Moore Trees
Arboricultural Services
ABN 90887347745

ARBORICULTURAL DEVELOPMENT ASSESSMENT REPORT

59-67 Karne Street
Narwee NSW 2209
Lot 2 DP 518855, Lot 2 DP 16063, Lot 3 DP 16063

November 2022
Final
Updated 13th July 2023

Prepared for: Opal Healthcare
c/o CYRE Projects Pty Limited

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Summary

This Addendum has been prepared to support the Response to Submission Report for the Narwee Parklands Care Community State Significant Development Application (SSD-45024776) located at 59-67 Karne Street North, Narwee. The NSW Department of Planning and Environment (DPE) placed the Environmental Impact Statement and the accompanying technical documentation on public exhibition from 14 February 2023 until 13 March 2023. During the exhibition, a total of 22 submissions were received in response to the public exhibition of the EIS. These included submissions made by the State and Local Government agencies, authorities, as well as the general public.

This table provides a response to matters relating to the SSDA RFI response and it should be read in conjunction with the EIS and all supporting documentation originally submitted with the SSDA. The table below identifies the specific matters raised by the relevant agencies and where these matters have been responded to.

RFI Topic	**Details to be addressed**	**Comment**	**Section Reference**
Landscaping	Retention of Tree 40 is not consistent between reports due to the close proximity of the trunk to the proposed driveway.	-	HH civil has confirmed trunk is not within 1m of proposed driveway; retain tree 40 – Section 4.2, Page 20.
Landscaping	Tree 41 has died and is noted for removal. Tree must be replaced with a new street tree.	-	Section 4.14, Page 22.
Landscaping	Impacts to trees due to cut and fill works	-	Section 3.11, Page 17.

This report has been compiled for Opal Healthcare c/o CYRE Projects Pty Limited, Level 8, Suite 18, 100 Walker Street, North Sydney NSW 2060. This Arborist Report has been requested for the SSDA submission in association with proposed development works at 59-67 Karne Street, Narwee NSW 2209. This Arborist Report refers to forty two (42) trees.

This report contains the following:-

1) All trees were assessed for Safe Useful Life Expectancy (SULE).
2) Genus and species of each tree.
3) Impact of the proposed development on each tree.
4) Impact of retaining tree on the proposed development.
5) The Tree Protection Zone (TPZ) calculated for each tree.
6) Any branch or root pruning that may be required for trees.
7) List trees within fifteen (15) metres of the site boundary.

Trees 21-34 will require a setback to ensure these trees are not affected by the works to the basement. The six (6) metre setback for these trees should be used on design drawings. There should be no level changes in this area, with the exception of the removal of the concrete. No trenching should occur through these setbacks. The current designs have achieved this.

Based on the plans and the bulk earth works plans (Diagram 2) provided Trees 4, 5, 7-16 are located within the building footprint and will require removal. Street Tree 39 is proposed to be removed due to the limitations of access to the site between the existing street trees. Trees within the site to be retained are numbered as 1, 2, 3, 6, 17-38. Street Trees 40 and 42 will be retained.

Trees 23-34 will require tree protection fencing as specified in Section 5.2 of this report. The specifications for a TPZ are in Section 5.4 of this report.

Street Trees 40 and 42, and Tree 6 will require trunk protection as specified in Section 5.3 of this report. This trunk protection will be required due to the proximity of heavy equipment operating near these trees. It is important to protect the bark on trees. Bark is a very effective barrier that helps to protect trees from pest, disease and decay pathogens.

Table of Contents

VERSION CONTROL

Date of Issue	Details
2/6/2022	Draft 1 issued
22/11/2022	Draft 2 issued
30/11/2022	Draft 3 issued
2/12/2022	Final version issued
17/5/2023	Updated civils and Final version issued
13/7/2023	Added RFI Response Summary

		Page
1	**INTRODUCTION**	4
2	**METHODOLOGY**	7
3	**RELEVANT BACKGROUND INFORMATION**	9
4	**RECOMMENDATIONS**	19
5	**TREE PROTECTION**	22
	Appendices	
	Tree TPZ and SRZ distances	27
1	**Tree Protection Plan**	28
	Tree Retention Values	29
2	**Tree Health and Condition Schedule**	30
3	**SULE methodology**	36
4	**TPZ and SRZ methodology**	37
5	**Tree Protection Fencing Specifications**	39
6	**Tree Protection Signs**	41
7	**TPZ and SRZ explanations**	43
8	**Tree structure information diagram**	44
9	**Explanatory notes**	45
10	**Bibliography**	46
11	**Curriculum Vitae**	47

1 INTRODUCTION

1.1 This report has been conducted to assess the health and condition of forty two (42) trees located at 59-67 Karne Street, Narwee NSW 2209. This report has been prepared for Opal Healthcare c/o CYRE Projects Pty Limited, Level 8, Suite 18, 100 Walker Street, North Sydney NSW 2060 as required for the State Significant Development Application (SSDA) submission in association with the proposed development works.

The purpose of this report is to collect the appropriate tree related data on the subject trees and to provide advice and recommendations to the design and possible construction alternatives to aid against any adverse impacts on the health of the subject trees to be retained.

The subject trees were assessed for their health and condition. This report also includes tree protection measures that will help retain and ensure that the long term health of the trees to be retained are not adversely affected by the proposed development in the future.

The following data was collected for each tree:

1) A site plan locating all trees over three (3) metres in height, including all street trees.
2) All trees were assessed for Safe Useful Life Expectancy (SULE), health and amenity value.
3) Genus and species identification of each tree.
4) Impact of the proposed development on each tree.
5) The Tree Protection Zone (TPZ) calculated for each tree.
6) Any branch or root pruning that may be required for trees.

Also noted for the purpose of this report were:

- Health and vigour; using foliage colour and size, extension growth, presence of deadwood, dieback and epicormic growth throughout the tree.
- Structural condition using visible evidence of bulges, cracks, leans and previous pruning.
- The suitability of the tree taking into consideration the proposed development.
- Age rating; Over-mature (>80% life expectancy), Mature (20-80% life expectancy), Young, Sapling (<20% life expectancy).

1.2 **Location:** The proposed development site is located at 59-67 Karne Street, Narwee NSW 2209, known as Lot 2 DP 518855, Lot 2 DP 16063, Lot 3 DP 16063. The proposed development site from herein will be referred to as "the Site".

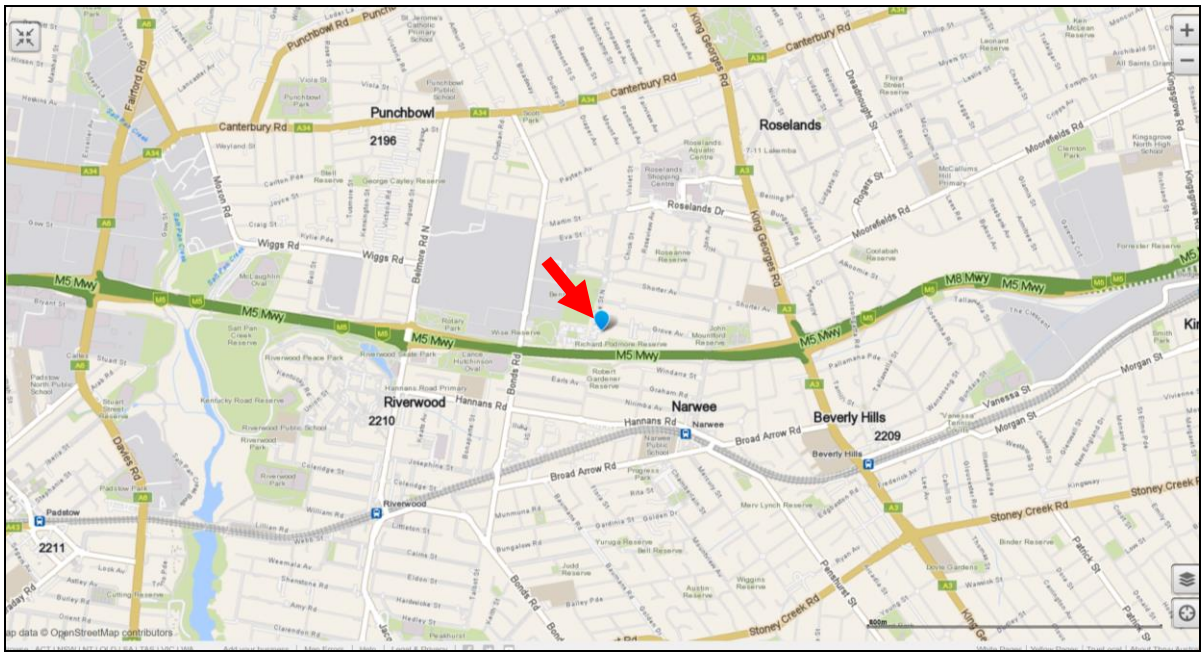


Diagram 1: Location of subject site, 59-67 Karne Street, Narwee NSW 2209 (Red arrow) (whereis.com.au, 2022)

1.3 SEARs Reporting: The State Government Planning Secretary's Environmental Assessment Requirement (SEARs) for 59 -67 Karne Street, Narwee was issued by the Department of Planning, Industry and Environment on 22/06/2022. Point 8, Trees and Landscaping, in the Issue and Assessment Requirements SEARs table for this project (application number SSD 45024776), sets out the Arboricultural matters for this report.

