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REPORT: Addendum Arboricultural Impact
Assessment
Ref No: 20113d

REPORT COMMISSIONED FOR:

Lindfield Learning Village

100 Eton Road, Lindfield
New South Wales 2070

Phone: 9415 8006

22nd of May 2020

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1.0 ABSTRACT

1.1 An Addendum Arboricultural Impact Assessment report was commissioned by Lindfield Learning Village in relation to the proposed bus turning bay on site at 100 Eton Road, Lindfield NSW 2070. This report is in addition to McArdle Arboricultural Consultancy Arboricultural Impact Assessment dated the 30th August 2019, which discusses tree removals south of the site. The Visual Tree Assessment (VTA) was conducted on the 9th of April, 2020 and thirty (30) trees were assessed for Stages 2 and 3, in addition to the trees previously assessed for Stage 1.

1.2 The retention value of thirty (30) trees on site were assessed as follows:

- eleven (11) trees are of MODERATE to HIGH retention value.
- seven (7) trees are of MODERATE retention value.
- eight (8) trees are of LOW to MODERATE retention value.
- four (4) trees/tree groups are of LOW retention value.

1.3 As a result of the assessment the following intervention works are required:

Intervention	Tree Number
Remove - Impacted	5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 18.
Retain & Protect	1, 2, 3, 4, 11, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Sensitive Construction AQF level 5 Supervision for all work within TPZ	1, 17, 19, 21, 25, 26, 27, 30.
Tree Trunk Protection	1, 3, 4, 17, 19, 25, 26, 27.

1.4 The number of trees to be removed to accommodate the Phases 2b and 3 works is as follows; 12 trees to the east of the building for construction of the bus turnaround area; 14 trees to the south of the building for the extended driveway and landscaping works and 22 trees to the south of the building in poor health. It is noted that the removal of these 22 trees were identified in the previous Arboricultural Impact Assessment, however the trees were not included in the Exhibited RtS. The amended proposal involves the removal of an additional 16 trees compared to the previous loop road design. A total of 48 trees will be removed as part of the Phases 2(b) and 3 works.

1.5 Tree Protection Systems are required and must be installed, prior to commencement of the development for all retained trees and certified compliant by an AQF level 5 arborist. At this stage, the proposal includes replacement tree planting of three trees to the east of the building. Further replacement tree planting should be investigated in consultation with RFS subject to meeting bushfire requirements.

REFERENCES

McArdle Arboricultural Consultancy. Arboricultural Impact Assessment. 30 August 2019.
Ku-ring-gai Local Environmental Plan 2015.

2.0 INTRODUCTION

2.1 An Addendum Arboricultural Impact Assessment report was commissioned by Lindfield Learning Village in relation to the proposed bus turning bay on site at 100 Eton Road, Lindfield NSW 2070. This report is in addition to McArdle Arboricultural Consultancy Arboricultural Impact Assessment dated the 30th August 2019, which discusses tree removals south of the site. An additional thirty (30) trees on site were assessed by Mr. Jim McArdle B.Ed. Sc ACU, Dip Arb AQF L5 Ryde, QTRA, TRA Assessor and TCAA President and Miss Caryssa Jones B.BioCons MQ, Dip Arb AQF L5 (pending), Tree Assessor, who attended the site on the 9th of April, 2020.

2.2 The retention value of thirty (30) trees on site were assessed as follows:

- Eleven (11) trees are of MODERATE to HIGH retention value. These trees are numbered 1, 2, 3, 8, 16, 17, 20, 21, 22, 23, 27.
- Seven (7) trees are of MODERATE retention value and are numbered 4, 6, 10, 12, 15, 19, 26.
- Eight (8) trees are of LOW to MODERATE retention value and are numbered 5, 7, 9, 11, 13, 25, 29, 30.
- Four (4) trees are of LOW retention value. These trees are numbered 14, 18, 24, 28.

2.3 Eighteen (18) trees will require retention and protection, with eight (8) trees requiring sensitive construction and supervision within the TPZ by an AQF level 5 arborist. Tree Protection and mulch 75mm depth over the TPZ of all retained trees is required. There is to be no work within the TPZ of the retained trees unless supervised by an AQF level 5 arborist. All work within the TPZ of trees is to be carried out as specified in the discussion.

2.4 The proposed bus turning bay will have anticipated impacts on twenty-four (24) trees and will require the removal of twelve (12) trees for the proposed works. Two (2) trees, 9 and 13, have potential hollows which are to be removed and will require two nesting boxes to be made and installed according to RMS standards. Habitat checking can be completed prior to removal by a competent person.

2.5 At this stage, the proposal includes replacement tree planting of three trees to the east of the building. Further replacement tree planting should be investigated in consultation with RFS subject to meeting bushfire requirements.

2.6 The number of trees to be removed to accommodate the Phases 2b and 3 works is summarised below:

- 12 trees to the east of the building for construction of the bus turnaround area.
- 14 trees to the south of the building for the extended driveway and landscaping works.
- 22 trees to the south of the building in poor health. It is noted that the removal of these 22 trees were identified in the previous Arboricultural Impact Assessment, however the trees were not included in the Exhibited RtS.

The amended proposal involves the removal of an additional 16 trees compared to the previous loop road design. A total of 48 trees will be removed as part of the Phases 2(b) and 3 works.

2.7 McArdle Arboricultural Consultancy Pty Ltd prepared the report. The Arboricultural Impact Assessment report is developed to assess the trees at the above address for health and status. Ms Caryssa Jones B.Bio.Cons MQ, Tree Risk Assessor, Dip Arb AQF L5 (pending) under the supervision of Mr James McArdle B.Ed. Sc ACU, Dip Arb AQF L5 Ryde, QTRA, Tree Risk Assessor and TCAA President, conducted the evaluation using Visual Tree Assessment (VTA) according to Claus Mattheck and Breloer (1994) method for biological and lower level mechanical functions. The systems are in accordance with industry best practice and impact assessments are based upon the Australian Standards AS4970-2009 *Protection of Trees on Development Sites*, Australian Standards 4373-2007 *Pruning of Amenity Trees*.

3.0 AIMS

The aim of the report is to:

- 3.1 To assess the impacts of an additional thirty (30) trees on site at 100 Eton Road, Lindfield NSW 2070, according to the methodologies presented in this report.
- 3.2 To give recommendations with professional opinion and management of these trees, utilising *Australian Standards AS4970-2009 – Protection of Trees on Development Sites*.

4.0 METHODOLOGY

4.1 A ground Visual Tree Assessment (VTA) method was employed in this report. The VTA is a method used to identify visible signs on trees that indicate health and potential hazards; and is based on the theory of tree biology, physiology, tree architecture, and structure. This system is based on Mattheck's (1994) 'The Body Language of Trees', and uses the Health and Structural Condition of Tree-Visual (see Appendix B).

4.2 The collection of data is performed in the field by an AQF Level 5 Arborist. The assessment summarises the species, height and diameter, health and structural condition, TULE life expectancy, and retention categories assigned to each tree.

4.3 Testing on site may include mallet sounding, non-invasive testing for hollows, and probing for cavities and white ant infestation. Invasive tests will determine the depth of decay around cavities. All testing is ground-based and options may include further investigation.

4.4 Impact assessment data was recorded in the Tree Survey Table (Table 1) with various assessment methods. The structural setbacks are calculated according to *Australian Standards AS 4970 2009 – Protection of Trees on Development Sites*. Including:

Appendix A: Tree Useful Life Expectancy TULE 2014. Gives an extra assessment of life expectancy. *Adapted from Jeremy Barrell 2014.*

Appendix B: Health & Structural Condition of Tree Assessment. This describes the vigour and vitality of the tree. *Mattheck 1994 The Body Language of Trees.*

Appendix C: Retention Values. Some trees have special restrictions including cultural, scientific, historical or threatened categories and may be reviewed as part of this report or further reporting. *Morton, 2006 Determining Landscape Significance Rating.*

Appendix D: Tree Protection Notes. With figures and prohibitions from *Australian Standards AS 4970 2009 – Protection of Trees on Development Sites*.

Appendix E: Tree Planting Specifications. Plants supplied must be council-compliant, be in the container sizes and within the approved plant heights specified, according to *Australian Standards AS 2303 2018 – Tree Stock for Landscape Use*.

5.0 PLANNING GUIDELINES AND SPECIFIC LEGISLATION

5.1 Tree management measures are in place for Ku-ring-gai Council under the provisions of the trees and vegetation preservation for properties covered under the Ku-ring-gai Local Environmental Plan 2015.

5.2 According to the NSW Planning Portal, land zoning is classified as **B4: Mixed Use**, **E3: Environmental Management** and **R1: General Residential**; and the site is located on bushfire prone land classified as **Vegetation Category 1** and **Vegetation Buffer**. The site also occurs on a key site at **Crimson Hill**, which has **Terrestrial Biodiversity** value and **Class 5** acid sulfate soils.

5.3 A search of local and state heritage registers, tree registers and determination of landscape significance were carried out for trees identified in the survey. The UTS Ku-ring-gai campus is of state heritage significance, with a main building, gymnasium and footbridge of local heritage significance.

