Arborist Impact Assessment 2018

Prepared by

MCARDLE
ARBORICULTURAL
CONSULTANCY

Prepared for

Residential Aged Care Facility
by
Catholic Healthcare

C/o Adam Fahey
11-15 Lang Road,76-80 Marsh Parade & 542-536 Hume Highway
Casula, NSW 2170

23rd May 2018

CONSULTING ARBORIST
Jim McArdle
B.Ed (Science)
Dip.Arb L5

0449 228 788
jim@mcardlearborist.com.au

ISA
Member 199140

Tree Contractors Association Australia
Member 13104214

TABLE OF CONTENTS

1.0 ABSTRACT

The proposal will require four (4) streetscape trees to be preserved and protected, but all smaller vegetation and trees on site will be removed for the development. Noxious weeds, small plants and trees of value are included in this assessment. Six (6) trees will remain T14, T15, T16 ,T85, T86 and T87 being either streetscape on Lang Road and Marsh Parade Casula or within a neighboring property. These will be protected utilizing Tree fencing or trunk protection with mulch.

1.1 Of the Eighty-six (86) trees and small shrubs (including groups) assessed by the AQF level 5 arborists, Eighty (80) trees and shrubs will be impacted and removed. These trees will be replenished within the landscape plan which requires production of plans for comment. One street tree will be impacted of Moderate Value and removed by the proposal. The trees removed will be replenished with thirty five (35) x 70mm &45mm potted volume indigenous plants according to the Landscape Master Plan and selected from indigenous plants in Appendix G. Forty low, moderate and high value planted trees are to be removed and five of these trees are not necessarily classified as trees but shrubs ,succulent cacti and hedge plantings which have low value (T4,-Palm,T47&T74-toxic shrub,T53 hedge &T54 cacti-succulent).

2.0 INTRODUCTION

2.1 Catholic Healthcare Limited have commissioned an Arborist Impact Assessment over the residential allotments for the purpose of a proposed retirement complex and recreational area. On this site were approximately Eighty-six (86) trees and tree groups which were assessed by two AQF level 5 arborists Jim and Dan McArdle. These assessments were undertaken on the 2nd & 3rd of November 2016 utilising the VTA-Visual tree assessment according to Mattheck & Breloer (1994). A review of the tree assessment in May 23rd 2018, due to the access being changed to Marsh Parade will impact an additional street tree 83 *Callistemon viminalus* (Red Bottle Brush) .

2.2 Within the site marked out for proposed development there are eighty (80) trees proposed for removal. Of these trees one high value and one moderately high tree of value will be impacted. Over thirty-three (33) exempt trees will be removed and four trees (*two inclusive*) which are structurally unsound requiring removal numbered 10,40,42&45 (*Tree 40&45 are also exempt*). One tree numbered 66 (*and a part of the nine trees in a hedge-bordering the highway numbered 64 to 72*), located adjacent the Hume highway are exempt due to height. The other trees within this windbreak are poor quality and low to moderate retention value.

2.3 The Development has most vegetation being removed with four (4) streetscape trees being preserved. Trees under three metres and noxious weeds are exempt from the Liverpool control Development Plan). As the proposal, will impact one tree of high value we do not anticipate further design alteration but proceeding with the proposal and replenishment of thirty five (35) new indigenous species selected from the Appendix G would be suitable.

3.0 REFERENCES

1. Liverpool Tree Management Brochure 2011.
2. Liverpool Tree Management Policy 2016.
3. Liverpool Development Control Plan 2008 – Section 1 General Controls &2.1: Green Valley Release Area.
4. Site Survey Plans 11-15 Lang Road,76-80 Marsh Parade &542-536 Hume Highway Casula, including Elevations, Section Plans. Author Anderson Architecture Dated 14th September 2016 Sheet 1 0f 13.
5. Landscape Master Plan Author GSA Dated 2nd March 2017.
6. Revised Site Plan, Author Group GSA 1/10/17 DA1101 Project No.160474.

4.0 METHODOLOGY

4.1 An Arborist Impact Assessment uses a ground based VTA method employed in this report including assessment of biological and low level mechanical functions. 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. This system is based on Mattheck and Breloer (1994) 'Body language of trees', and uses 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 summarizes the species, height and diameter, the tree's health and structural condition for each tree's hazards and retention categories were assigned to this tree. Calculations for the Structural Root Zone (SRZ) are in accordance with AS 4970-2009 Australian standards, 'Tree Protection on Development Sites'.

4.3 All testing is ground based and various assessment methods were used according to the VTA (Mattheck and Breloer 1994), Tree Risk Assessment (TRA) (Barry Sullivan, 2014), Tree Retention Values (TRV) and Tree Useful Life expectancies (TULE) (TCAA Website-Interim Tree Management Guidelines 2014 McArdle D&J1).

4.4 Testing on site included, mallet sounding, non-invasive testing for hollows, probing surface cavities, surveying for white ant infestation. All testing is ground based.

4.5 This data was recorded in a Tree Survey Table and various assessment methods were used including:

1. Tree Useful Life Expectancy. TULE. Adapted from Jeremy Barrel (SULE) gives extra assessment life expectancy categories range to no potential for life expectancy. Appendix A.

2. Health & Structural Condition of Tree Assessment. Found in the tree survey table as a written comment, this describes the factors of vigour and vitality of the tree with any comments on structural defects or condition as described in Mattheck (1994). Appendix B.

3. 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. Retention values use very low, low, medium and high in line with Melanie Howdens and Andrew Morton's significance of trees and the following TCAA interim guide. Appendix C.

4. Tree Protection Measures and impact assessments are based on As4970 2009 Tree Protection on Development Sites. Appendix D presents an extract on Tree protection requirements and Tree Survey table 1 includes setback values for the SRZ-structural root zone and the TPZ-tree protection zone in metres from the center of the tree. These values for trees preserved under the legislative controls and the proposal are presented with the TMP-Tree Management Plan the appendix.

[1] *www.tcaa.com.au/abouttrees/interimtreemanagementguide*

5.0 PLANNING GUIDELINES AND SPECIFIC LEGISLATION

5.1 Tree management measures are in place for the Liverpool Council under the provisions of the Liverpool Development Control Plan 2008 and Tree Management Policy and Local Environment Plan 2008. A search of Local and State heritage registers, tree registers and determination of landscape significance were carried out for tree species identified in the survey. The site is zoned for R3-Medium Density housing.

5.2 Significance in The Environment

Trees are subject to the following legislation:

Biodiversity Act 2016(NSW) (Bio Act) –The Bio Act allows for provisions to enhance and conserve trees identified as having Biodiversity value. Where identified, threatened tree species are considered in this report.

Threatened Species Conservation Act 1995 (NSW) (TSC Act) – The TSC Act provides a number of provisions for conserving threatened species, populations and ecological communities of animals and plants as well as managing key threatening processes. Where identified, threatened tree species are considered in this report.

Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) – The EPBC Act provides provisions to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. Where identified, threatened tree species are considered in this report.

Noxious Weeds Act 1993. NSW DPI allows management of weeds within the classified category of weed within each shire district. Where identified, these are commented on. EPA has constraints to transport noxious waste and it must be disposed of to an authorized waste disposal facility.

5.3 Significance in The Landscape

Assessment of trees significance in the landscape is generally categorized as either:

Significant in the Landscape-Prominent from a broad landscape perspective, including streetscape. HIGH VALUE. *

Significant in the Landscape-Prominent from a neighborhood perspective. -Retained due to its status but may have some conditions or health issues. HIGH VALUE. *

Significant in the Landscape-Prominent from adjacent areas surrounding the site. HIGH VALUE*

Good and worthy of Preservation-Retained due to its status, but may have minor conditions or health issues. Moderate VALUE. *

Worthy of preservation- retained due to its status, but may have major conditions or health issues. Moderate VALUE.*

Low Retention-Retain if possible. Exempt- Very Low VALUE* According to Appendix C.

(Significance of trees in environment and landscape has a retention value categorizing Trees with Melanie Howden and Andrew Morton's Retention Values Tables in Appendix C).

6.0 THE SITE

6.1The review of the trees was conducted on the 2nd& 3rd of November 2016 & 23rd May 2018. An additional site map showing the location of the Eighty-six (86) trees and tree groups is at the end of this report (*after the section II*).

8.2The satellite plate locates the site, within the property. (Pre 2016) SCALED SITE MAP

Plate1: An aerial photo of Site at Lang road, Marsh Parade and Hume Highway, CASULA. NSW.