In preparing this Report, the following SEARs requirements have been addressed for this project. Most matters have been addressed within this report, with the exception to matters that are required to be addressed by the Landscape Architect.Please see Table 1 below.

Key issue	**Requirement**	**Relevant report section**
8. Trees and Landscaping • Assess the number, location, condition and significance of trees to be removed and retained and note any existing canopy coverage to be retained on site. • Provide a detailed site-wide landscape plan, that: • Details the proposed site planting, including location, number and species pf plantings, heights of trees at maturity and proposed canopy coverage. • Provides evidence that opportunities to retain significant trees have been explored and/or informs the plan. • Demonstrates how the proposed development would: • Contribute to long term landscape setting in respect of the site and streetscape. • Mitigate the urban heat island effect and ensure appropriate comfort levels on site. • Contribute to the objective of increased urban tree canopy cover. • Maximise opportunities for green infrastructure, consistent with *Greener Places.*		Refer section 3 of this Report

Table 1: SEARs reporting table – 59 -67 Karne Street, Narwee

2 METHODOLOGY

2.1 To record the health and condition of the trees, a Visual Tree Assessment (VTA) was undertaken on the subject trees on 4th May 2022. This method of tree evaluation is adapted from Matheny and Clark, 1994 and is recognised by The International Society of Arboriculture, Arboriculture Australia and The Institute Australian of Consulting Arborists (IACA). It is also known as a Level 2: Limited Visual Assessment Process as per the International Society of Arboriculture best management practices titled *'Tree Risk Assessment"* (Smiley, Matheny & Lilly, 2011).

2.2 The State Environmental Planning Policy (Vegetation in Non Rural Areas) must be referred to for the proposed removal of trees/vegetation. Clauses 21.1 of the SEPP applies to vegetation in non – rural areas declared by the SCC, DCP chapter. Refer to the SEPP for the relevant LEP 2013 zones the SEPP applies to. Trees or other vegetation declared in this DCP chapter require a tree management permit if it is sought to ringbark, cut down, top, lop, remove, injure or wilfully destroy them. In this DCP a tree is declared if it meets any one or more of the following criteria:

(a). is 3 metres or more in height

(b). has a trunk circumference of 30 cm or more at natural ground level

(c). has a branch spread of three (3) metres or more

(d). Is a hollow bearing tree (has cavities in trunk or branches, which can be used by native animals for foraging, shelter, roosting and nesting).

2.3 **Height:** The heights and distances within this report have been measured with a Bosch DLE 50 laser measure.

2.4 **Tree Protection Zone (TPZ):** The TPZ is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. TPZ's have been calculated for each tree to determine construction impacts. The TPZ calculation is based on the Australian Standard *Protection of trees on development sites,* AS 4970, 2009. The Tree Protection Zones are shown in the Tree Protection Plan (Appendix 1, Plan 2).

2.5 Structural Root Zone (SRZ): The SRZ is a specified distance measured from the trunk that is set aside for the protection of tree roots, both structural and fibrous. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. SRZ areas are shown in the Tree TPZ and SRZ distances (Appendix 1, Plan 1) for the more significant site trees. The TPZ and SRZ are measured as a radial measurement from the trunk. No roots should be severed within the SRZ area. A detailed methodology on the TPZ and SRZ calculations can be found in Appendix 4.

2.6 Safe Useful Life Expectancy (SULE): The subject trees were assessed for a Safe Useful Life Expectancy (SULE). The SULE rating for each tree can be seen in the Tree Assessment Schedule (Appendix 2). A detailed explanation of SULE can be found in Appendix 3.

2.7 Plans and information provided: For this Arboricultural Report I was supplied the following documents:

- Architectural plan set by Group GSA for Narwee Aged Care Development as noted below;

DRAWING LIST - GROUPGSA			
Sheet Number	Sheet Name	Current Revision Date	Current Revision
DA0000	DRAWING SCHEDULE / SITE LOCATION PLAN	29/11/2022	A
DA1100	SITE PLAN	29/11/2022	A
DA2000	BASEMENT PLAN	29/11/2022	B
DA2001	GROUND FLOOR PLAN	29/11/2022	B
DA2002	LEVEL 1 PLAN	29/11/2022	B
DA2003	LEVEL 2 PLAN	29/11/2022	B
DA2004	ROOF PLAN	29/11/2022	B
DA3000	ELEVATION	29/11/2022	A
DA3001	ELEVATION	29/11/2022	A
DA3100	SECTIONS	29/11/2022	A
DA3101	SECTIONS	29/11/2022	A
DA4101	GFA CALCULATIONS	29/11/2022	A
DA4103	DEEP SOIL DIAGRAM	29/11/2022	A
DA4104	LANDSCAPE DIAGRAM	29/11/2022	A
DA4105	COMMUNAL OPEN SPACE DIAGRAM	29/11/2022	A
DA6200	SIGNAGE DETAILS	29/11/2022	A
Grand total: 16			

- Stormwater Plan by Henry & Hymas marked drawing number 22M21_DA_C100 Rev 01 dated 31/10/2022;
- (Civil Integrated Water Management Plan by Henry and Hymas Dated May 2023, Revision 5)

2.8 Impact Assessment: An impact assessment was conducted on the site trees. This was conducted by assessing the site survey and plans provided by CYRE Projects Pty Limited. The plans provided were assessed for the following:

- Reduced Level (R.L.) at base of tree.
- Incursions into the Tree Protection Zone (TPZ).
- Assessment of the likely impact of the works.

3 RELEVANT BACKGROUND INFORMATION

3.1 The existing site contains a mix of exotic and native trees, the proposed building works entail construction of an aged care residential facility. The site was previously used as a care hospital for elderly. All previous structures have been demolished. Tree species on site were a mix of native and exotic tree species, with most being large mature specimens. Several trees are located around the perimeter of the site that could potentially be affected by any proposed plans.

3.2 **Environmental Significance**: The data collected for this Report is based on Clause 5.9 "Preservation of trees or vegetation" of the Canterbury Local Environmental Plan 2012 (LEP) is used to manage the pruning and removal of all trees within the City of Canterbury. The LEP is supported by the Canterbury Development Control Plan DCP 2012. The DCP Part 6.7: Preservation of trees and vegetation outlines the provision for the preservation and management of trees within the City of Canterbury. Clause 6.7.1 (i) states:

> *"A person must not ring bark, lop, prune, remove, injure or deliberately destroy any trees 5m in height or greater and/or with a trunk diameter of 150mm or greater measured 1.4m above ground level without a permit or development consent granted by the Council, except as otherwise stated in clause 5.9 Preservation of Trees or Vegetation of the CLEP or this part"*

In 2021, Council adopted the Draft Consolidated Development Control Plan to support the Draft LEP. The Draft DCP will come into effect when the Draft LEP is approved.

3.3 **Illegal tree removal:** Damaging or removing trees can result in heavy fines. Local Government does have the authority to issue on the spot fines known as penalty infringement notices (PINS) starting from $3,000 or can elect to have a potential tree damaging incident addressed in the Local Court. Recent cases, for example, include two (2) mature trees removed for development (Sutherland Shire Council (SSC) v Palamara, 2008) costing $4,500 in fines and $5,000 in court costs. SSC v El-Hage, 2010 concerning illegal tree removal of a single tree costing $31,500 in fines and $5,000 in costs. Poisoning trees can also incur substantial fines (SSC v Hill) resulted in a single tree fine that totalled $14,000 plus a $10,000 bond for a replacement tree. All of the above cases resulted in a criminal conviction for the offending parties.

3.4 **The Site Trees:** The site was inspected on 4th May 2022. Each tree has been given a unique number for this site and can be viewed on the Tree Plans (Appendix 1). This plan is based on the plan provided by CYRE Projects Pty Limited.

3.5 Native species on site include; *Melaleuca decora,* Kentia palm *(Howea fosteriana),* Bangalow palm *(Archontophoenix cunninghamiana),* Brushbox *(Lophostemon confertus),* Tallowwood *(Eucalyptus microcorys),* Weeping bottle brush *(Callistemon viminalis),* Spotted gum *(Corymbia maculata).*

3.6 Some smaller, less significant exotic species on site include *Cupresses sp., Magnolia soulangiana, Acer negundo, Prunus sp* and Leyland cypress *(x Cupressocyparis leylandii).*

3.7 The more significant trees on site are Trees 1, 3, 6 and 7. Trees 1 and 3 are semi mature Spotted gum *(Corymbia maculata).* Tree 2 is a suppressed specimen between these two trees. Trees 6 and 7 are both in good health and condition (Plate 2). The main trunks, first and second order branches are free of any cracks, splits or fruiting bodies. Old pruning wounds are showing good occlusion, a sign that these trees are photosynthesizing effectively. New extension growth was noted with leaf colour showing good vitality. These trees would be considered to have 95% live canopies. The basal area and woody root zone were free of any ground heaving, or lifting. Tree 7 was noted as having a small open cavity at approximately six (6) metres from ground level.

3.8 Trees outside the site: Along the northern boundary are various exotic shrubs planted along the fence line. To the east of the site are large Forest red gum *(Eucalyptus tereticornis).* These trees are in fair health and condition. The park has several Turpentine *(Syncarpia glomulifera)* and Forest red gum *(Eucalyptus tereticornis)* that are in good condition. Trees 39-42 are mature street trees that are Weeping bottle brush *(Callistemon viminalis).* The main trunks, first and second order branches are free of any cracks, splits or fruiting bodies. New extension growth was noted with leaf colour showing good vitality. These trees would be considered to have 95% live canopies. The basal area and woody root zone were free of any ground heaving, or lifting.

