Moore Trees
Arboricultural Services

ABN 90887347745

Arboricultural Development Assessment Report

Darlington Public School
Chippendale NSW 2008
August 2020

FINAL

Member 2020

Prepared for: SINSW - Darlington Public School
c/o Mace Australia Pty Ltd

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Summary

This report has been compiled for SINSW c/o Mace Australia Pty Ltd, Suite 17.03, Level 17, 44 Market Street, Sydney, NSW . The report concerns a proposed Development Application for Darlington Public School. This Arborist Report refers to twenty three (23) trees.

This report contains the following information required in City of Sydney Council Development guidelines:-

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) for each tree to be retained.
6) Any root barriers necessary, type and location.
7) Any branch or root pruning that may be required for trees.

Based on the plans provided, it appears possible to retain trees numbered as 33, 35-39, 44-46. Trees 20-25, 34, 40-43, 49, 50 and 51 are proposed to be removed. Trees 20-25 are located within the sports court footprint and Trees 49, 50 and 51 are located within an area required to be resumed for the levelling of the sports court area. Trees 34, 40-43 are smaller suppressed specimens that will never reach their full potential. Provided the existing steps along Trees 33, 35-39, and the small wall along Trees 44-46, can be retained or at least no excavations beyond these trees then these trees could be successfully be retained. As seen in the Tree Protection Plan the TPZ distances are within the Sports court works area however the roots from these trees will have been restricted in radial growth due to these steps and footings currently present. Any roots under the sports court area should be reasonably deep and provided the existing finished levels can be maintained impacts to these trees will be minimal.

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VERSION CONTROL

Date of Issue	Details
21 April 2020	Draft 1 issued
22 May 2020	Draft 2 issued
22 May 2020	Final issued
1 September 2020	Final issued (updated for T34 removal)

1 INTRODUCTION

1.1 This report has been conducted to assess the health and condition of twenty three (23) trees located at Darlington Public School, Golden Grove St, Chippendale NSW 2008. This report has been prepared for SINSW c/o Mace Australia Pty Limited on behalf of Darlington Public School as required for a Development Application at this site. The tree numbering is based on an existing tree numbering system for the site and as such is not consecutive. For the purpose of this report trees included are numbered as 20-25, 33-46, and 49-51. The proposed works entail the construction of a large sports court in the location of an existing outdoor play area associated with the school grounds.

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 subject trees' health where required.

The subject trees were assessed for their health and condition. Also included in this report are 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.
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) and Structural Root Zone (SRZ) calculated for each tree.

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.

- Age rating; Over-mature (>80% life expectancy), Mature (20-80% life expectancy), Young, Sapling (<20% life expectancy).

1.2 Documents and information provided: For this Arborist Report I have been provided with the Architectural Masterplan Report by Fjmt Studio for SSDA; and Tree Management Plan by Fjmt Studio, reference sheet #8200 Rev 02 dated 21/5/2020. The plans show the buildings and existing trees on the site and proposed development works.

1.3 Location: The site is located at Darlington Public School, known as Lot 592 in DP 752049 and Lot 100 in DP 623500. The proposed works are from herein will be referred to as "the Site". The study area of the school assessed for this report can also be seen in the Tree Protection Plan (Appendix 1).

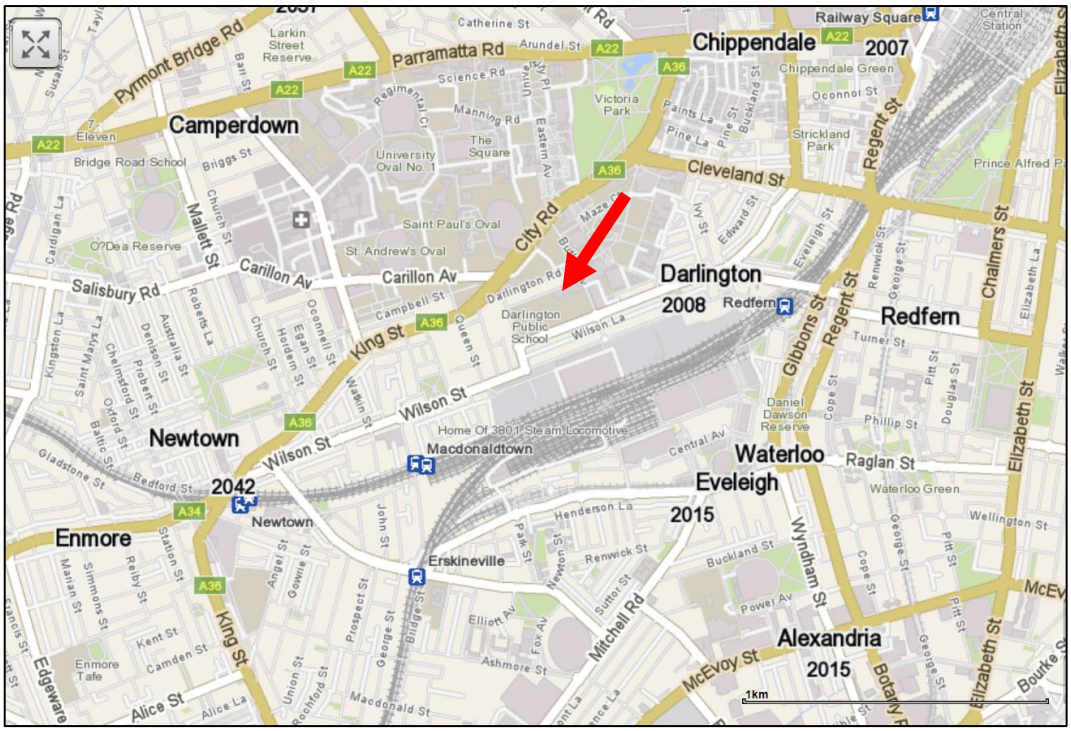


Diagram 1: Location of subject site, Darlington Public School (Red arrow) (whereis.com.au, 2020)

2 METHODOLOGY

2.1 To record the health and condition of the trees, an initial Visual Tree Assessment (VTA) was undertaken on the subject trees on 15th October 2018. This method of tree evaluation is adapted from Matheny and Clark, 1994 and is recognised by The International Society of Arboriculture. Individual tree assessments are listed in Appendix 2 of this report. All inspections were undertaken from the ground. No diagnostic devices were used on these trees.

