moderate | Moderate | Fair | D. | 2.5 m | 5m | Part of the avenue of semi mature Pepper trees. Retain. |




## Legend for matrix assessment

| | |
|---|---|
| | **Priority for Retention (High)** – These 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 e.g. pier and beam etc. 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 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. |
| | **Priority for Removal** – These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development. |

**Genus, Species, and Common name**
The botanical and common name of each tree is identified and recorded. Occasionally the exact species name is unknown; sp. Is recorded to indicate this.

**Height, Spread, Trunk Diameter, DBH and DRB**
The Trees height and spread are recorded in meters.
The tree DBH is recorded in millimeters. DBH is an abbreviation of diameter (of the trunk) measured at breast height (or 1.4 meters from the base of the trunk). If more than one trunk is present the DBH is calculated in accordance with AS4970-2009 Protection of Trees on Development Sites.
If the tree has multiple trunks each trunk DBH will be recorded individually.
The tree DRB is recorded in millimeters. DRB is an abbreviation of Diameter (of the trunk) measured above the root buttress. It is required to calculate the SRZ in accordance with AS4970-2009 Protection of Trees on Development Sites when there is major encroachment within the TPZ, i.e. greater than 10% is encroached upon or if there is an encroachment within the SRZ.

**Age**
The age class of each tree is estimated as either:
**J-** Juvenile, a young sapling, easily replaced from nursery stock
**SM-** Semi mature, a tree that has not grown to mature size
**M-** Mature, a tree that has reached mature size and will slowly increase in size over time.
**OM-** Over mature, a tree that has been mature for a long period and is beginning to display signs of decline, e.g. large dead branches
**S-** Senescent, an over mature tree that is now in decline

**Health**
The Tree's health is recorded as a measurement of:
**G-** Good, the does not appear stressed with no excessive dieback, insect infestation, decay, deadwood or epicormic shoots
**Avg-** Average health, the tree appears stressed and has some crown dieback, and/or areas or few epicormic shoots, and/0r some deadwood in the crown and some new growth at the branch tips. These trees may benefit from remediation of the growing environment to reduce stress and return it to good health.
**F-** Fair, the tree may have areas of crown die back, and/or many epicormic shoots, and/or reduced new growth at branch tips. These trees have been stressed fort a short period of time; remediation of the growing environment may improve the trees health.
**P-** Poor, the tree may have large areas of crown die back, and/or many epicormic shoots, and/or reduced new growth at branch tips. These trees have been stressed for a long time, remediation of the growing environment would not return the tree to good health.

**Crown Condition**
The crown condition of each tree is assessed and recorded as either:
**G-** Good Condition: the tree appears to have no visible indication of inherent structural effects.
**Avg-** Average Condition: the tree has minor structural defects which may be corrected with remedial works or pruning, allowing the tree to return to Good Condition.
**F-** Fair Condition: the tree has visible structural defects such as (but not limited to) dead branches, and/or an unbalanced crown, and/or leaning trunk and/or signs of decay. These trees do not demonstrate the typical form of their species, of have been damaged or have begun to deteriorate. Remedial works or pruning may return the tree to Average Condition.
**P-** Poor Condition: the tree has significant structural defects such as (but not limited to) very large dead branches, and/or extremely unbalanced crown, and/or subsiding trunk, and/or large areas of decay. These trees do not demonstrate the typical form of their species, or have been severely damaged or have deteriorated significantly. Remedial pruning would not return the tree to fair condition.

**Significance**
The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. When determining a trees significance within the landscape context, the following questions are asked.
Significance is measured as high, medium, or low. High being a affirmative answer for 4 or more questions, Medium being 3 affirmative answers, and Low being 2 or less affirmative answers.

- Is the tree a local native remnant; an endangered species, a part of an endangered species community; or does the tree provide critical habitat for an endangered species?
- Is the tree botanical interest; listed as a heritage item under the federal state or Local regulations?
- Is the tree visually prominent in the locality?
- Is the tree well structured?
- Is the tree in good health and does it display signs of good vigor?
- Is the tree typically formed for the species?
- Is the tree located in a position that will accommodate future growth?

