REPORT: Arborist Impact Assessment

REPORT COMMISSIONED FOR:

Opal Specialist Aged Care
C/o Matthew O'Sullivan

5-7 Floribunda Avenue
Glenmore Park

New South Wales
2745

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24th June 2019

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1.0 ABSTRACT

1.1 An Arborist Impact Assessment was commissioned by Opal Specialist Aged Care in relation to the proposed new additions on site at 5-7 Floribunda Avenue, Glenmore Park New South Wales. Fifty-two (52) trees including tree groups in the surrounding area of the proposed new development on site were assessed. No High Retention valued trees will be removed from this proposal.

1.2 The retention value of fifty-two (52) trees have been assessed on the site to be:
The retention value of fifty-two (52) trees have been assessed on the site to be:
Three (3) trees are of high retention value, these trees are numbered 11, 17,& 28.
Fourteen (14) trees are of moderate to high retention value, these trees are numbered 1, 2, 4,5, 7, 10, 13, 14b,18, 19, 20, 22,26 &30.
Sixteen (16) trees are of moderate retention value, these trees are numbered 6, 8, 9, 11a, 12, 15, 16, 21a, 21b, 24, 25, 31, 32, 33, 34, 35.
Seven (7) trees are of low to moderate retention value, these trees are numbered 13a, 13b, 13c, 14, 14a, 23, 24a.
Twelve (12) trees are of low retention value, these trees are numbered 3, 4a, 4b, 20a, 27, 27a, 27b, 29, 29a, 29b, 29c, 36.

1.3 The proposed new development will impact upon forty (40) trees that will require thirty-four (34) trees to be removed for the development. Twenty-two (22) trees are to be replenished. There are eighteen (18) trees that will be retained and protected with some having impacts from the development. Supervision of any work within the TPZ of trees numbered 17, 19, 21b, 28 is required by an AQF level 5 arborist.

1.4 Tree Protection Systems are required and must be installed, prior to commencement of the development. Supervision of an AQF level 5 arborist is required for this proposal.

REFERENCES

Calder Flower Architecture. Detained Site Plan. Page 1 to 8. Date 13/5/2019.
Penrith Development Control Plan 2014.

2.0 INTRODUCTION

2.1 An Arborist Impact Assessment was commissioned by Opal Specialist Aged Care in relation to proposed new development on site at 5-7 Floribunda Avenue, Glenmore Park New South Wales.
Fifty two (52) trees in the surrounding area of the proposed new development on site were assessed by Caryssa Jones B.BioCons MQ, Dip Arb L5 Ryde (pending) whom attended site on the 20th of May 2019 under the supervision of Jim McArdle B.Ed. Sc ACU, Dip Arb AQF L5 Ryde, QTRA, TRA Assessor and TCAA President.

2.2 The retention value of fifty-two (52) trees have been assessed on the site to be:
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Three (3) trees are of high retention value, these trees are numbered 11, 17,& 28.
Fourteen (14) trees are of moderate to high retention value, these trees are numbered 1, 2, 4,5, 7, 10, 13, 14b,18, 19, 20, 22,26 &30.
Sixteen (16) trees are of moderate retention value, these trees are numbered 6, 8, 9, 11a, 12, 15, 16, 21a, 21b, 24, 25, 31, 32, 33, 34, 35.
Seven (7) trees are of low to moderate retention value, these trees are numbered 13a, 13b, 13c, 14, 14a, 23, 24a.
Twelve (12) trees are of low retention value, these trees are numbered 3, 4a, 4b, 20a, 27, 27a, 27b, 29, 29a, 29b, 29c, 36.

2.3 Removal and replenishment, retention and tree protection measure of fifty-two (52) trees have been assessed on the site which require:
Removal will be required of thirty-four (34) trees for the proposal, these trees are numbered 3, 4, 4a, 4b, 5, 6, 8, 13, 13a, 13b, 14b, 15, 16, 20, 21a, 22, 23, 24, 24a, 25, 26, 27a, 27b, 29, 29a, 29b, 29c, 30, 31, 32, 33, 34, 35, 36. Twenty-two (22) trees are to be replenished.
Retention and protection will be required of eighteen (18) trees, these trees are 1, 2, 7, 9, 10, 11, 11a, 12, 13c, 14, 14a, 17, 18, 19, 20a, 21b, 27, 28.

2.4 Tree protection fence line/Tree trunk protection and mulch 75mm depth over the TPZ of all retained trees is required. Four high value trees 17, 19, 21b &28 require sensitive construction methods within their TPZ.

2.5 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. Miss Caryssa Jones B.BioCons MQ, Dip Arb L5 Ryde (pending) and 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.*

3.0 AIMS

The aim of the report is to:

3.1 To assess the trees at 5-7 Floribunda Avenue, Glenmore Park New South Wales according to the methodologies presented in this report.

3.2 To give recommendations for management and protection during the proposed development. Protection measures will be referenced from *Australian Standards AS4970 2009 Tree Protection on Development Sites.*

4.0 METHODOLOGY

4.1 This arborist impact assessment uses a ground Visual Tree Assessment (VTA) method employed in this report. The VTA system is based on the theory of tree biology, physiology and tree architecture and structure and is a method used to identify visible signs on trees that indicate health and potential hazards.

4.2 The collection of data is performed in the field by an AQF Level 5 arborist. The assessment summaries the species, height and diameter, the trees health and structural condition for each trees, hazards, and retention categories were assigned to each tree.

4.3 Testing on site may include, mallet sounding, non-invasive testing for hollows, probing cavities, white ant infestation. Invasive tests will determine the depth of decay around cavities. All testing is ground based, options may include further investigation. It should be noted that this tree assessment report couldn't be considered final until all aerial inspections; drill and root tests have been completed, as these may reveal further defects.

4.4 Impact assessment data was recorded in a Tree Survey Table with various assessment methods, setbacks are calculated according to *Australian Standards AS 4970 2009 Protection of Trees on Development Sit*es. Including:

Appendix A: Tree Useful Life Expectancy TULE 2014. Gives extra assessment life expectancy categories range to no potential for 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 category and may be reviewed as part of this report or further reporting. *Morton, 2006 Determining Landscape Significance Rating.*

Appendix D: Tree Protection. Details of Tree Protection Zones and minimum setback, distances for each numbered tree. *Australian Standards AS 4970 2009 Protection of Tree on Development Sites.*

Appendix E: Tree Planting Specifications. Plants supplied must council compliant and be in the container sizes and within the approved plant heights specified. *Australian Standards AS 2303 2015 Tree Stock for Landscape Use.*

Appendix F: Indigenous Tree Replenishment. Planting of locally occurring native tree species will be a requirement.

5.0 PLANNING GUIDELINES AND SPECIFIC LEGISLATION

5.1 Tree management measures are in place for Penrith Council under the provisions of the trees and vegetation preservation for properties covered under the Penrith Development Control Plan 2014.

5.2 Land Zoning is Low Density Residential RU according to the NSW Planning Portal with Bushfire prone Land to the far east of the site not impacted.

5.3 A search of local and state heritage registers, tree registers and determination of landscape significance were carried out for tree identified in the survey.