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

2.3 **Tree Protection Zones (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. The TPZ calculation is based on the Australian Standard *Protection of trees on development sites,* AS 4970, 2009.

2.4 **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. The TPZ and SRZ are measured as a radial measurement from the trunk. No roots should be severed within this area. A detailed methodology on the TPZ and SRZ calculations can be found in Appendix 5. The TPZ and SRZ distances are listed in the Tree Schedule (Appendix 2).

2.5 **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 the Tree Assessment Schedule (Appendix 2). A detailed explanation of SULE can be found in Appendix 3.

2.6 Tree Significance & Retention Value: The Tree Significance & Retention Value used in this report is known as the Significance of a Tree, Assessment Rating System or STARS© system created by the Australian Institute of Consulting Arboriculturists (IACA). This system allows a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix,* are taken from the IACA Dictionary for Managing Trees in Urban Environments (Draper and Richards 2009). The system uses a scale of *High, Medium and Low significance* in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined. The Retention Value is selected between *High, Medium, Low and Priority for removal.* The Matrix can be seen in Appendix 4.

2.7 Tree Retention Value Plans: All trees have been allocated a Tree Retention Value. These values have been applied to the colour coded plans in Appendix 1. No trees assessed for this project were allocated the value of *Priority for removal.*

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 Mace Australia. 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 Darlington Public School is located in Chippendale in Sydney. Darlington Public School is an inner city school servicing the suburbs of Chippendale, Darlington, Redfern and Waterloo. The school was built in the 1970s (Diagram 2) however the school's trees are well established, with some being almost twenty (20) metres in height and spread.

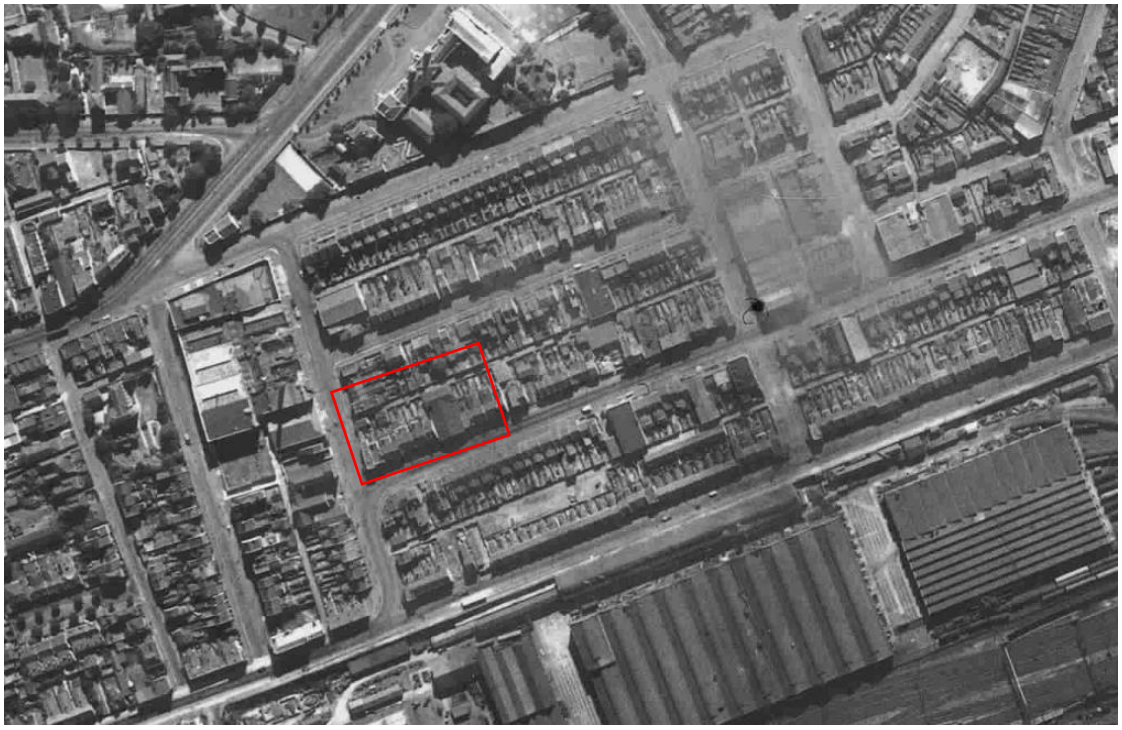


Diagram 2: The site as seen in 1943, devoid of trees (RTA From the skies, 2007).

3.2 **Environmental Significance**: Tree Management Controls in City of Sydney's Development Control Plan (DCP) provide the legislative tool for the protection of all trees located within the City of Sydney.

As outlined in Sydney Development Control Plan 2012, Section 3 – General Provisions this applies to trees that:

(a) have a height of five (5) metres or more; or

(b) have a canopy spread of over five (5) metres; or

(c) have a trunk diameter of more than three hundred (300) millimetres, measured at ground level; or

(d) is listed in the Register of Significant Trees.

It should be noted that the Local Environmental Plan 2012, Part 5 Clause 5.9 Preservation of trees or vegetation has now been repelled.

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 guilty parties.

3.4 **The Site Trees:** The site was inspected on 15th October 2018. Each tree has been given a unique number for this site and can be viewed on the Tree Location Plan (Appendix 1). All site trees have been tagged to correspond with the Tree Location Plan.

3.5 The larger site, being a school, consists of several buildings connected by covered walkways. Playground areas are located throughout the site. The study area of this report is located around an existing asphalted play area. For the purpose of this report the trees included are numbered as Trees 20-25, 33-46, and 49-51. The proposed works entail the construction of a large sports court in the location of an existing outdoor play area associated with the school grounds.