Tree No	Location	Scientific Name &Common	Crown Spread (m)	Height (m)	Diam' DBH DGL (mm)	TPZ SRZ (m)	Condition of Tree *Health & Structural (see Appendix B)*	TULE	Retention value	Proposed IMPACTS of DA
1	Hall	***Pittosporum undulatum*** *Sweet pittosporum*	4	3	15 16+16	-	Immature, adjacent house.	2d	Exempt Very Low	REMOVE
2	Near tree 9(Neighbours tree)	***Lagerstroemia indica*** Crepe myrtle	3	3	- 25	-	Immature, heavily pruned.	3d	Exempt Very Low	Requires additional neighbours consent if required removal.
3		***Cinnamomum camphora*** *Camphor laurel*	14	12	45/70/30 90	10.56 3.17	Mature, three main leaders.	2d	Exempt Very Low	REMOVE
4	Back of 13 lane cove road	***Musa banksii*** Banana palm	3-6	3-6	20-40 -	-	Immature, good condition but poor development.	2a	Low	REMOVE
5	Back of 13 lane cove road	***Angophora backeri*** Rough barked apple	4	4	20 20	-	Immature, multi-stemmed	2d	Low	REMOVE
6		***Macadamia australis*** *Australian macadamia*	3	4	20 30	-	Immature, multi-stemmed	2d	Low	REMOVE
7		***Cortaderia Sp.*** Pampas grass	3	4	1m	-	Immature, good condition but poor development. Class 3 noxious weed	2a	Exempt Very Low	REMOVE
8	In garden bed	***Banksia integrifolia*** Coastal banksia	4	5	10 15	2 2-	Immature, twin stems.	2a	Low	REMOVE
9		***Albizia julibrissin*** Persian Silk tree	-	-	18/16 40		Immature. Twin stemmed, heavily pruned.	2d	Exempt Low	REMOVE
10		***Callistemon viminalis*** Bottlebrush	2	4	20 29	-	Immature, heavily pruned.	4c	Very Low	Structurally defected. Remove.
11		***Callistemon viminalis*** Bottlebrush	N5 e0 s8 w5	8	20/19 35	3.36 2.13	Mature, twin stems, inclusion at base.	2a	Moderate	REMOVE
12		***Archontophoenix alexandrae*** Alexander palm	2	3	18 20	-	Immature, excellent condition.	2a	Exempt Very Low	REMOVE
13	Adjacent powerline	***Jacaranda mimosifolia*** Jacaranda	6	7	12/20 40	2.76 2.25	Immature, excellent condition, minor prune.	2d	Moderate	REMOVE

Tree No	Location	Scientific Name &Common	Crown Spread (m)	Height (m)	Diam' DBH DGL (mm)	TPZ (m) SRZ (m)	Condition of Tree *Health & Structural (see Appendix B)*	TULE	Retention value	Proposed IMPACTS of DA
14		***Callistemon sp.*** Bottlebrush	5	6	18x2 60	3 2.67	Immature, good condition but poor development, multi-stemmed	2d	Moderate	**Retain** 3m setback
15		***Lagerstroemia indica*** Crepe myrtle	4	5	15x4 34	3.6 2.1	Immature, heavily pruned, multi-stemmed	2d	Moderate	**Retain**
16	Street	***Lagerstroemia indica*** Crepe myrtle	4	4.5	9/6 36	-	Multi-stemmed and smaller compacted canopy, previously pruned.	2d	Low	**Retain**
17		***Hibiscus Sp.*** *Flowering Hibiscus*	3	2	20 20		Immature, good condition but poor development.	3a	Exempt very Low	REMOVE
18	X10 and x5	***Pittosporum ferrugineum*** Citrus pittosporum	>1m	1m	>1.5m	-	Juveniles, excellent condition or good condition but poor development.	2a	Exempt Very Low	REMOVE
19	Adjacent poles 2x	***Camellia Sp.*** Camellia	4	5	8x3+3x7 mm 20	-	Immature, good condition but poor development.	2d	Low	REMOVE
20		***Camellia Sp.*** Camellia	3	3	15 15	-	Mature, excellent condition.	3a	Exempt Very Low	REMOVE
21		***Ficus benjamina*** Weeping fig	0.5	1.5	10 11	-	Immature, good condition but poor development.	2d	Exempt Very Low	REMOVE
22	Adjacent fence	***Lagunaria patersonii*** *Norfolk Island hibiscus*	3	7	25 30	3 2	Immature, good condition but poor development, four stems.	2a	Exempt Low	REMOVE
23	Adjacent fence	***Lagunaria patersonii*** Norfolk Island hibiscus	3	8	29/20-22/20 40	5.52 2.25	Immature, good condition but poor development, climbing vine present.	2d	Exempt Low	REMOVE
24	542 Hume Hwy	***Liquidambar styraciflua*** Liquidambar	3	4	8/8 1.5	-	Immature, adjacent power lines.	3d	Low	Seen from street. REMOVE
25	Adjacent powerline 540 Hume Hwy	***Lagerstroemia indica*** Crepe myrtle	4	4	10/10 20	-	Immature, multi-stemmed, good canopy.	2d	Low	Seen from street REMOVE
26	540Hume Hwy	***Cupressus macrocarpa*** Pine	3	7	42 45	--	Immature, excellent condition, climbing vine present.	2d	Low	Adjacent road REMOVE

Tree No	Location	Scientific Name &Common	Crown Spread (m)	Height (m)	Diam' DBH DGL (mm)	TPZ SRZ (m)	Condition of Tree *Health & Structural (see Appendix B)*	TULE	Retention value	Proposed IMPACTS of DA
27	X4	***Michelia figo*** Port wine magnolia	3	3	10 10	-	Immature, good condition but poor development.	2d	EXEMPT Low	REMOVE
28	X3	***Spirea cantoniensis*** May bush	N3 E0 W5 S3	3	10 10	-	Immature, good condition but poor development	2d	EXEMPT Very low	REMOVE
29		***Schefflera actinophylla*** *Umbrella tree*	E-W 3	5	8 12	-	Immature, good condition but poor development.	2d	Very Low Exempt	REMOVE
30		***Lophostemon confertus*** *Brush box*	8 EWS	10	44 48	5.28 2.43	Immature, good condition but poor development, unbalanced canopy, previously pruned.	2d	Moderate	REMOVE
31		***Ligustrum lucidium*** Privet& ***Cotoneaster Sp.***	6	4	10 10	-	Immature, excellent condition.	2d	Exempt Very low	REMOVE
32	X2	***Morus alba*** White mulberry	4	6	9/12/ 10 30	-	Immature, good condition but poor development.	3d	Low	REMOVE
33		***Ligustrum lucidium*** privet	6	7	36/18/ 10 55	-	Immature, good condition but poor development.	2d	Very low Exempt	REMOVE Noxious weed
34		***Brachychiton acerifolius*** Flame tree	4	8	23 35	2.76 2.13	Immature, excellent condition.	2a	Moderate	REMOVE
35	On fence line	***Cinnamomum camphora*** Camphor laurel	4	7	12/18 16/23		Immature, good condition but poor development.	2d	Exempt Low	REMOVE
36		***Jacaranda mimosifolia*** Jacaranda	E-W 8' N-S 7	10	42 40	5.04 2.25	Immature, good condition but poor development, minor decay, two leaders.	2a	Moderate-high	REMOVE
37		***Michelia figo*** Port wine magnolia	3	3	3 16	-	Immature, excellent condition.	2a	Exempt Very low	REMOVE
38		***Cuppressus sempervirens*** Mediterranean cypress	4	5	15/20 34	-	Immature, physical damage, twin leaders.	2d	Low	REMOVE
39		***Camellia oleifera*** Oil-seed camellia	3	3	10 10	-	Immature, good condition but poor development.	2d	Exempt Low	REMOVE
40		***Ligustrum lucidium*** Privet	4	5	20 20	-	Immature, good condition but poor development.	2d	Very Low Exempt	Noxious weed, REMOVE