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.

Threatened Species Conservation Act NSW (1995 TCS Act). Provides provision for conserving threatened species, populations and ecological communities of animals and plants as well as managing key threatening processes.

Environmental Protection and Biodiversity Conservation Act NSW (EPBC Act 1999) provides provision 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.

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.

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
Land Zoning

R2 - Low Density Residential : (pub. 2015-02-25) R2

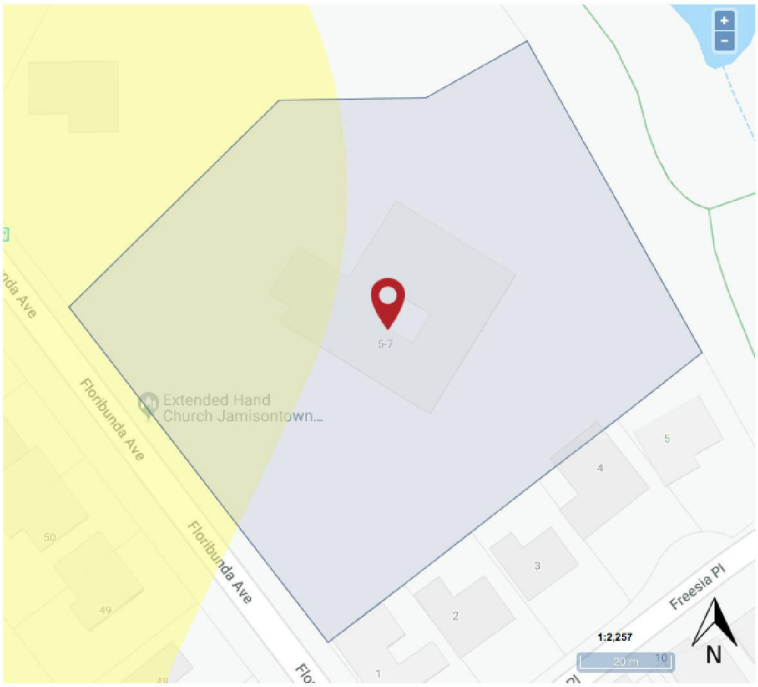


Figure 2
Bushfire Prone Land

Vegetation Buffer 0

7.0 THE SITE

7.1 The site is 5-7 Floribunda Avenue, Glenmore Park New South Wales. The collection of survey data was limited, and an inspection was conducted on the 20th of May 2019.

7.2 The topography of the area is gently undulating and the vegetation has no mapped ecological community, listed under the BC Act, characterizes the native vegetation. There are approximately fifty-two (52) trees on or adjacent this site. This site has limited presence of Acid Sulfate Soils.

7.3 SCALED SITE MAP

Figure 3. Map of site location

8.0 TREE SURVEY TABLE

Tree No.	Location	Scientific & Common Name	Crown Spread (m)	Height (m)	Diam (cm)	TPZ SRZ (m)	Condition of Tree & Failure potential (Health &Structure) (Defect & Measurements)	TULE	Retention Values	Impacts (Specification)
1.		*Ulmus parvifolia* Chinese Elm	8	8	35 32	4.2 2.05	Immature, good condition but poor development, twin leaders, previously pruned.	2a	Mod-High	RETAIN & PROTECT
2.	adjacent playground	*Fraxinus angustifolia* Claret Ash	7	6	26 36 (base)	3.12 2.15	Mature, minor dehydration spreading, epicormics, moderate condition.	2d	Mod-High	RETAIN & PROTECT
3.		*Stag*	-	7	20/15	3	Dead tree	2d	Very Low	REMOVE & REPLENISH
4.		*Corymbia citriodora* Lemon Scented Gum	10	17	45 50	5.4 2.47	Immature, minor dehydration, good condition but poor development.	2d	Moderate-High	REMOVE & REPLENISH
4a.		*Ulmus glabra* 'Lutescens' Goldens Elm	6	6	5-10 20	2 1.68	immature, poor condition due to elm beetle attack.	3d	Low	REMOVE & REPLENISH
4b.		*Ornamental spp.*(Lack of identifying features at this time)*	5	7	10/12 18	2 1.61	immature, moderate condition.	2d	Low	REMOVE & REPLENISH
5.		*Casuarina glauca* She Oak	7	18	30/27 60	4.84 2.67	Immature, twin trunk, branch hanging at 5m West, inclusions at base, moderate condition.	2d	Mod-High	REMOVE & REPLENISH
6.		*Casuarina glauca* She Oak	4	15	25 29	3 1.97	Immature, unbalanced canopy and leaning towards East, cavity at 4m, response wood forming around cavity.	3d	Mod	REMOVE & REPLENISH

Tree No.	Location	Scientific & Common Name	Crown Spread (m)	Height (m)	Diam (cm)	TPZ SRZ (m)	Condition of Tree & Failure potential (Health &Structure) (Defect & Measurements)	TULE	Retention Values	Impacts (Specification)
7.		*Eucalyptus microcarpa* Grey box	8	14	35 40	4.2 2.25	Immature, previously pruned at 3m (200mm cut).	2d	Mod-High	RETAIN & PROTECT
8.	in raided garden bed	*Ulmus parvifolia* Chinese Elm	11	11	32 38	3.84 2.2	Immature, minor dehydration, cavity at 2m, inclusion at 2m, good condition but poor development.	2d	Mod	REMOVE & REPLENISH
9.		*Ulmus parvifolia* Chinese Elm	12	10	35 40	4.2 2.25	Immature, broken branch at 6m North, inclusion at 1m & 3m, good condition but poor development.	2d	Mod	RETAIN & PROTECT
10.		*Corymbia citriodora* Lemon Scented Gum	10	18	52 50	6.24 2.47	Mature, twin trunk, inclusion at 3m, broken branch at East 12m, cavity at 13m, moderate condition.	2d	Mod-high	RETAIN & PROTECT
11.		*Corymbia citriodora* Lemon Scented Gum	12	18	58 60	6.96 2.67	Mature, good condition but poor development, slight leaning to North, minor damage at 5m north side.	2d	High	RETAIN & PROTECT
11a..		*Deciduous spp.*	7	7	18/15 /8/7 20	3.09 1.68	immature, good condition but poor development.	2d	Mod	RETAIN & PROTECT
12.		*Ulmus parvifolia* Chinese Elm	12	10	34 45	4.08 2.37	Mature, good condition but poor development, minor cavity, inclusion at 1m.	2d	Mod	RETAIN & PROTECT
13.		*Fraxinus* 'Raywood' Claret Ash	5	11	22/35 50	3.09 2.47	Immature, unbalanced canopy and leaning towards East, inclusion at base.	2d	Mod-High	REMOVE & REPLENISH
13a.		*Liquidambar styraciflau* Liquid amber	4	12	19 22	2.28 1.75	immature, poor development and condition, sparse foliage crown.	2d	Low-Mod	REMOVE & REPLENISH