3.6 Trees 20 and 21 are some of the larger trees on site being some twenty (20) metres in height (Plate 1). The majority of the root zone of these trees is covered with hard surface. These trees have some previous failures which is to be expected from trees of this size and age. These trees were assessed as being in good health and condition. The main trunks, first and second order branches are free of any cracks, splits or fruiting bodies. New extension growth was noted. The basal area and woody root zones were free of any ground heaving, or lifting. Ideally an aerial inspection should occur to fully determine the condition of the main branch unions if they were to be retained.

Plate 1: Image showing Trees 21, 20. P. Vezgoff

3.7 Trees 32-43 are growing along the northern boundary fence (Plate 2). These are a mixed group of large mature *Eucalyptus* specimens but competing with some exotic specimens that have been planted between and under the large *Eucalyptus* specimens. These trees are also tightly grouped specimens that have a restricted root space and are covered with asphalt and playground rubberised matting up to the trunks. Varied levels are present as these trees have been planted on a stepped area (Plate 3).

3.8 Under these larger more dominant specimens are Trees 40-43 that are Liquidambar *(Liquidambar styraciflua)* and a single *Cupresses* specimen. These trees can be seen in Plate 3. Now suppressed, these trees will not reach maturity and as such are not long term viable specimens.

Plate 2: Image showing Trees 32-43. P. Vezgoff

Plate 3: Image showing surface condition of Trees 32-43. P. Vezgoff

Plate 4: Image showing Trees 44-46. P. Vezgoff

3.9 Trees 44-46 (Plate 4) are growing along the eastern boundary fence. These trees are younger specimens in excellent health and condition and provide a good screen between two properties. The majority of the root zones of these trees is covered with hard surface.

3.10 Although this part of Sydney may be high in sand content that would normally encourage deeper root systems, the site has an uncertain history. Based on Diagram 2, it appears that prior to the school being built, there were rows of terrace houses and warehouse structures, so subsoil conditions will be far from natural and would be highly disturbed. This will mean that old footings or foundations that may be subsurface will deflect woody roots keeping them close to the surface such as near Tree 20 (Plate 5).

Plate 5: Image showing surface roots from Tree 20. P. Vezgoff

3.11 **Safe Useful Life Expectancy (SULE)** is a method of evaluating individual trees. The evaluation is a subjective assessment, not an absolute judgement, because the nature of trees and opinions on trees can vary greatly. SULE assessments are made only by those who are experienced and knowledgeable in tree management. SULE is generally accepted and used world-wide as a method of evaluating trees. Each category has a number of sub-categories. These sub-categories should always be recorded to help future users of the information appreciate the reason for each allocation decision. It is normal to have instances where trees will not fit neatly into a single SULE category. The assessment of the site trees can be seen in Graph 1. In general, the trees were mostly assessed as being in good health. The list of SULE assessments for each tree can be seen in Appendix 2 (Tree Schedule)

3.12 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.

Significance Scale	**1 (High)**	**2 (Medium)**	**3 (Low)**
Tree No.	20, 21, 22, 24, 33-39, 44-46.	25, 49, 50, 51.	23, 40-43.

3.13 **Impacts:** Based on the plans, it appears possible to retain trees numbered as 33, 35-39, 44-46. Trees 20-25, 34, 40-43, 49, 50 and 51 are proposed to be removed. Trees 20-25 are located within the sports court footprint and Trees 49, 50 and 51 are located within an area required to be resumed for the levelling of the sports court area. Trees 34, 40-43 are smaller suppressed specimens that will never reach their full potential. Provided the existing steps along Trees 33, 35-39, and the small wall along Trees 44-46, can be retained or at least no excavations beyond these trees, then these trees could be successfully retained. As seen in the Tree Protection Plan the TPZ distances are within the sports court works area however the roots from these trees will have been restricted in radial growth due to these steps and footings currently present. Any roots under the sports court area should be reasonably deep and provided the existing finished levels can be maintained impacts to these trees will be minimal.

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 design process for this 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 Trees 33, 35-39 and 44-46 will require tree protection fencing as specified in Section 5.2 of this report. This fencing will be located at the Tree Protection Zones (TPZ) listed in the Tree Schedule (Appendix 2). The specifications for a TPZ are in Section 5.3 of this report. This fencing is to stay in place until all works are completed.

4.3 A flat bucket excavator is to be used for the removal of hard surfaces and excavations below Trees 33, 35-39 and 44-46. Any roots damaged that are smaller than fifty (50) millimetres in diameter to be cleanly cut with a pruning saw. Any roots with a diameter of greater than fifty (50) millimetres to be assessed by the project Arborist with minimum 48 hours' notice.

4.4 This report should be included in any tender documentation so that the contractor is aware of the importance of the managing and protecting the trees on this project.

5 TREE PROTECTION

5.1 Trees to be protected: 33, 35-39 and 44-46 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 are shown in the Tree Protection Plan (Appendix 1).

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). Specifications for this fencing are shown in Tree Protection Fencing Specifications (Appendix 6). Typically the fencing is set at the TPZ measurement (Table 1) however for this project the top area of the steps in front of trees 33, 35-39 and the wall along Trees 44-46 shall have to be used to locate the fences to allow the works to proceed.

5.3 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 the trees 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.

5.4 **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.

5.5 **Signage:** It is recommended that signage is attached to the tree protection fencing. A sample sign has been attached in Appendix 7. This sign may be copied and laminated then attached to any TPZ fencing.

5.6 **Soil compaction:** Mulch has been recommended to be placed within the TPZ areas. This is to help reduce soil compaction and moisture retention for the trees that are to be retained. The area for mulch can be seen in the Tree Protection Plan (Appendix 1). Mulch is to be no thicker than 100mm in depth and spread evenly across the TPZ area.

