



### **PROJECT & CLIENT**

# Warringah Mall Stage 2

Stage 2 Lot 100, DP1015283, 145 Old Pitwater Rd Brookvale NSW 2100

Prepared for : Scentre Design & Construction Pty Ltd

# Arboricultural Plans

### DRAWING INDEX

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DATE :

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ARTERRA DESIGN PTY LTD ABN 40 069 552 610 SUITE 602 / 51 RAWSON STREET, EPPING, NSW 2121 **P** 02 9957 2466 **F** 02 9957 3977 **W** ARTERRA.COM.AU



## FOR DEVELOPMENT APPLICATION

#### **TREE PROTECTION SPECIFICATIONS** 1. Tree Protection Measures and Protocols.

All work around existing trees to be retained shall be in accordance with AS 4970-2009 Protection of trees on development sites with the clear establishment of the required Tree Protection Zones (TPZ's). If the scope of work allowed within or the extent of the Tree Protection Zones of existing trees is not clear, please refer to the Contract Manager or Project Consulting Arborist for clarification.

<u>Before</u> any site works commence tree protection zones and other measures must be established and conveyed to those all working on the site. The Contractor shall ensure all subcontractors are inducted prior to working on the site. All inductions shall include description and identification of the Tree Protection Zones and the restriction on work and activities with regard to trees.

Damage to roots or degradation of the soil through compaction and/or excavation within TPZ's is likely to cause serious damage to the tree. Any work operations required within TPZ's must be carried out with extreme care. All trees, palms and other shrubs within TPZ's are to be retained unless shown otherwise on the Tree Protection Plan(s). Trees marked for retention shall not be used to display signage, or as fence or cable supports for any reason. No materials stockpiling, chemicals or washout areas are permitted immediately upslope of or within the Tree Protection Zone. The washing down of wheel barrows, paint cans/ brushes, acids and the like shall not to be done near existing trees as the runoff is very harmful to tree roots.

No fuel powered pumps or generators or air compressors are to be placed within TPZ's. No fuel or chemicals shall be stored and no equipment or vehicles shall be serviced or re-fuelled within a TPZ.

#### 2. Controlled Construction Access

Construction access points, stockpiling and storage areas shall be clearly identified on site and fenced off where appropriate. Uncontrolled access and parking of vehicles inside TPZ's shall be avoided. If access is required through a tree protection zone, the access way shall be treated with ground protection.

#### 3. Tree Protection Fencing & Signage

The Tree Protection Plan(s) shows the extent of areas to be fenced and protected. Protection measures shall be certified as adequate by the Project Consulting Arborist. This fencing may form part of the general construction site fencing, where practical. It shall remain in place as long as possible and typically not be removed until the final landscape installation in those areas begins.

All tree protection fencing shall be 1800mm high galvanised chain wire or welded steel mesh. Fencing must be bolted together and secured with the necessary back stays and bracing.

#### Star pickets with bunting or danger tape shall not constitute acceptable tree protection fencing.

Suitable signage as defined by AS 4970-2009 Appendix C shall be affixed to the external side of the fencing at a spacing of not less than 1 sign per 20 lineal metres of fence.

If fence locations conflict with the proposed works, contact the Project Consulting Arborist and Contract Manager for resolution. No new services (unless under-bored) shall be located within or through the Tree Protection Zone.

#### 4. Trunk and Lower Branch Protection

A trunk barrier is to be erected around the circumference of the tree trunk and root buttress where shown. This barrier will consist of a double layer of used carpet or carpet underfelt placed around the trunk. A layer of battens is to be placed over the underfelt. The battens are to have a maximum spacing of 50mm. The height of the battens is to be 2 metres or to the height of the first branches. Lower large branches may require the same protection if likely to be damaged by passing vehicles or equipment. Secure in place with galvanised steel bracing straps. Do not nail into or otherwise injury the trunk or bark. Battens may be made from any suitable waste timber of similar sizes and depths. All sharp or protruding edges are to be properly covered with tape or similar padding.

#### 5. Works within the TPZ

All work within the root zone of existing trees shall be undertaken with the utmost care. If by necessity a tree requires removal of branches for building or access, pruning shall be done in strict accordance with accepted arboriculture techniques and AS 4373-2007. No rubbish, spoil or new materials shall be placed on the root zone of any existing tree or against their trunks.