Plate 1: Image showing Trees 1-3. P. Vezgoff.

Plate 2: Image showing Trees 6 (Right) and 7 (Left). P. Vezgoff.

Plate 3: Image showing the canopy of Tree 6. P. Vezgoff.

Plate 4: Image showing Trees 22-34 to the east of the site. P. Vezgoff.

Plate 5: Image showing the Council park trees numbered as 17-20. These trees will not be impacted by any works. P. Vezgoff.

Plate 6: Image showing Trees 13 and 14. P. Vezgoff.

3.9 Trees 35, 36, 37 and 38 are growing on the adjoining property to the north. These species include *Cupresses sp., Magnolia soulangiana and Murraya.* These trees are all growing against the boundary fence. As seen in Plates 7-9 there is a slight change in levels along this boundary to an extent where this will work in with the proposed drainage designs along this boundary.

Plate 7: Image showing Tree 35. A change in level is noted by the sleeper edge. P. Vezgoff.

Plate 8: Image showing Trees 36 and 37. A change in level is noted by the ramp. P. Vezgoff.

Plate 9: Image showing Trees 39. A change in level is noted by the double sleeper edge. P. Vezgoff.

3.10 **Impacts:** Based on the plans and the bulk earthworks plans (Diagram 2) provided, Trees 4, 5, 7-16 are located within the building footprint and will require removal. Street Tree 39 is proposed to be removed due to the limitations of access to the site between the existing street trees. Trees within the site to be retained are numbered as 1, 2, 3, 6, 17-38. Street Trees 40 and 42 will be retained.

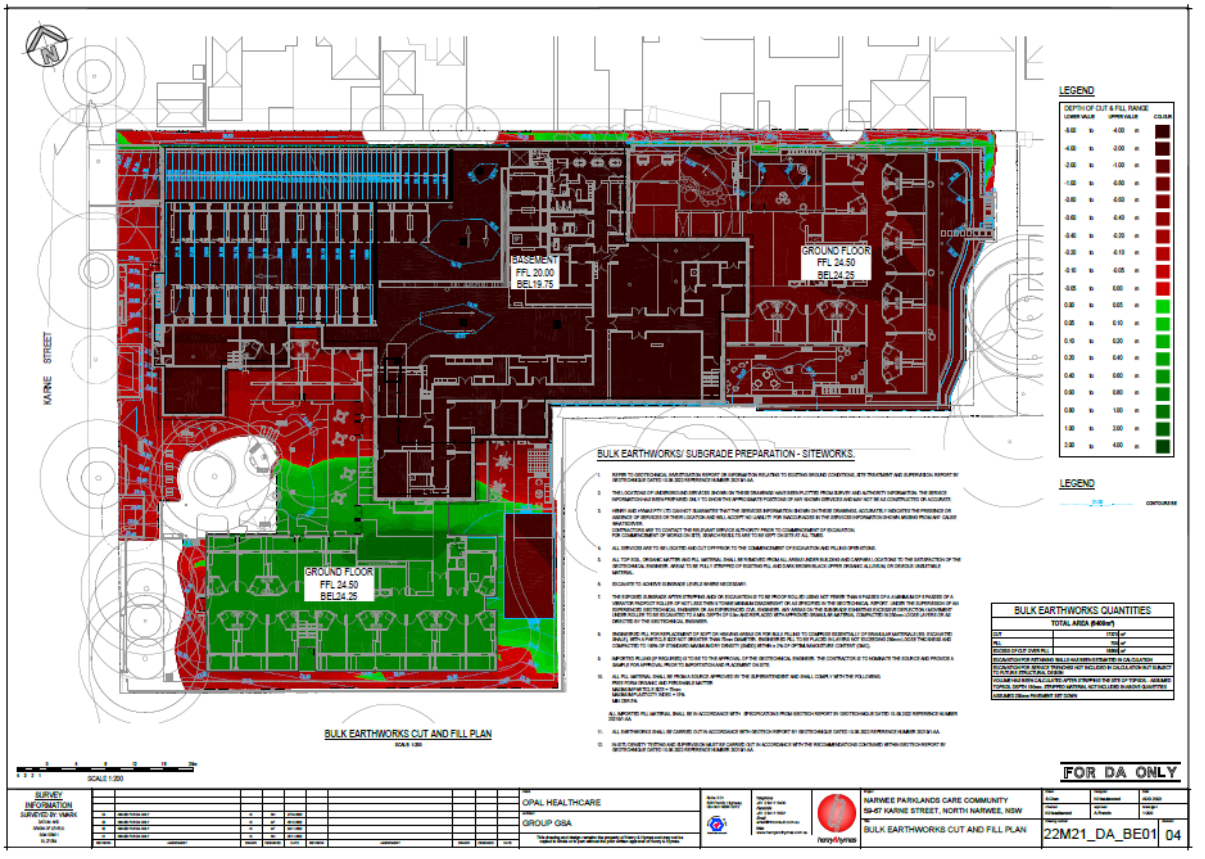


Diagram 2: Bulk earth works plans.

3.11 Some smaller shrubs growing within neighbouring properties to the north will not be impacted by any works, provided there is a nine hundred (900) millimetre set back from this boundary fence. These trees are numbered as Trees 35-38. Updated plans and designs (Civil Integrated Water Management Plan by Henry and Hymas Dated May 2023, Revision 5) show that in Section Drawings A-E, the area along the northern boundary, that the existing ground level impacts will be minimal to Trees 35-38 in terms of level changes.

3.12 Trees 24-34 are located on adjoining properties to the east. In particular, Trees 33 and 34 are large mature specimens that will require setbacks of six (6) metres from this boundary. These trees will also require protection from construction disturbance.

3.13 The street trees numbered as Trees 39-40 and 42 are more large shrub species, however they are well established. Tree 39 is proposed to be removed to allow for the main site entry. Tree 41 has died since the initial inspection. The TPZ for Trees 39, 40 and 42 is 4.2 metres. Based on the civil plans an incursion of 15% of the TPZ for Trees 39, 40 and 42 will occur (Diagram 3). These shrubs will tolerate this incursion.

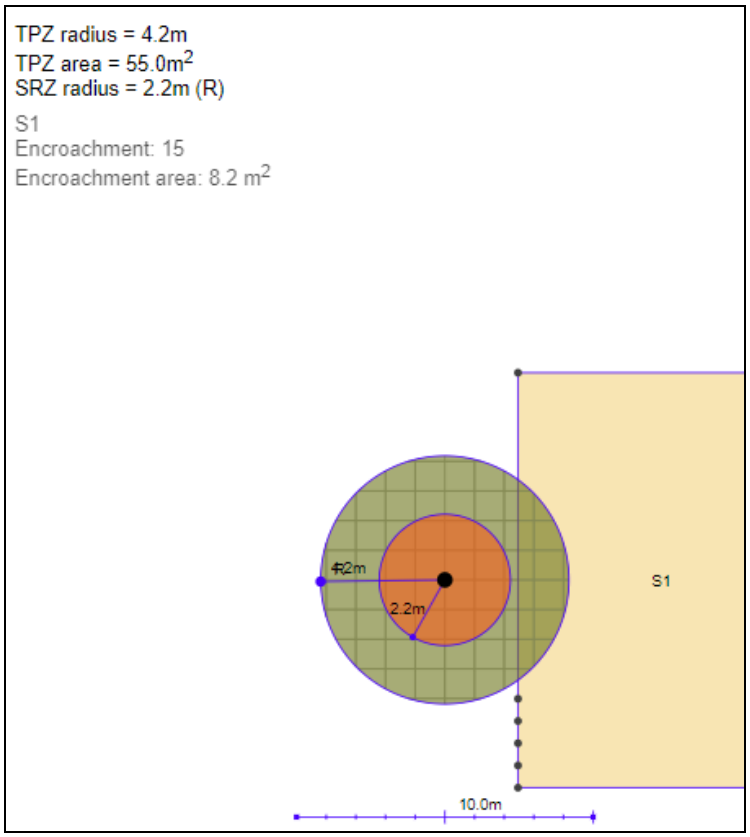


Diagram 3: Calculation of the incursions to the street trees.

3.14 Stormwater impacts: A storm water line passes through the TPZ of Trees 1 and 6, along with a pollution control pit. This has the potential to sever many roots on this tree if not undertaken correctly. Hydro excavation will allow the pipes to be threaded under the roots. Hydro excavation should also be used for the pollution control pit excavation.

3.15 Substation: The proposed substation, I have been informed, cannot be moved and the substation location has been selected to avoid adversely impacting on the proposed building fabric. With the limited remaining space along the street frontage, the substation has been positioned to avoid being too close to the proposed building which would require the removal windows along with the construction of a fire wall in proximity of the substation. As such, its location may encounter structural woody roots with the footing required for this piece of infrastructure. As such, this tree (Tree 3) may require removal pending exploratory root mapping.

3.16 The trees were assessed as below for the Significance of a Tree, Assessment Rating System or STARS©. The STARS© Matrix can be seen in Appendix 4. This rating can be seen in Plan form in Appendix 1 (Plan 3).

