



*Dubbo Base Hospital Redevelopment
Stage 1 & 2 Review of Environmental Factors (REF)*

Report prepared for

Health Infrastructure

Level 8, 77 Pacific Highway,

North Sydney,

NSW 2059

9th June 2012



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PREFACE

Outback Tree Service Dubbo has prepared this report for TSA Management Pty Limited (*the project manager*) on behalf of Health Infrastructure (*the client*) for the Dubbo Base Hospital Redevelopment – Stage 1 & 2 Review of Environmental Factors (REF), Erskine Street, Dubbo NSW.

Mr Carl Martin (*the arborist*) attended Dubbo Base Hospital, NSW (*the site*), on 5/6 June, 2012, the trees and their growing environment were examined. The project facilitates the construction of new and refurbished hospital facilities as identified by the Western NSW Local Health District. The arborist is to provide an arboriculture assessment as part of the Review of the Environmental Factors.

INTRODUCTION

The land is located in the Dubbo Council (*the Council*) Local Government Area which currently has no tree preservation orders. The trees as indicated on the site map (appendix 1) consider the eventual removal of 117 trees as the project advances. This report also offers protection strategies for the 39 trees to be retained that are around the construction zones. The trees are not of Historical Significance so are not protected by Historical Preservation Orders.

The first stage of the works comprises of buildings being demolished to make way for future development, new utility building being built, new roads being built and new parking lots. New planting of appropriate tree species will be required in the new car park that will be covered in the tree plan. This plan offers suggestion on species that could be planted that will prevent future conflict between trees and built structures.

The report also offers recommendations on 2 rows of trees (trees 1-16 and 146-155) that are to be retained as per the plan but issues may arise that could lead to serious affects in the trees health as the development progresses.

SUMMARY

This report considers a total of 167 trees, both trees to be removed and retained. One tree was in the incorrect position on the map (tree 76), while others around the existing carpark (trees 115-119, 131-133, 134 & 142-145) have been added to the Site plan. There are recommendations that suggest a change to the positioning of a footpath leading from the main car entry to the hospital car park and the complete removal of a row of trees 151-155 that were to be retained on the site plan.

REPLACEMENT TREE SUGGESTIONS

For trees that are to be planted around the grounds it is recommended that similar trees to those that have been retained should be planted. New trees to be planted need to be positioned so that they can reach their mature growth without conflicting with established trees.

Trees around the new carparks should have a root barrier in place along the edge of the new surface to reduce the risk of trees lifting it.

We offer a list of trees that would be appropriate to grow in and around carparks. This is a short list of suggestions that may be of assistance to the Landscape Gardner in charge.

- **Bottlebrush** (*Callistemon*)
- **Golden ash** (*Fraxinus excelsior* 'aurea')- Deciduous Tree
- **Claret Ash** (*Fraxinus* 'Raywood')- Deciduous Tree
- **Crepe Myrtle** (*Lagerstromia indica* (hybrids))
- **Magnolia** (*Magnolia Little Gem*)
- **Flowering Gum Trees** (*Eucalyptus* 'Summer Red'), (*Eucalyptus* 'Summer Beauty') ,(Summer Glory)and (Summer Snow) are some examples.
- The tree species that are being removed are also an option as replacement trees excluding She Oaks due to size and White Cedars due to the berries which are slightly toxic to humans (although not birds).

Table 1.0

Tree No.	Genus and Species	Common Name	Height in metres	Condition G = Good F = Fair P = Poor D = Dead	Description of work	Significance scale 1= High 2= Medium 3= Low
1-4	<i>Grevillea robusta</i>	Silky Oaks	12 metres	G	Trees to be retained (See tree assessment for all trees to be retained- Table 2.0)	1
5-15	<i>Callistemon Myrtaceae</i>	Bottle brush Trees	2 metres	G	Trees to be retained (See tree assessment for all trees to be retained- Table 2.0)	1
16	<i>Callistemon Myrtaceae</i>	Bottle brush Trees	2 metres	G	Tree to be removed to make way for new road leading into carpark.	1
17	<i>Radyera farragei</i>	Bush Hibiscus Shrub	2 metres	F	Remove to make way for new road leading into carpark.	2
18	<i>Eucalyptus maculata</i>	Spotted Gum Tree	3 metres	P	Tree has been lopped in the past and is not growing as it should be. Needs to be removed for this reason.	3
19	<i>Melia azedarach</i>	White Cedar tree	8 metres	F	Tree to be removed to make way for new road leading into carpark.	3
20	<i>Jacaranda mimosifolia</i>	Jacaranda Tree	8 metres	G	Tree is to be removed in revised tree site plan.	2
20 A & B	<i>Grevillea Poorinda</i>	Grevillea	2 metres	F	Tree is to be removed in revised tree site plan.	2
21-25	<i>Sapium sebiferum</i>	Chinese Tallow Tree	6 metres	G	Trees to be removed so that land can be re-graded for future development. Care will need to be taken with the removal of stumps due to proximity of water pipes if they are being retained.	2
26	<i>Pistachio Chinensis</i>	Chinese Pistachio tree	5 metres	F	Tree that has been lopped in the past and is to be removed so that the land can be re-graded for future development.	3
27	<i>Jacaranda mimosifolia</i>	Jacaranda Tree	12 metres	G	Tree is to be removed so that land can be re-graded for future development.	2