Tree No	Location	Scientific Name &Common	Crown Spread (m)	Height (m)	Diam' DBH DGL (mm)	TPZ (m) SRZ (m)	Condition of Tree *Health & Structural (see Appendix B)*	TULE	Retention value	Proposed IMPACTS of DA
41	*53* Adjacent porch	***Syagrus romanzoffiana*** *Cocos palm*	6	8	23 32	-	Immature, good condition but poor development, heavy canopy.	2a	Very Low Exempt	REMOVE
42	Streetscape	***Castanospermum australe*** Black bean tree	3	6	13 18	-	Immature, lean to the west.	2d	Low	REMOVE
43	Streetscape	***Buckingham celsissima*** Ivory curl	3	7	18 18	-	Immature, excellent condition.	2d	Low	REMOVE
44		***Ligustrum lucidium*** Privet	3	5	20 20	-	Immature, good condition but poor development.	2d	Very Low Exempt	REMOVE
45		***Salix babylonica*** Willow Sp	5	10	44	-	Immature, structural hollow present.	4c	- Very Low Exempt	REMOVE
	Near 540 Hume Hwy	***Monsteria sp.*** Fruit Salad Plant	5	3	30est	-	Semi mature, fractures at 1m, decay at 5m.	3d	Very Low Exempt	REMOVE
46	Streetscape	***Syagrus romanzoffiana*** Cocos palm	6	8	20 36	-	Immature, good condition but poor development.	2a	Exempt Low	REMOVE
47	**Streetscape** X3	***Nerium Sp.*** oleander	3	4	10 -	-	Immature, excellent condition. Toxic tree.	2d	Very low	REMOVE
48	Rear	***Lagerstroemia indica*** Crepe myrtle	3	3	28	-	Immature, multi stemmed.	2d	Exempt Very low	REMOVE
49	Rear	***Lagerstroemia indica*** Crepe myrtle	4	4	50	-	Immature, good condition but poor development, multi stemmed.	2d	Very low	REMOVE
50	Rear	***Brachychiton acerifolius*** Flame tree	8	12	47 50	5.64 2.47	Mature, good condition but poor development, physical damage	2a	High	REMOVE
51		***Ligustrum lucidium*** Privet	4	5	- -	-	Inaccessible and noxious weed class 5.	2d	Very low Exempt	REMOVE
52		***Melaleuca linariifolia*** Narrow leaf paperbark	6	8	38 30	4.56 2	Immature, good condition but poor development, inclusion, twin stem, termite damaged.	3d	Moderate	REMOVE
53		***Murraya paniculata*** Murraya bush	3	4	10/8 20	-	Immature. Multi-stemmed hedge.	3a	Very low	REMOVE
54		***Yucca sp*** Yucca	1	5	18 17	-	Immature, good condition but poor development.	2d	Very low	REMOVE
55		***Fraxinus angustifolia*** Narrow leaf ash	5	5	26/15 at 1m 40	-	Immature, twin stems.	2d	Low	REMOVE

Tree No	Location	Scientific Name &Common	Crown Spread (m)	Height (m)	Diam' DBH DGL (mm)	TPZ (m) SRZ (m)	Condition of Tree *Health & Structural (see Appendix B)*	TULE	Retention value	Proposed IMPACTS of DA
56		***Taxandria juniperina*** Juniper myrtle	5	3	15/20 20	-	Immature, unbalanced canopy.	2d	Low	REMOVE
57		***Liriodendron tulipifera*** Tulip tree	3	6	12/12/12 25	-	Immature, multi-stemmed	2d	Low	REMOVE
58	80 Marsh Parade.	***Callistemon viminalis*** Bottlebrush	4	4	10x3 26	2.04 1.88	Immature, inclusion at 50cm, multi-stemmed	2d	Moderate	REMOVE Street course 3m setback.
59	Adjacent Hwy	***Harpephyllum Kaffrum*** Kaffir Plum tree	3	5	10/10/18 36	2.76 2.15	Immature, good condition but poor development, inclusion at 20cm.	2d	Moderate	REMOVE
60	Adjacent Hwy	***Harpephyllum Kaffrum*** Kaffir Plum tree	3	5	20/10/15 39	3.24 2.23	Immature, good condition but poor development, inclusion at 50cm.	2d	Moderate	REMOVE
61	Streetscape of Hume Hwy	***Harpephyllum Kaffrum*** Kaffir Plum tree	3	5	10x4 16	2.4 1.53	Immature, multi-stemmed, inclusion at base.	2d	Moderate	REMOVE
62	Streetscape	***Harpephyllum Kaffrum*** Kaffir Plum tree	4	5	10x6 35	2.88 2.13	Immature, multi-stemmed, inclusion at base.	2d	Moderate	REMOVE
63	Streetscape	***Cotoneaster sp.*** Cotoneaster	3	3	10x2 40	-	Immature, unbalanced canopy, multi-stemmed	2d	**Exempt** Very Low	REMOVE
64	Streetscape	***Cuppressus leylandii*** Leyland pine	3	8	30 40	3.6 2.25	Immature, good condition but poor development.	2a	Moderate	REMOVE
65	Streetscape	***Cuppressus leylandii*** Leyland pine	3	8	30 40	3.6 2.25	Immature, good condition but poor development.	2d	Moderate	REMOVE
66	Streetscape	***Cuppressus leylandii*** Leyland pine	1	3	18 10		Immature, good condition but poor development.	2d	Exempt Very low	REMOVE
67	Streetscape	***Cuppressus leylandii*** Leyland pine	3	7	15 22	2 1.75	Immature, good condition but poor development.	2d	Moderate	REMOVE
68	Streetscape	***Cuppressus leylandii*** Leyland pine	3	7	15/17 22	2.76 1.75	Immature, good condition but poor development.	2d	Moderate	REMOVE
69	Streetscape	***Cuppressus leylandii*** Leyland pine	4	7	20 22	2.4 1.75	Immature, good condition but poor development.	2d	Moderate	REMOVE
70	Streetscape	***Cuppressus leylandii*** Leyland pine	3	6	10 15	2 1.5	Immature, good condition but poor development.	2d	Moderate	REMOVE
71	Streetscape	**Cuppressus leylandii** Leyland pine	2	4	7 8	2 1.5	Immature, good condition but poor development.	2d	Low	REMOVE

Tree No	Location	Scientific Name &Common	Crown Spread (m)	Height (m)	Diam' DBH DGL (mm)	TPZ (m) SRZ (m)	Condition of Tree *Health & Structural (see Appendix B)*	TULE	Retention value	Proposed IMPACTS of DA
72	Streetscape	***Cuppressus leylandii*** Leyland pine	4	8	30 45	3.6 2.37	Immature, multi-stemmed In fair condition	2a	Moderate	REMOVE
73		***Jacaranda mimosifolia*** Jacaranda	4	6	15/4 30		Immature, two stems.	2a	Low	REMOVE
74		***Asparagaceae Sp.*** *Yucca*	0.5	1	- 25	1	Immature, excellent condition.	2a	Exempt Very Low	REMOVE
75		***Szygium smithii*** Lilly pilly	3	5	8/8 15		Immature, good condition but poor development, inclusion at base.	2a	low	REMOVE
76		***Leptospermum patersonii*** Lemon scented tea tree	3	4	8x4 20	2 1.68	Immature, multistemmedx4.	2a	Low-Moderate	REMOVE
77		***Leptospermum patersonii*** Lemon scented tea tree	W-S 3	4	10/12 14	-	Immature, inclusion, twin stem at 2m.	2d	**Low**	REMOVE
78		***Cuppressus leylandii*** Leyland pine	3	6	15 20	2 1.68	Immature, good condition but poor development.	2a	Exempt Low-	REMOVE
79		***Cuppressus leylandii*** Leyland pine	2	5	10	-	Immature, good condition but poor development.	2a	Exempt Low-	REMOVE
80		***Cuppressus leylandii*** Leyland pine	3	6	18 20	2.16 1.68	Immature, good condition but poor development.	2a	Exempt Low-	REMOVE
81		***Citrus limon*** lemon tree	4	7	36 40	-	Immature, good condition but poor development, dehydrated.	3d	Low	REMOVE
82		***Callistemon viminalis*** Bottlebrush	N-S3 E-W3	6	12 15	2 1.5	Mature, moved for clearance, failx1 at 2m north. Some damage to branches.	2d	Moderate	REMOVE & Replenish with tree from Landscape Plan Design.
83		***Callistemon viminalis*** Bottlebrush	S-W12 N-S6	8	35/40 55	6.36 2.57	Mature, triple leader, heavily pruned at 2m.	2d	Moderate	Impacted by the new access. REMOVE.
84	No listed or tagged tree									
85	Neighbours tree	***Koelreuteria paniculata*** *Golden rain tree*	10E-W S7	7	30 42	-	Mature, failed branch at 3m, structural defect.	3d-4c	Low	RETAIN
86	Neighbours tree Neighbours tree	***Syagrus romanzoffiana*** Cocos palm.	6	12	29 50	-	Mature, good condition but poor development.	2d	Exempt Very Low	RETAIN

Tree No	Location	Scientific Name &Common	Crown Spread (m)	Height (m)	Diam' DBH DGL (mm)	TPZ (m) SRZ (m)	Condition of Tree *Health & Structural (see Appendix B)*	TULE	Retention value	Proposed IMPACTS of DA
87	Neighbours tree	***Ligustrum lucidium*** Common privet	4	5	20 40	-	Immature, good condition but poor development. Noxious weed.	2d	Exempt Very low	RETAIN

8.0 MAPPING ANALYSIS

Fig 1. Site Locality-NSW Planning Portal.

Fig 2.Riparian and Green corridors.