5.4 SIGNIFICANCE IN THE ENVIRONMENT

Trees are subject to the following legislation:

Biodiversity Conservation Act NSW (BIO Act 2016): Provides provisions for conserving biodiversity.

Environmental Protection and Biodiversity Conservation Act NSW (EPBC Act 1999): Provides provisions to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places.

Biosecurity Act NSW (BIO Act 2015): Refers to the protection of native plant communities, reducing the risk to human's health and the risk to agricultural production from invasive weeds.

NSW Bushfire Brigade 10/50 Legislation is enforced for this site; however, this site may exclude or otherwise restrict clearing under the 10/50 Code.

5.5 SIGNIFICANCE IN THE LANDSCAPE

Trees are generally categorised as either:

- Significant in the landscape; based on a broad landscape perspective, including streetscape. HIGH retention value.
- Significant in the landscape; based on a neighbourhood perspective. Retained due to its status but may have some conditions or health issues. HIGH retention value.
- Significant in the landscape; based on an adjacent area surrounding the site. HIGH retention value.
- Good and worthy of preservation; retained due to its status, but may have minor conditions or health issues. MODERATE retention value.
- Worthy of preservation; retained due to its status, but may have major conditions or health issues. MODERATE retention value (according to TULE).
- Retain if Possible. LOW retention value.
- Exempt. VERY LOW retention value.

REFERENCES: *Retention Values Tables based on Melanie Howden and Andrew Morton.*

Tree Useful Life Expectancy TULE Adapted from Jeremy Barrell for use by TCAA consultant arborists. Tree Contractor's Association of Australia TCAA.

6.0 ANALYSIS OF MAPPING CONTROLS



Figure 1: Acid Sulfate Soils.
Class 5 (yellow).



Figure 2: Bushfire Prone Land.
Vegetation Buffer (yellow).
Vegetation Category 1 (red).



Figure 3: Heritage.
UTS Ku-ring-gai Campus (brown).



Figure 4: Key Sites
Crimson Hill (purple line).



Figure 5: Land Zoning.
*B4: Mixed Use (grey).
E3: Environmental Management (beige).
R1: General Residential (green).*

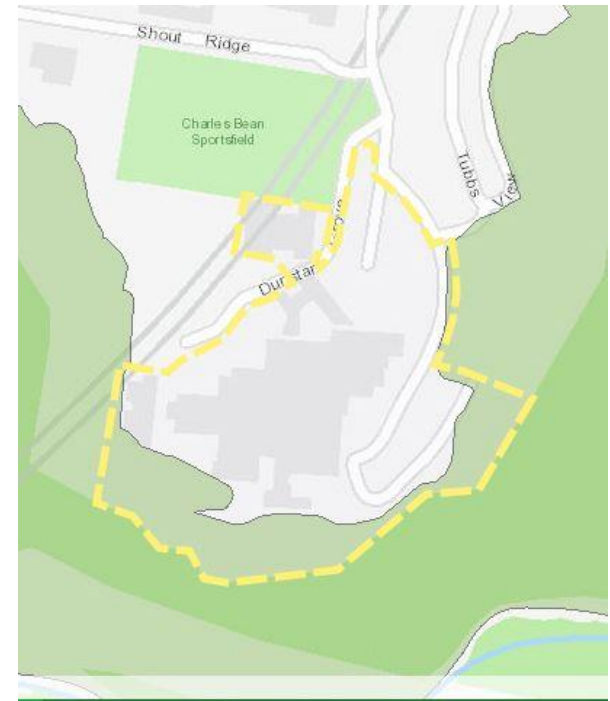


Figure 6: Terrestrial Biodiversity.
Biodiversity (green).

7.0 THE SITE

7.1 The site is located at 100 Eton Road, Lindfield NSW 2070.

7.2 SCALED SITE MAP



Figure 7: A scaled site map of Lindfield Learning Village at 100 Eton Road, Lindfield NSW 2070. The study area of the thirty (30) trees assessed is bounded by the red lines. (Scale: 20m = 5mm).

8.0 TREE SURVEY TABLE 1

Table 1: Tree Survey Table. This table lists the results of the ground VTA for this site.

Tree no.	GPS Location	Scientific& Common name	Crown Spread (m)	Height (m)	Diam (cm)	TPZ SRZ (m)	Condition of tree & failure potential (health &structure) (defects and measurements)	Tule	Retention Value	Intended works
1	-33.730358 151.015976 (Metal Tag 155)	<i>Eucalyptus grandis</i> Flooded Gum	10	26	70 80	8.4 3.01	Semi mature, exposed roots east, epicormics, damaged branch at 1m west, minor dead wood, good condition but poor development.	2d	Mod-High	RETAIN & PROTECT
2	-33.730358 151.015976	<i>Corymbia gummifera</i> Red Bloodwood	8	16	58 64	6.96 2.74	Semi mature, lean and unbalanced canopy north, previously pruned, exudation on trunk, dead wood, epicormics, damage at 2m north.	2d	Mod-High	RETAIN & PROTECT
3	-33.730358 151.015976	<i>Eucalyptus grandis</i> Flooded Gum	6	20	40 66	4.8 2.78	Immature, bulge at base, unbalanced canopy north due to adjacent tree.	2d	Mod-High	RETAIN & PROTECT
4	-33.730358 151.015976 (Metal Tag 170)	<i>Eucalyptus punctata</i> Grey Gum	6	16	28/25 45	4.56 2.37	Immature, twin stem, good condition but poor development, unbalanced canopy southeast growing on slope.	2d	Mod	RETAIN & PROTECT
5	-33.730358 151.015976	<i>Eucalyptus elata</i> River Peppermint	5	19	27 30	3.24 2	Immature, lean north, sparse foliage crown, anchorage issues, growing on steep slope.	3d	Low-Mod	REMOVE
6	-33.730358 151.015976	<i>Corymbia gummifera</i> Red Bloodwood	5	16	29 35	3.48 2.13	Immature, good condition but poor development, exudation at attachment point at 1m, epicormics.	2d	Mod	REMOVE
7	-33.730358 151.015976	<i>Eucalyptus elata</i> River Peppermint	7	17	37 47	4.44 2.41	Immature, severe lean southwest and unbalanced canopy south, growing on steep slope, anchorage issues, epicormics.	2d-3d	Low-Mod	REMOVE
8	-33.730358 151.015976	<i>Corymbia gummifera</i> Red Bloodwood	8	16	46 53	5.52 2.53	Semi mature, inclusion at 6m, twin stem, good condition but poor development. Growing on embankment.	2d	Mod-High	REMOVE
9	-33.730358 151.015976	<i>Eucalyptus haemastoma</i> Scribbly Gum	5	11	16/20 40	3.12 2.25	Immature, two main leaders, one dead leader 1m height, with hollow 10x10, epicormics.	3d	Low-Mod	REMOVE

Addendum Arboricultural Impact Assessment

Tree no.	GPS Location	Scientific& Common name	Crown Spread (m)	Height (m)	Diam (cm)	TPZ SRZ (m)	Condition of tree & failure potential (health & structure) (defects and measurements)	Tule	Retention Value	Intended works
10	-33.730358 151.015976	<i>Eucalyptus punctata</i> Grey Gum	5	17	28 36	3.36 2.15	Immature, good condition, epicormics, growing in rock.	2d	Mod	REMOVE
11	-33.730358 151.015976	<i>Eucalyptus saligna</i> Blue Gum	3	12	17 21	2.04 1.72	Immature, unbalanced canopy north, many epicormics, poor condition, 1m from ledge.	2d-3d	Low-Mod	RETAIN & PROTECT
12	-33.730358 151.015976 (Metal Tag 156)	<i>Eucalyptus grandis</i> Flooded Gum	11	25	70 78	8.4 2.98	Semi mature, scar at base north 14m length, hollow, epicormics, termites, unbalanced canopy east.	2d-3d	Mod	REMOVE
13	-33.730358 151.015976	<i>Eucalyptus grandis</i> Flooded Gum	3	14	16 21	2 1.72	Immature, leader, failed branch west at base, lean east, epicormics, cavity at base west side.	3d	Low-Mod	REMOVE
14	-33.730358 151.015976	<i>Angophora costata</i> Smooth Bark Apple	2	8	12/10 18	2 1.61	Juvenile, twin stem, damage to north stem 2m length.	2d	Low	REMOVE
15	-33.730358 151.015976 1.5m from road	<i>Corymbia maculata</i> Spotted Gum	6	18	36 42	4.32 2.3	Immature, union at 12m, unbalanced canopy south, sparse foliage crown, good condition but poor development, growing on steep slope east, root issues.	2d-3d	Mod	REMOVE
16	-33.730358 151.015976	<i>Corymbia maculata</i> Spotted Gum	7	21	46 56	5.52 2.59	Semi mature, inclusion and twin stem at 2m, unbalanced canopy south, good condition but poor development, growing on east slope.	2d	Mod-High	REMOVE
17	-33.730358 151.015976	<i>Corymbia maculata</i> Spotted Gum	6	24	47 55	5.64 2.57	Semi mature, unbalanced canopy east, good condition.	2d	Mod-High	RETAIN & PROTECT
18	-33.730358 151.015976	<i>Angophora costata</i> Smooth Bark Apple	2	8	12/10/10 20	2.28 1.68	Juvenile, dead primary leader, declining, peeling bark, poor condition.	3d	Low	REMOVE
19	-33.730358 151.015976	<i>Eucalyptus resinifera</i> Red Mahogany	13	15	40* 45	4.8 2.37	Immature, bracket fungi south at 5m, epicormics, dead leader, good condition but poor development, dehydrated.	2d-3d	Mod	RETAIN & PROTECT
20	-33.730358 151.015976	<i>Eucalyptus robusta</i> Swamp Mahogany	12	26	45* 50	5.4 2.47	Semi mature, root damage from wall, lean and unbalanced canopy west, epicormics, dead wood.	2d	Mod-High	RETAIN & PROTECT