Significance Scale	**1 (High)**	**2 (Medium)**	**3 (Low)**
Tree No.	1, 3, 17-38	2, 6, 7, 13, 14, 39-42	4, 5, 8, 9-12, 15, 16

4 RECOMMENDATIONS

4.1 A Project Arborist should be appointed to oversee the arboricultural related works for the project. The Project Arborist should be used for arboricultural certification services and also used as a point of contact should any questions arise during the project. As specified in AS 4970, 2009, a Project Arborist is a person with a minimum Australian Qualification Framework (AQF) level 5 Diploma of Arboriculture or Horticulture qualification.

4.2 Based on the plans provided Trees 4, 5, 7-16 and 39 are located within the building footprint and will require removal. Trees within the site to be retained are numbered as 1, 2, 3, and 6. Trees to be retained outside the site are numbered as 17-38, 40 and 42.

4.3 Trees 1-3 will require no level changes within the area of the proposed building and the road verge area. No trenching should occur through these setbacks. Protection of the root zone will be required so as to enable building works to be completed (See Section 5.5).

4.4 Plans indicate the existing levels to be retained below Tree 6. The proposed suspended timber deck on the southern side of this tree is acceptable in terms of allowing moisture and oxygen exchange to continue to occur across the root zone of Tree 6. Any excavations for post holes for the deck shall be hand excavated for the top five hundred (500) millimetres of soil profile. The Project Arborist shall inspect the holes and retain a photographic record once they are exposed.

4.5 With regards to Tree 3 and the possible impacts from the substation, a determination on the viability of retaining this tree can be made once the extent of roots is determined. As no other location options are available, the only option is that once construction commences, if too many structural roots are found then the tree may have to be removed for safety reasons (but ultimately the tree will be attempted to be retained).

4.6 **Stormwater impacts:** A storm water line passes through the TPZ of Trees 1 and 6 along with a pollution control pit. Either hand excavation or Hydro excavation will allow the pipes to be threaded under the roots without damaging them. Hydro excavation should also be used for the pollution control pit excavation. Water pressure to be set so as not to ringbark the roots. The Project Arborist will supervise these works.

4.7 **Substation:** The proposed substation and associated excavation shall be located to avoid, where possible, existing structural roots within its current designated location.

4.8 Trees 1 and 2 may require branches on the eastern portion of the canopy to be reduced to allow for scaffolding. These branches should be reduced back so as to maintain the canopy of the tree (ie, no lopping or 'flat topping'). Pruning points should be no greater than one hundred (100) millimetres in diameter. This pruning is known as selective pruning and can be read about in more detail in the Australian Standard for the Pruning of Amenity Trees (AS 4373) 2007.

4.9 Trees 21-34 will require a setback to ensure these trees are not affected by the works to the basement. The six (6) metre setback for these trees should be used on design drawings. There should be no level changes in this area, with the exception of the removal of the concrete. No trenching should occur through these setbacks. This is shown on the plans provided for this report.

4.10 The street trees numbered as Trees 40 and 42 should be retained. No excavations within one (1) metre of these trees should occur. Storm water lines should be designed around this one (1) metre setback for each of these trees. Hand excavation though the lawn road verge will be required.

4.11 Any connection for underground services that breach the TPZ distances of Trees 40, and 42 shall be underbored.

4.12 The side boundary fence will be required to be retained as post and pole construction (this includes colour bond type fencing). This type of fence will have minimal impact on the root system of the trees located on adjoining properties. Any solid brick type fence that requires concrete strip footings should be avoided, due to the likelihood of structural woody roots being severed on the trees on adjoining properties.

4.13 **Building material storage:** Areas on the Site shall have to be set aside for the exclusive use of:

- Construction access points
- Position of site sheds and latrines and temporary services
- Storage of materials

These points are to be outside of any TPZ area. Any area set aside for the stockpiling of soil and waste shall have the appropriate erosion control measures around this area as specified by an engineer. These erosion control measures shall be monitored and maintained regularly throughout the construction period of the Site. These measures are to restrict any waste material entering the TPZ areas of the trees to be retained.

4.14 Tree 41 has died since the initial inspection. Once removed, a new street tree is to be planted in its place. This tree should ideally be a Weeping Bottlebrush *(Callistemon Viminalis),* to match trees 40 and 42.

5 TREE PROTECTION

5.1 Trees to be protected: Trees 1-3, 6 and 22-34, 40, 42 will be required to be fenced for protection. All fencing shall be installed as specified in Section 5.2 (Tree Protection – Implementation of Tree Protection Zone). Indicative locations of the fencing will be shown in the Tree Protection Plan (Appendix 1, Plan 2).

5.2 Implementation of Tree Protection Zone: All tree protection works should be carried out before the start of demolition or building work. It is recommended that chain mesh fencing with a minimum height of 1.8 metres be erected as shown in the Tree Protection Plan (Appendix 1, Plan 2). Specifications for this fencing are shown in Tree Protection Fencing Specifications (Appendix 5). TPZ fencing shall comply with the Australian Standard *Protection of trees on development sites,* AS 4970, 2009.

5.3 Individual trunk protection: Trees 6, 40 and 42 will require trunk protection. This is achieved by attaching lengths of timber (75mm x 50mm x 2000mm) fastened around the trunk. Geotextile fabric or carpet underlay shall be wrapped around the trunk prior to the timbers being attached. These timbers are to be fastened with hoop iron strapping and not attached directly into the bark of the tree. These timbers are only to be removed when all construction is complete. See Plate 10 for an example of trunk protection. Trunk protection shall comply with the Australian Standard *Protection of trees on development sites,* AS 4970, 2009.

5.4 Implementation of Tree Protection Zone: All tree protection works should be carried out before the start of demolition or building work. It is recommended that chain mesh fencing with a minimum height of 1.8 metres be erected as shown in the Tree Protection Plan (Appendix 1, Plan 2). Specifications for this fencing are shown in Tree Protection Fencing Specifications (Appendix 5).

5.5 Root Zone Protection: Ply sheeting should be placed over the root zone of Tree 1-3 and 6 to reduce compaction over the root zone whilst works are occurring. This ground protection allows the TPZ fenced to be placed closer to a tree to allow construction access. See Plate A as an example. The area for ply sheeting can be seen in the Tree Protection Plan, Plan 2.

Plate A: An example of board protection to reduce compaction over the root zone. This technique should be used over the root zone of Trees 1, 2, 3 and 6. P. Vezgoff.

5.6 **Instructional videos:** Alternatively, you can view the Moore Trees short instructional films on the links below. These films are a quick onsite reference for builders, project managers and architects.

Film #1, Trunk Protection
https://www.youtube.com/watch?v=ehcFre6bp74
Film #2, Tree Protection Fencing
https://www.youtube.com/watch?v=ffMabxLN9nU
Film #3, TPZ Ground Protection
https://www.youtube.com/watch?v=Se-VlLi-AGQ

5.7 **The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ):** The TPZ is implemented to ensure the protection of the trunk and branches of the subject tree. The TPZ is based on the Diameter at Breast Height (DBH) of the tree. The SRZ is also a radial measurement from the trunk used to protect and restrict damage to the roots of the tree.

The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) have been measured from the centre of the trunk. TPZ and SRZ distances are all listed in the Tree Schedule (Appendix 2). The following activities shall be avoided within the TPZ and SRZ of any tree to be retained.

- Erecting site sheds or portable toilets.
- Trenching, ripping or cultivation of soil (with the exception of approved foundations and underground services).
- Soil level changes or fill material (pier and beam or suspended slab construction are acceptable).
- Storage of building materials.
- Disposal of waste materials, solid or liquid.

5.8 Tree Damage: If the retained trees are damaged, a qualified Arborist should be contacted as soon as possible. The Arborist will recommend remedial action so as to reduce any long term adverse effect on the tree's health.

5.9 Signage: It is recommended that signage is attached to the tree protection fencing. A sample sign has been attached in Appendix 6. This sign may be copied and laminated then attached to any TPZ fencing.

5.10 Arborist Certification: It is recommended that the developer/Contractor supply Council or the Principal Certifying Authority with certification from the Project Arborist three (3) times during the construction phase of the development in order to verify that retained trees have been correctly retained and protected as per the conditions of consent and Arborist's recommendations. The certification is to be conducted by a Qualified Consulting Arborist with AQF level 5 qualifications that has current membership with either Arboriculture Australia (AA) or Institute of Australian Consulting Arboriculturists (IACA). Arborist certification is recommended:

(1) Before the commencement of demolition or construction to confirm the application of mulch and fencing has been installed;
(2) At monthly intervals of the construction phase;
(3) At completion of the construction phase.

If you have any questions in relation to this report please contact me.