Fig3. Land zoning is R3-Medium density residential.

Fig 4.Acid Sulphate class five(5) soils on s

9.0 DISCUSSION

9.0. Of the assessed 86 trees and tree groups, very few trees of High Retention Value are found within and adjacent this site. One tree impacted of high value numbered 50, two trees of moderate to high value tree 35&83 will be impacted and removed. Trees numbered 36,50,82& 83 are high or moderate value. Twenty one (21) trees are moderate value. Six (6) street trees must be retained and protected with tree protection measures numbered 14,15,16 on Lang road, 85 on Marsh Parade and 86, 87 on a neighboring property. Forty (41) low, moderate and high value trees will be removed with five (5) of these nominally classified as trees; (T4,-Palm,T47&T74-toxic shrub,T53 hedge &T54 cacti-succulent) leading to thirty five (35) trees being replenished.

9.1. Along the Hume Highway trees 57-72 provide existing screening and are nearly all of moderate landscape value except two trees. These trees are unaesthetic and uneven in growth and could be removed. Tree 63 Cotoneaster under 3 metres height, in this group is advised to be removed as it can be propagated with its prolific berries. Tree number 2 is in the adjacent property is exempt but should not be impacted during development.

9.2. The amenity value for screening and streetscape amenity must be regarded as per Liverpool Councils Development Control Plan 2008 and Tree Management Policy from section 1, (*See also Appendix F*). For replenishment we could plant small, medium and high new stock (of 75 litre pot sized), even spaced along and within the site adjacent the highway and 45 litre pot sized indigenous plants selected from the indicative plant schedule Appendix G.

9.3. Of these trees from the proposal thirty eight (38) of the trees on site are trees which are structurally unsound, or exempt being noxious weeds or under the three and a half metres height with a canopy spread less than 4 metres and trunk diameter of 400mm at 1m above the ground level of the tree, will be removed.

9.4. Four trees defected from poor structure are numbered; 10,40,42&45. These 33 trees are numbered; 1 ,3,7,9,12,18,19,20,21,22,23,27,28,29,31,33,35,37,38,40,41,43,46 ,48,51,63,66,74,78,79,80,86&87. (Tree number two is outside the adjacent development but would most likely be removed with neighbours consent as it is exempt).

9.5. Several noxious trees require removal and specialized disposal including class 3 weed for tree numbered including Tree 7 as per EPA regulation to a waste disposal Authority depot. If *Lagunaria sp.*(Privet) has berries in it the fruits must also be disposed of to the waste disposal facility and not transported to another site (*other than this authorized disposal facility*).

9.6. The overall quality of stock is low on this amalgamated sites. Tree 4 (Group)which constitutes 13 Banana Palms of which over 5 are under height would also benefit in the removal due to vermin and pests habituating within the protected fibrous shoots, stems and long grass surrounding.

9.7. Tree trunk protection would be specified for Trees numbered 14,15,16 & 83&85 (street trees) with 2 metre lengths of hardwood and hessian or underlay protecting the tree trunks. These hardwood lengths must be of 100mmx50mm and have a gap of 150mm to allow for aeration to the stem. It would also be advised to mulch within the Tree Protection zones of preserved trees on site with Certified clean *Eucalyptus sp*. mulch deposited at 75mm depth within the setback area.

9.8 Storage of materials and hoardings are kept out of the tree protection zones of preserved trees.

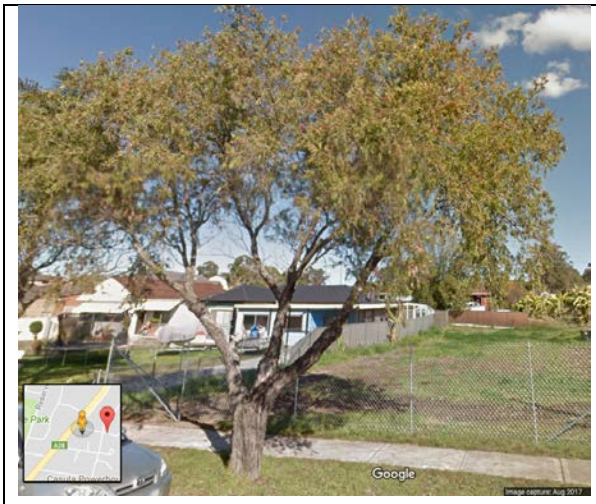


Plate 2.Street Tree 83 impacted by access to the development. Moderate value. (Courtesy Google Maps).

Plate 3. Tree 83 existing to be removed for access. Site Plan GSA 2017.

Plate 4. Indicates the revised plan access where tree 83 will be removed. Blue arrow.

10.0 CONCLUSION

1. Remove eighty (80) trees and replenish with thirty five (35) trees medium and large sized trees with and preserve and protect amenity value trees on the streetscape and the nature strip numbered 14,15,16, 85,86&,87 planned for retention. The trees selected for removal are of moderate value or low value with one high value tree and one moderate to high value tree impacted and removed.

11.0 IMPACTS

Tree numbered which will be impacted.	**Impacts and Tree Protection Requirements**
Trees; 1, ,3,4,5,6,7,8,9,10,11,12, 13,17,18,19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35,36,37,38,39,40,41 ,42,43,44,45,46,47,48,49,50,51,52,53, 54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70, 71,72,73,74,75,76,77,78,79,80,81,82&83.	Remove eighty (80) trees and utilize six (6) preserved trees on or adjacent the site. Replenish thirty five (35) indigenous plants of year old stock. Three trees adjacent the site will most likely remain but are exempt.

Note the replenishment of trees utilizing the indicative planting schedule would be suitable as selected trees are chosen for indigenous selection, Drought tolerance Liverpool recommended by the LCC. See appendix

12.0 HOLDING POINTS

12.1 The removal of trees by a reputable company who has a competent level 3 arborist who can mark the correct trees to be removed.

12.2 Replenishment of thirty five (35) trees will be required to be certified by an AQF level 5 arborist. These must be indigenous of 45-75 litre potted volume and planted according to the landscape plan, including small, medium and high trees to increase biodiversity. Choose species relevant from Appendix G.

12.3 Four (4) Street trees numbered 14,15,16,&85 on site must be protected with Tree Trunk Protection or trunk protection utilizing hardwood lengths of 2m long and 50mmx100mm wide with gaps of 150mm between timbers. The timbers are secured to the tree using framing steel and screwed onto the timbers. This hardwood is laid over hessian or underlay wrapped on the trunk.

12.4 Prohibitions in appendix D 1,2,3,4 are to be complied with and certified by an AQF level 5 arborist.

12.5. Select stock according to *As 2303 2015 Tree stock for landscape use*. Plant according to specification in Appendix E. Tree planting guideline. Twenty (20) indigenous stock of 75 litre pot size are to be planted as screen planting along the site parallel to Hume Highway and fifteen (15) indigenous stock of 45 litre pot size are both to be planted according to the landscape plan.

12.6. Signage presented on the steel fencing stating "TREE PROTECTION ZONE DO NOT ENTER" unless authorized by the Project Arborist. The sign must also have the Project arborist name stated on the sign and mobile phone number. It must be of size 22 font and in legible writing or print. It also must be of waterproof ink and be located at eye level (1.6 metres).

12.7 Final certification and reporting of these measures prior to occupation by an AQF level 5 arborist, including bi- monthly site visits ensuring tree protection and or remedial works for the preserved trees.

12.8 Ground protection is essential and any access to the preserved trees TPZ must be supervised by the AQF level 5 arborist. No roots greater than 40mm are to be severed without supervision of the AQF level 5 project arborist. Any excavations within the setback TPZ area for preserved trees must be supervised by the AQF level 5 arborist.

12.9 Any pruning due to dehydration, clearances for access or storm damages, must be supervised by an AQF level 5 arborist and be carried out by a minimum AQF level 3 arborist. These pruning's are to be in accordance with As4373 2007 and a clean sharp saw to be utilized for the work.

12.10 The consenting authority is Liverpool Council. Trees discussed are in accordance with Liverpool Local Environmental Plan 2016 and Liverpool Development Control Plan 2008.

13.0 RECOMENDATIONS

1. Removal of Tree 1, 3-13,17-83.
2. Replenishment offset would be 35 indigenous trees of 45&75litrepotted volume and planted according to the Landscape master plan. This will include twenty (20) 75litreindigenous plants planted along the site parallel to Hume Highway. A replenishment of tree 83 is included within this replenishment.
3. Holding points 1.1,1.2,1.3.0,1.4,1.5,1.6,1.7,1.8&1.9 will be certified by an AQF level 5 arborist.