5.7 **Arborist Certification:** It is recommended that the contractor that undertakes these works 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 fencing has been installed;

(2) At mid point 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

20th April 2020
Updated 1 September 2020

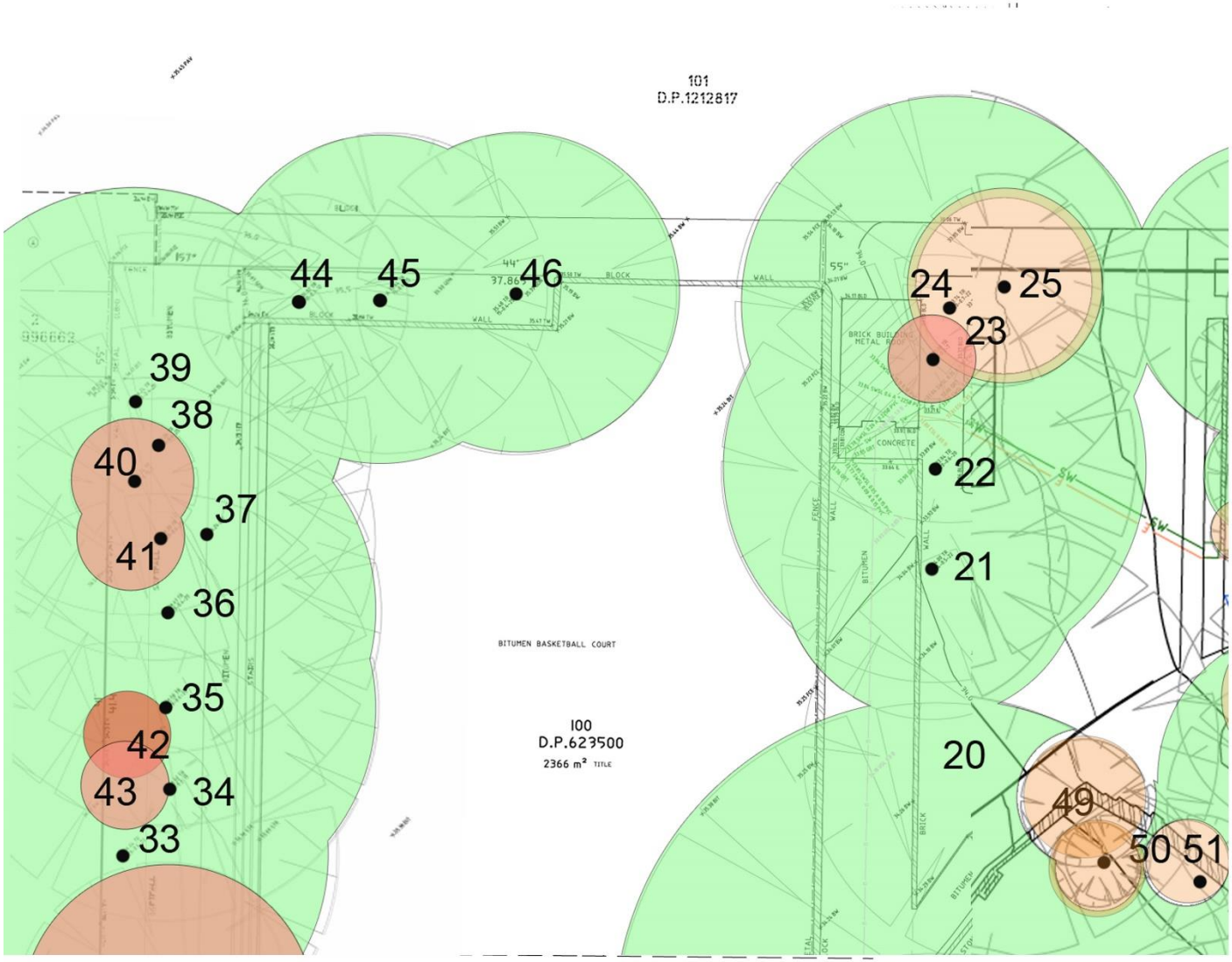
Appendix 1

Plan 1

Tree Location Plan
&
Retention Values

Plan 2

Tree Protection Plan



Tree Retention Values

MOORE TREES

Moore Trees

Plan 1

High

Medium

Low

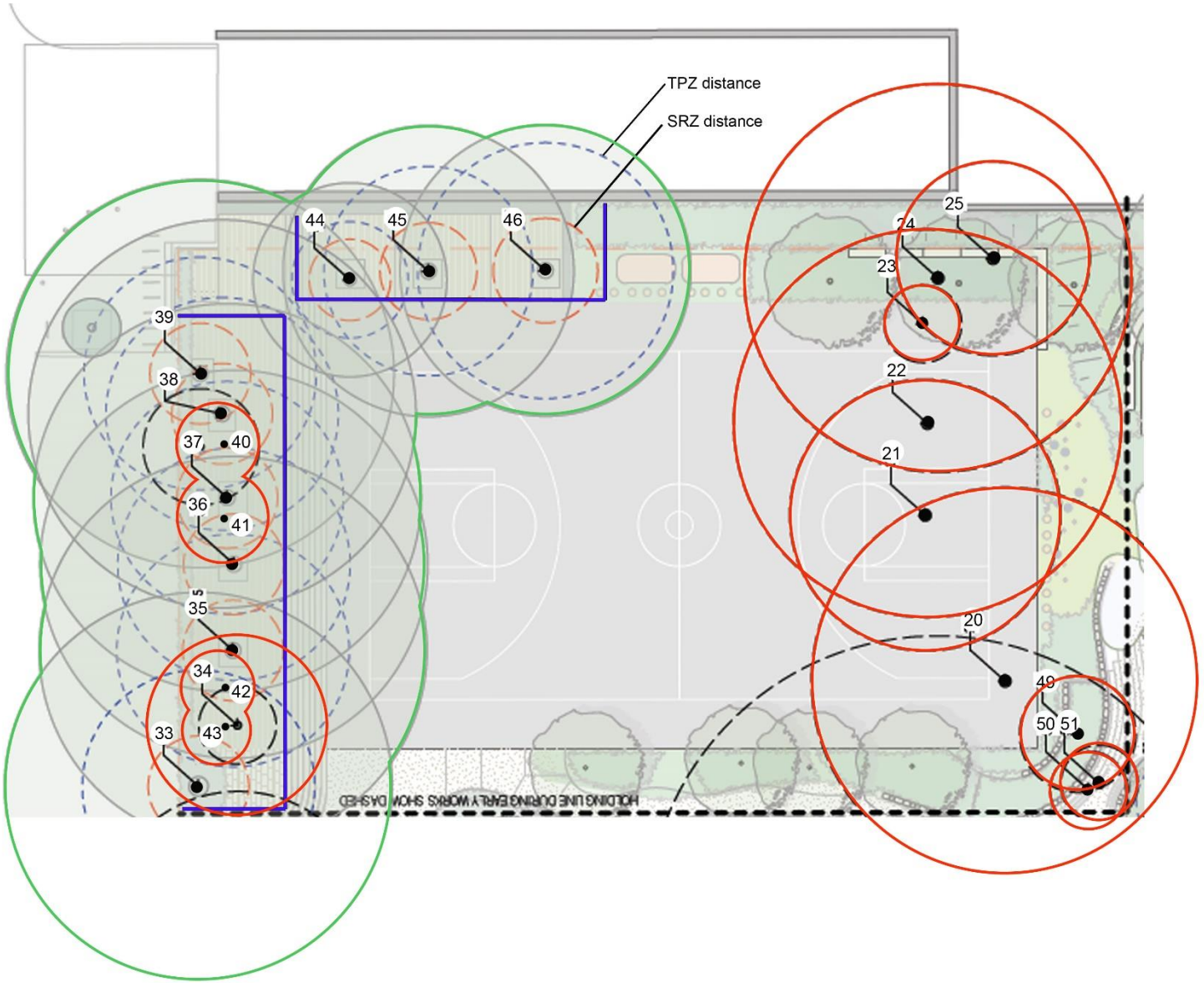
Note: The tree condition plan is seperate to the SULE categories that have been allocated to the site trees.

Date: 19.04.2020
Drawn: P.Vezgoff
Site Address: Darlington Public School
Darlington NSW

Tree protection plan

Moore Trees

Plan 2

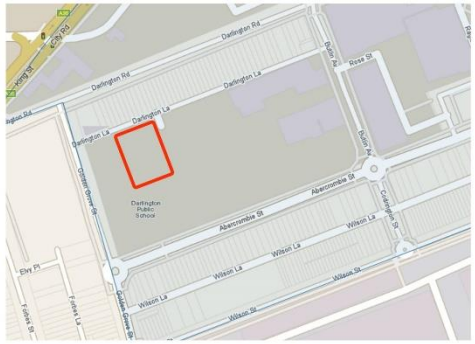


Tree to be retained

Tree to be removed

20-25, 34, 40, 41, 42, 43, 49, 50, 51

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



Date:	31.08.2020
Drawn:	P.Vezgoff
Site Address:	Darlington Public School Darlington NSW

Appendix 2

Tree health & condition assessment schedule

TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE – Darlington Public School Tree Data

Tree	Species	Height (m)	Spread (m)	DBH (m)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (m)	SRZ (m)
20	Lemon-scented gum tree (Corymbia citriodora)	20	8	0.6	95	Dead wood >50mm	2a May only live for 15-40 years	Good	Mature	Old storm damage noted. Section of dead wood	7.2	2.6