Tree No.	Location	Scientific & Common Name	Crown Spread (m)	Height (m)	Diam (cm)	TPZ SRZ (m)	Condition of Tree & Failure potential (Health &Structure) (Defect & Measurements)	TULE	Retention Values	Impacts (Specification)
13b.		*Deciduous spp.** *Fraxinus sp.* Ash	7	9	15/15 /20 45	3.5 2.37	immature, moderate condition.	2d	Low Mod	REMOVE & REPLENISH
13c.		*Araucaria columnaris* Cook pine	4	6	20 22	2.4 1.75	immature, inclusion up top, lean	2d	Low-Mod	RETAIN & PROTECT
14.		*Brachychiton acerifolius* Flame tree	10	7	20 24	2.4 1.82	Immature, good condition but poor development.	2d	Low Mod	RETAIN & PROTECT
14a.		*Brachychiton acerifolius* Flame Tree	8	12	28 33	3.36 2.07 7	Mature, good condition but poor development.	2a	Low Mod	RETAIN & PROTECT
14b.		*Eucalyptus moluccana* Grey Box	14	20	60 70	7.2 2.85	Mature, cavity at 3m, parasitic vine present, mallet sounding test is showing some defect, response wood around inclusion.	2d	Moderate-High	REMOVE & REPLENISH
15.		*Corymbia citriodora* Lemon scented gum	6	16	40 44	4.8 2.34	immature, good condition but poor development, damage at 8m	2d	Mod	REMOVE & REPLENISH
16.		*Ccasuarina glauca* She oak	5	8	37 48	4.44 2.43	immature, lean and unbalanced canopy north	2d	Mod	REMOVE & REPLENISH
17.		*Corymbia citriodora* Lemon scented gum	7	15	50 59	6 2.65	immature, sparse foliage crown south, moderate condition, exudation	2d	High	RETAIN & PROTECT

Tree No.	Location	Scientific & Common Name	Crown Spread (m)	Height (m)	Diam (cm)	TPZ SRZ (m)	Condition of Tree & Failure potential (Health &Structure) (Defect & Measurements)	TULE	Retention Values	Impacts (Specification)
18.		*Corymbia maculata* Spotted Gum	7	16	32 39	3.84 2.23	Immature, unbalanced canopy to East.	2d	Mod-High	RETAIN & PROTECT
19.		*Corymbia maculata* Spotted Gum	7	18	43 49	5.16 2.45	Immature, good condition but poor development.	2a	Mod-High	RETAIN & PROTECT
20		*Corymbia maculata* Spotted Gum	8	13	30 35	3.6 2.13	Immature, good condition but poor development, sparse canopy exudation.	2a	Mod-High	REMOVE & REPLENISH
20a		*Callistemon viminalis* Bottlebrush group x4	3	3-4	5-15 18	2 1.61	Immature, sparse foliage crown, moderate condition	2d	Low	RETAIN & PROTECT
21a		*Corymbia maculata* Spotted Gum	6	11	25 29	3 1.97	Immature, sparse foliage crown, moderate condition, minor insect damage.	2d	Mod	REMOVE & REPLENISH
21b		*Corymbia maculata* Spotted Gum	6	13	30 39	3.6 2.23	Immature, sparse foliage crown, moderate condition, minor insect damage.	2a	Mod	RETAIN & PROTECT
22.		*Corymbia maculata* Spotted Gum	15	18	65 55	7.8 2.57	Mature, dehydrating branch at 5m, physical damage at 8m, sparse foliage crown on laterals, attachment at 1m.	2d	Mod-High	REMOVE & REPLENISH
23.		*Corymbia maculata* Spotted Gum	6	12	21 26	2.52 1.88	Immature, physical damage at 3m, sparse canopy.	2d	Low-Mod	REMOVE & REPLENISH
24.		*Eucalyptus moluccana* Grey Box	12	13	32/21 20	4.59 1.68	Immature, good condition but poor development, broken branch at 7m, previous fail at 4m, epicormics.	2d	Mod	REMOVE & REPLENISH

Tree No.	Location	Scientific & Common Name	Crown Spread (m)	Height (m)	Diam (cm)	TPZ SRZ (m)	Condition of Tree & Failure potential (Health &Structure) (Defect & Measurements)	TULE	Retention Values	Impacts (Specification)
24a.		*Corymbia maculata* Spotted Gum	4	10	12 18	2 1.61	immature, sparse foliage crown, moderate condition.	2d	Low -Mod	REMOVE & REPLENISH
25.	(front) south of school	*Eucalyptus moluccana* Grey Box	15	19	71 74	8.52 2.92	Mature, slight lean towards East, inclusion at 5m, termite damage present, borers on response wood at 7m North, epicormics, spars foliage crown. Dehydrating crown.	3a	Moderate	REMOVE & REPLENISH
26.	*Within three metres of the current building.*	*Eucalyptus moluccana* Grey Box	10	17	44/53 92	8.27 3.19 5	Mature, twin stem, inclusion at base, with decay previously pruned at 8m, epicormics.	2d-4c	Moderate-High	REMOVE & REPLENISH
27		*Leptospermum species* Tea Tree	3	7	22 25	2.64 1.85	Immature, good condition but poor development.	2a	Low	RETAIN & PROTECT
27a.		*Leptospermum species* Tea Tree	5	7	10/12 /8/8/10 34	2.61 2.1	immature, poor development, unbalanced canopy east, in decline.	2d-3d	Low	REMOVE & REPLENISH
27b.		*Leptospermum species* Tea Tree	5	7	18/15 /8/10 28	3.2 1.94	immature, poor development, unbalanced canopy east, in decline.	2d-3d	Low	REMOVE & REPLENISH
28.		*Eucalyptus species* Peppermint	10	14	43/22 60	5.8 2.67	Mature, inclusion at 3m, ants nest present at 1m, moderate condition.	2d	High	RETAIN & PROTECT

Tree No.	Location	Scientific & Common Name	Crown Spread (m)	Height (m)	Diam (cm)	TPZ SRZ (m)	Condition of Tree & Failure potential (Health &Structure) (Defect & Measurements)	TULE	Retention Values	Impacts (Specification)
29.		*Leptospermum species.* tea tree	6	7	12/10 /10/8/ 8 35	2.61 2.13	immature, poor development, in decline.	2d	Low	REMOVE & REPLENISH
29a.		*Leptospermum species* Tea Tree	4	6	6-18 22	2.16 1.75	immature, poor development, multistemmed, sparse foliage crown	2d-3d	Low	REMOVE & REPLENISH
29b.		*Leptospermum species* Tea Tree	4	6	12/10 /8/10 28	2.42 1.94	immature, poor development, multi-stemmed, sparse foliage crown.	2d-3d	Low	REMOVE & REPLENISH
29c.		*Leptospermum species* Tea Tree	5	6	10/12 /15 20	2.6 1.68	immature, poor development, multi-stemmed, sparse foliage crown.	2d-3d	Low	REMOVE & REPLENISH
30.		*Eucalyptus tereticornis* Forest Redgum	10	13	50 61	6 2.68	Immature, failed stem, minor borers epicormics, borers and termite damage present.	2d	Moderate-High	REMOVE & REPLENISH
31.		*Casuarina glauca* She oak	6	8	34 45	4.08 2.37	immature, moderate condition, sparse foliage crown, dehydration.	2d-3d	Mod	REMOVE & REPLENISH
32.		*Castanospermum australe* Black bean	6	9	37 40	4.44 2.25	immature, sparse foliage crown, deadwood, dehydration, scar, poor condition.	2d-3d	Mod	REMOVE & REPLENISH
33.		*Eucalyptus microcarpa* Grey box	6	10	34 38	4.08 2.2	immature, twin stem at 1m, epicormics, dehydration.	2d	Mod	REMOVE & REPLENISH
34.		*Casuarina glauca* She oak	4	12	20 30	2.4 2	immature, heavily pruned, moderate condition.	2d	Mod	REMOVE & REPLENISH