**Amenity value**
Amenity value is a subjective measurement based on the tree's contribution to the landscape, it may be based on the tree's visual form, however it also includes non visual attributes such as provision of shade for a seat, screening of poor views or for privacy, or if it has historical significance. The amenity value is recorded as:
**H-** High, the trees form is an excellent example of its species and it makes a great specimen and/or it has other attributes such as screening, or its historical significance. These trees are visually prominent and valuable to the community or public domain.
**M-** Medium, the tree may have an altered form and/or it has attributes that provide amenity to local residents only.

**L-**Low, the tree is not a good specimen and it does not provide substantial benefit to local residents or the community.

**Ecological value**

Ecological value is a measurement of the trees contribution to the environment. It is determined by the trees area of origin, its potential to provide habitat to native fauna and its potential to become an environmental pest. The ecological value is recorded as:

**H-** High, the tree is locally native or reminant and/or it has habitat for native fauna

**M-** Medium, the tree is native but not locally native

**L-** Low, the tree is not native and/or it may be a listed nuisance or weed species.

**Ha-** Habitat, is the tree valued by fauna for food (i.e. foliage, fruit, or sap) or shelter (i.e. nesting, roosting, dray, or hollow).

**Form**

The form, structure or shape of each tree is assessed and recorded as either one or a combination of several of the below terms may be used to describe the trees form; (U) Upright, (B) Broad, (C) Conical, (Sh) Shrub, (CS) Crown Shy (also referenced is the adjacent dominant tree canopy i.e. T4), (V) Vase, (D) Dome, (P) Palm, (S) Spreading, (L) Leaning or (BM) Basal Multi Trunked.

Crown form may also be assessed in accordance with the relationship with the neighbouring tree and recorded as either: S- Suppressed, the crown is located beneath another larger crown and is leaning away (Crown Shy); C- Codmoninant, the crown is adjacent to another crown of similar size, their crown areas may appear joined; D- Dominant, the crown is above the lower crowns; E- Emergent, the crown emerges from a lower canopy formed by the other dominant or codominant crowns.

**Defects**

The presence of one or a combination of several defects is recorded (W) Wound, (D) Decay, (F) Fungus, (B) Bulge, (FB) Fibre Buckling, (C) Cracks, (S) Split, (H) Hollow, (DB) Die back, (Epicormic Shoots, (DW) Dead wood, (I) Inclusion, (CA) Cavities, (PF) Previous Failure, (R) Root Damage, (P) Pruning wound, (PD) Pests and Diseases, (ST) Storm Damage.

**Structural Root Zone (SRZ**

The SRZ is a radial area extending outwards from the center of the trunk. This area contains the majority of the structural woody roots. This area is primarily responsible for stability. Root damage or root loss within this zone greatly increases the opportunity for decay fungi to ingress in to the heartwood, causing internal decay in addition to destabilizing the trees structural integrity. The SRZ is calculated as follows (This calculation is derived from the Australian Standard $4970-2009 Protection of Trees on Development Sites):

$$\textbf{SRZ (Radius)} = (D \times 50)^{0.42} \times 0.6$$

**Tree protection Zone (TPZ)**

The TPZ is a circular area with a radius measured by multiplying the DBH by twelve, or a circular area the size of the trees drip line, whichever is greater. This area contains the majority of the essential structural and feeder roots responsible for stability, gaseous exchange and water and nutrient uptake. Excavation, back filling, compaction or other disturbance should not occur in this area. The TPZ is used to identify the minimum area required for the safe retention of a given tree. This calculation is derived from the Australian Standard 4970-2009 Protection of Trees on Development Sites. An incursion to 10% within the TPZ is potentially acceptable if no other option is available. A major encroachment (in excess of 10%) is required to be clearly justified by the project Arborist and compensated for elsewhere. Justification methodology mat vary depending on site or individual trees health, vigor and ability to withstand disturbance may require root investigation.