#### 6. Ground Protection

If it is proposed to create any access route, or similar, within the TPZ of a retained tree, the Contractor shall install rumble boards over the TPZ ground surface. No excavation shall be allowed. Contractor shall first place a suitable permeable geotextile to the extent required and then a 100mm thick layer of wood chip mulch or coarse no-fines gravel over the extent to be covered. Then place hardwood boards (minimum 3600 x 200 x 75mm) on their flat edge, side by side, with a 30 - 50mm gap to form a rumble strip. These boards are to be held together with three galvanised metal bracing straps nailed to each board. The two outer straps are to be approximately 200mm in from the ends of the boards.

#### 7. Structural Demolition Within TPZ's

Project Consulting Arborist shall be on site during all demolition work within the TPZ's to monitor and advise on tree protection. Secateurs and a handsaw shall be available to deal with and cleanly cut any exposed roots that have to be cut. Machines with a long reach may be used if they can work from outside TPZ's or from protected areas within TPZ's. They shall not encroach onto unprotected soil in TPZ's.

Debris to be removed from TPZ's must be moved across existing hard surfacing or temporary ground protection in a way that prevents compaction and disturbance of soil. Alternatively, it can be lifted out by machines provided this does not disturb TPZ's or damage the canopy. If appropriate, leave below ground structures such as footings and disused pipes in place if their removal will cause excessive root disturbance.

When pulling up existing paving the Contractor shall work backwards, lifting demolished paving back onto the existing paving. Roots may be found growing under the pavement and should not be trafficked. Roots growing into existing sub-base should be left and new surface finishes placed over the top without disturbance.

#### 8. Excavations or Trenching within TPZ's

Excavation within TPZ's shall not be allowed using mechanical equipment such as excavators or backhoes. Excavation within TPZ's shall only be carried out carefully by hand taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using compressed air (air spade), or water vacuum extraction shall be an appropriate alternative to hand digging and is the preferred method.

Exposed roots to be removed shall be cut cleanly with a sharp saw or secateurs at the face of the excavation. Roots temporarily exposed must be protected by appropriate covering with damp hessian or sand. Roots greater than 50mm in diameter are to be retained and shall only be cut in exceptional circumstances and only after consultation with the Project Consulting Arborist. Roots greater than 100mm in diameter shall typically not be allowed to be cut and must be worked around.

#### 9. Soft Landscaping Installation

Final trimming and planting shall be judiciously undertaken around trees. All soft landscaping within the tree protection zones will be installed with care to avoid root disturbance from irrigation trenching, lighting installation and the planting of larger plants. Permanent irrigation (if used) shall be installed as spray heads located outside of TPZ's and spraying inwards. All other services such as small-scale electrical services shall also be designed and installed to avoid any excavation or trenching around the trees.

No significant excavation or cultivation, especially by rotary hoes or excavators, shall occur within TPZs. Where new designs require the levels to be increased, good quality and permeable top soil shall be used. It should be firmed into place but not over compacted. All areas close to tree trunks shall be kept at the original ground level. Where turf is to be installed tree trunks shall have mulched rings applied rather than grass laid up to the trunk.

The size of the installed plants shall typically be less than 5L pots so that the maximum depth of the new root balls is less than 200mm. Any planting proposed that is larger than this shall be only installed outside of the SRZ and with care to not injure roots while digging planting holes.

#### 10. Canopy Pruning

The Contractor shall prune branches of protected trees only as directed by the Project Consulting Arborist. Pruning is only to be undertaken by a qualified arborist (under the supervision of a person with AQF Level 4 or above). The Project Consulting Arborist is to be at present at all times during the pruning work. Work is to be in strict accordance with to AS4373 Pruning of Amenity Trees. Do not treat wounds.

#### 11. Root Pruning

Pruning of roots of protected trees shall only be as directed the Project Consulting Arborist. The Tree Contractor shall use only a qualified arborist (AQF Level 4 or above). The Project Consulting Arborist is to be present at all times during the root pruning.