Paul Vezgoff
Consulting Arborist
Dip Arb (Dist), Arb III, Hort cert, AA, ISA
29th November 2022
Updated 17 May 2023

Appendix 1

Plan 1

Tree TPZ and SRZ distances

Plan 2

Tree Protection Plan

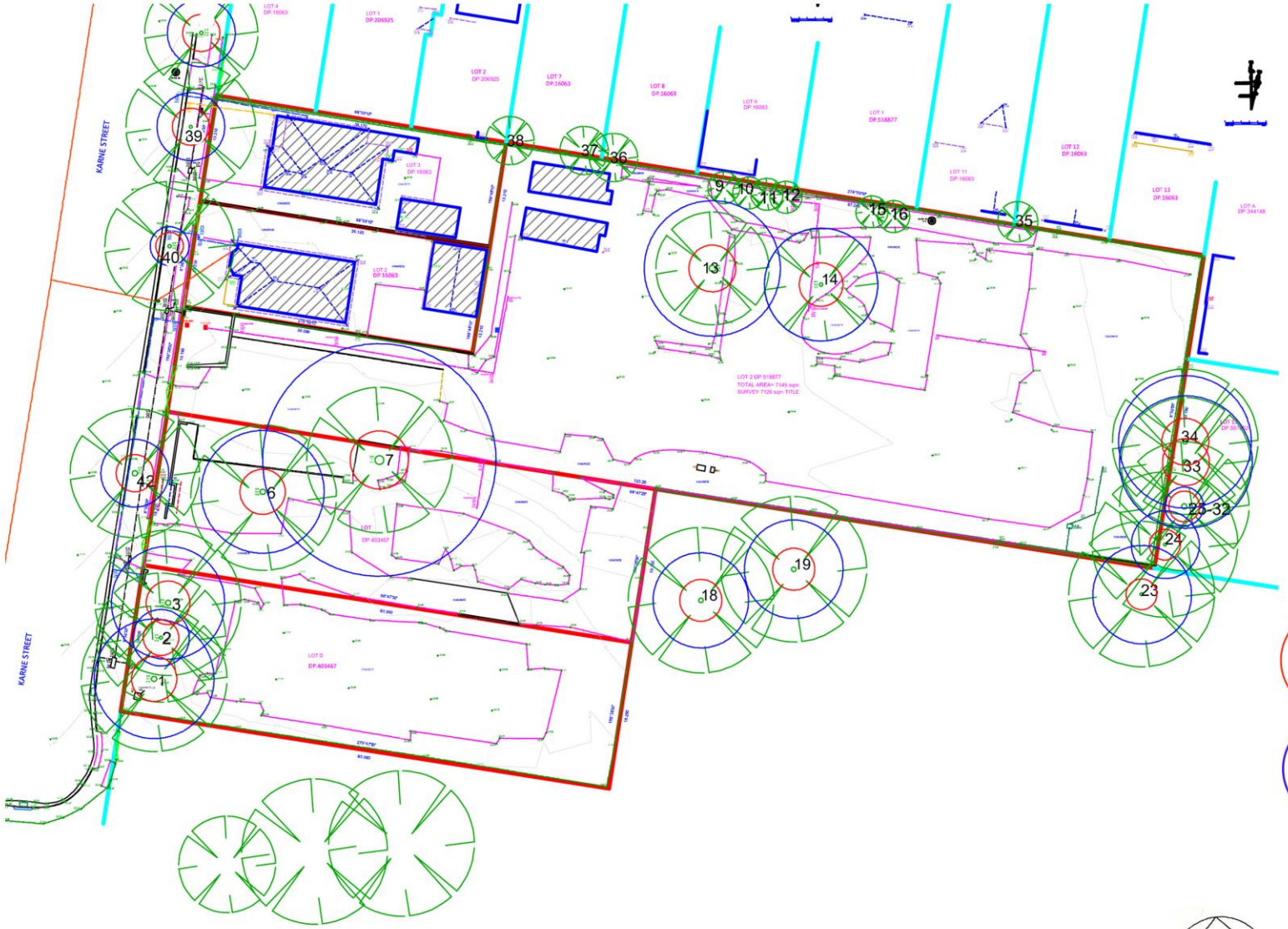
Plan 3

Tree Retention Value Plan

Moore Trees

TPZ and SRZ Distances

Plan 1



Structural Root Zone (SRZ). No roots over 50mm in diameter to be severed within this area. The area within this circle is also known as the Tree Protection Zone.

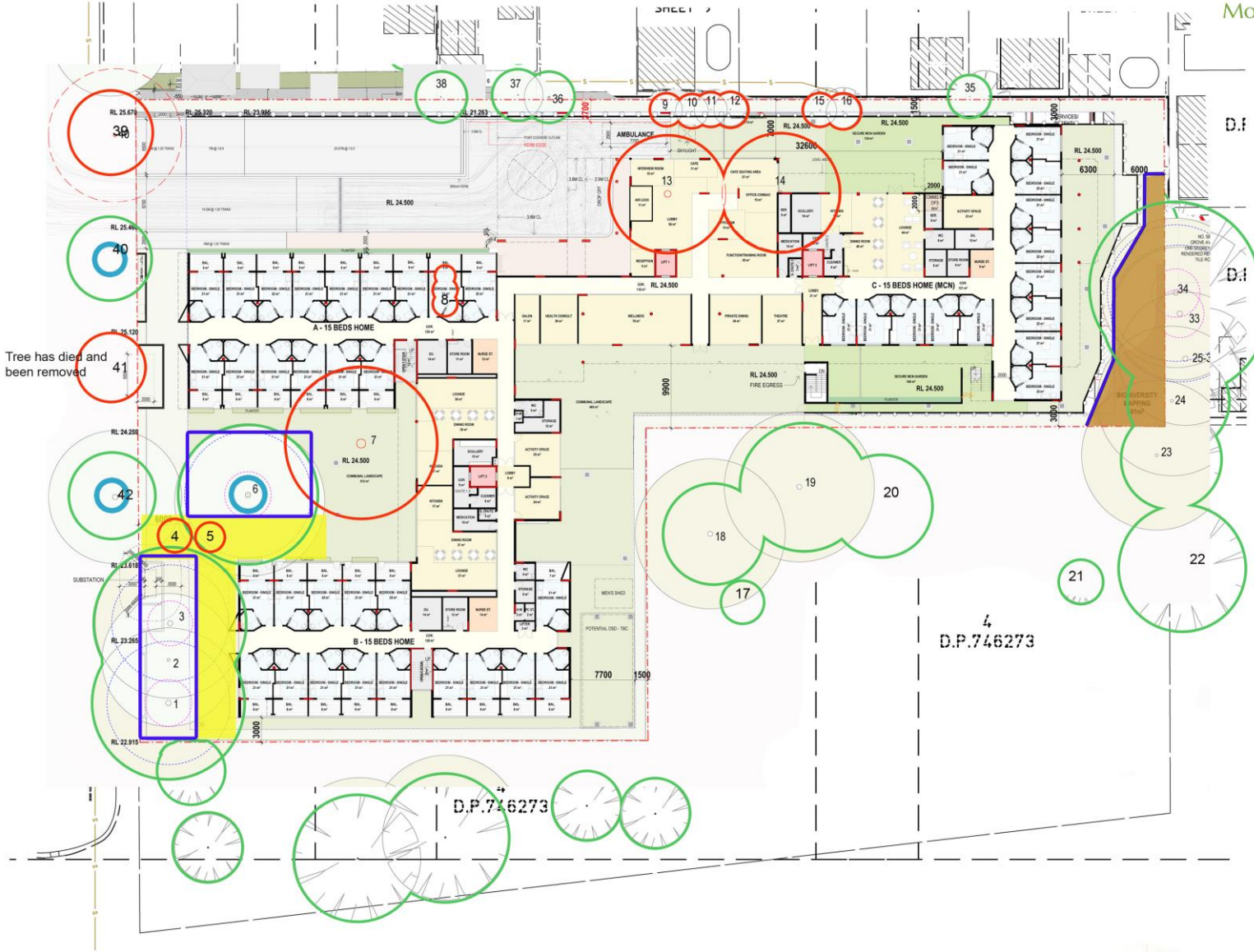
Tree Protection Zone (TPZ). TPZ area based on AS 4970. See *Recommendations* and *Tree Protection* section of Arborist Report.

Date:	04.05.2023
Drawn:	P.Vezgoff
Site Address:	59-67 Karne Street Narwee NSW

Tree protection plan

Moore Trees

Plan 2



Tree to be retained

Tree to be removed

Ply Sheeting. Ply sheeting to be placed over the root zone to the extent of the drip line. Sheeting to be 19mm thick 1200mm x 2400mm. Sheeting to remain until all construction works are completed.

Fence. Implementation of tree protection zone (TPZ). All tree protection works should be carried out before the start of demolition or building works. It is recommended that chain mesh fencing with a minimum height of 1.8 metres be erected

Trunk protection. Lengths of timber (75mm x 50mm x 2000) shall be fastened to the trunk or overhead branches that are greater than 80mm in diameter. These timbers are to be fastened with hoop iron strapping and not fixed directly onto the trunk of the tree.

Mulching. Area recommended for mulching. Prior to any demolition or construction work mulch shall be applied to a depth of 100mm to this area for the duration of the construction period. Once construction is complete the mulch shall be reduced to a depth of no greater than 70mm.

0 5 10 15 20 25 30

SCALE 1:300

Date: 21.11.2022
Drawn: P.Vezgoff
Site Address: 59-67 Karne Street
Narwee NSW

Tree Retention Values

MOORE TREES

Moore Trees

Plan 3

High

Medium

Low

Note: This Tree Retention Plan is seperate to the SULE categories that have been allocated to the site trees.