To assist in the trees being managed competently the following recommendation is given:

In maintaining the quality of the contractor selected to maintain the work in accordance with AS/4743-2007 Pruning of Amenity Trees and Safe Work Australia "The Guide" absorbing the Code of Practice. The owner should engage a contractor from the following associations; a registered current member of Tree Contractors Association Australia (TCAA) or Arborists Australia (AA) must complete the works.

GLOSSARY

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

Crown lifting means the removal of the lower branches of the tree.

Diameter at Breast Height (DBH)/Diameter: Diameter of assessed tree trunk at 1.4 meters above the ground.

Genus/ Species: The genus and species of each tree has been identified using its scientific name. Where the species name is not known the abbreviation *sp.* species is used. The common name for trees may vary considerably in different geographical areas and so will not be used in the field survey.

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

Maturity: Tree maturity can be assessed as *over mature* (last one third of life expectancy), *mature* (one third to two thirds life expectancy) and *semi mature* (less than one third life expectancy).

Structural Soil is a medium that can be compacted to pavement design and installation requirements while permitting root growth. It is a mixture of gap-graded gravels (made of crushed stone), clay loam, and a hydrogel stabilizing agent to keep the mixture from separating. It provides an integrated, root penetrable, high strength pavement system that shifts design away from individual tree pits.

Tree Age: Trees have either been assessed as mature, immature or semi-mature.

Tree Protection Zones: As approved under As4970 2009 measured diametres at 1.4m from grade then multiplied by 12.

Tree Retention Values (*RV): Significance in the environment and the landscape may be assessed by considering ecological, cultural, heritage, biosecurity and domestic usage.

Tree Useful Life Expectancy (TULE): An estimation of the tree's useful life expectancy using appropriate industry methods with an inspection regime.

Vigour: This is an indication of the tree health. Trees may be assessed as having *good vigour*, *normal vigour* or l*ow vigour*.

Visual Tree Assessment (VTA): 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. This system is based on Mattheck and Breloer (1994) 'Body language of trees'

BIBLIOGRAPHY

*AS/NZ ISO 31000:2009 Risk Management &Principles
*Australian Standards AS 4970-2009. *Protection of Trees on Development Sites* Sydney: Standards Australia.
*Australian Standards AS 2303-2015. *New stock for Landscape Use* Sydney: Standards Australia.
*Barrel, J (2012). Balancing tree benefits against tree security: The duty holder's dilemma, Arboricultural journal. The International Journal of Urban Forestry, 34:1,29-44.
*Mattheck Dr.; Claus R & Breloer Helge. *The Body Language of Trees - A Handbook for Failure Analysis 6th Edition:* London. England. The Stationery Office: 1995.
*E. Thomas Smiley, Nelda Matheny, and Sharon Lilly (2011) Tree Risk Assessment & Principles. ISA Printed USA

WEBSITE

http://www.Liverpool.nsw.gov.au/en/environment/in-your-community/tree-management/tree-management-policies/
http://www.liverpool.nsw.gov.au/planninganddevelopment/liverpools-planning-control/liverpool-dcp
http://www.legislation.nsw.gov.au/#/view/EPI/2011/645/partlanduseta/include2
https://maps.planningportal.nsw.gov.au/Map
http://www.safeworkaustralia.gov.au
http://tcaa.com.au/abouttrees/interimtreemanagementguide
https://www.planningportal.nsw.gov.au/find-a-property/property/2502116_11_Lang_Road_7_Casula_DP28819/11_lang_road,_casula,_2170

SECTION II APPENDIX A TULE – TREE USEFUL LIFE EXPECTANCY

McArdle Arboricultural Consultancy Pty Ltd Revised 14.4.14 *ADAPTED FROM JEREMY BARELL (SULE) FOR TCAA CLIBING CONSULTANT ARBORISTS*

	1 Long TULE	**2 Medium TULE**	**3 Short TULE**	**4 Remove**	**5.No Potential for Retention REMOVE IMMEDIATELY**	**6 Small, Young or Regularly clipped**
	Trees that appeared to be retainable at the time of assessment for more than 40 years with low level of risk	**Trees that appeared to be retainable at the time of assessment for 15 to 40 years with and with low to medium level risk**	**Trees that appeared to be retainable at the time of assessment for 5 to 15 years with medium to high level of risk**	**Trees that should be removed within the next 5 years High to Very high level of risk**	**Trees that must be removed immediately. Very high to Extreme level of risk**	**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

McArdle Arboricultural Consultancy Pty Ltd

Health & Structural Condition of Tree	
1. Age *J- Juvenile; Im- Immature; SM-Semi- Mature; M-Mature*	
2. Excellent Condition	
3. Good Condition but Poor Development	3b Moderate Condition
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	
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	

Developed by Claus Mattheck in: *The Body Language of Trees (*1994), which have adapted versions from Hornsby Shire Council.

APPENDIX C RETENTION VALUES

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 300m² 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 200m²; 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 100m²; 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 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 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 buildings or other structures.	The subject tree has a small live crown size of less than 40m² 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 Leichhardt 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.

DETERMINING THE RETENTION VALUE OF TREES ON DEVELOPMENT SITES 4

PARTICULARS HORTICULTURAL SERVICES

APPENDIX D TREE PROTECTION

Extract from Australian Standard AS4970 2009 Protection of trees on development sites

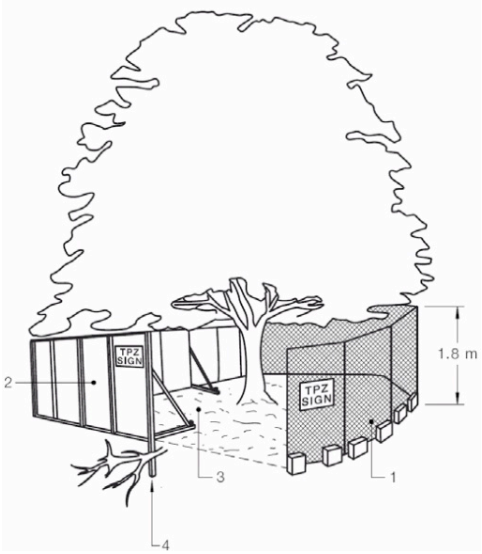
3.3.5 Structural root zone (SRZ)

"The SRZ is the area required for street stability. A larger area is required to maintain a viable tree. The SRZ only needs to be calculated when a major encroachment into a TPZ is proposed. Root investigation may provide more information on the extent of these roots."

Extract from Australian Standard AS4970 2009 Protection of trees on development sites

SECTION 4 TREE PROTECTION ZONES - STANDARD PROCEDURE

The Protective fencing where required may delineate the ***TPZ*** and should be installed using a 1.8-meter cyclone chain mail fence or star pickets at 2m intervals, connected by a continuous highly-visible barrier/hazard mesh at the height of 1.8 meters. It shall be installed prior to any demolition, clearing, rating or construction work and will remain in place until all the construction work has been completed in accordance with AS4970 *Protection of trees on development sites*,



Protective fencing shows examples of such fencing.

Extract from Australian Standard AS4970 2009 Protection of trees on development sites

4.5 OTHER TREE PROTECTION MEASURES

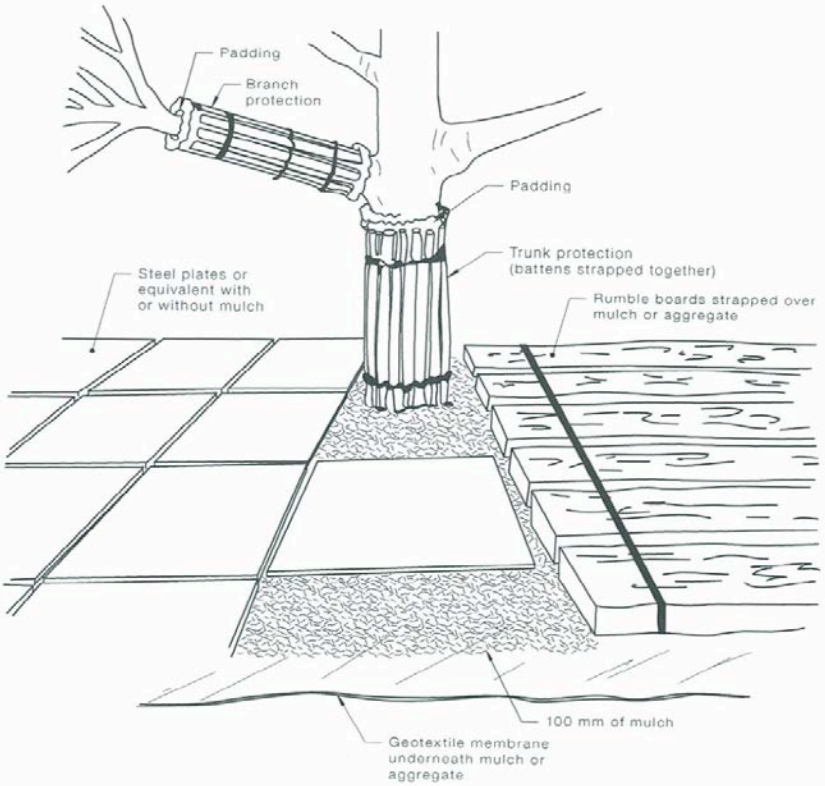
When tree protection fencing cannot be installed due to restricted access e.g. tree located along side an access way or requires temporary removal, other tree protection measure should be used, including those set out below;

4.5.2 TRUNK AND BRANCH PROTECTION see fig4.

4.5.3 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) or crushed rock below rumble boards as per fig 4.