21	Sydney blue gum (Eucalyptus saligna)	20	8	0.6	95	No visual defects	2a May only live for 15-40 years	Good	Mature		7.2	2.8
22	Sydney blue gum (Eucalyptus saligna)	20	8	0.6	95	No visual defects	2a May only live for 15-40 years	Good	Mature		7.2	2.8
23	No Value	5	1	0.2	70	Root damage	2c removed for more suitable planting	Poor	Mature	Lopped for shed roof	2.4	1.6
24	Spotted gum (Corymbia maculata)	21	8	0.8	95	No visual defects	2a May only live for 15-40 years	Good	Mature		9.6	3.1
25	Lone Pine (Pinus brutia)	9	5	0.5	70	No visual defects	2a May only live for 15-40 years	Fair	Mature		6	2.6
33	Sydney blue gum (Eucalyptus saligna)	21	10	0.5	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Soft fall over root zone	6	2.6
34	Sydney blue gum (Eucalyptus saligna)	8	5	0.2	80	No visual defects	2c removed for more suitable planting	Fair	Mature	Asymmetrical canopy to the south suppressed specimen	2.4	1.9
35	Sydney blue gum (Eucalyptus saligna)	21	10	0.5	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Soft fall over root zone	6	2.6
36	Sydney blue gum (Eucalyptus saligna)	21	10	0.5	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Soft fall over root zone	6	2.6
37	Sydney blue gum (Eucalyptus saligna)	21	10	0.5	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Soft fall over root zone	6	2.6
38	Sydney blue gum (Eucalyptus saligna)	21	10	0.5	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Soft fall over root zone	6	2.6
39	Sydney blue gum (Eucalyptus saligna)	21	10	0.5	95	No visual defects	2a May only live for 15-40 years	Good	Mature	Soft fall over root zone	6	2.6