0 5 10 15 20 25 30

SCALE 1:300

Date: 29.11.2022
Drawn: P.Vezgoff
Site Address: 59-67 Karne Street
Narwee NSW

Appendix 2

Tree health & condition assessment schedule

TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE – 59-67 Karne Street, Narwee

Tree	Species	Height (m)	Spread (m)	DBH (mm)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (mm)
1	Spotted gum (Corymbia maculata)	16	5	620	100	No visual defects	1a >40 years	Good	Mature	Sewer pipe at base.	7440
2	Spotted gum (Corymbia maculata)	11	5	290	95	Included codom stems	2a May only live for 15-40 years	Fair	Mature	Suppressed by trees one and three	3480
3	Spotted gum (Corymbia maculata)	16	5	580	100	No visual defects	1a >40 years	Good	Mature		6960
4	Cupresses sp.	7	1	150	100	No visual defects	2c removed for more suitable planting	Fair	Mature		1800
5	Cupresses sp.	7	1	150	100	No visual defects	2c removed for more suitable planting	Fair	Mature		1800
6	Spotted gum (Corymbia maculata)	19	8	630	95	No visual defects	1a >40 years	Good	Mature	Tree is a large mature specimen bifurcating at approximately 7 m the tree has a main dominant leader growing within a grass lawn area.	7560
7	Tallowwood (Eucalyptus microcorys)	25	11	1200	95	No visual defects	2a May only live for 15-40 years	Good	Mature	This tree is the largest tree on site. It has a broad spreading canopy that has minimal deadwood. on the western side of the main stem is a small hollow.	14400
8	Magnolia soulangiana	3.5	1	150	95	No visual defects	3c Removed for a better specimen.	Good	Mature	Magnolia soulangiana	1800
9	Cupresses sp.	5	1.2	150	95	No visual defects	2c removed for more suitable planting	Fair	Mature	Multi stemmed specimen	1800
10	Cupresses sp.	5	1.2	150	95	No visual defects	2c removed for more suitable planting	Fair	Mature	Multi stemmed specimen	1800

Tree	Species	Height (m)	Spread (m)	DBH (mm)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (mm)
11	Cupresses sp.	5	1.2	150	95	No visual defects	2c removed for more suitable planting	Fair	Mature	Multi stemmed specimen	1800
12	Cupresses sp.	5	1.2	150	95	No visual defects	2c removed for more suitable planting	Fair	Mature	Multi stemmed specimen	1800
13	Brushbox (Lophostemon confertus)	10	5.5	700	95	Dead wood <50mm	2a May only live for 15-40 years	Fair	Mature	Extensive woody roots growing and building foundation	8400
14	Brushbox (Lophostemon confertus)	12	5	580	95	Dead wood <50mm	2a May only live for 15-40 years	Fair	Mature		6960
15	Cupresses sp.	5	1.2	150	95	No visual defects	2c removed for more suitable planting	Fair	Mature	Multi stemmed specimen	1800
16	Cupresses sp.	5	1.2	150	95	No visual defects	2c removed for more suitable planting	Fair	Mature	Multi stemmed specimen	1800
17	Turpentine (Syncarpia glomulifera)	7	2.5	250	100	No visual defects	1a >40 years	Good	Mature		3000
18	Forest red gum (Eucalyptus tereticornis)	19	7	490	95	Dead wood <50mm	1a >40 years	Good	Mature		5880
19	Forest red gum (Eucalyptus tereticornis)	20	6.5	510	95	Dead wood <50mm	1a >40 years	Good	Mature		6120
20	Forest red gum (Eucalyptus tereticornis)	17	5.5	450	95	Dead wood <50mm	1a >40 years	Good	Mature		5400
21	Turpentine (Syncarpia glomulifera)	7	2.5	250	100	No visual defects	1a >40 years	Good	Mature		3000
22	Forest red gum (Eucalyptus tereticornis)	17	5.5	450	95	Dead wood >50mm	4a Dead, dying or declining.	Poor	Mature		5400

Tree	Species	Height (m)	Spread (m)	DBH (mm)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (mm)
23	Melaleuca decora	7	5	350	95	Dead wood >50mm	2a May only live for 15-40 years	Fair	Mature	On adjoining property to the east in council reserve. Multi stemmed specimen	4200
24	Forest red gum (Eucalyptus tereticornis)	7	5	350	95	Dead wood >50mm	2a May only live for 15-40 years	Fair	Mature	On adjoining property to the east in council reserve.	4200
25	Forest red gum (Eucalyptus tereticornis)	17	5	350	95	Dead wood >50mm	2a May only live for 15-40 years	Fair	Mature	On adjoining property to the east. On fence line	4200
26	Forest red gum (Eucalyptus tereticornis)	17	5	350	95	Dead wood >50mm	2a May only live for 15-40 years	Fair	Mature	On adjoining property to the east. On fence line	4200
27	Leyland cypress (x Cupressocyparis leylandii)	7	1.5	200	95	No Value	2a May only live for 15-40 years	Fair	Mature	On adjoining property to the east. On fence line	2400
28	Leyland cypress (x Cupressocyparis leylandii)	7	1.5	200	95	No Value	2a May only live for 15-40 years	Fair	Mature	On adjoining property to the east. On fence line	2400
29	Leyland cypress (x Cupressocyparis leylandii)	7	1.5	200	95	No Value	2a May only live for 15-40 years	Fair	Mature	On adjoining property to the east. On fence line	2400
30	Leyland cypress (x Cupressocyparis leylandii)	7	1.5	200	95	No Value	2a May only live for 15-40 years	Fair	Mature	On adjoining property to the east. On fence line	2400
31	Leyland cypress (x Cupressocyparis leylandii)	7	1.5	200	95	No Value	2a May only live for 15-40 years	Fair	Mature	On adjoining property to the east. On fence line	2400
32	Leyland cypress (x Cupressocyparis	7	1.5	200	95	No Value	2a May only live for 15-	Fair	Mature	On adjoining property to the	2400

Tree	Species	Height (m)	Spread (m)	DBH (mm)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (mm)
	leylandii)						40 years			east. On fence line	
33	Forest red gum (Eucalyptus tereticornis)	25	10	680	95	Dead wood >50mm	2a May only live for 15-40 years	Fair	Mature	On adjoining property to the east. 1.8 from fence line	8160
34	Forest red gum (Eucalyptus tereticornis)	25	10	680	95	Dead wood >50mm	2a May only live for 15-40 years	Fair	Mature	On adjoining property to the east. On fence line	8160
35	Mock orange (Murraya paniculata)	4.5	2	180	95	No visual defects	2a May only live for 15-40 years	Fair	Mature	Multi stemmed specimen . On adjoining property to the north.	2160
36	Cupresses sp.	10	3	250	95	No visual defects	2a May only live for 15-40 years	Fair	Mature	Multi stemmed specimen . On adjoining property to the north.	3000
37	Cupresses sp.	10	3	250	95	No visual defects	2a May only live for 15-40 years	Fair	Mature	Multi stemmed specimen . On adjoining property to the north.	3000
38	Magnolia soulangiana. On adjoining property	3.5	1	150	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Magnolia soulangiana. On adjoining property	1800
39	Weeping bottle brush (Callistemon viminalis)	6.5	4.5	350	95	No visual defects	1a >40 years	Good	Mature	Street tree. Multi stemmed specimen	4200
40	Weeping bottle brush (Callistemon viminalis)	6.5	4.5	350	95	No visual defects	1a >40 years	Good	Mature	Street tree. Multi stemmed specimen	4200
41	Turpentine (Syncarpia glomulifera)								Sapling	DEAD	
42	Weeping bottle brush (Callistemon viminalis)	6.5	4.5	350	95	No visual defects	1a >40 years	Good	Mature	Street tree. Multi stemmed specimen	4200

KEY

Tree No: Relates to the number allocated to each tree for the Tree Plan.

Height: Height of the tree to the nearest metre.

Spread: The average spread of the canopy measured from the trunk.

DBH: Diameter at breast height. An industry standard for measuring trees at 1.4 metres above ground level, this measurement is used to help calculate Tree Protection Zones.

Live Crown Ratio: Percentage of foliage cover for a particular species.

Age Class:	Young:	Recently planted tree	Semi-mature:< 20% of life expectancy
	Mature:	20-90% of life expectancy	Over-mature:>90% of life expectancy

SULE: See SULE methodology in the Appendix 3

Tree Protection Zone (TPZ): The minimum area set aside for the protection of the trees trunk, canopy and root system throughout the construction process. Breaches of the TPZ will be specified in the recommendations section of the report.

Structural Root Zone (SRZ): The SRZ is a specified distance measured from the trunk that is set aside for the protection of the trees roots both structural and fibrous.

Appendix 3

SULE categories (after Barrell, 2001)[1]

SULE Category	Description
Long	*Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.*
1a	Structurally sound trees located in positions that can accommodate for future growth
1b	Trees that could be made suitable for retention in the long term by remedial tree care.
1c	Trees of special significance that would warrant extraordinary efforts to secure their long term retention.
Medium	*Trees that appeared to be retainable at the time of assessment for 15-40 years with an acceptable level of risk.*
2a	Trees that may only live for 15-40 years
2b	Trees that could live for more than 40 years but may be removed for safety or nuisance reasons
2c	Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide for new planting.
2d	Trees that could be made suitable for retention in the medium term by remedial tree care.
Short	*Trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable level of risk.*
3a	Trees that may only live for another 5-15 years
3b	Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
3c	Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
3d	Trees that require substantial remedial tree care and are only suitable for retention in the short term.
Remove	*Trees that should be removed within the next five years.*
4a	Dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
4b	Dangerous trees because of instability or loss of adjacent trees
4c	Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
4d	Damaged trees that are clearly not safe to retain.
4e	Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
4f	Trees that are damaging or may cause damage to existing structures within 5 years.
4g	Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).
4h	Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
Small	*Small or young trees that can be reliably moved or replaced.*
5a	Small trees less than 5m in height.
5b	Young trees less than 15 years old but over 5m in height.
5c	Formal hedges and trees intended for regular pruning to artificially control growth.

updated 01/04/01)

1 (Barrell, J. (2001) "SULE: Its use and status into the new millennium" in *Management of mature trees*, Proceedings of the 4th NAAA Tree Management Seminar, NAAA, Sydney.