Roots are not to be cut using normal excavation machinery of any sort. This usually results in splitting and massive disturbance well past the intended line of cut. When required to cut roots, use hand methods and sharp hand tools (e.g. secateurs, hand saw) such that the remaining root systems are preserved intact and undamaged. Roots are to be cut back by hand square to the direction of the root travel (or edge of the excavation). Do not cut any tree roots exceeding 50mm diameter unless permitted. Excavations within root zones should be kept open for as short a period as possible. Any excavated face containing roots is to be temporarily supported, where necessary, to prevent soil loss from around the other retained roots.

#### 12. Accidental Tree Damage

Should a tree be accidentally damaged, the Contractor shall immediately notify the Project Consulting Arborist. Timing can be of the essence, particularly with bark injuries, trunk damage or chemical contaminations.

If a branch has been broken, it shall be removed and the damaged end pruned to a suitable branch collar. If the branch has been torn out of the trunk, assessment shall be made and the damage cleaned up by as much as possible without further damage to the tree.

If roots are accidentally disturbed or excavated, any broken, crushed and torn sections shall be exposed and pruned leaving clean cuts to minimise risk of infection by fungal pathogens and promote good conditions for new root growth.



 ARTERRA DESIGN PTY LTD
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 SUITE 602 / 51 RAWSON STREET,
 EPPING, NSW 2121

 P 02 9957 2466 F 02 9957 3977 W ARTERRA.COM.AU



Example image of acceptable ground protection rumble boards



Example image of acceptable tree tree protection battens



Example image of acceptable tree protection fencing measures to be applied. (1.8m high rigid metal fencing with appropriate lateral bracing)