Tree No.	Genus and Species	Common Name	Height in metres	Condition G = Good, F = Fair P = Poor, D = Dead	Description of work	Significance scale 1= High 2= Medium 3= Low
28-33	<i>Melia azedarach</i>	White Cedar tree	12 metres	P	Trees to be removed so that land can be re-graded for future development. Trees have hollows in the trunks and contain wood rot.	2
34	<i>Jacaranda mimosifolia</i>	Jacaranda Tree	12 metres	G	Tree is to be removed so that land can be re-graded for future development.	2
35,36	<i>Melia azedarach</i>	White Cedar tree	12 metres	P	Trees to be removed so that land can be re-graded for future development. Trees have hollows in the trunks and contain wood rot.	3
37	<i>Robinia pseudoacacia</i>	Black Locust	3 metres	F	Tree is to be removed so that land can be re-graded for future development.	3
38	<i>Callistemon Myrtaceae</i>	Row of Bottlebrush shrub	2 metres	G	Shrubs to be removed so that land can be re-graded for future development.	1
39	<i>Melia azedarach</i>	White cedar tree	15 metres	G	Tree is leaning against a building attached the existing morgue. It is damaging the guttering on the building. Tree is to be removed so that land can be re-graded for future development.	3
40	<i>Casuarina cunninghamiana</i>	She Oak	20 metres	G	Tree to be retained (See tree assessment for all trees to be retained- Table 2.0)	1
41	<i>Casuarina cunninghamiana</i>	She Oak	20 Metres	G	Tree to be retained (See tree assessment for all trees to be retained- Table 2.0)	1
42-46	<i>Koelreuteria paniculata</i>	Golden Rain Tree	3 metres	G	Trees to be removed to make way for new road leading into new carpark.	2
47	<i>Magnolia Grandiflora</i> (Little Gem)	Magnolia Tree	3 metres	G	Tree is to be removed to make way for new road leading into new carpark.	3

Tree No.	Genus and Species	Common Name	Height in metres	Condition G = Good, F = Fair P = Poor, D = Dead	Description of work	Significance scale 1= High 2= Medium 3= Low
47 A	<i>Callistemon Myrtaceae</i>	Bottle brush shrubs	1-2 metres	F	Trees to be removed to make way for new road leading into new carpark.	3
48-52	<i>Pistachio Chinensis</i>	Chinese Pistachio trees	5 metres	G	Trees to be removed to make way for new road leading into new carpark.	3
53-55	<i>Salix Salicaceae</i>	Willow Trees	9 metres	P	Trees to be removed so that land can be re-graded for future development.	3
56	<i>Melia azedarach</i>	Cedar Tree	8 metres	P	Trees to be removed so that land can be re-graded for future development.	3
57,58	<i>Salix Salicaceae</i>	Willow Trees	9 metres	P	Trees to be removed so that land can be re-graded for future development.	3
59	<i>Eucalyptus maculata</i>	Spotted Gum tree	12 metres	F	Tree to be removed so that a new main switch room can be built.	3
60-67	<i>Casuarina cunninghamiana</i>	She oaks	16 metres	F	8 trees to be removed so that new transformers room can be built.	3
68	<i>Melia azedarach</i>	White Cedar tree	6 metres	P	Tree to be removed so that land can be re-graded for future development.	3
69	<i>Wikstroemia australis</i>	Kurrajong tree	10 metres	F	Tree to be removed so that a new generators room can be built.	2
70	<i>Wikstroemia australis</i>	Kurrajong tree	10 metres	F	Tree to be removed to make way for new road.	2
71-73	<i>Wikstroemia australis</i>	Kurrajong tree	10 metres	F	Tree to be removed to make way for new carparks.	2
74	<i>Melia azedarach</i>	White Cedar Tree	6 metres		Tree to be retained (See tree assessment for all trees to be retained- Table 2.0)	2