Appendix 4

TPZ and SRZ methodology

Determining the Tree Protection Zone (TPZ)

The radium of the TPZ is calculated for each tree by multiplying its DBH x 12.

TPZ = DBH x 12

Where

DBH = trunk diameter measured at 1.4 metres above ground

Radius is measured from the centre of the stem at ground level.

A TPZ should not be less than 2 metres no greater than 15 metres (except where crown protection is required.). Some instances may require variations to the TPZ.

The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 metre outside the crown projection.

Determining the Structural Root Zone (SRZ)

The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree.

The SRZ only needs to be calculated when major encroachment into a TPZ is proposed.

There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings. An indicative SRZ radius can be determined from the trunk diameter measured immediately above the root buttress using the following formula or Figure 1. Root investigation may provide more information on the extent of these roots.

SRZ radius = $(D \times 50)^{0.42} \times 0.64$

Where

D = trunk diameter, in m, measured above the root buttress

NOTE: The SRZ for trees with trunk diameters less than 0.15m will be 1.5m (see Figure 1).

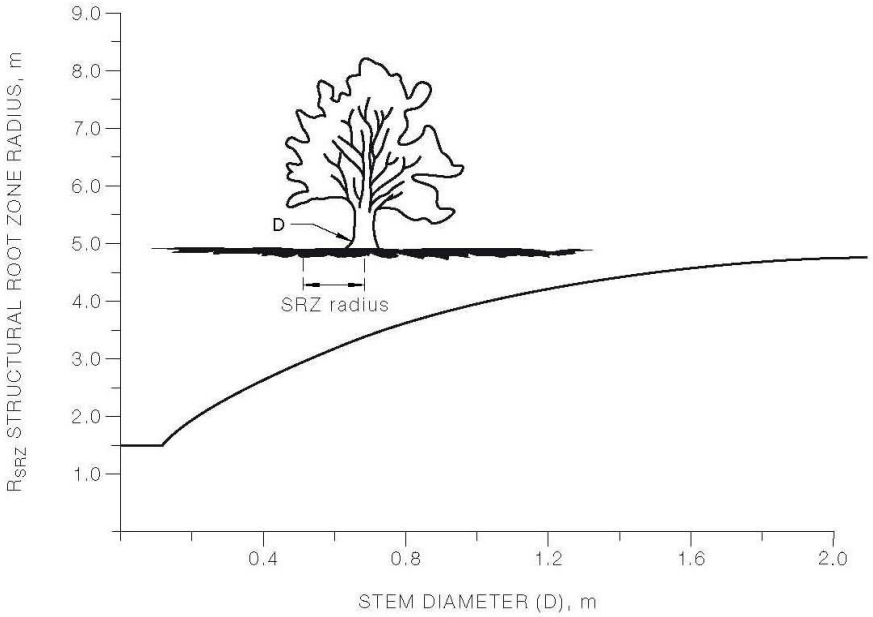


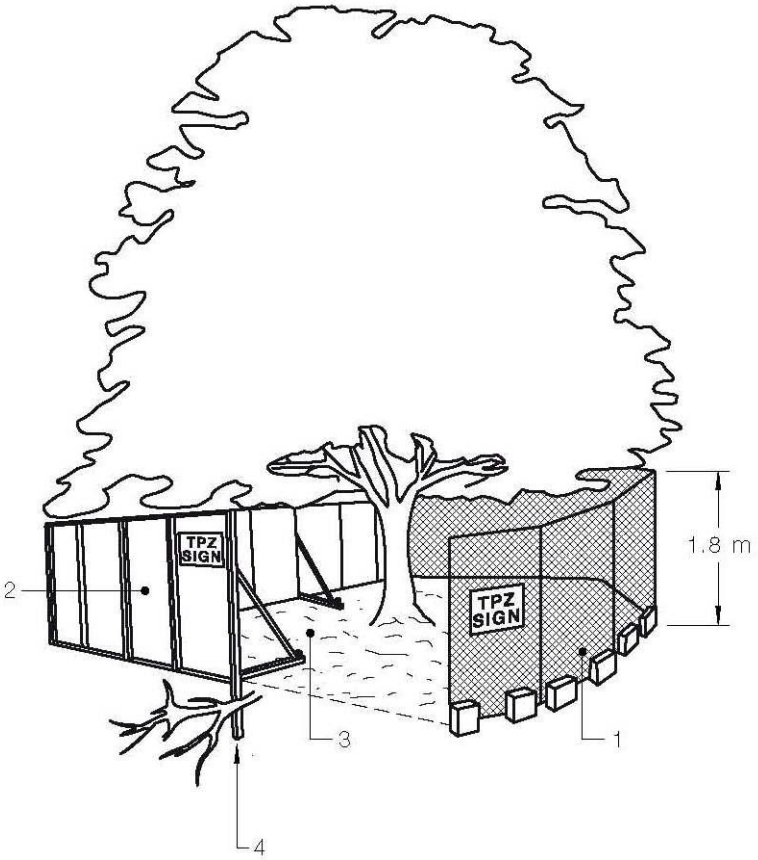
FIGURE 1 - STRUCTURAL ROOT ZONE

Notes:

1 R_{SRZ} is the structural root zone radius.
2 *D* is the stem diameter measured immediately above root buttress.
3 The SRZ for trees less than o.15 metres diameter is 1.5 metres.
4 The SRZ formula and graph do not apply to palms, other monocots, cycads and tree ferns.
5 This does not apply to trees with an asymmetrical root plate.

Appendix 5

Tree protection fencing specifications



LEGEND:

1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

Figure 1: Protective fencing as specified in AS 4970, 2009.

Appendix 6

Tree protection sign

sign sample

Moore Trees
Tree Consultancy
0411 712 887

Tree Protection Zone

Fence not to be moved without approval from Arborist

Within this fence there is to be

NO

Storage of materials

Trenching or excavation

Washing of tools or equipment

Appendix 7

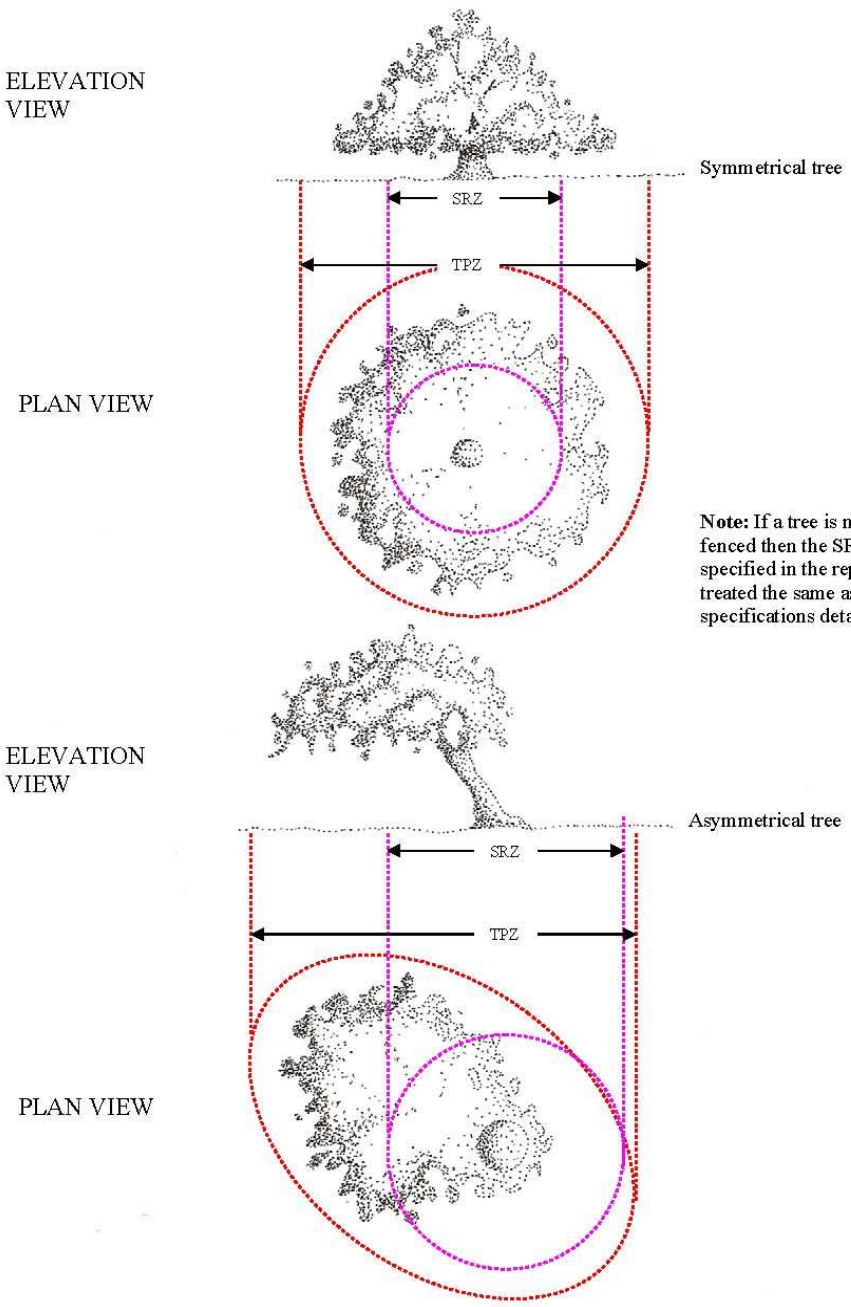


Figure 1: Indicative Tree Protection Zone (TPZ) and Root Protection Zone (SRZ)
Drawn: P. Vezgoff ©