Tree	Species	Height (m)	Spread (m)	DBH (m)	Live canopy %	Defects	SULE	Condition	Age	Comments	TPZ (m)	SRZ (m)
40	Liquidambar (Liquidambar styraciflua)	9	3	0.18	108	No visual defects	2a May only live for 15-40 years	Good	Mature	Suppressed by larger trees	2.2	1.6
41	Liquidambar (Liquidambar styraciflua)	9	3	0.18	108	No visual defects	2a May only live for 15-40 years	Good	Mature	Suppressed by larger trees	2.2	1.6
42	Liquidambar (Liquidambar styraciflua)	9	3	0.2	108	No visual defects	2a May only live for 15-40 years	Good	Mature	Suppressed by larger trees	2.4	1.9
43	Cupresses sp.	7	0.5	0.15	100	No visual defects	2a May only live for 15-40 years	Good	Mature	Suppressed by larger trees	1.8	1.6
44	Sydney blue gum (Eucalyptus saligna)	11	5	0.25	95	No visual defects	2a May only live for 15-40 years	Excellent	Mature	Soft fall over root zone	3	2.1
45	Sydney blue gum (Eucalyptus saligna)	18	8	0.45	95	Dead wood >50mm	2a May only live for 15-40 years	Excellent	Mature	Soft fall over root zone. Sections of dead wood	5.4	2.5
46	Spotted gum (Corymbia maculata)	19	8	0.55	95	No visual defects	2a May only live for 15-40 years	Excellent	Mature		6.6	2.7
49	Broad leaved paperbark (Melaleuca quinquenervia)	8	2.5	0.25	90	No visual defects	1a >40 years	Good	Mature	Group of three stems	3	2.1
50	Illawarra flame tree (Brachychiton acerifolius)	7	4	0.2	95	No visual defects	2a May only live for 15-40 years	Good	Mature		2.4	1.9
51	Hymenosporum flavum	5	2	0.1	100	No visual defects	5a Small tree <5 m in height.	Good	Mature		1.2	1.3

KEY

Tree No: Relates to the number allocated to each tree for the Tree Protection 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

Tree Significance - Assessment Criteria

1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ - tree is appropriate to the site conditions.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

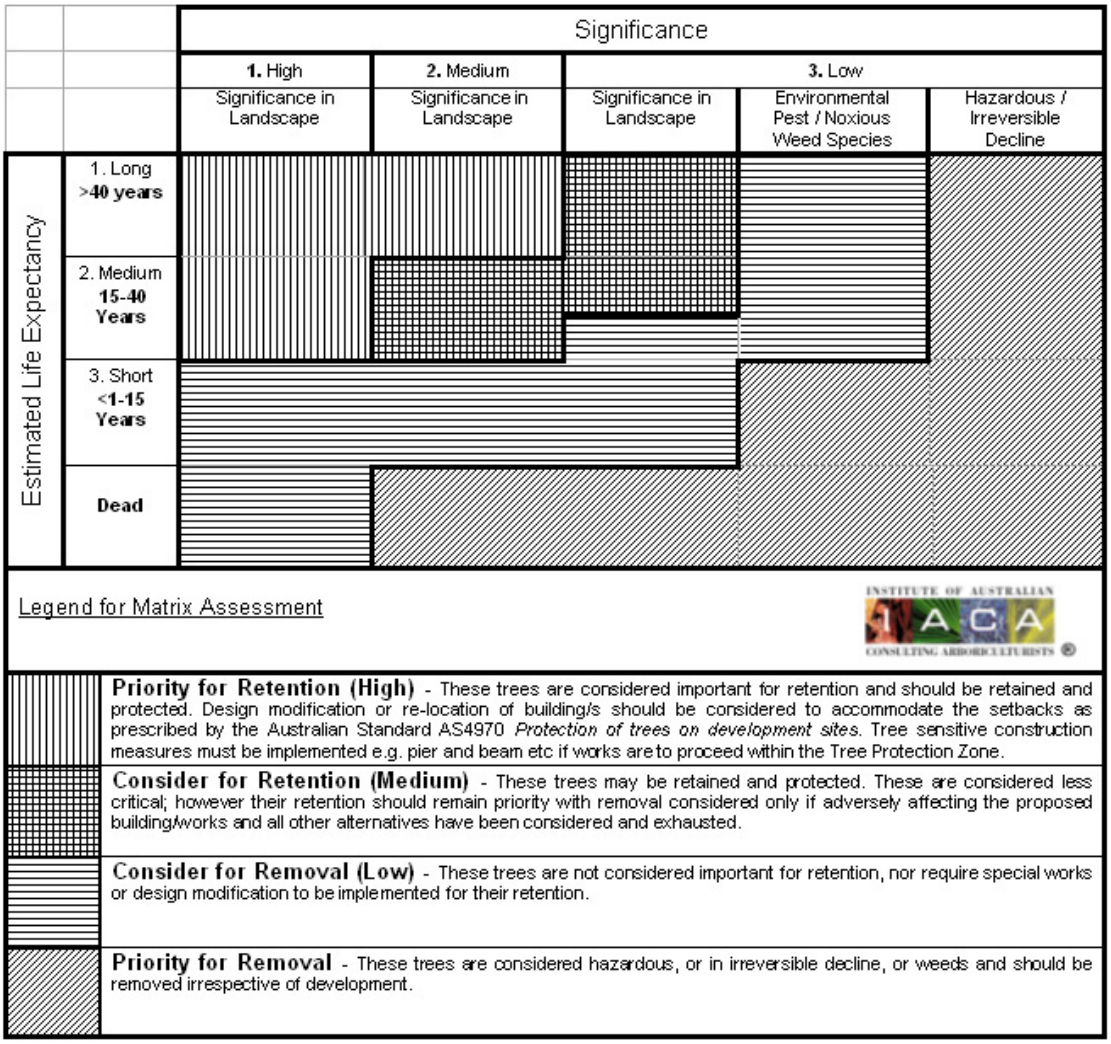
- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous, - The tree is

dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.



Legend for Matrix Assessment.

IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, **www.iaca.org.au**

Appendix 5

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).