Tree No.	Genus and Species	Common Name	Height in metres	Condition G = Good, F = Fair P = Poor, D = Dead	Description of work	Significance scale 1= High 2= Medium 3= Low
75	<i>Melia azedarach</i>	White Cedar Tree	6 metres	D	Tree is dead and needs to be removed as a safety precaution. There are no cavities in the trunk that would allow for native fauna to utilise.	3
76-81	<i>Callistemon Myrtaceae</i>	Bottlebrush	3 metres	G	Trees to be removed to make way for new road..	2
82	<i>Eucalyptus tricarpa</i>	Iron bark tree	8 metres	F	Trees to be removed to make way for new carparks.	3
83-86	<i>Eucalyptus maculata</i>	Spotted Gum tree	6-7 metres	F	Trees to be removed to make way for new carparks.	3
87	<i>Corymbia torrelliana</i>	Cadagi	7 metres	G	Trees to be removed to make way for new carparks.	2
88, 89					There are no trees in these positions at the site.	
90-109	<i>Eucalyptus citriodora</i> <i>Eucalyptus resinifera</i> <i>Callistemon Myrtaceae</i>	Lemon Scented gum Stringy Barks Bottlebrush	10-15 metres	G	Trees are positioned in a large clump and are to be removed to make way for a new road leading into the new carpark.	2
110-112	<i>Casuarina cunninghamiana</i>	She Oak	17 metres	G	Trees to be removed to make way for new carparks.	2
113-117	<i>Casuarina cunninghamiana</i>	She Oak	17 metres	G	Tree to be retained in revised tree site plan (See tree assessment for all trees to be retained- Table 2.0)	2
118 A-O	<i>Casuarina cunninghamiana</i>	She Oak	17 metres	G	Tree to be retained in revised tree site plan (See tree assessment for all trees to be retained- Table 2.0)	2
119-125	<i>Casuarina cunninghamiana</i> <i>Corymbia torrelliana</i>	She Oak Cadagi	8-10 metres	G	Trees are positioned in a clump and are to be removed to make way for a new road leading into the new carpark.	2

Tree No.	Genus and Species	Common Name	Height in metres	Condition G = Good, F = Fair P = Poor, D = Dead	Description of work	Significance scale 1= High 2= Medium 3= Low
126	<i>Lophostemon confertus</i>	Brush Box	3 metres	P	Not on site plan but has been lopped previously and needs to be removed to make way for new carpark.	3
127,128	<i>Lophostemon confertus</i>	Brush Box	5 metres	G	Trees to be removed to make way for new carparks.	2
129	<i>Lophostemon confertus</i>	Brush Box	5 metres	G	Trees to be retained (See tree assessment for all trees to be retained- Table 2.0)	2
130,131	<i>Eucalyptus maculata</i>	Spotted Gum tree	4 metres	F	Trees to be removed to make way for new carparks.	3
132-134	<i>Callistemon Myrtaceae</i>	Bottle brush	3 metres	F	Not on tree plan but will need to be removed to make way for new car park.	2
135	<i>Wikstroemia australis</i>	Kurrajong	5 metres	G	Not on site map but tree to be removed to make way for new carparks.	2
136- 137	<i>Callistemon Myrtaceae</i>	Bottlebrush	4 metres	G	Trees to be retained (See tree assessment for all trees to be retained- Table 2.0)	2
138-139	<i>Sapium sebiferum</i>	Chinese Tallow	4 metres	F	Trees to be removed to make way for new carparks.	3
140-147	<i>Melaleucas</i> <i>Sapium sebiferum</i> <i>Nerium oleander</i> <i>Melia azedarach</i> <i>Pistachio Chinensis</i>	5 Paper Barks Chinese Tallow tree Oleander White Cedar tree Chinese Pistachio	3-5 metres	F	Trees to be removed to make way for new carparks.	3
148	<i>Casuarina cunninghamiana</i>	She Oak	12 metres	G	Tree to be retained (See tree assessment for all trees to be retained- Table 2.0)	2