Tree No.	Location	Scientific & Common Name	Crown Spread (m)	Height (m)	Diam (cm)	TPZ SRZ (m)	Condition of Tree & Failure potential (Health &Structure) (Defect & Measurements)	TULE	Retention Values	Impacts (Specification)
35.		*Casuarina glauca* She oak	5	13	35 41	4.2 2.27	immature, good condition but poor development.	2d	Mod	REMOVE & REPLENISH
36.		*Grevillea spp.* group x6	3	3-4	10-13 10-15	2 1.5	immature, lean and unbalanced canopy, poor condition.	3d	Low	REMOVE & REPLENISH

* *Identification not completed due to lack of fruit and leaves, as deciduous. Could be identified at a later date.*

9.0 FINDINGS

Plate 1. Tree 14b. *Eucalyptus moluccana* Grey Box

Moderate to high value

Plate 2. Trees 22-25.

Plate 3. Tree 26 *Eucalyptus moluccana* Grey Box.

Moderate to high value

Plate 4. Tree 30 *Eucalyptus tereticornis* Forest Red

Moderate to high value

Plate 5. View East of rear of site.

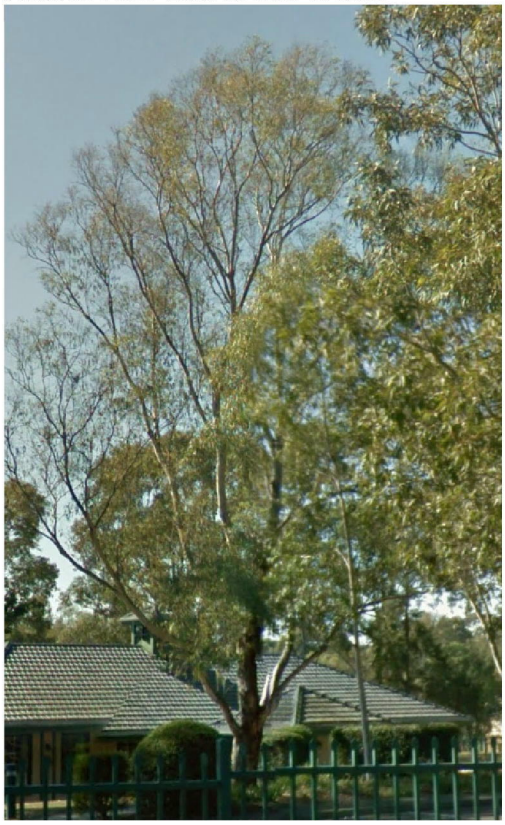
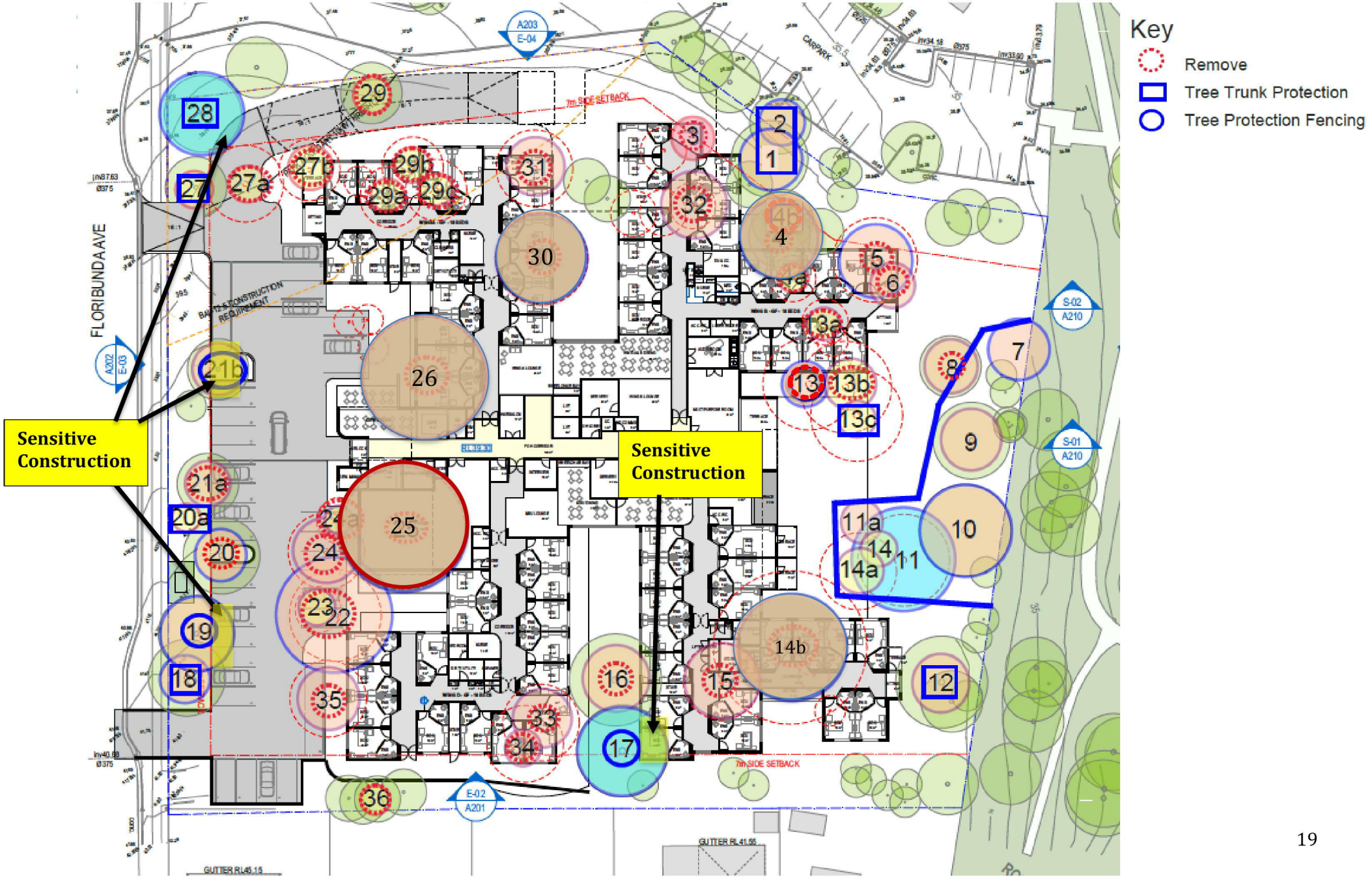
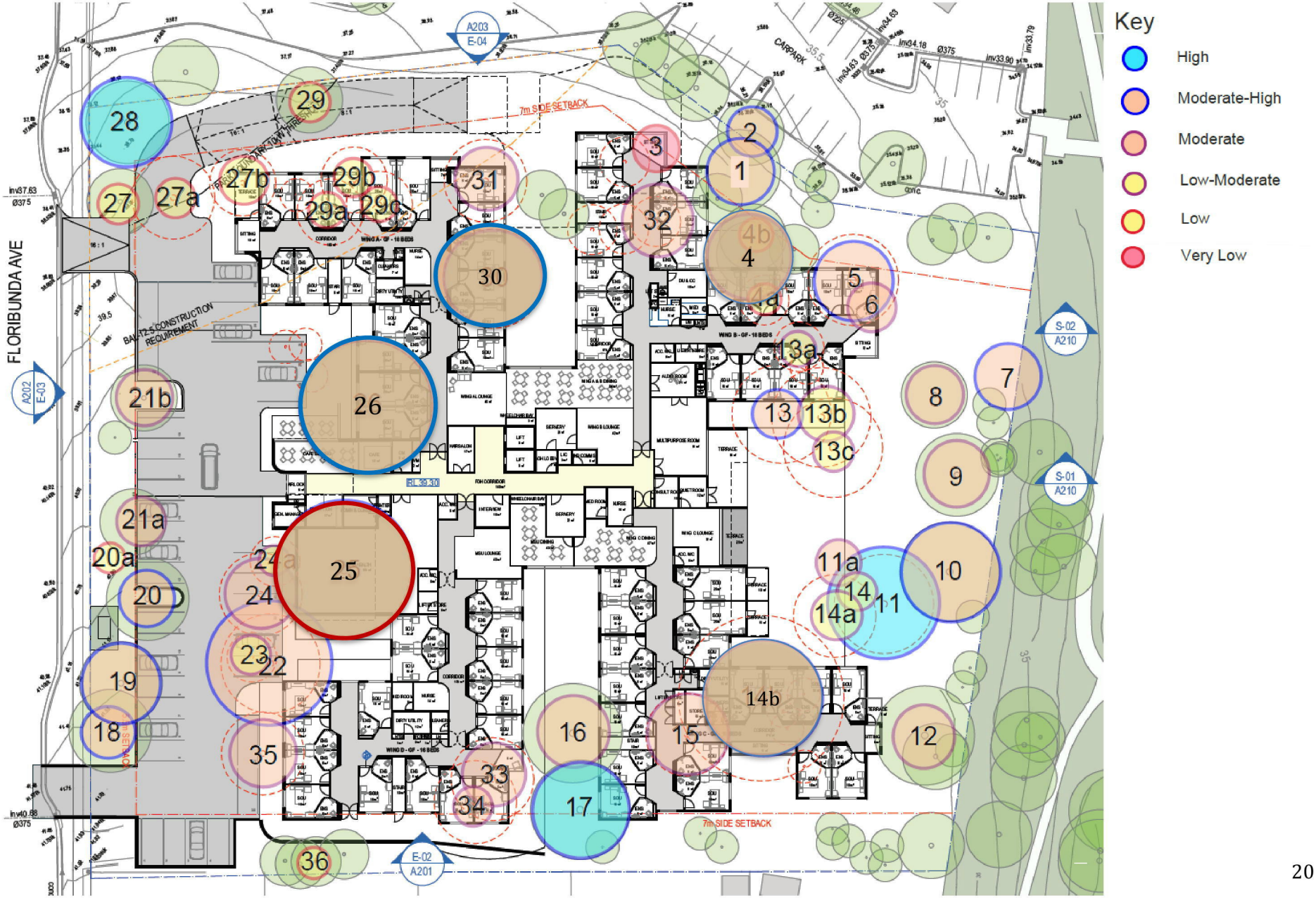