I ree I D	Tree Species	Common Name	Trunk Diamet er	Trunk Diamet er	Nominal TPZ radius	Nomin al SRZ	Retention Value	Recommendation	$\left  \right\rangle$
			Breast Height (dbh)	at base (dgl) (m)	(m) 12xdbh (AS	radius (m) (AS			
1	Livistona australis	Cabbage Palm	0.60	0.67	<u>4970)</u> 3.00	<u>4970)</u> 2.80	Moderate	Retain and Protect	i <
2	Livistona australis	Cabbage Palm	0.40	0.47	3.00	2.41	Moderate	Retain and Protect	] /
3	Livistona australis	Cabbage Palm	0.47	0.53	3.00	2.53	Moderate	Retain and Protect	
4 57	Livistona australis Dypsis decaryi	Cabbage Palm Triangle Palm	0.40	0.48	3.00 2.50	2.43 2.13	Moderate Low	Retain and Protect Retain and Protect	- <
58	Elaeocarpus reticulatus x 5	Blueberry Ash	0.00	0.00	2.50	1.79	Low	Remove	$\dashv$
60	Eucalyptus microcorys	Tallowood	0.77	0.94	9.24	3.22	High	Remove	1)
61	Livistona australis	Cabbage Palm	0.00	0.29	2.00	1.97	Moderate	Retain and Protect	] <
62	Howea forsteriana	Kentia Palm	0.00	0.20	2.00	1.68	Moderate	Retain and Protect	$\downarrow$
63	Syagrus romanzoffiana	Queen Palm	0.00	0.90	2.00	3.17	V Low / Remove	Remove	
64	Schefflera actinophylla	Umbrella Tree	0.41	0.41	4.92	2.28	Low	Remove	
65	Livistona australis	Cabbage Palm	0.00	0.40	2.00	2.25	Moderate	Remove	] <
66	Lophostemon confertus	Brush Box	0.33	0.42	3.96	2.30	Moderate	Retain and Protect	$\left  \right\rangle$
67 68	Lophostemon confertus Howea forsteriana	Brush Box Kentia Palm	0.32	0.42 0.16	3.84	2.30	Moderate Moderate	Retain and Protect Retain and Protect	-
69	Howea forsteriana	Kentia Palm	0.00	0.10	2.00	1.53	Moderate	Retain and Protect	$d \leq 1$
105	Callistemon salignus cv.	Willow Bottlebrush	0.65	0.68	7.80	2.81	Moderate	Remove	1
106	Corymbia citriodora	Lemon Scented Gum	0.44	0.56	5.28	2.59	Moderate	Retain and Protect	
107	Corymbia citriodora	Lemon Scented Gum	0.37	0.51	4.44	2.49	Moderate	Retain and Protect	] <
108	Corymbia citriodora	Lemon Scented Gum	0.33	0.44	3.96	2.34	Moderate	Remove	$\downarrow$
109 110	Eucalyptus botryoides Eucalyptus botryoides	Bangalay Bangalay	0.68	0.84 0.51	8.16	3.08	High Moderate	Remove Remove	- )
110 111	Eucalyptus botryoides	Bangalay Bangalay	0.40	0.51	4.80 6.96	2.49 2.81	High	Retain and Protect	$- \langle$
112	Melaleuca quinquenervia	Broad Leafed Paperbark	0.30	0.50	5.28	2.01	Moderate	Remove	12
113	Melaleuca quinquenervia	Broad Leafed Paperbark	0.64	0.81	7.68	3.03	Moderate	Remove	] )
114	Melaleuca quinquenervia	Broad Leafed Paperbark	0.40	0.54	4.80	2.55	Moderate	Remove	] <
115	Corymbia maculata	Spotted Gum	0.60	0.75	7.20	2.93	High	Remove	
116	Eucalyptus robusta Melaleuca quinquenervia	Swamp Mahogany Broad Leafed Paperbark	0.23 0.48	0.30	2.76	2.00	High Moderate	Remove Remove	- )
117 118	Melaleuca quinquenervia	Broad Leafed Paperbark	0.46	0.72	5.76 7.20	2.88	Moderate	Remove	-1
119	Melaleuca quinquenervia	Broad Leafed Paperbark	0.66	0.66	7.92	2.00	Moderate	Remove	$\dashv$
120	Melaleuca quinquenervia	Broad Leafed Paperbark	0.92	0.99	11.04	3.30	Moderate	Remove	1)
121	Melaleuca quinquenervia	Broad Leafed Paperbark	0.62	0.70	7.44	2.85	Moderate	Remove	] <
122	Melaleuca quinquenervia	Broad Leafed Paperbark	0.52	0.72	6.24	2.88	Moderate	Remove	] <
123	Cupaniopsis anacardioides	Tuckeroo	0.35	0.45	4.20	2.37	Moderate	Remove	
124 125	Livistona australis Cupaniopsis anacardioides	Cabbage Palm Tuckeroo	0.33	0.51 0.27	3.96	2.49	Moderate Low	Transplant Remove	-1
125	Melaleuca quinquenervia	Broad Leafed Paperbark	0.22	0.27	2.64 3.96	1.91 2.28	Low	Remove	$\dashv$
127	Melaleuca quinquenervia	Broad Leafed Paperbark	0.48	0.51	5.76	2.49	Low	Remove	
128	Melaleuca quinquenervia	Broad Leafed Paperbark	0.52	0.51	6.24	2.49	Low	Remove	1 5
129	Cupaniopsis anacardioides	Tuckeroo	0.20	0.22	2.40	1.75	Low	Remove	] <
130	Cupaniopsis anacardioides	Tuckeroo	0.24	0.29	2.88	1.97	Low	Remove	
131 132	Cupaniopsis anacardioides Cupaniopsis anacardioides	Tuckeroo Tuckeroo	0.30	0.33	3.60	2.08	Moderate Moderate	Remove Remove	-