Tree No.	Genus and Species	Common Name	Height in metres	Condition G = Good, F = Fair P = Poor, D = Dead	Description of work	Significance scale 1= High 2= Medium 3= Low
149	<i>Fraxinus 'Raywood'</i>	Claret Ash	6 metres	G	Tree to be retained (See tree assessment for all trees to be retained- Table 2.0)	1
150-156	<i>Melia azedarach</i>	White Cedar Tree	8 metres	P	Trees to be removed to make way for new carparks.	3
157-159	<i>Callistemon Myrtaceae</i>	Bottle brush	5 metres	G	Not on tree plan and they are in line with trees 136, 137 which are to be retained.	1
160-164	<i>Fraxinus 'Raywood'</i>	Claret Ash	11 metres	G	Tree to be retained (See tree assessment for all trees to be retained- Table 2.0)	1
165-167	<i>Melia azedarach</i>	White Cedar	10 metres	P	Tree to be retained (See tree assessment for all trees to be retained- Table 2.0)	3
168,169	<i>Melia azedarach</i>	White Cedar	10 metres	P	Trees to be removed to make way for new footpath	3
170	<i>Robinia pseudoacacia 'Umbraculifera'</i>	Mop Top Robinia	4 metres	G	Tree to be removed to make way for new footpath	1
171-179	<i>Jacaranda mimosifolia</i>	Jacaranda tree	10-15 metres	G	Tree to be retained (See tree assessment for all trees to be retained- Table 2.0)	1

Table 2.0- This table only applies to trees that are to be retained as per the site plan.

Tree Assessment												
Tree No	Genus & Species Common Name	Age Y= Young M=Mature O= Overmature	Vigour GV= Good Vigour LV= Low vigour	Condition G=Good F=Fair P=Poor D=Dead	SRIV Age, Vigour, Condition/ Index Rating www.iaca.org.au Estimated Life Expectancy 1= Long 2= Medium 3= Short	Crown Form D= Dominant C= Co-dominant I= Intermediate S= Suppressed F= Forest E= Emergent	Roots evident at root crown 1=None 2=Adventitious 3=Basal Flare 4=Buttresses 5=First order	Height approx. metres	Trunk Lean 1=Upright 2=Moderate 3=Severe 4=Critical 5= Acaulescent	Pests and diseases Yes or No	Significance scale 1= High 2= Medium 3= Low	Retention Value 1= High 2= Medium 3= Low 4= Remove
1-4	<i>Grevillea robusta</i>	M	GV	G	MGVG=10 1	D	5	12	1	No	1	1
	Silky Oaks	Comment- trees are alongside of road are where a footpath is projected to be which will cause major problems. (see recommendations)										
5-15	<i>Callistemon viminalis</i>	M	GV	G	MGVG=10 1	D	5	2	1	No	1	1
	Bottle Brush	Comment- trees are alongside of road are where a footpath is projected to be which will cause major problems. (see recommendations)										
40, 41	<i>Casuarina cunninghamiana</i>	M	GV	G	MGVG=10 1	D	5	20	1	No	1	1
	She Oaks	Comment- trees appear to be a distance from main work but will be subject to a tree protection zone.										
74	<i>Melia azedarach</i>	O	GV	F	OGVF=5 2	C	5	6	1	Yes	3	3
	White Cedar	Comment- Tree has been lopped in the past and is lifting pavers around BBQ area. Has root rot in trunk due to branches falling off. (See recommendations)										

Tree No	Genus & Species Common Name	Age Y= Young M=Mature O= Overmature	Vigour GV= Good Vigour LV= Low vigour	Condition G=Good F=Fair P=Poor D=Dead	SRIV Age, Vigour, Condition/ Index Rating Estimated Life Expectancy 1= Long 2= Medium 3= Short	Crown Form D= Dominant C= Co-dominant I= Intermediate S= Suppressed F= Forest E= Emergent	Roots evident at root crown 1=None 2=Adventitious 3=Basal Flare 4=Buttresses 5=First order	Height approx. metres	Trunk Lean 1=Upright 2=Moderate 3=Severe 4=Critical 5= Acaulescent	Pests and diseases Yes or No	Significance scale 1= High 2= Medium 3= Low	Retention Value 1= High 2= Medium 3= Low 4= Remove
113-117, 118 A-O	<i>Casuarina cunninghamiana</i>	M	GV	F	MGVF=9 2	D	5	17	1	Yes	1	1
	She Oak	Comment- Trees to be retained as they form a screen for the swimming pool. Trees will require TPZ (See recommendations)										
129	<i>Lophostemon confertus</i>	M	GV	G	MGVG=10 2	D	5	5	1	No	1	1
	Brush box	Comment- Tree is positioned at the back of proposed carpark and will require TPZ. (See recommendations)										
136, 137	<i>Callistemon Myrtaceae</i>	M	GV	G	MGVG=10 2	C	5	3	2	No	2	2
	Bottlebrush	Comment. (See recommendations)										
148	<i>Casuarina cunninghamiana</i>	M	GV	G	MGVG=10 2	D	5	9	1	No	2	1
	She Oak	Comment- Tree is extremely close to the established road surface and is used to shade maintenance workers vehicles. (See recommendations)										
160-164	<i>Fraxinus 'Raywood'</i>	Y	GV	G	YGVG=9 1	D	5	11	1	No	1	1
	Claret Ash	Comment- Trees have surface roots and is extremely close to the established road surface. (See recommendations)										