Addendum Arboricultural Impact Assessment

Tree no.	GPS Location	Scientific & Common name	Crown Spread (m)	Height (m)	Diam (cm)	TPZ SRZ (m)	Condition of tree & failure potential (health & structure) (defects and measurements)	Tule	Retention Value	Intended works
21	-33.730358 151.015976	<i>Eucalyptus saligna</i> Blue Gum	12	22	50* 55	6 2.57	Immature, growing on rocks, good condition but poor development, kink in trunk at 5m, epicormics.	2d	Mod-High	RETAIN & PROTECT
22	-33.730358 151.015976	<i>Eucalyptus grandis</i> Flooded Gum	12	25	30* 39	3.6 2.23	Immature, good condition but poor development, minor root damage from rocks.	2d	Mod-High	RETAIN & PROTECT
23	-33.730358 151.015976	<i>Eucalyptus saligna</i> Blue Gum	14	22	38* 42	4.56 2.3	Immature, good condition, good canopy, epicormics, growing on rocks.	2d	Mod-High	RETAIN & PROTECT
24	-33.730358 151.015976	<i>Eucalyptus punctata</i> Grey Gum	3	13	15* 17	2 1.57	Juvenile, lean and unbalanced canopy northwest.	2d	Low	RETAIN & PROTECT
25	-33.730358 151.015976	<i>Corymbia gummifera</i> Red Bloodwood	5	17	23 25	2.76 1.85	Immature, good condition but poor development, sparse foliage crown, damage at 7m west, unbalanced canopy east.	2d	Low-Mod	RETAIN & PROTECT
26	-33.730358 151.015976 (Metal Tag 75)	<i>Eucalyptus haemastoma</i> Scribbly Gum	7	11	50 53	6 2.53	Semi mature, sparse foliage crown, unbalanced canopy, kinked trunk, epicormics, previously pruned, exposed roots, growing on slope.	2d-3d	Mod	RETAIN & PROTECT
27	-33.730358 151.015976	<i>Eucalyptus haemastoma</i> Scribbly Gum	11	12	45/23 63	6.12 2.73	Semi mature, twin stem at base, exposed roots southeast, good condition but poor development.	2d-3d	Mod-High	RETAIN & PROTECT
28	-33.730358 151.015976 (Metal Tag 61)	<i>Eucalyptus haemastoma</i> Scribbly Gum	5	9	28 30	3.36 2	Immature, good condition but poor development, previously pruned at base leader, epicormics, scar along length of trunk west, hollow 3m south 15x15cm.	3d	Low	RETAIN & PROTECT
29	-33.730358 151.015976	<i>Corymbia gummifera</i> Red Bloodwood	5	13	27 28	3.24 1.94	Immature, good condition but poor development, 1m from rock edge, damage at 2m west, sparse foliage crown, epicormics.	2d	Low-Mod	RETAIN & PROTECT
30	-33.730358 151.015976 (Metal Tag 21)	<i>Corymbia gummifera</i> Red Bloodwood	4	13	27 33	3.24 2.08	Immature, good condition but poor development, sparse foliage crown, growing on rock edge, possible structural issue.	2d-3d	Low-Mod	RETAIN & PROTECT

9.0 FINDINGS



Plate 1. Trees 15-17 *Corymbia maculata* Spotted Gum, east of road.



Plate 2. Tree 19 *Eucalyptus resinifera* Red Mahogany.

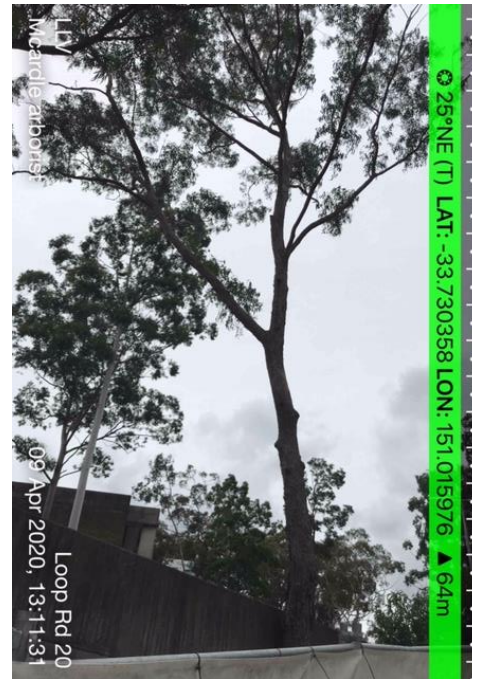


Plate 3. Tree 20 *Eucalyptus robusta* Swamp Mahogany.

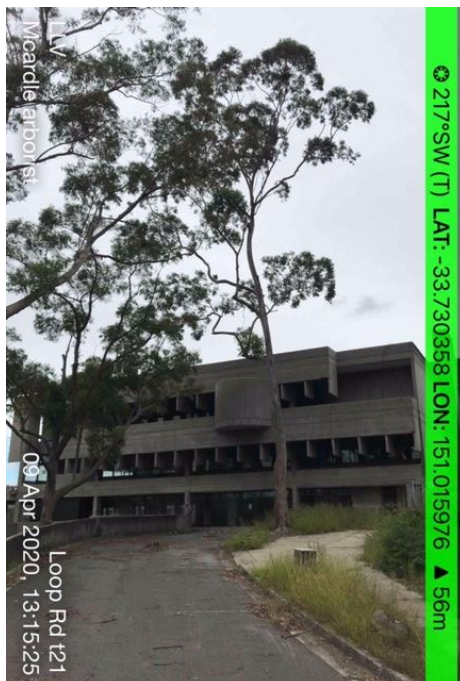


Plate 4. Tree 21 *Eucalyptus saligna* Blue Gum.



Plate 5. Tree 24 *Eucalyptus punctata* Grey Gum.