Plate 6. Tree 25 Moderate value in decline

10.0 TREE PROTECTION PLAN



10.1 TREE RETENTION MAP



11.0 DISCUSSION

11.1 Fifty-two (52) trees within the proposed area of development have been assessed. No High value trees will be removed from this proposal. High value trees will be retained for this site.

11.2 The retention values of fifty-two (52) trees have been assessed on the site to be:
Three (3) trees are of high retention value, these trees are numbered 11, 17,& 28.
Fourteen (14) trees are of moderate to high retention value, these trees are numbered 1, 2, 4,5, 7, 10, 13, 14b,18, 19, 20, 22,26 &30.
Sixteen (16) trees are of moderate retention value, these trees are numbered 6, 8, 9, 11a, 12, 15, 16, 21a, 21b, 24, 25, 31, 32, 33, 34, 35.
Seven (7) trees are of low to moderate retention value, these trees are numbered 13a, 13b, 13c, 14, 14a, 23, 24a.
Twelve (12) trees are of low retention value, these trees are numbered 3, 4a, 4b, 20a, 27, 27a, 27b, 29, 29a, 29b, 29c, 36.

11.3 The impacts of trees have been assessed on the site to be:
Twelve (12) trees have a no impact they are numbered 1, 2, 7, 9, 10, 11, 11a, 12, 13c, 14, 14a, 20a.
Three (3) trees have a minor impact of 10% or less and they are numbered 18, 27, 28.
Eight (8) trees have an impact ranging from 20% to 30% and they are numbered 4, 4b, 13, 13b, 16, 17, 19, 21b.
Fourteen (14) trees have a major impact of 50-80% and they are numbered 3, 5, 6, 14b, 20, 21a, 27a, 27b, 29, 29b, 30, 31, 33, 35.
Thirteen (13) trees have a major impact of 100% and they are numbered 4a, 13a, 15, 22, 23, 24, 24a, 25, 26, 29a, 29c, 32, 34.
Two (2) trees have an impact on their Structural Root Zone numbered 8, 36.

11.4 Trees with no impact numbered 1, 2, 7, 9, 10, 11, 11a, 12, 13c, 14, 14a, 20a are to be retained and protected. Trees with an impact of 10% numbered 18, 27, 28, are to be retained and protected as it is within the acceptable percentage of the Australian Standards. Tree 28 is of high value and will require sensitive construction for the construction of the driveway when within the TPZ. An AQF level 5 arborist must supervise all works within the TPZ and any roots to be cut must be cut under the supervision of the project arborist.

11.5 Tree 17 *Corymbia citriodora* Lemon scented Gum has an impact of 20% by the proposed development. As this tree has high value it is recommended to be retained and protected. Due to the 20% impact proposed on the tree, all work within the TPZ must use sensitive construction and must be carried out under the supervision of an AQF level 5 arborist, including any roots to be cut.