Examples of Trunk, Branch and ground protection



NOTES:

1 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.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

FIGURE 4 EXAMPLES OF TRUNK, BRANCH AND GROUND PROTECTION

4.4.5 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.

Location of services Option B (Driveway Construction)

If a service is to be located within the Tree Protection Zone, and site conditions such as shallow bedrock or if mass rooting has occurred from multiple trees growing in close proximity to each other, the service trench is to be elevated and positioned above natural ground level within the new driveway structure. The existing driveway surface is to be scraped and a reinforced concrete topping is to be provided with down turned thickened edges constructed under the curb edging to prevent lateral movement

Where the Project Arborist determines that tree protection fencing cannot be installed, as per this tree 1 and the tree protection fencing needs to be removed temporarily, access within or through the Tree Protection Zone is necessary or where work will be carried out within the Tree Protection Zone (as approved and supervised by the Project Arborist).

PROHIBITIONS

1.The following activities shall not be carried out within any Tree Protection Zone:

I. Disposal of chemicals and liquids (including concrete and mortar slurry, solvents, paint, fuel or oil);

ii. Stockpiling, storage or mixing of materials;

iii. Refuelling, parking, storing, washing and repairing tools, equipment, machinery and vehicles;

iii. Disposal of building materials and waste;

2.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.

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

4.Excavation within the Tree Protection Zone of any tree to be retained shall:

A. Be undertaken using non-destructive methods (eg. an Airspade or by hand) to ensure no roots greater than 40mm in diameter are damaged, pruned or removed. All care shall be taken to preserve and avoid damaging roots; B.not occur within the Structural Root Zone.

APPENDIX E TREE PLANTING SPECIFICATIONS AND MAINTENANCE

These notes are useful to assist the planting of additional trees.

Before planting, careful consideration should be given to the location of trees and shrubs to minimize future problems. A basic guide for planting follows:

1. Don't plant too close to buildings or hard surface infrastructure 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.
2. 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.
3. Considering the effect of landscape amenity on neighboring properties (i.e. shading, loss of views, impact on foundations, fences and services).
4. Planting suitable trees (suitable to the climate and soils utilizing the LDCP & appendix G for drought tolerant plants). Consider the summer and winter shadows of evergreen trees.
5. Retain and protect trees preserved as throughout the construction process (This will be a Council requirement).
6. Use locally native and non-invasive species in your landscape plan which has been achieved with the Indicative Planting Schedule (see appendix G): Increase the success rate of your planting schedule with compliance visits.
7. Don't excavate or alter the ground level around retained 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.
8. When buying plants, check their characteristics according to As2303-2015 Tree stock for Landscape Use: Check on mature size, shade characteristics, potential for roots to cause damage, flowers, fruits and pollen, to determine their suitability.

Mature trees do need maintenance: Remove or trim misshapen branches. Check for fungal rots or other diseases. Contact an experienced Arborist for further tree inspections. Indiscriminate pruning or lopping can be dangerous to your safety and the health of the tree.

Staking of trees should be carried out similar to the diagram opposite.

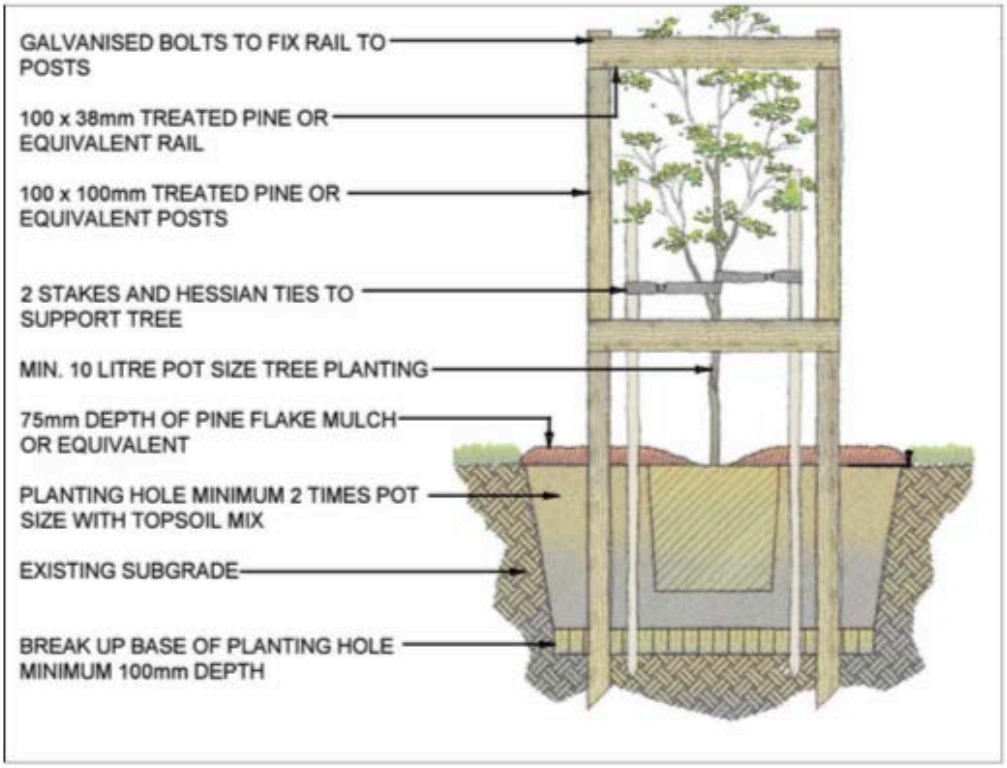


Figure 18 Tree Guard and Planting Details

From LDCP 2013 Section 1 General Controls for Development.

both within the development and external to the development to a legal point of discharge.

Street Tree Planting

1. Street trees shall be required to be planted in conjunction with the creation of a new street or the extension of an existing street.
2. One street tree shall be planted for each allotment created.
3. The street trees shall be planted prior to the release of the subdivision certificate.
4. The trees shall be provided with protection to ensure their survival during the construction of buildings in the street. Refer to Figure 5 for details.

APPENDIX F TREE MANAGEMENT POLICY

Part 1 General Controls for all development.pg 1-16.

2. Tree Preservation

Applies to

This section applies to applications to remove trees with or without a development application for a development and involves:

a) Any perennial plant that has a:

- Height greater than 3.5m and/or
- Canopy spread of greater than 4m and/or
- Primary trunk diameter greater than 400mm when measured 1m above the existing ground level of the tree.

b) Any conservation area.

tree that forms part of a heritage item or is situated within a heritage

This section does not apply to:

. a) Any species, populations or communities listed under the provisions of the *Threatened Species Conservation Act (TSC) 1995;* or their habitats.

. b) Any plant that is on the Noxious Weeds Register for Liverpool City Council or listed in Appendix 3. (These plants must be removed, and destroyed in a way to ensure that they do not spread. It can be an offence to leave a noxious weed on a site.)

APPENDIX G INDIGENOUS SPECIES OF SELECTION FROM LDCP 2008 & PLANT SELECTION

Appendix 2 - Recommended Plant Species List for Landscaping

1. The following plant list is a guide only. It is a list of shrub and tree species known to grow well in the heavy clay soils of Liverpool. The list is a substitute for independent Landscape Architectural advice. It is recommended that a qualified Landscape Architect shall prepare all Landscape Plans submitted for Council approval.