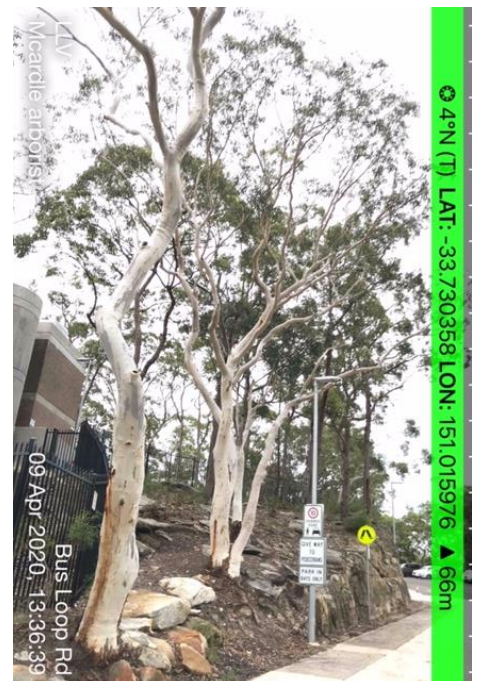
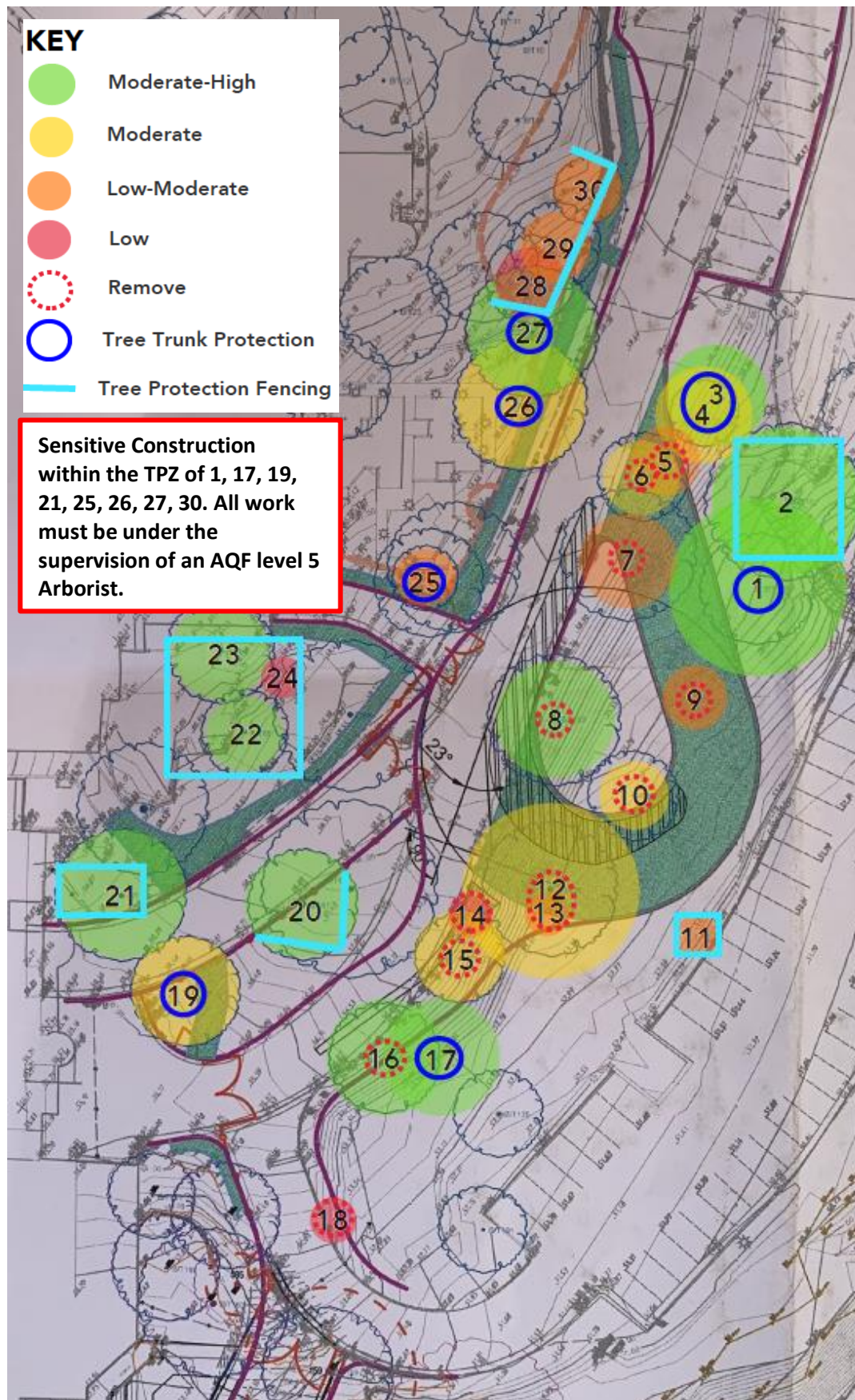


Plate 6. Trees 26-30, west of road.

10.0 TREE PROTECTION ZONE & MANAGEMENT PLAN



11.0 DISCUSSION

11.1 Thirty (30) trees were assessed for Stages 2 and 3 in addition to the trees previously assessed for Stage 1, on site at Lindfield Learning Village. This report is in addition to McArdle Arboricultural Consultancy Arboricultural Impact Assessment, dated the 30th August 2019, which discusses the impacts and tree removal south of the site.

11.2 The retention value of thirty (30) trees on site were assessed as follows:

- Eleven (11) trees are of MODERATE to HIGH retention value. These trees are numbered 1, 2, 3, 8, 16, 17, 20, 21, 22, 23, 27.
- Seven (7) trees are of MODERATE retention value and are numbered 4, 6, 10, 12, 15, 19, 26.
- Eight (8) trees are of LOW to MODERATE retention value and are numbered 5, 7, 9, 11, 13, 25, 29, 30.
- Four (4) trees are of LOW retention value. These trees are numbered 14, 18, 24, 28.

11.3 The impacts of trees have been assessed on the site by the current proposal and are listed in the Impacts Table 2. Twenty-four (24) trees are impacted by the proposed works. A final Site Plan is required to finalise the impacts as a draft plan has been used for the assessment.

11.4 Twelve (12) trees are impacted by the proposed bus turning bay and cannot be retained numbered 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16 & 18. Trees with impacts that would be detrimental to their health have been selected to be removed to ensure the minimal number of trees are being removed on site. Tree 8 has a 15% impact which could be managed using sensitive construction, however as the tree is growing on the steep embankment and the turning bay will impact the SRZ it cannot be retained as the proposed works would cause anchorage and stability issues for the tree.

11.5 Eighteen (18) trees are to be retained and protected numbered 1, 2, 3, 4, 11, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 & 30. Eight (8) trees numbered 1, 17, 19, 21, 25, 26, 27, 30 require sensitive construction for all work within the TPZ which must be under the supervision of an AQF level 5 arborist. Sensitive construction within the TPZ of the impacted retained trees is required to ensure the root systems of the trees are not severely damaged. All work within the TPZ must be under the supervision of an AQF level 5 Arborist and no roots greater than 50mm are to be cut unless given consent. The excavations required for the bus turning bay are to be excavated by hand within the TPZ of retained trees. The impacts proposed on some of the retained trees are greater than the standards allow, however some of them have already been impacted upon and the previous footprint of the road and path will have minimal changes. The larger impacts are to be managed using sensitive construction in order to retain as many trees as possible on site due to the high biodiversity value of the site.

11.6 Eight (8) trees numbered 1, 3, 4, 17, 19, 25, 26 & 27, require Tree Trunk Protection and all remaining trees require Tree Protection Fencing over the TPZ. Any pruning required must be carried out by an AQF level 3 arborist and must be in accordance with *Australian Standards AS/4743-2007 Pruning of Amenity Trees*.

11.7 To assist in competent removal and pruning of trees, contractors must be AQF level 3 licensed arborists and must work in accordance with *Australian Standards AS/4743-2007 Pruning of Amenity Trees* and *SafeWork NSW Guide to Managing Risks Tree Trimming Removal*. A registered current member of Tree Contractors Association Australia (TCAA) or Arboriculture Australia (AA) must complete the works.

11.8 At this stage, the proposal includes replacement tree planting of three trees to the east of the building. Further replacement tree planting should be investigated in consultation with RFS subject to meeting bushfire requirements. The recommended replenishment species include *Eucalyptus saligna* Sydney Blue Gum, *Eucalyptus grandis* Flooded Gum, *Eucalyptus haemastoma* Scribbly Gum, *Corymbia gummifera* Red Bloodwood, *Casuarina glauca* She Oak and *Elaeocarpus reticulatus* Blueberry Ash.

11.9 A summary of the number of trees to be removed to accommodate the works required for Phases 2b and 3 are listed below:

- 12 trees to the east of the building for construction of the bus turnaround area.
- 14 trees to the south of the building for the extended driveway and landscaping works.
- 22 trees to the south of the building in poor health. It is noted that the removal of these 22 trees were identified in the previous Arboricultural Impact Assessment, however the trees were not included in the Exhibited RtS.

The amended proposal involves the removal of an additional 16 trees compared to the previous loop road design. A total of 48 trees will be removed as part of the Phases 2(b) and 3 works.

11.10 Two (2) trees with potential hollows numbered 9 and 13 are to be removed will have nesting boxes made and installed prior to removal of these trees. These trees must be supervised by an AQF level 5 arborist or ecologist (including a competent person) ensuring no habitat is damaged or killed with the processing of trees. Cutting of the trees and allowing one hour to pass while checking for habitat would be a suitable ameliorative choice. Nesting boxes to RMS standards to allow for relocation prior or during the process of clearing these trees. The stump of dead trees that are not within the foot print of proposed pathways are to be retained and the stump can be either cut at the desired level or the stump can be ground down to ground level. The retention of the root systems is to prevent the erosion of soil.

11.11 An induction process with education on the sited area is required for general workers to ensure that tree protection measures and guidelines are described. General workers are to

be inducted by the AQF Level 5 arborist, with visits to site during the construction period to be logged. Foot baths are encouraged to protect the soil rhizosphere from infection, ensuring biosecurity is maintained during works. This is to be logged and reported on to the consenting authority.

PROJECT ARBORIST

11.12 Tree Trunk protection is to utilise timber lengths of 1.8-2metresx 50mmx100mm and stand vertically on wrapped geofabric on the trunk. With airgaps of 150mm. The timber is to be secure with framing steel and screws the hardwood (*not the tree, See section 4,2 Appendix D*) Tree Protection Fencing must be utilised where stated in the tree management plan. It is to be interlocking 1.8m steel mesh fencing.

11.13 Prohibitions in appendix D state that no washouts or chemicals are to be released into the TPZ of preserved trees unless the project arborist has given consent.

All rubbish and waste is to be kept within the hoardings and waste designated areas on site. The sited areas for waste are located to the east of the site within the road access area.

11.14 Remedial reports may be required if yellowing of tree leaves, chlorosis or browsing is greater than 20% of the canopy. Where physical damage has been maintained the project arborist will ensure that the tree is undergoing a plan and construction staff and the management are inducted into the care of the specimen. Further reporting may be required during the course of the remedial works and the construction process. By an AQF level 5 project arborist.