11.6 Tree 13 *Fraxinus 'Raywood'* Claret Ash is of moderate to high value and is impacted 20% by the proposed plans. Due to the significant impact of the proposed building and the location of the raised terrace, the tree is not viable for retention and is to be removed. Tree 16 *Casuarina glauca* She oak is of moderate retention value and is impacted by the proposed plans by 20%. As there is a 20% impact on the TPZ and the tree is within close proximity to the proposed plans, as seen in the landscape plan, it is not viable to retain the tree. These impacts cannot be managed and the tree would not survive the proposed works thus Tree 16 is to be removed. Tree 4b *Ornamental spp.* has low value and is impacted significantly by the courtyard in the proposed landscape plan. This impact does not enable the retention of the tree and Tree 4b is to be removed. (*4b could not be identified as it is deciduous but could be identified at a later date*).

11.7 Trees 13b *Fraxinus sp*. *Deciduous spp.* and 19 *Corymbia maculata* Spotted Gum are impacted 25% and have low-moderate and moderate-high retention values respectively. As Tree 13b is of low-moderate value and does not offer much amenity to the area it is to be removed and replenished. Tree 19 is of moderate-high value and is located along the street within a row of the same species, offering high amenity to the area. Due to the high value of the tree, Tree 19 is to be retained and protected. The 25% impact by the proposed carpark must be managed using sensitive construction within the TPZ, with all work including excavations to be carried out under the supervision of an AQF level 5 arborist.

11.8 Trees numbered 4 *Corymbia citriodora* Lemon scented Gum and 21b *Corymbia maculate* Spotted Gum are impacted by 30% by the proposed development. Tree 4 is of moderate-high retention value and is impacted by the proposal by 30% This impact is greater than the standards allow to retain the tree and is to be removed and replenished. As the tree is of high value it is highly recommended that the design alterations are considered to move the development outside of the TPZ of Tree 4 in order to retain the tree. Tree 21b has moderate value and is part of a row of *Corymbia maculata* Spotted Gum that line the street front offering amenity to the street scape. Tree 21b is impacted 30% by the proposed driveway. As the only impact is the driveway it can be managed with sensitive construction for the construction of the driveway. All work and excavations for the driveway within the TPZ of tree 21b must be under the supervision of an AQF level 5 arborist including the cutting of any roots.

11.9 Trees numbered 3, 4a, 5, 6, 13a, 14b, 15, 20, 21a, 22, 23, 24, 24a, 25, 26, 27a, 27b, 29, 29a, 29b, 29c, 30, 31, 32, 33, 34, 35 have a major impact of 50-100% which is more than the Australian Standards allow. These trees are to be removed and replenished. Tree 8 has an impact on the SRZ by the drainage and is to be removed as it is not viable for retention. Tree 36 has an impact on the SRZ by the extension of the driveway, which can be seen in the landscape plan. As Tree 36 is in poor condition and in decline it is to be removed. Tree 25 is also in decline and is of moderate value.

11.10 Twenty-two (22) trees are to be replenished as twelve (12) trees that are to be removed are either dead or in poor condition and in decline and do not require to be replenished. The replenished trees are to be planted on site with 50 litre potted species listed in Appendix F.

11.11 Trees to be removed are 3, 4, 4a, 4b, 5, 6, 8, 13, 13a, 13b, 14b, 15, 16, 20, 21a, 22, 23, 24, 24a, 25, 26, 27a, 27b, 29, 29a, 29b, 29c, 30, 31, 32, 33, 34, 35, 36 as these trees are impacted by the proposed development, which includes trees of moderate to high retention value.

11.12 TREE IMPACTS TABLE

Tree No.	Impact	Works Required
1, 2, 7, 9, 10, 11, 11a, 12, 13c, 14, 14a, 20a	0%	**Retain & Protect** Tree Trunk Protection & Mulch 75mm depth over TPZ.
18, 27	10%	**Retain & Protect** Tree Trunk Protection & Mulch 75mm depth over TPZ.
28	10%	**Retain & Protect** **Sensitive Construction** Tree Trunk Protection & Mulch 75mm depth over TPZ. No excavations within TPZ and if any works are required in the TPZ it must be supervised by an AQF Level 5 Arborist.
17	20%	**Retain & Protect** **Sensitive Construction** Tree Trunk Protection & Mulch 75mm depth over TPZ. No excavations within TPZ and if any works are

		required in the TPZ it must be supervised by an AQF Level 5 Arborist.
4b, 13, 16	20%	**Remove & Replenish** Replenish with 50 litre pot.
19	25%	**Retain & Protect** **Sensitive Construction** Tree Trunk Protection & Mulch 75mm depth over TPZ. No excavations within TPZ and if any works are required in the TPZ it must be supervised by an AQF Level 5 Arborist.
13b	25%	**Remove & Replenish** Replenish with 50 litre pot.
4	30%	**Remove & Replenish** Replenish with 50 litre pot.
21b	30%	**Retain & Protect** **Sensitive Construction** Tree Trunk Protection & Mulch 75mm depth over TPZ. No excavations within TPZ and if any works are required in the TPZ it must be supervised by an AQF Level 5 Arborist.
3, 5, 6, 30, 21a, 27b, 29b, 30, 31, 35	50-60%	**Remove & Replenish** Replenish with 50 litre pot.
14b, 27a, 29, 33	70-80%	**Remove & Replenish** Replenish with 50 litre pot.
4a, 13a, 15, 22, 23, 24, 24a, 25, 26, 29a, 29c, 32, 34	100%	**Remove & Replenish** Replenish with 50 litre pot.
8, 36	SRZ Impact	**Remove & Replenish** Replenish with 50 litre pot.

11.13 The proposed development will impact upon forty (40) trees that will result in the removal of thirty four (34) trees, these trees are numbered 3, 4, 4a, 4b, 5, 6, 8, 13, 13a, 13b, 14b, 15, 16, 20, 21a, 22, 23, 24, 24a, 25, 26, 27a, 27b, 29, 29a, 29b, 29c, 30, 31, 32, 33, 34, 35, 36. Trees to be retained and protected are numbered 1, 2, 7, 9, 10, 11, 11a, 12, 13c, 14, 14a, 17, 18, 19, 20a, 21b, 27, 28, and require Tree Trunk Protection/Tree Protection Fencing and mulch. Sensitive construction methods are required for four trees numbered 17, 19, 21b, 28 and an AQF Level 5 Arborist must supervise all work within the TPZ of these trees.

11.14 To assist in competent removal 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.

11.15 An AQF level 5 Arborist must supervise all works within the TPZ of any of the retained trees and if the proposed development plans are altered than a new impact assessment must be conducted for those affected trees.

12.0 HOLDING POINTS - Retention and Protection of Trees

12.1 The project arborist is to mark the proposed trees to be removed with a waterproof marker at a visible height with a yellow cross. Removal works to be completed by an AQF level 3 Arborist in accordance to *Australian Standards AS4373 2007 Pruning of Amenity Trees* and *SafeWork NSW Guide to Managing Risks Tree Trimming Removal*, under the supervision of an AQF 5 Arborist.

12.2 Any pruning greater than 40mm within TPZ of preserved trees will need to be cut cleanly under supervision of an AQF Level 5 Arborist in accordance to *Australian Standards AS4373 2007 Pruning of Amenity Trees*. This will include clearances and crown canopy modification of any type.