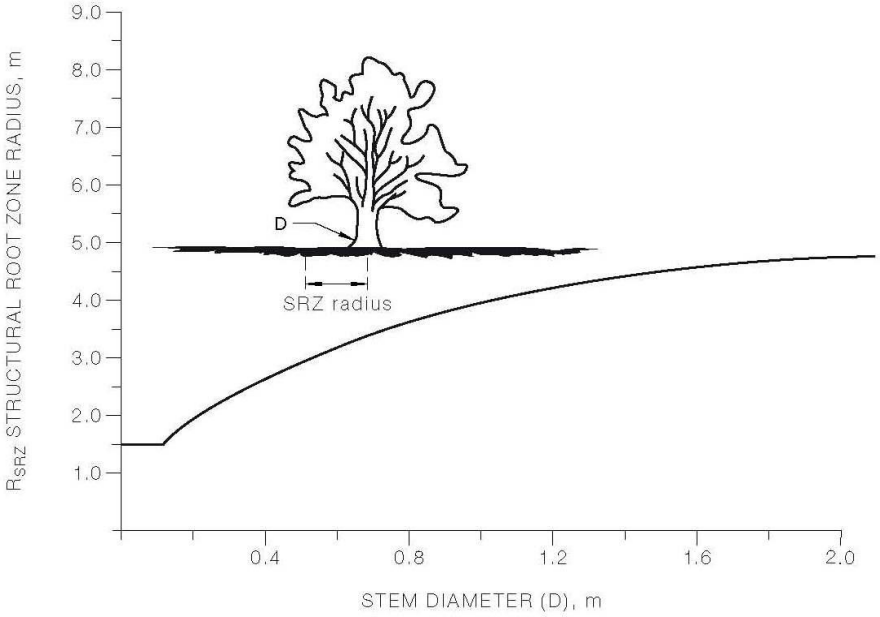


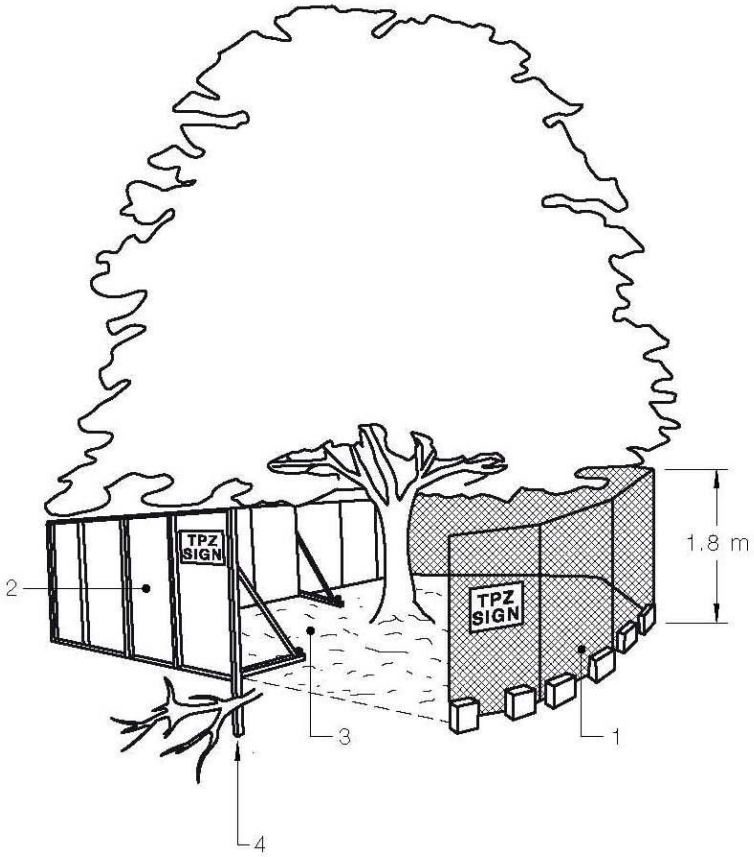
FIGURE 1 - STRUCTURAL ROOT ZONE

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 6

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 7

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 8

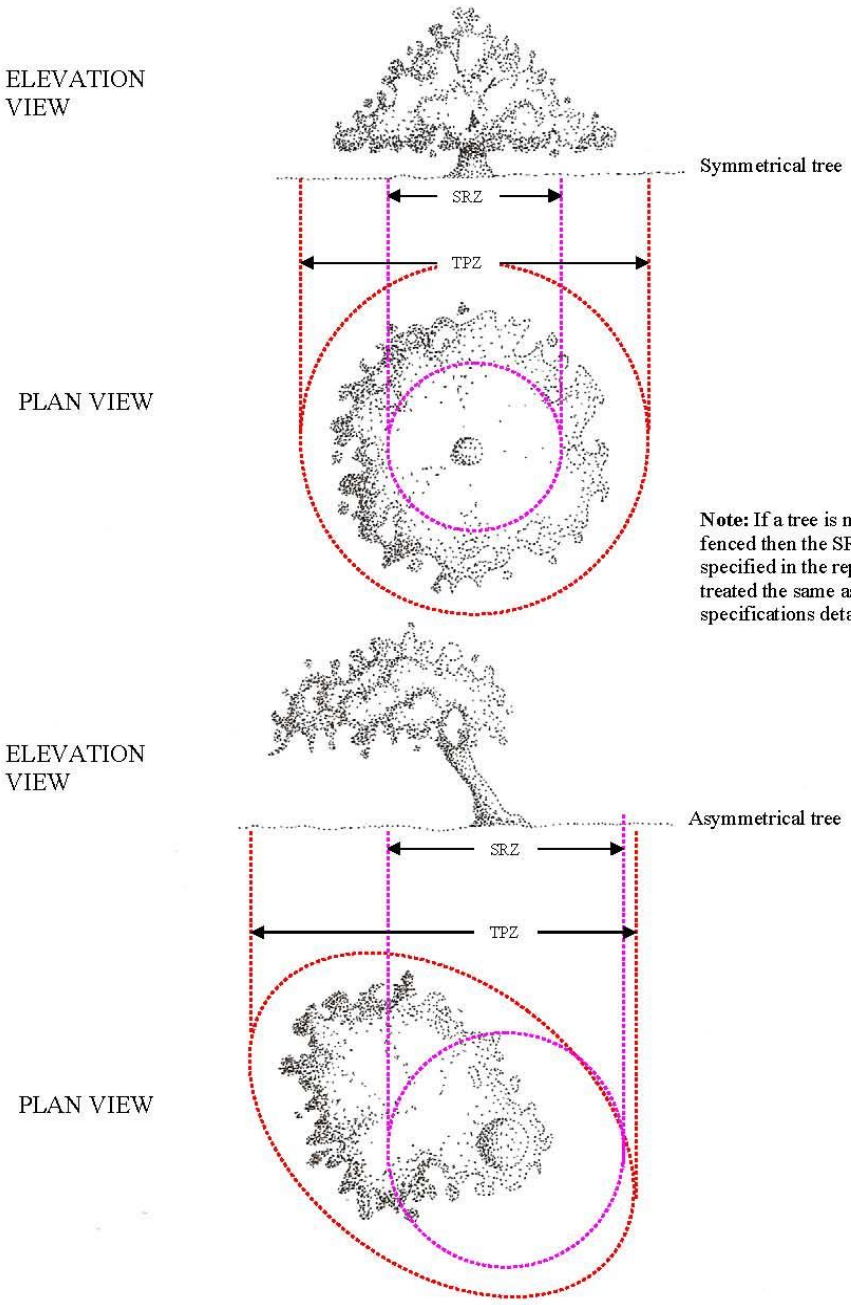


Figure 1: Indicative Tree Protection Zone (TPZ) and Root Protection Zone (SRZ)
Drawn: P. Vezgoff ©

Appendix 9

Tree structure information diagram

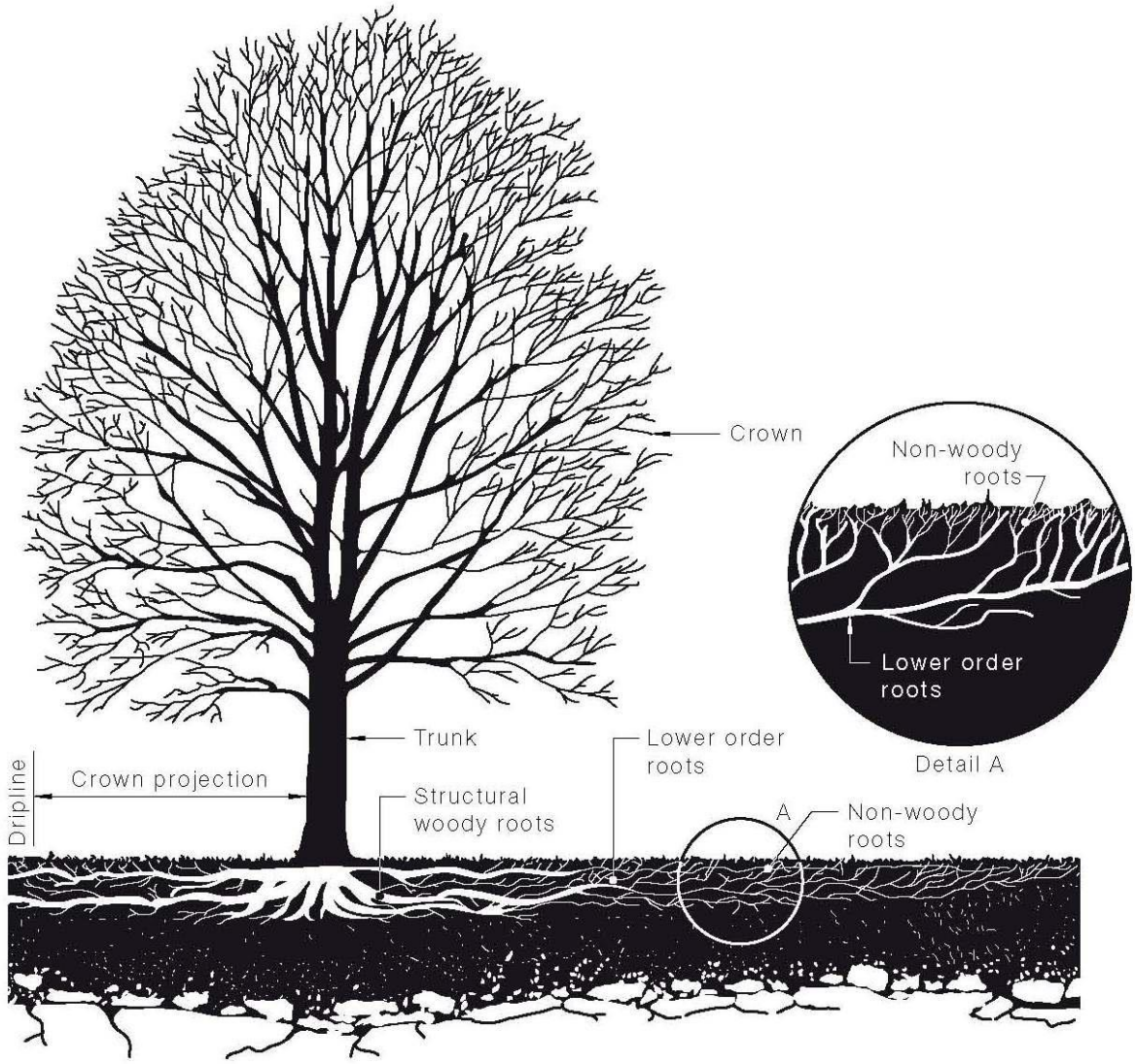


Figure 2: Structure of a tree in a normal growing environment (AS 4970, 2009.).

Appendix 10

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 11

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- 2013 – 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

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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
TEAM LEADER
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TEAM LEADER
September 2000 – January 2003
HORTICULTURALIST
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Northern Landscape Services **July to Oct 1995**
Tradesman for Landscape Construction business

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CONFERENCES AND WORKSHOPS ATTENDED

- International Society of Arboriculture Conference (Canberra May 2017)
- QTRA Conference, Sydney Australia (November 2016)
- TRAQ Conference, (October 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).