11.15 Contact details must be presented on site with indelible ink and state the project arborist name and contact number on tree protection areas. Tree Protection areas must be labelled clearly.

11.16 Small machines may only be used where suitable ground protection is in place, under close supervision of the project arborist and only where the project arborist deems it safe for the tree to do so.

11.17 Exposed roots shall be wrapped or covered over with carpet or hessian and moistened until such time as the pathway materials are installed. Roots greater than 50mm diameters are to be protected with dense SBR rubber to avoid the risk of direct contact/abrasion from materials and access usage.

11.18 Irrigation is to be undertaken for a period of 12 months following completion of works. The Project Arborist is to ensure the soil moisture is adequate during inspections.

11.19 Ensure trees are removed by a qualified Arborist AQF 3 or AQF 5. An ecologist shall be on site during clearing works to ensure any fauna are relocated. Prior to the approval of

removal for hollow bearing trees the manager is to carry out the following actions to prevent the harm to native wildlife.

- a) Ensure that the trees are removed in sections prior to dusk when roosting animals would be alert and likely to disperse from the site. Ensure the trees are knocked several times to alert any roosting animals. Ensure all hollow in trees are examined prior to and immediately after their removal to ensure roosting animals are free from danger.
- b) A WIRES contact volunteer can be contacted on (02) 89773333 or An AQF level 5 arborist who is competent.
- c) Nesting boxes (2) are constructed to RMS standards¹ utilising 19mm marine ply with design of holes and attached with glue and screw. These can be nominally located above five metres to the north east of the allocated tree and secured with non-abrasion type plastic tubing on wire. An AQF level 5 arborist who is competent at installing these boxes must be engaged.
- d) Footbath is to be utilised of disinfectant and sodium solution 1% to water. A signed log and induction in to the use of this footbath during the construction process is necessary for biosecurity. This could be further determined by an ecologist.
- e) A logged induction into the sited area for construction will ensure that the trees are protected by workers entering the landscaping and construction area.

¹ https://www.rms.nsw.gov.au/business-industry/partners-suppliers/documents/guides-manuals/biodiversity_guidelines.pdf

12.0 IMPACTS TABLE 2

Tree No.	Scientific & Common name	Retention Value	Impact	Works Required
1	<i>Eucalyptus grandis</i> Flooded Gum	Mod-High	24%	Retain & Protect Sensitive Construction: All work within the TPZ must be supervised by an AQF Level 5 Arborist. Tree Protection & Mulch 100mm depth over TPZ.
2	<i>Corymbia gummifera</i> Red Bloodwood	Mod-High	0%	Retain & Protect Tree Protection & Mulch 100mm depth over TPZ.
3	<i>Eucalyptus grandis</i> Flooded Gum	Mod-High	8%	Retain & Protect Tree Protection & Mulch 100mm depth over TPZ.
4	<i>Eucalyptus punctata</i> Grey Gum	Mod	<5%	Retain & Protect Tree Protection & Mulch 100mm depth over TPZ.
5	<i>Eucalyptus elata</i> River Peppermint	Low-Mod	>50%	Remove Impacts greater than the standards allow to retain the tree.
6	<i>Corymbia gummifera</i> Red Bloodwood	Mod	>50%	Remove Impacts greater than the standards allow to retain the tree.
7	<i>Eucalyptus elata</i> River Peppermint	Low-Mod	>50%	Remove Impacts greater than the standards allow to retain the tree.
8	<i>Corymbia gummifera</i> Red Bloodwood	Mod-High	15% SRZ Impact	Remove Impacts greater than the standards allow to retain the tree.
9	<i>Eucalyptus haemastoma</i> Scribbly Gum	Low-Mod	100%	Remove Impacts greater than the standards allow to retain the tree.
10	<i>Eucalyptus punctata</i> Grey Gum	Mod	40% SRZ Impact	Remove Impacts greater than the standards allow to retain the tree.
11	<i>Eucalyptus saligna</i> Blue Gum	Low-Mod	0%	Retain & Protect Tree Protection & Mulch 100mm depth over TPZ.
12	<i>Eucalyptus grandis</i> Flooded Gum	Mod	>50%	Remove Impacts greater than the standards allow to retain the tree.
13	<i>Eucalyptus grandis</i> Flooded Gum	Low-Mod	>50%	Remove Impacts greater than the standards allow to retain the tree.
14	<i>Angophora costata</i> Smooth Bark Apple	Low	100%	Remove Impacts greater than the standards allow to retain the tree.
15	<i>Corymbia maculata</i> Spotted Gum	Mod	90%	Remove Impacts greater than the standards allow to retain the tree.
16	<i>Corymbia maculata</i> Spotted Gum	Mod-High	50%	Remove Impacts greater than the standards allow to retain the tree.

17	<i>Corymbia maculata</i> Spotted Gum	Mod-High	10%	Retain & Protect Sensitive Construction: All work within the TPZ must be supervised by an AQF Level 5 Arborist. Tree Protection & Mulch 100mm depth over TPZ.
18	<i>Angophora costata</i> Smooth Bark Apple	Low	80%	Remove Impacts greater than the standards allow to retain the tree.
19	<i>Eucalyptus resinifera</i> Red Mahogany	Mod	27%	Retain & Protect Sensitive Construction: All work within the TPZ must be supervised by an AQF Level 5 Arborist. Tree Protection & Mulch 100mm depth over TPZ.
20	<i>Eucalyptus robusta</i> Swamp Mahogany	Mod-High	<5%	Retain & Protect Tree Protection & Mulch 100mm depth over TPZ.
21	<i>Eucalyptus saligna</i> Blue Gum	Mod-High	15%	Retain & Protect Sensitive Construction: All work within the TPZ must be supervised by an AQF Level 5 Arborist. Tree Protection & Mulch 100mm depth over TPZ.
22	<i>Eucalyptus grandis</i> Flooded Gum	Mod-High	0%	Retain & Protect Tree Protection & Mulch 100mm depth over TPZ.
23	<i>Eucalyptus saligna</i> Blue Gum	Mod-High	0%	Retain & Protect Tree Protection & Mulch 100mm depth over TPZ.
24	<i>Eucalyptus punctata</i> Grey Gum	Low	0%	Retain & Protect Tree Protection & Mulch 100mm depth over TPZ.
25	<i>Corymbia gummifera</i> Red Bloodwood	Low-Mod	17%	Retain & Protect Sensitive Construction: All work within the TPZ must be supervised by an AQF Level 5 Arborist. Tree Protection & Mulch 100mm depth over TPZ.
26	<i>Eucalyptus haemastoma</i> Scribbly Gum	Mod	15%	Retain & Protect Sensitive Construction: All work within the TPZ must be supervised by an AQF Level 5 Arborist. Tree Protection & Mulch 100mm depth over TPZ.
27	<i>Eucalyptus haemastoma</i> Scribbly Gum	Mod-High	15%	Retain & Protect Sensitive Construction: All work within the TPZ must be supervised by an AQF Level 5 Arborist. Tree Protection & Mulch 100mm depth over TPZ.
28	<i>Eucalyptus haemastoma</i> Scribbly Gum	Low	0%	Retain & Protect Tree Protection & Mulch 100mm depth over TPZ.
29	<i>Corymbia gummifera</i> Red Bloodwood	Low-Mod	<5%	Retain & Protect Tree Protection & Mulch 100mm depth over TPZ.
30	<i>Corymbia gummifera</i> Red Bloodwood	Low-Mod	13%	Retain & Protect Sensitive Construction: All work within the TPZ must be supervised by an AQF Level 5 Arborist. Tree Protection & Mulch 100mm depth over TPZ.

13.0 HOLDING POINTS – RETENTION AND PROTECTION OF TREES.

13.1 Any pruning greater than 40mm within TPZ of preserved trees will need to be cut cleanly under supervision of an AQF Level 5 certified Arborist in accordance to *Australian Standards AS4373 2007 Pruning of Amenity Trees*.

13.2 Retention and protection of eighteen (18) trees using Tree Protection and 100mm of clean certified *Eucalyptus spp* mulch within the TPZ. (See the Tree Management Plan)

13.3 Sensitive construction is required within the TPZ of eight (8) trees and all work must be installed under the supervision of an AQF level 5 arborist.

13.4 Replacement tree planting of three trees to the east of the building. The recommended replenishment species include *Eucalyptus saligna* Sydney Blue Gum, *Eucalyptus grandis* Flooded Gum, *Eucalyptus haemastoma* Scribbly Gum, *Corymbia gummifera* Red Bloodwood, *Casuarina glauca* She Oak and *Elaeocarpus reticulatus* Blueberry Ash.

13.5 An AQF level 5 Arborist must install or supervise Tree Protection. The installation found in the Tree Management Plan is to be installed prior to any demolition, construction or re-landscaping.

13.6 The TPZ of all trees on site adjacent the works must be maintained with a 100mm depth of clean certified Eucalyptus species, mulch for the duration of the proposed development.