Tall Evergreen Shrubs up to 3m high

Botanic Name	Common Name	Yr 1	Yr 2	Maturity
Westringia fruticosa	Coast Rosemary	0.5 m	1 m	1.5 m
Westringia longifolia	Westringia	0.5 m	1 m	1.5 m
Grevillea 'Robyn Gordon'	Grevillea 'Robyn Gordon'	0.5 m	1.5 m	1.5 m
Grevillea rosmarinifolia	Rosemary Gevillea	0.5 m	2 m	2 m
Melaleuca hypericifolia	Hillock Bush	0.5 m	1 m	2 m
Callistemon 'Captain Cook'	Bottlebrush	0.5 m	1 m	2 m
Grevillea 'Sandra Gordon'	Grevillea 'Sandra Gordon'	0.5 m	1.5 m	3 m
Banksia ericifolia	Heath Banksia	0.5 m	2 m	3 m
Leptospermum laevigatum	Coast Tea Tree	0.5 m	2 m	3 m
Melaleuca ericifolia	Melaleuca ericifolia	0.5 m	2 m	3 m
Melaleuca nesophyla	Melaleuca nesophyla	0.5 m	2 m	3 m
Hakea salicifolia	Silky Hakea	0.5 m	2 m	3 m
Doryanthes excelsa	Gymea Lily	0.5 m	2 m	3 m
Leptospermum spp.	Tea tree	0.5 m	2 m	3 m
Baekea spp.	Heath Myrtle	0.5 m	2 m	3 m
Pittosporum tenuifolium	New Zealand Pittosporum	0.5 m	2 m	3 m
Michelia figo	Port Wine Magnolia	0.5 m	2 m	3 m

Small Trees less than 9m high (D) = Deciduous

Botanic Name	Common Name	Yr 1	Yr 3	Maturity
Planted a minimum of 1.5mfrom the building				
Callistemon hannah ray	Hannah Ray Bottlebrush	2 m	3 m	4 - 5 m
Callistemon citrinus	Lemon Scented Bottlebrush	2 m	3 m	4 - 5 m
Leptospermum petersonii	Lemon-scented Tea tree	1.5 m	3 m	4 - 6.m
Acacia floribunda	Gossamer Wattle	2 m	3.m	4 - 6.m
Acacia baileyana	Cootamundra Wattle	2 m	3 m	5 - 8.m
Ceratopelum gummiferum	NSW Christmas Bush	2 m	4 m	5 - 8 m
Elaeocarpus reticulatus	Blueberry Ash	1.5 m	2 m	6 - 8 m
Banksia integrifolia	Coast Banksia	2 m	5 m	6 - 8 m
Tristaniopsis laurina	Water Gum	2 m	3 m	6 - 8 m

Medium Sized Trees 9 - 15m high

Botanic Name	Common Name	Yr 1	Yr 3	Maturity
Planted a minimum of 3mfrom the building				
Melaleuca bracteata	Melaleuca bracteata	3 m	5 m	8 - 10 m
Melaleuca decora	White Cloud Tree	3 m	5 m	6 - 12 m
Melia azedarch	White Cedar (D)	2 m	4 m	8 - 12 m
Brachychiton acerifolium	Illawarra Flame Tree (D)	2 m	4 m	8 - 12 m
Hymenosporum flavum	Native Frangipani	2 m	4 m	8 - 12 m
Melaleuca quinquenervia	Broad-leaved Paper bark	3 m	5 m	8 - 15 m
Eucalyptus scoparia	Willow Gum	3 m	5 m	8 - 15 m
Angophora bakeri	Narrow leaved Apple	2 m	4 m	9 - 15 m
Brachychiton populneus	Kurrajong	2 m	4 m	9 - 15 m

Large Trees greater than 15m Tall

Native

Botanic Name	Common Name	Yr 1	Yr 3	Maturity
Planted a minimum of 4.0mfrom the building				
Acacia elata	Cedar Wattle	2 m	5 m	10 –18 m
Casuarina glauca	Swamp She Oak	3 m	5 m	10 –18 m
Casuarina littoralis	Black She Oak	3 m	5 m	10 –18 m
Callistemon viminalis	Weeping Bottlebrush	3 m	5 m	10 –18 m
Planted a minimum of 5.0mfrom the building				
Eucalyptus molucanna	Grey Box	3 m	5 m	12 -18 m
Eucalyptus crebra	Narrow Leaved Ironbark	3 m	5 m	12 -18 m
Eucalyptus fibrosa	Broad Leaved Ironbark	3 m	5 m	12 -18 m
Eucalyptus sclerophylla	Hard Leaved Scribbly	3 m	5 m	12 -18 m
Eucalyptus haemastoma	Scribbly Gum	3 m	5 m	12 -18 m
Planted a minimum of 6.0mfrom the building				
Eucalyptus microcorys	Tallow-wood	3 m	5 m	15 - 20 m
Eucalyptus botryoides	Bangalay Tree	3 m	5 m	15 - 20 m
Eucalyptus tereticornis	River Red Gum	3 m	5 m	15 - 20 m
Eucalyptus sideroxylon	Red Ironbark	3 m	5 m	15 - 20 m
Syncarpia glomulifera	Turpentine	2 m	4 m	15 - 20 m
Casuarina cunninghamiana	River She Oak	3 m	5 m	15 - 20 m

The following indicative planting schedule is the

INDICATIVE PLANT SCHEDULE

*Plants to be selected from the following list

CODE	BOTANIC NAME	COMMON NAME	INSTALLATION SIZE	MATURE SIZE (H x W) m	SPACING (mm)	Native (N) Drought Tolerant (DT), Liverpool recommended (LCC),
FEATURE TREES						
Ab	*Acer buergerianum*	Trident Maple	45 lt	6 x 3	as shown	
Af	*Agonis flexuosa*	Willow Myrtle	75 lt	14 x 6	as shown	N
Bi	*Banksia integrifolia*	Coast Banksia	45 Lt	8 x 4	as shown	N LCC list
Ba	*Brachychiton acerifolium*	Illawarra Flame Tree	100 Lt	10 x 6	as shown	N LCC list
Er	*Elaeocarpus reticulatus*	Blueberry Ash	75 lt	8 x 3	as shown	N LCC list
E sp.	*Eucalyptus scoparia*	Willow Gum	45 lt	12 x 9	as shown	N LCC list
E sr	*Eucalyptus 'Summer Red'*	Flowering grafted eucalypt sp	45 lt	5 x 4	as shown	N
Ga	*Callistemon viminalis*	Bottlebrush	300 mm	4 x 4	as shown	N LCC list
Jm	*Jacaranda mimosifolia*	Jacaranda	45 lt	20 x 8	as shown	
LS	Lagerstroemia species	Crepe Myrtle cultivar	45 lt	4.5 x 3	as shown	
Ms	*Magnolia soulangiana*	Magnolia	45 lt	12 x 8	as shown	
Ml	*Melaleuca decora*	White Cloud Tree	75 lt	10 x 4	as shown	N LCC list
Ma	*Melia azedarach*	White Cedar	75 lt	15 x 5	as shown	N LCC list
Ss	*Sapium sebiferum*	Chinese Tallow Tree	45 lt	7 x 3	as shown	

**Note the plant selection for the indigenous species Codes; Er,Esp.,Ga,Mi,Ma,Bi are found on the LDCP2008 list.*

DISCLAIMER

McArdle Arboricultural Consulting 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.

Any legal description provided to McArdle Arboricultural Consultancy Pty Ltd is assumed to be correct. Any titles and ownerships to any property are assumed to be good and sound. 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's reports and recommendations shall not be viewed by others or for any other reason outside its intended target, either partially or whole, without the prior written consent of the consultant. Unauthorized alteration or separate use of any section of the report invalidates the whole report. 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. All recommendations contained within this report represent the current industry best practice methods of inspection.
McArdle Arboricultural Consultancy Pty Ltd shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.

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.