12.3 Retention and protection of eighteen (18) trees numbered 1, 2, 7, 9, 10, 11, 11a, 12, 13c, 14, 14a, 17, 18, 19, 20a, 21b, 27, 28. Sensitive Construction is required for trees numbered 17, 19, 21b, 28. All work within the TPZ of these trees must be under the supervision of an AQF level 5 Arborist and any roots required to be cut must be under the supervision of the arborist. No root greater than 50mm are to be cut.

12.4 An AQF level 5 Arborist must install or supervise Tree Trunk Protection and Tree Protection Fencing at the required setbacks found in the Tree Management Plan prior to any demolition, construction or re-landscaping.

12.5 Fencing must be of 1.8 metres height, with steel construction fencing as per Appendix D fig 4, or steel pickets every two metres with barrier mesh of 1.2m attached. Signage of the Tree protection zone and the project arborist in legible waterproof ink must be presented on signs on each fence. Tree Trunk Protection must be of 50mmx100mmx2m lengths with 150mm airgaps secured with underlay of carpet or hessian wrapped around the trunk.

12.6 The TPZ of all trees on site must be maintained with a 75mm depth of clean certified Eucalyptus species, mulch for the duration of the proposed development. This will exclude hard surfaces and trees neighbouring the site will have mulch distributing the TPZ that extends on to the site only.

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

12.8 Replenishment of indigenous stock of twenty-two (22) 50 litre potted volume selected from Appendix F list and planted according to the Landscape Plan.

12.9 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.

12.10 Prohibitions listed in Appendix D I,II,III,IV are to be complied with and certified by an AQF level 5 Arborist.

13.0 RECOMMENDATIONS

13.1 The removal of thirty-four (34) trees as stated includes tree numbers 3, 4, 4a, 4b, 5, 6, 8, 13, 13a, 13b, 14b, 15, 16, 20, 21a, 22, 23, 24, 24a, 25, 26, 27a, 27b, 29, 29a, 29b, 29c, 30, 31, 32, 33, 34, 35, 36.

13.2 Any clearance pruning required for trees for clearance must be supervised by an AQF level 5 arborist ensuring pruning is done in accordance to *Australian Standards AS4373 2007 Pruning of Amenity Trees.*

13.3 Retained trees will require Tree Trunk Protection or Tree Protection Fencing which utilises steel mesh construction style fencing of 1.8m to be positioned outside of the TPZ of each tree.

13.4 To assist in competent pruning and removal 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.

13.5 Replenishment of twenty-two (22) new stock trees of 50 litre pots and added according to schedule of the landscape plan. Including canopy and moderate sized trees, with shrubs of suitable species and potted volume. Compliant prior to occupation.

13.6 Holding points 1-10 will be compliant by an AQF level 5 arborist.

13.7 Sensitive Construction is required for trees numbered 17, 19, 21b, 28. All work within the TPZ of these trees must be under the supervision of an AQF level 5 Arborist.

13.8 To reduce the compaction of the soil around the retained trees, it is recommended the addition of clean *Eucalyptus sp.* mulch at 75mm depth over the TPZ of each tree.

14.0 GLOSSARY

Aerial Inspection: Where a tree is climbed by an arborist to inspect upper stem and crown for signs or symptoms of defects and disease etc.
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

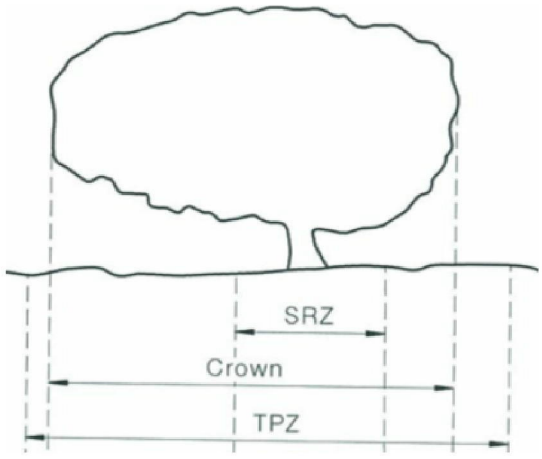
DETERMINING LANDSCAPE SIGNIFICANCE RATING MORTON, A 2006			
RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
1. SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant 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.	The subject tree has a medium live crown size exceeding 40m^2; 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
			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.
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 Significant Ratings	
RETENTION VALUE	RECOMMENDED ACTION
High	• 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	• 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	• 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	• 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*



D.1 STRUCTURAL ROOT ZONE (SRZ)

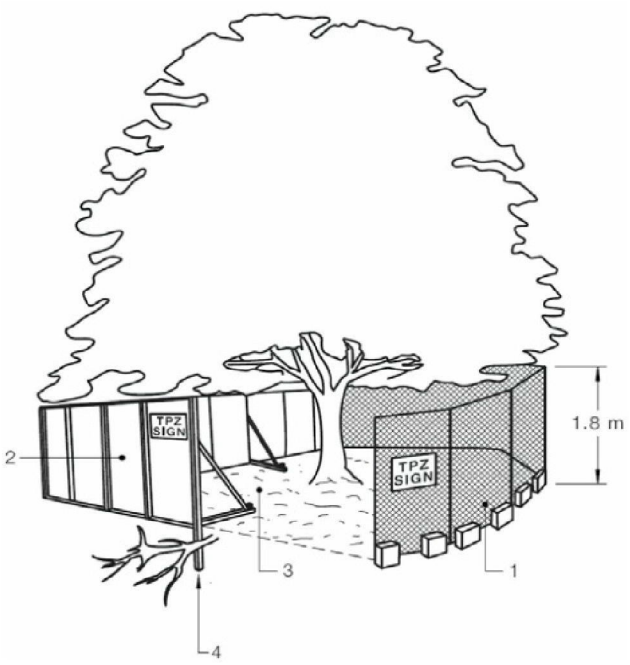
"The SRZ is the area considered essential for tree stability. Temporary tree protection fencing shall be erected around the perimeter of all tree protection zones.

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 measure should be used, including those set out below;

D.3 PROTECTIVE FENCING

It shall be installed prior to any demolition, clearing, Chain wire mesh panel 1.8-meter cyclone fencing or star pickets at 2m intervals, connected by a continuous highly-visible barrier/hazard mesh at the height of 1.8 meters. Alternative plywood or wooden paling fence panels. This fencing material also prevents building material soil entering the TPZ. Mulch installation across surface of TPZ. 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