13.7 No changes in soil level within the TPZ of retained trees unless the consent authority has agreed and is supervised by the project arborist. Soil must not be stockpiled into the TPZ of preserved trees.

13.8 Any roots to be cut greater than 50mm must be carried out using a clean, sharp hand tool and must be given consent by an AQF level 5 arborist.

13.9 Trees with potential hollows to be removed will have nesting boxes made and installed prior to removal of these trees. These trees must be supervised by an AQF level 5 arborist or ecologist (including a competent person) ensuring no habitat is damaged or killed with the processing of trees. Cutting of the trees and allowing one hour to pass while checking for habitat would be a suitable ameliorative choice. Nesting boxes to RMS standards to allow for relocation prior or during the process of clearing these trees.

13.10 Monthly inspections by an AQF level 5 arborist are required for this site and need to be complied with for the duration of the development. Certification of tree protection as per Tree Protection Plan by AQF level 5 Arborist prior to any demolition, construction or re-landscaping.

13.11 Prohibitions are listed Appendix D, to be complied with and certified by an AQF level 5 Arborist.

14.0 RECOMMENDATIONS AND CONCLUSION

14.1 Eighteen (18) trees are to be retained and protected.

14.2 Pruning required is to be carried out by an AQF level 3 arborist ensuring pruning is done in accordance to *Australian Standards AS4373 2007 Pruning of Amenity Trees*.

14.3 Retained trees will require either Tree Protection Fencing or Tree Trunk Protection with no work within the TPZ of retained trees unless under supervision of the AQF level 5 certified arborist.

14.4 Sensitive construction is required within the TPZ of eight (8) trees as specified in the discussion and all work must be under the supervision of an AQF level 5 arborist.

14.5 At this stage, the proposal includes replacement tree planting of three trees to the east of the building. Further replacement tree planting should be investigated in consultation with RFS subject to meeting bushfire requirements. The recommended replenishment species include *Eucalyptus saligna* Sydney Blue Gum, *Eucalyptus grandis* Flooded Gum, *Eucalyptus haemastoma* Scribbly Gum, *Corymbia gummifera* Red Bloodwood, *Casuarina glauca* She Oak and *Elaeocarpus reticulatus* Blueberry Ash.

14.6 To assist in competent removal and pruning of trees, contractors must be AQF level 3 licensed arborists and must work in accordance with *Australian Standards AS4790-2009 Protection of Trees in Development Sites* and *Australian Standards AS/4743-2007 Pruning of Amenity Trees* and *SafeWork NSW Guide to Managing Risks Tree Trimming Removal*. A registered current member of Tree Contractors Association Australia (TCAA) or Arborists Australia (AA) must complete the works.

14.7 Holding points 13.1-13.11 will be compliant by an AQF level 5 arborist.

14.8 To reduce the compaction of the soil around the retained trees, it is recommended the addition of clean *Eucalyptus sp.* mulch at 100mm depth over the TPZ of each tree.

14.9 Trees with potential hollows to be removed will have nesting boxes made and installed prior to removal of these trees. These trees must be supervised by an AQF level 5 arborist or ecologist (including a competent person) ensuring no habitat is damaged or killed with the processing of trees. Cutting of the trees and allowing one hour to pass while checking for habitat would be a suitable ameliorative choice. Nesting boxes to RMS standards to allow for relocation prior or during the process of clearing these trees.

14.10 The number of trees to be removed to accommodate the works required for Phases 2b and 3 are summarised below:

- 12 trees to the east of the building for construction of the bus turnaround area
- 14 trees to the south of the building for the extended driveway and landscaping works
- 22 trees to the south of the building in poor health. It is noted that the removal of these 22 trees were identified in the previous Arboricultural Impact Assessment, however the trees were not included in the Exhibited RtS.

The amended proposal involves the removal of an additional 16 trees compared to the previous loop road design. A total of 48 trees will be removed as part of the Phases 2(b) and 3 works.

15.0 GLOSSARY

Borer: larvae beetles, moths or wasps that cause damage within the phloem/cambium, sapwood and heartwood of the tree. Borers generally attack weakened trees or stressed trees.

Cambium: The layer of cells between the exterior bark and the inner wood which control cell division, hence stem, branch and shoot expansion.

Cavity: A void, initiated by a wound within the trunk, branches or roots. These voids are referred to as hollows.

Co-dominant: Stems or branches equal in size and relative importance.

Crown: The width of the foliage in the upper canopy of the assessed tree to the four cardinal points.

Crown lifting: The removal of the lower branches of the tree.

Crown thinning: The portion of the tree consisting of branches and leaves and any part of the stem from which branches arise.

Drip line: Where the canopy releases water shed from the foliage during precipitation.

DBH/Diameter: Diameter of trunk at 14meters in height of assessed tree.

Dead wooding: The removal dead branches from a tree.

Dieback: Tree deterioration where the branches and leaves die.

Flush cut: A cut that damages or removes the branch collar or removes the branch and stem tissue and is inconsistent with the branch attachment as indicated by the bark branch ridge.

Genus/ Species: Identified using its scientific name. Where the species name is not known, species is used. The common name for trees may vary considerably in each area of geographical differences and so will not be used in the field survey.

Height: Height has been estimated to + / - 2 meters.

Maturity: Tree age, Assessed as over mature (last 1/3 of life expectancy), mature (1/3 to 2/3 life expectancy) and semi mature (less than 1/3 life expectancy).

Remedial (restorative) pruning: includes: Removing damaged, deadwood; trimming diseased or infested branches. Trimming branches back to undamaged tissue in order to induce the production of shoots from latent or adventitious buds, from which a new crown will be established.

SRZ- Structural Root Zone: An area within the trees root zone in which roots stabilize the tree. Roots cut in this zone can cause instability and lead to anchorage loss.

Structural Integrity: Describes the internal supporting timber. (Substantial to frail)

Target: risk targets are people, property or activities that could injure, damage or disrupted.

Tree Numbering: All trees listed in the tree survey have been numbered and plotted.

TULE- Tree Useful Life Expectancy: An estimation of the trees useful life expectancy using appropriate industry methods with an inspection regime.

Vigour: This is an indication of the tree health. Trees have either been assessed as Good Vigour, Normal Vigour or Low Vigour.

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APPENDIX A TREE USEFUL LIFE EXPECTANCY - TULE

Adapted from Jeremy Barrell (SULE) 2014 for TCAA Consultant Arborists						
	1 Long TULE Trees that appeared to be retainable at the time of assessment for more than 40 years with low level of risk	2 Medium TULE Trees that appeared to be retainable at the time of assessment for 15 to 40 years with and with low to medium level risk	3 Short TULE Trees that appeared to be retainable at the time of assessment for 5 to 15 years with medium to high level of risk	4 Remove Trees that should be removed within the next 5 years High to Very high level of risk	5. No Potential for Retention REMOVE IMMEDIATELY Trees that must be removed immediately. Very high to Extreme level of risk	6 Small, Young or Regularly clipped Trees that can be easily transplanted or replaced.
A	Structurally sound trees located in positions that can accommodate future growth.	Trees that may only live for between 15 and 40 more years.	Trees that may only live for between 5 and 15 more years.	Dead, dying, suppressed or declining trees through disease or inhospitable conditions.	Dead, dying or declining trees diseased or inhospitable conditions.	Small trees less than 5 meters in height.
B	Trees that could be made suitable for retention in the long term by Intervention Works.	Trees that may live for more than 40 years, but would need to be removed for safety or nuisance reasons.	Trees that may live for more than 15 years, but would need to be removed for safety or nuisance reasons.	Dangerous trees through instability or recent loss of adjacent trees.	Dangerous trees through instability or recent loss of adjacent trees.	Young trees less than 15 years old but over 5 meters in height.
C	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.	Trees that may live for more than 40 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees that may live for more than 15 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form.	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form.	Trees that have been regularly pruned to artificially control growth.
D		Trees that could be made suitable for retention in the medium term by Intervention Works.	Trees that require substantial Intervention Works, and are only suitable for retention in the short-term.	Damaged trees that are clearly not safe to retain.	Damaged trees that are clearly not safe to retain and must be removed immediately.	
E				Trees that may live for more than 5 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	High Toxicity Allegan trees, asthmatic and poisonous trees and must be removed immediately.	
F				Trees that may cause damage to existing structures within 5 years.	OTHER, with legitimate explanation to be removed immediately.	
G				Trees that will become dangerous after removal of other trees for reasons given in 1A-1F.		
INSPECTION FREQUENCY	Inspection frequency 1-5 Years by competent inspector unless event monitored.	Inspection frequency 1-5 Years by competent inspector unless event monitored.	Inspection frequency 1-3 years by competent inspector unless event monitored.	Inspection frequency to 1 year by competent inspector unless event monitored.	1-7 days by competent inspector and event monitored	Inspection frequency Biannually by competent inspector.