132	Magnolia grandiflora	American Bull Bay Magno		0.25	3.36 3.12	1.97 2.13	Moderate	Transplant	$\neg$
134	Acacia saligna	WA Golden Wattle	0.22	0.31	2.64	2.02	Low	Remove	1)
135	Elaeocarpus reticulatus x 20	Blueberry Ash	0.14	0.17	2.00	1.57	Low	Remove	
136	Corymbia citriodora	Lemon Scented Gum	0.48	0.72	5.76	2.88	Low	Remove	
137	Corymbia citriodora	Lemon Scented Gum	0.80	1.15	9.60	3.51	V Low / Remove	Remove	
139	Howea forsteriana	Kentia Palm	0.19	0.26	2.28	1.88	High	Transplant	1)
141	Tristaniopsis laurina	Water Gum	0.17	0.18	2.04	1.61	Low	Remove	] <
144	Eucalyptus grandis	Flooded Gum	0.42	0.57	5.04	2.61	Moderate	Retain and Protect	$\downarrow$
145	Eucalyptus grandis	Flooded Gum	0.62	0.92	7.44	3.20	High	Retain and Protect	
146 147	Eucalyptus grandis Livistona australis	Flooded Gum Cabbage Palm	0.41	0.47 0.61	4.92	2.41	Moderate High	Retain and Protect Retain and Protect	$- \langle \langle \rangle$
147 148	Livistona australis	Cabbage Palm Cabbage Palm	0.40	0.61	3.00	2.69 2.55	High	Retain and Protect	$\dashv$
140	Livistona australis	Cabbage Palm	0.40	0.86	3.00	2.55	High	Retain and Protect	- )
154	Livistona australis	Cabbage Palm	0.00	0.56	2.00	2.59	Moderate	Retain and Protect	] <
155	Livistona australis	Cabbage Palm	0.00	0.39	2.00	2.23	Moderate	Retain and Protect	] <
156	Phoenix canariensis	Canary Island Date Palm	0.00	0.74	2.00	2.92	Moderate	Retain and Protect	])
157	Fraxinus pennsylvanica?	Red Ash Red Ash	0.24	0.36	2.88	2.15	Low	Retain and Protect Retain and Protect	-1
158 159	Fraxinus pennsylvanica? Livistona australis	Red Ash Cabbage Palm	0.22	0.29	2.64 2.00	1.97 2.53	Low Moderate	Retain and Protect	$\dashv$ $\prec$
159	Livistona australis	Cabbage Palm	0.00	0.34	2.00	2.53	Moderate	Retain and Protect	1)
161	Livistona australis	Cabbage Palm	0.00	0.49	2.00	2.45	Moderate	Retain and Protect	1 1
162	Livistona australis	Cabbage Palm	0.00	0.48	2.00	2.43	Moderate	Retain and Protect	] <
163	Xylosma senticosum	Shiny Xylosma	0.37	0.45	4.44	2.37	Moderate	Remove	
167	Michelia champaca	Champaca	0.57	0.63	6.84	2.73	Low	Remove	- ``
168 169	Araucaria heterophylla Ficus rubiginosa	Norfolk Island Pine Port Jackson Fig	0.07	0.10	2.00	1.26	Moderate Moderate	Transplant Retain and Protect	$\prec$
	Ficus rubiginosa	Port Jackson Fig	0.07	0.10	2.00	1.26 1.26	Moderate	Transplant	+
171	Ficus rubiginosa	Port Jackson Fig	0.07	0.10	2.00	1.20	Moderate	Retain and Protect	$\neg$
172	Ficus rubiginosa	Port Jackson Fig	0.10	0.12	2.00	1.36	Moderate	Retain and Protect	] <
173	Ficus rubiginosa	Port Jackson Fig	0.10	0.12	2.00	1.36	Moderate	Retain and Protect	
174	Lophostemon confertus	Brush Box	0.05	0.07	2.00	1.08	Moderate Moderate	Retain and Protect	_ )
175 176	Araucaria heterophylla Araucaria heterophylla	Norfolk Island Pine Norfolk Island Pine	0.07	0.10	2.00	1.26	Moderate Moderate	Retain and Protect Retain and Protect	- < -
176 177	Araucaria neterophylia Lophostemon confertus	Brush Box	0.07	0.10	2.00 4.80	1.26 2.43	Moderate	Retain and Protect	_ ) B
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NOTE

Refer to the accompanying Arboricultural Impact Assessment Report for full description of trees, measurements and methods used to assess the trees, and proposed tree protection measures.

B For Development Application A For Development Application REVISION DESCRIPTION







ROJECT & CLIENT Warringah Mall Stage 2	Project No : 16.36 Designed : RWS Drawn : RWS/CB	
Scentre Design & Construction Pty Ltd	Scale : 1:250@A1, 1:500@A3	
RAWING TITLE Tree Protection and Removal Plan	DRAWING NUMBER REVIS	SION A
	Plotted at : 2:59 pm 28/5	5/19













OJECT & CLIENT	$\bigcirc$	Project No	: 16.36	
Varringah Mall Stage 2		i roject no	: RWS	
		5	: RWS/CB	
centre Design & Construction Pty Ltd		Scale	: 1:250@A1,	1:500@A3
RAWING TITLE		DRAWING NUMB	ER	REVISION
ree Protection and Removal Plan		ART-T-	-05	A
			Plotted at : 2	:59 pm 28/5/19









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Tree Protection and Removal Plan