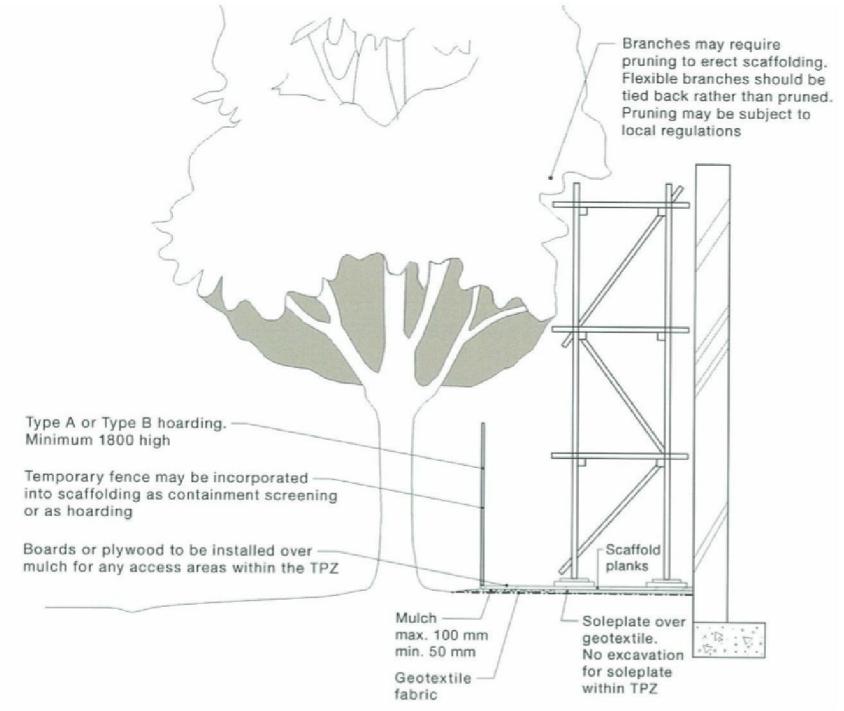
Signage shall be attached to the fence at regular intervals. Signage shall read "TREE PROTECTION ZONE. NO ENTRY EXCEPT TO AUTHORISED PERSONNEL. FINES

D.5 GROUND PROTECTION

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

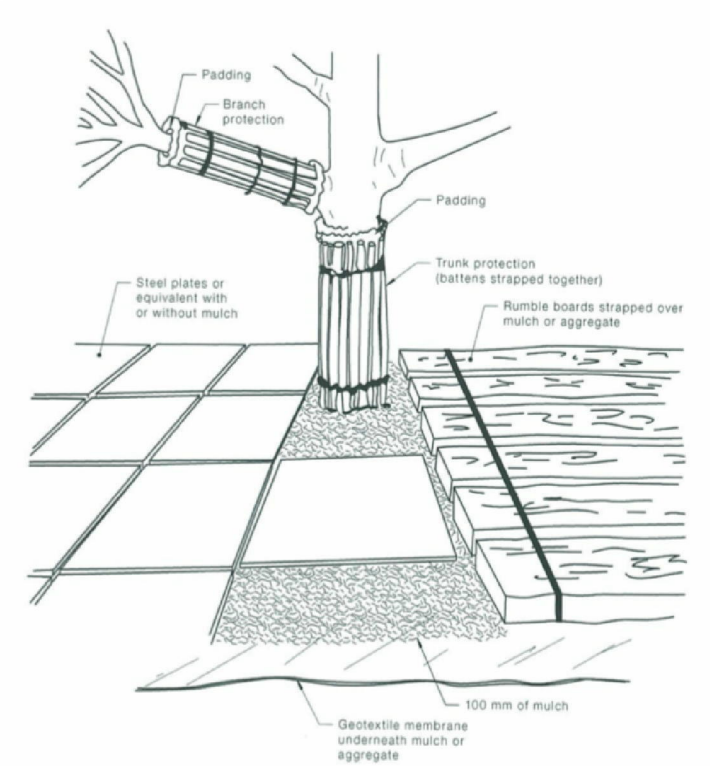
D.6 INSTALLING UNDERGROUND SERVICES WITHIN TPZ

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.



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 REQUIRED for the insertion of supports 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.

APPENDIX D PROHIBITIONS

FOR TREE PROTECTION ZONES

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.

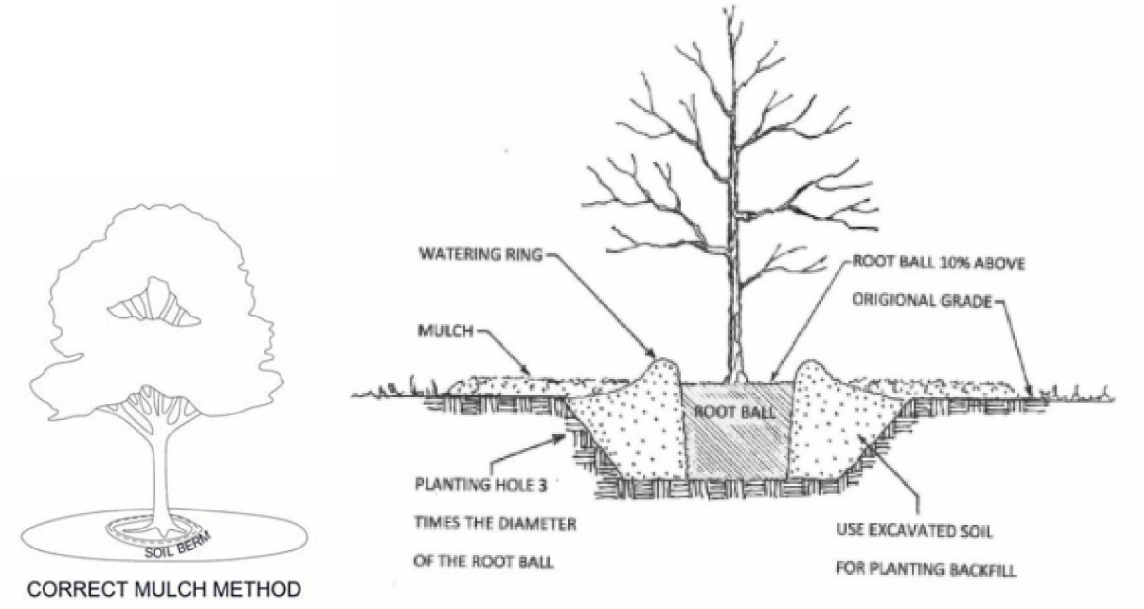
III All work undertaken within or above a Tree Protection Zone shall be supervised by the Project Arborist.

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 2015 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.



APPENDIX F INDIGENOUS TREE REPLENISHMENT

F.1 Check local Council's community nursery for suitable trees and possible free native tree giveaways. For suitable community plants in addition to this the following species should be considered for replenishment.

F.2 Recommended Replacement Species

		Height at maturity (m)
Acmena smithii	Lilly Pilly*	8
Tristaniopsis laurina	Water Gum*	7
Corymbia eximia	Yellow Bloodwood	12
Backhousia citriodora	Lemon Scented Myrtle*	8
Elaeocarpus reticulatus	Blueberry Ash*	6
Waterhousia floribunda	Weeping Lilly Pilly*	6
Syzygium leuhmannii	Riberry*	10
Hymenosporum flavum	Native Frangipani*	8
Eucalyptus haemastoma	Scribbly Gum*	15
Eucalyptus paniculata	Grey Ironbark	20
Eucalyptus microcorys	Tallowood	20
Eucalyptus leucoxylon	Yellow Gum	20
Eucalyptus crebra	Narrow Leaved Ironbark	20
Lophostemon confertus	Brush Box*	12 (can vary according to conditions)
Syncarpia glomulifera	Turpentine*	20

*Suitable for this site with a height of maturity as stated.

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.

Consulting Arborist
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