APPENDIX B HEALTH & STRUCTURAL CONDITION OF TREE-VISUAL

KEY	Health & Structural Condition of Tree	
1.	Maturity: J - Juvenile; IM - Immature; SM - Semi-Mature; M - Mature	
2.	Excellent condition	
3.	Good condition but poor development	3b Moderate
4.	Dieback is more than 20%.	4b Epicormics
5.	Sparse foliage crown	5b Unbalanced Canopy
6.	Physical damage	
7.	Insect damage	7b Borers
8.	Fungal attack	
9.	Cavity	
10.	Termite damage inclusions	
11.	Lean	
12.	Heavily pruned	12b Dying
13.	Damage to roots	13b Encroachment
14.	Parasitic vine present	
15.	Damage by climbing plant	
16.	Inclusions	
17.	Habitat tree	
18.	Endangered species	

Mattheck The Body Language of Trees 1994 adapted; Hornsby Shire Council

APPENDIX C RETENTION VALUES

DETERMINING LANDSCAPE SIGNIFICANCE RATING			MORTON, A 2006
RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
1. SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register.	The subject tree is scheduled as a Threatened Species as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999.	The subject tree has a very large live crown size exceeding 300m ² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species.
	The subject tree forms part of the curtilage of a Heritage Item (building/structure/artefact as defined under the LEP) and has a known or documented association with that item.	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species.	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity.
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event.	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area.	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
2. VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc.) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m ² , a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area.
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence.	The tree is a locally indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link/Wildlife Corridor or has known wildlife habitat value.	The subject tree has a large live crown size exceeding 100m ² ; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. Crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area.
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of this DCP.	<p>The subject tree has a medium live crown size exceeding 40m²; The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc.) with a crown density of more than 50% (thinning to normal); and</p> <p>The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.</p>
5. LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item.	The subject tree is scheduled as exempt (not protected) under the provisions of this DCP due to its species, nuisance or position relative to building or other structures.	The subject tree has a small live crown size of less than 40m ² and can be replaced within the short term (5-10 years) with new tree planting.
6. VERY LOW	The subject tree is causing significant damage to a heritage Item.	The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
7. INSIGNIFICANT	The tree is completely dead and has no visible habitat value.	The tree is a declared Noxious Weed under the Noxious Weeds Act (NSW) 1993 within the relevant Local Government Area.	The tree is completely dead and represents a potential hazard.

APPENDIX C Continued

RETENTION VALUES: MORTON, A 2006 Determining landscape significance ratings.	
RETENTION VALUE	RECOMMENDED ACTION
High	<ul style="list-style-type: none"> • These trees considered worthy of preservation; as such careful consideration should be given to their retention as a priority. • Proposed site design and placement of buildings and infrastructure should consider the Tree Protection Zones as discussed in the following section to minimise any adverse impact. • In addition to Tree Protection Zones, the extent of the canopy (canopy dripline) should also be considered, particularly in relation to a high-rise development. Significant pruning of the trees to accommodate the building envelope or temporary scaffolding is generally not acceptable.
Moderate	<ul style="list-style-type: none"> • The retention of these trees is desirable. • These trees should be retained as part of any proposed development if possible, however these trees are considered less critical for retention. • If these trees must be removed, replacement planting should be considered in accordance with Council's Tree Replacement Policy to compensate for loss of amenity.
Low	<ul style="list-style-type: none"> • These trees are not considered to be worthy of any special measures to ensure their preservation, due to current health, condition or suitability. They do not have any special ecological, heritage or amenity value, or these values are substantially diminished due to their SULE. • These trees should not be considered as a constraint to the future development of the site.
Very Low	<ul style="list-style-type: none"> • These trees are considered potentially hazardous or very poor specimens, or may be environmental or noxious weeds. • The removal of these trees is therefore recommended regardless of the implications of any proposed development.

APPENDIX D TREE PROTECTION

Extract from *Australian Standard AS4970 2009 – Protection of Trees on Development Sites*.

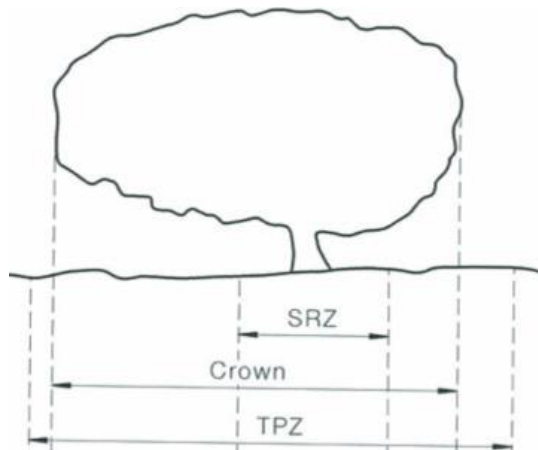


Figure 8. The TPZ, SRZ and Crown protection zones.

D.1 STRUCTURAL ROOT ZONE (SRZ)

"The SRZ is the area considered essential for tree stability. Temporary tree protection fencing shall be erected around the perimeter of all tree protection zones.

D.2 OTHER TREE PROTECTION MEASURES

When tree protection fencing cannot be installed due to restricted access e.g. tree located along side an access way or requires temporary removal, other tree protection measures should be used, including those set out below.

D.3 PROTECTIVE FENCING

It shall be installed prior to any demolition, or clearing and consists of a chain wire mesh panel, 1.8m-height cyclone fencing or star pickets at 2m intervals, connected by a continuous highly-visible barrier/hazard mesh at the height of 1.8 m. An alternative is plywood or wooden paling fence panels. This fencing material also prevents building material and soil from entering the TPZ. Mulch is to be applied across the surface of TPZ within the fencing. Bracing is permissible within the TPZ. Avoid damaging roots. This fencing will remain in place until all the construction work has been completed.

D.4 TREE PROTECTION ZONES

Signage shall be attached to the fence at regular intervals. Signage shall read "TREE PROTECTION ZONE. NO ENTRY EXCEPT TO AUTHORISED PERSONNEL. FINES APPLY."

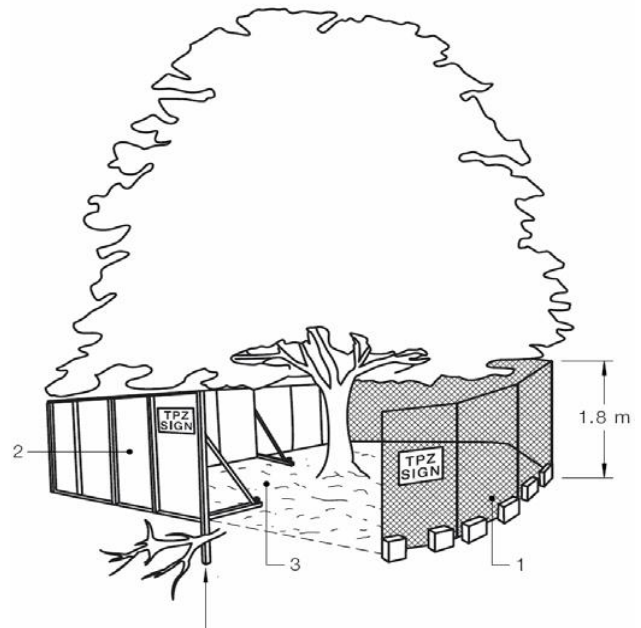


Figure 9. Tree Protection Fencing over the TPZ.

D.5 GROUND PROTECTION

If temporary access for machinery is required within the TPZ, ground protection measures will be required to prevent compaction in the root zone. Measures may include a permeable membrane such as geotextile fabric beneath a layer of mulch 100mm maximum and 50mm minimum or crushed rock below rumble boards.

D.6 INSTALLING UNDERGROUND SERVICES WITHIN TPZ

All services should be routed outside the TPZ. If underground services must be routed within the TPZ, they should be installed by directional drilling or in manually-excavated trenches. The directional drilling bore should be at least 600 mm deep. The project arborist should assess the likely impacts of boring and bore pits on retained trees. For manual excavation trenches, the project arborist should advise on roots to be retained and should monitor the works. Manual excavation may include the use of pneumatic and hydraulic tools.