Appendix 8

Tree structure information diagram

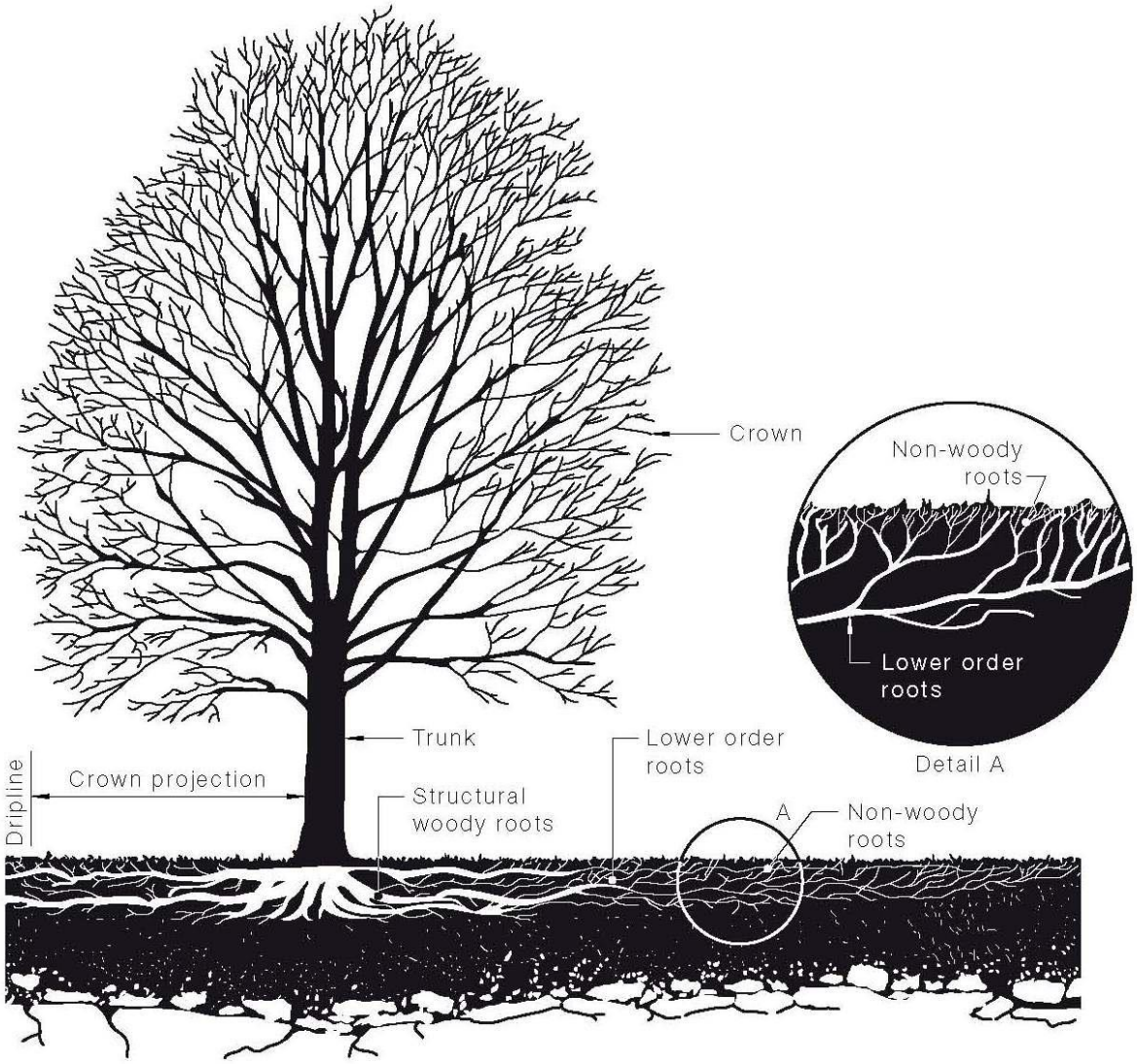


Figure 2: Structure of a tree in a normal growing environment (AS 4970, 2009.).

Appendix 9

Explanatory Notes

- **Mathematical abbreviations:** > = Greater than; < = Less than.

- **Measurements/estimates:** All dimensions are estimates unless otherwise indicated. Less reliable estimated dimensions are indicated with a '?'.

- **Species:** The species identification is based on visual observations and the common English name of what the tree appeared to be is listed first, with the botanical name after in brackets. In some instances, it may be difficult to quickly and accurately identify a particular tree without further detailed investigations. Where there is some doubt of the precise species of tree, it is indicated with a '?' after the name in order to avoid delay in the production of the report. The botanical name is followed by the abbreviation sp if only the genus is known. The species listed for groups and hedges represent the main component and there may be other minor species not listed.

- **Height:** Height is estimated to the nearest metre.

- **Spread:** The maximum crown spread is visually estimated to the nearest metre from the centre of the trunk to the tips of the live lateral branches.

- **Diameter:** These figures relate to 1.4m above ground level and are recorded in centimetres. If appropriate, diameter is measure with a diameter tape. 'M' indicates trees or shrubs with multiple stems.

- **Estimated Age:** Age is estimated from visual indicators and it should only be taken as a provisional guide. Age estimates often need to be modified based on further information such as historical records or local knowledge.

- **Distance to Structures:** This is estimated to the nearest metre and intended as an indication rather than a precise measurement.

Appendix 10

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Standards Australia Ltd
Sydney

Curriculum Vitae

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EDUCATION and QUALIFICATIONS

- 2013 / 2018 – ISA TRAQ qualification
- 2007 – Diploma of Arboriculture (AQF Cert V) Ryde TAFE. (Distinction)
- 1997 – Completed Certificate in Crane and Plant Electrical Safety
- 1996 – Attained Tree Surgeon Certificate (AQF Cert II) at Ryde TAFE
- 1990 – Completed two month intensive course on garden design at the Inchbald School of Design, London, United Kingdom
- 1990 – Completed patio, window box and balcony garden design course at Brighton College of Technology, United Kingdom
- 1989 – Awarded the Big Brother Movement Award for Horticulture (a grant by Lady Peggy Pagan to enable horticulture training in the United Kingdom)
- 1989 – Attained Certificate of Horticulture (AQF Cert IV) at Wollongong TAFE

INDUSTRY EXPERIENCE

Moore Trees Arboricultural Services **January 2006 to date**
Tree Consultancy and tree ultrasound. Tree hazard and risk assessment, Arborist development application reports
Tree management plans.

Woollahra Municipal Council **Oct 1995 to February 2008**
ARBORICULTURE TECHNICAL OFFICER
August 2005 – February 2008
ACTING COORDINATOR OF TREES MAINTENANCE
June – July 2005, 2006
Responsible for all duties concerning park and street trees. Prioritising work duties, delegation of work and staff supervision.
TEAM LEADER
January 2003 – June 2005
September 2000 – January 2003
HORTICULTURALIST
October 1995 – September 2000

Northern Landscape Services **July to Oct 1995**
Tradesman for Landscape Construction business

Paul Vezgoff Garden Maintenance (London, UK) **Sept 1991 to April 1995**

CONFERENCES AND WORKSHOPS ATTENDED

- International Society of Arboriculture Conference (Canberra May 2017)
- QTRA Conference, Sydney Australia (November 2016)
- TRAQ Conference, Auckland NZ / Sydney (2013/2018)
- International Society of Arboriculture Conference (Brisbane 2008)
- Tree related hazards: recognition and assessment by Dr David Londsdale (Brisbane 2008)
- Tree risk management: requirements for a defensible system by Dr David Londsdale (Brisbane 2008)
- Tree dynamics and wind forces by Ken James (Brisbane 2008)
- Wood decay and fungal strategies by Dr F.W.M.R. Schwarze (Brisbane 2008)
- Tree Disputes in the Land & Environment Court – The Law Society (Sydney 2007)
- Barrell Tree Care Workshop- Trees on construction sites (Sydney 2005).
- Tree Logic Seminar- Urban tree risk management (Sydney 2005)
- Tree Pathology and Wood Decay Seminar presented by Dr F.W.M.R. Schwarze (Sydney 2004)
- Inaugural National Arborist Association of Australia (NAAA) tree management workshop- Assessing hazardous trees and their Safe Useful Life Expectancy (SULE) (Sydney 1997).