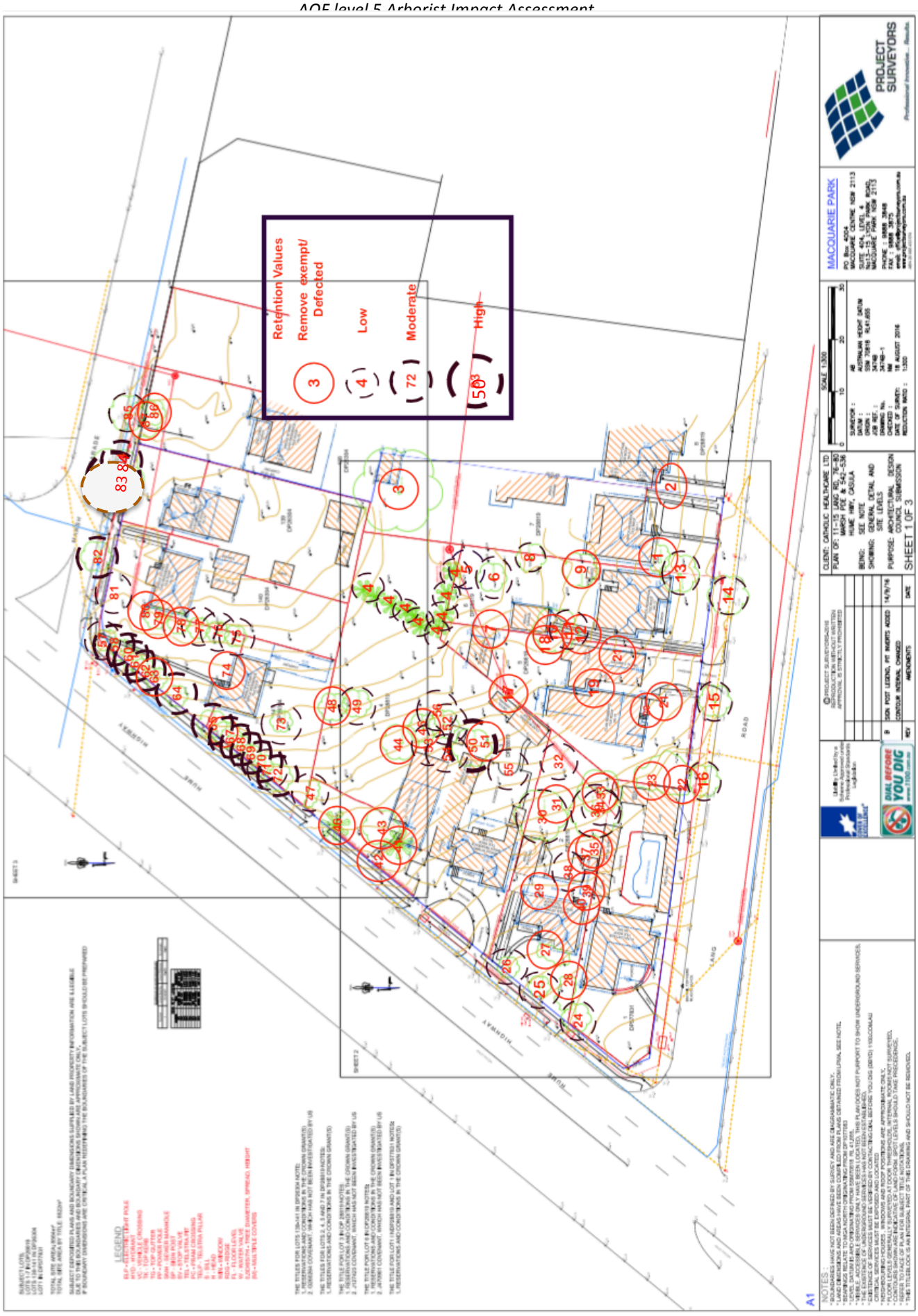
All standing trees have an element of unpredictable risk. McArdle Arboricultural Consultancy Pty Ltd endeavors to identify the risk that the tree represents; however, a level of risk associated with every tree will remain. McArdle Arboricultural Consultancy Pty Ltd does not provide any warranty or guarantee that problems, deficiencies or failures with regard to the plant/s, property or building/s will not arise in the future.

Ongoing monitoring may foresee deterioration of a tree and allow remedial action to be taken to prevent injury or damage. The timing for re-inspection on individual trees is subjective and will vary however an annual inspection is advisable for trees in subsequent years.

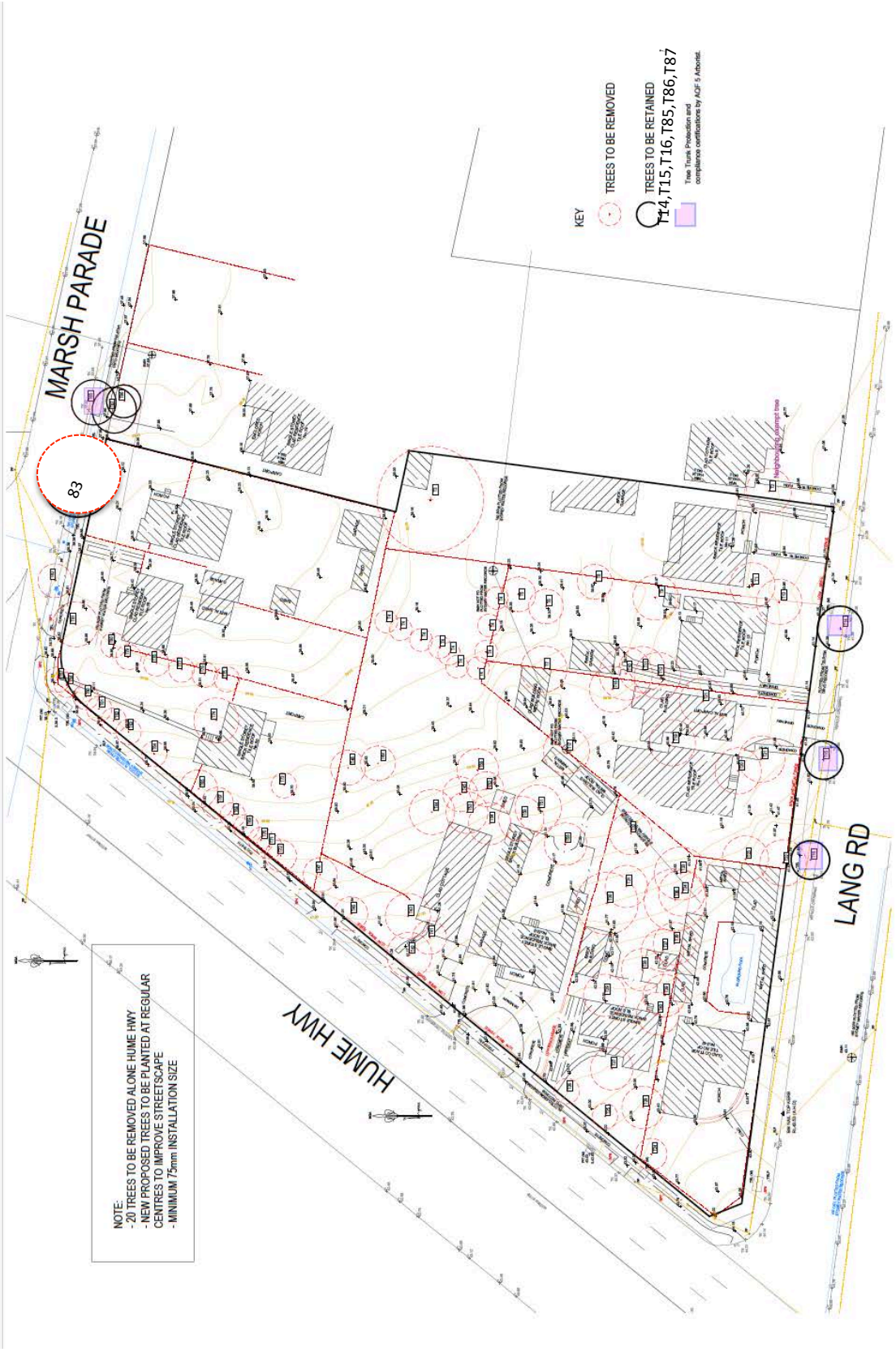
FURTHER RESEARCH The report does not cover threatened, heritage or existing trees in relation to remnant forest. Further reporting may be considered as part of the relevant RISK ASSESSMENT.

LIMIT OF OBSERVATIONS BY RODNEY M. PAGE
"There are many factors that may contribute to limb or total tree failure. Factors include, decay (in the trunk, crown or branch junctions), external damage to branches leading to decay, poor branch taper, included bark, root rot/ decay. Not all these symptoms are visible i.e. internal decay; of these some external symptoms may indicate the presence of deadwood but not the extent of decay. The most solid looking piece of timber may be riddled with breaks in continuity of growth caused by insect damage or poor pruning practices or other physical damage caused many years previous. Trees don't heal; they simply box in the damaged area ((CODIT) Compartmentalization of Decay In Trees.) and continue to expand in girth, completely disguising the fact that the branch or trunk has a hollow or decayed section. Having said this, not all areas, of decay past or present suggest a point of failure."

In addition to this information, other variables that can contribute to limb or total tree failure are tree species, wood densities, weight, age, location, exposure to the elements, soil types, disease and pests, birds using trees as habitat and food sources, termites causing structural problems and human influences such as, altered drainage, compaction or leaching of minerals.


Retention Values
Remove exempt/ Defected
Low
Moderate
High
3
4
72
503
PROJECT SURVEYORS
MACQUARIE PARK
CLIENT: CATHOLIC HEALTHCARE LTD
PLAN OF: 11-15 LANG RD, 76-80 MARSH PDE & 542-536 HUME HWY, CASULA
BEING: SEE NOTE
SHOWING: GENERAL DETAIL AND SITE LEVELS
PURPOSE: ARCHITECTURAL DESIGN COUNCIL SUBMISSION
SHEET 1 OF 3
SCALE 1:200
A1
DIAL BEFORE YOU DIG

TREE MANAGEMENT PLAN - REMOVAL PLAN



Map of tree locations in 11 Lang road, Casula.