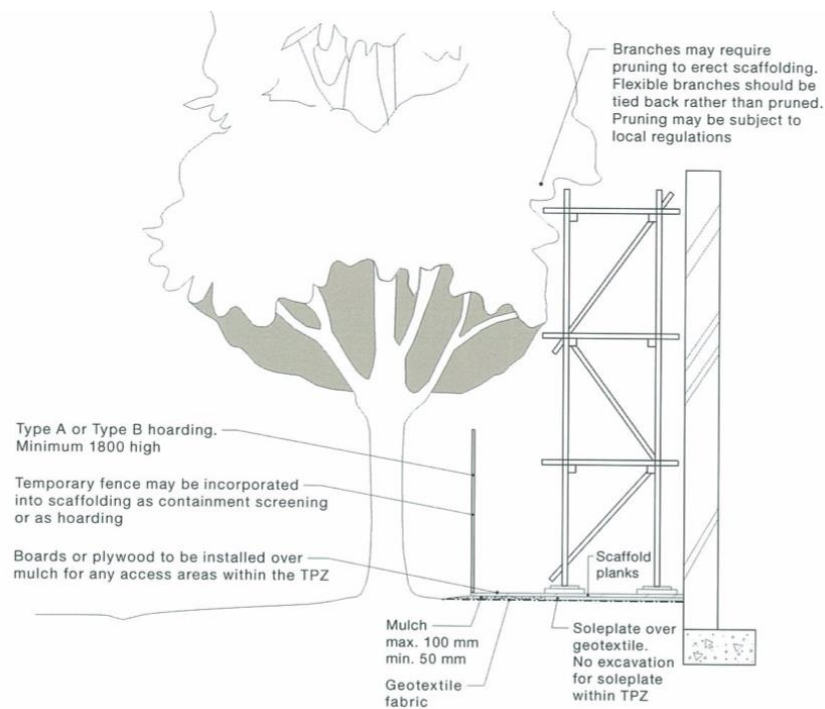


Figure 10. Ground Protection

D.7 TRUNK AND BRANCH PROTECTION

For trunk and branch protection, use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed. Rumble boards should be a suitable thickness to prevent soil compaction and root damage.

D.8 EXCAVATION

Excavation required for the insertion of support posts for tree protection fencing should not involve the severance of any roots greater than 20mm in diameter, without the prior approval of the project arborist.

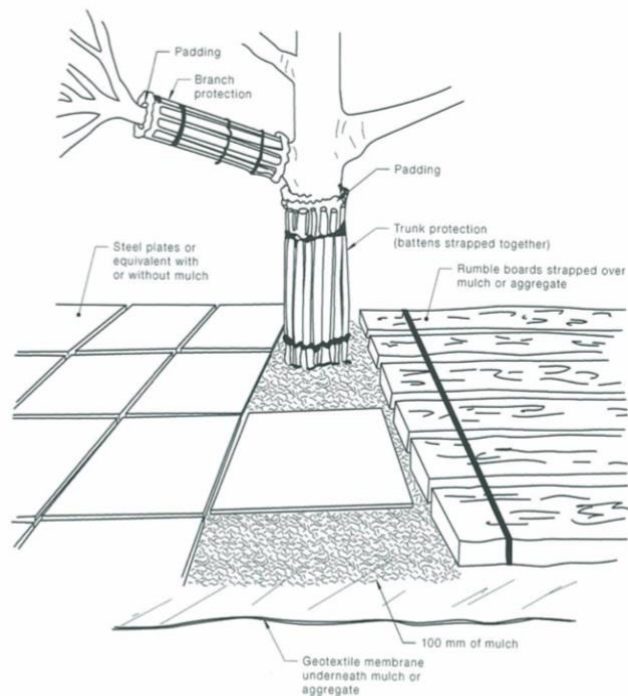


Figure 10a. Tree Trunk and Branch Protection.

APPENDIX D Continued

PROHIBITIONS

- I The following activities shall not be carried out within any Tree Protection Zone:
 - a. Disposal of chemicals and liquids (including concrete and mortar slurry, solvents, paint, fuel or oil);
 - b. Stockpiling, storage or mixing of materials;
 - c. Refuelling, parking, storing, washing and repairing tools, equipment, machinery and vehicles;
 - d. Disposal of building materials and waste;

- II The following activities shall not be carried out within any Tree Protection Zone unless under the supervision of the Project Arborist:
 - a. Increasing or decreasing soil levels (including cut and fill);
 - b. Soil cultivation, excavation or trenching;
 - c. Placing offices or sheds;
 - d. Erection of scaffolding or hoardings; and/or
 - e. Any other act that may adversely affect the vitality or structural condition of the tree.

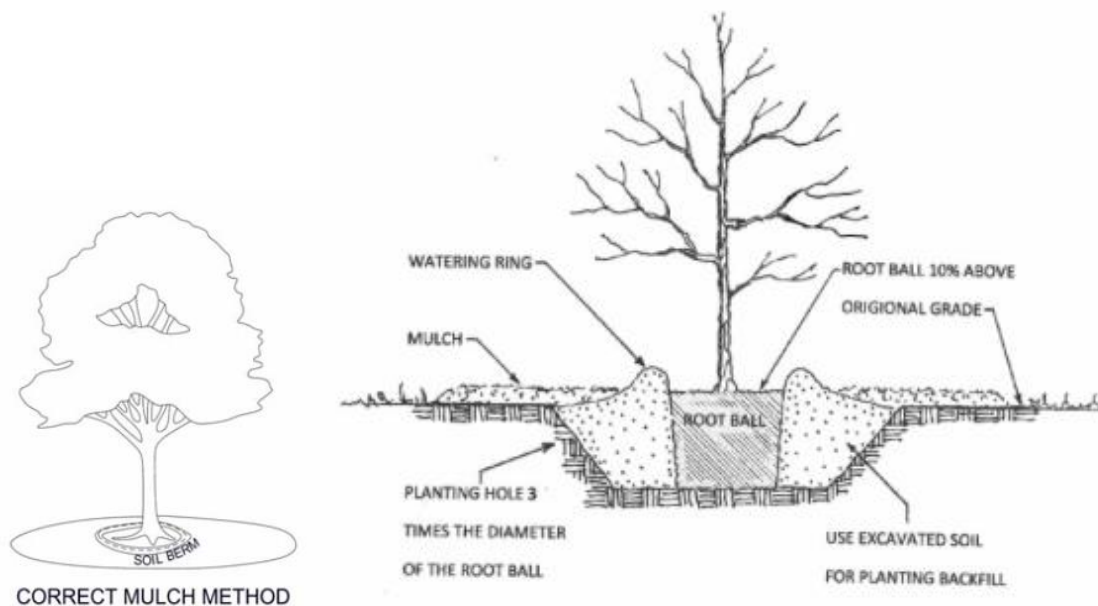
- III All work undertaken within or above a Tree Protection Zone shall be supervised by the Project Arborist.

- IV Excavation within the Tree Protection Zone of any tree to be retained shall:
 - a. Be undertaken using non-destructive methods (e.g. an Air-spade or by hand) to ensure no roots greater than 40mm in diameter are damaged, pruned or removed.
 - b. All care shall be taken to preserve and avoid damaging roots; excavation should not occur within the Structural Root Zone.

APPENDIX E TREE PLANTING SPECIFICATIONS AND MAINTENANCE

Australian Standards AS 2303 2018 – Tree Stock for Landscape Use.

- E.1 Careful consideration should be given to the location of trees and shrubs to minimise future problems. A basic guide for planting follows:
- E.2 Don't plant too close to buildings or in-ground pools or plant large trees too close together: Determine the height and canopy of trees when fully grown. Allow room for root growth (at least twice the height of the tree). Large trees should be planted at least three meters from buildings. Check when planting under wires or over drainage lines: Determine the mature size of the tree and the size and nature of its root system.
- E.3 Consider your neighbours when choosing plants: Consider the effect on neighbouring properties (i.e. shading, loss of views, impact on foundations, fences and services).
- E.4 Use trees to provide your home with summer shade and/or winter sun: Plant deciduous trees (suitable to the climate and soils of this Shire). Consider the summer and winter shadows of evergreen trees.
- E.5 Don't grow climbers on trees: Climbers can strangle trees, leading to the tree's eventual death. Retain and protect as many trees as possible when building or extending your home. (This will be a Council requirement).
- E.6 Use locally native and non-invasive species in your garden: Increase the success rate of your garden. Attract native fauna to your garden. Reduce the amount of watering required.
- E.7 Don't excavate or alter the ground level around trees: Can cause root damage or starving of the roots. Can cause limb drop, instability or tree death. Substantially altering soil level within three meters of the trunk is in breach of the Tree Preservation Order.
- E.8 When buying plants, check their characteristics: Check on mature size, shade characteristics, potential for roots to cause damage, flowers, fruits and pollen, to determine their suitability.
- E.9 Mature trees do need maintenance: Remove or trim misshapen branches. Check for fungal rots or other diseases. If in doubt, contact Council for a tree inspection or contact an experienced Arborist. Indiscriminate lopping can be dangerous to your safety and the health of the tree. Staking of trees and mulch should be carried out similar to the diagrams.



DISCLAIMER

McArdle Arboricultural Consultancy Pty Ltd does not assume responsibility for liability associated with the tree on or adjacent to this project site, their future demise and/or any damage, which may result therefrom.

McArdle Arboricultural Consultancy Pty Ltd takes care to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.

McArdle Arboricultural Consultancy Pty Ltd cannot be held responsible for any consequences as a result of work carried out outside specifications, not in compliance with Australian Standards or by inappropriately qualified staff.

Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale.

LIMITS OF OBSERVATION

McArdle Arboricultural Consultancy Pty Ltd makes every effort to accurately identify current tree health and safety issues. Results may or may not correlate to actual tree structural integrity. There are many factors that may contribute to limb or total tree failure. Not all these symptoms are visible. There can be hidden defects that may result in a failure even though it would seem that other, more obvious defects would be the likely cause of failure. All standing trees have an element of unpredictable risk.



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