Tree No	Genus & Species Common Name	Age Y= Young M=Mature O= Overmature	Vigour GV= Good Vigour LV= Low vigour	Condition G=Good F=Fair P=Poor D=Dead	SRIV Age, Vigour, Condition/ Index Rating Estimated Life Expectancy 1= Long 2= Medium 3= Short	Crown Form D= Dominant C= Co-dominant I= Intermediate S= Suppressed F= Forest E= Emergent	Roots evident at root crown 1=None 2=Adventitious 3=Basal Flare 4=Buttresses 5=First order	Height approx. metres	Trunk Lean 1=Upright 2=Moderate 3=Severe 4=Critical 5= Acaulescent	Pests and diseases Yes or No	Significance scale 1= High 2= Medium 3= Low	Retention Value 1= High 2= Medium 3= Low 4= Remove
165-167	<i>Melia azedarach</i>	O	GV	F	OGVF=5 2	C	5	10	1	Yes	3	4
	White Cedar	Comment- Trees have surface roots and is extremely close to the established road surface. Has root rot in trunk due to branches falling off. (See recommendations)										
171-179	<i>Jacaranda mimosifolia</i>	M	GV	G	MGVG=10 1	D	5	10-15	1	No	1	1
	Jacaranda	Comment- Trees positioned where car parks have been built in the past and has full landscaping. (See recommendations)										

RECOMMENDATIONS

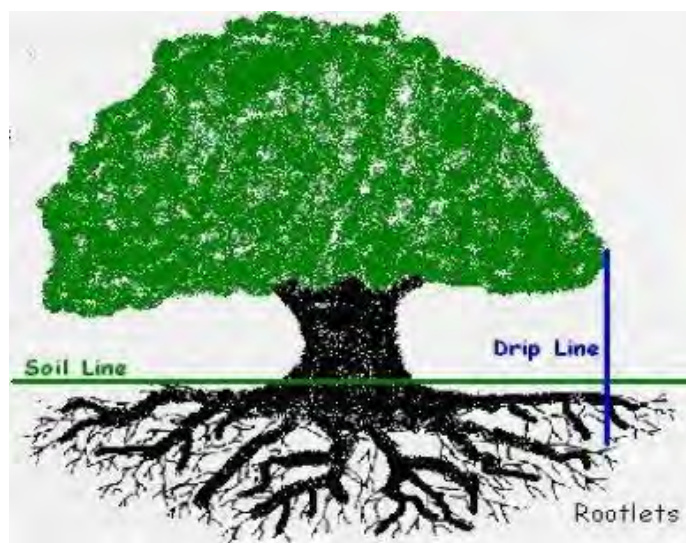
- **Trees 1-4 Silky Oaks (*Grevillea robusta*) & trees 5-15 Bottle brush trees (*Callistemon Myrtaceae*):** The trees are in a row running parallel with the main access road into the hospital carpark. A footpath is going to be placed parallel with the road as well on the same side. Installing the footpath should not be an issue if it will be incorporating a section of the road and a minimal section of the grass area under the trees.

If the footpath is to be an extension of the road then extra preventative measures will need to be taken into account. Roots are one of the most vital parts of a tree. They are responsible for nutrient and water uptake, store energy and anchor the plant. This makes it critical to protect the roots not just the branches. Typically there are approximately 90-95% of the trees roots are in the first 600mm of soil. This is greatly affected by heavy machinery driving over the roots and also digging around the tree. All tree roots extend outwards to the width of its branches and often beyond and this is called the Drip Zone (see Fig 1).

The trees have a distance of approx. 1 metre from road edge to trunk with the branches extending out to approx. 1 metre and are about 1.5 metres from the ground. It is in the bottlebrush trees best interest if no footpath is installed underneath them as too much of the foliage will need to be cut away to give pedestrians head room and too many important surface roots will be damaged and there is no guarantee that they will survive.



Figure 1



- **Trees 40, 41 She Oak (*Casuarina cunninghamiana*):** The trees are positioned away from the road and any works that are planned according to the site map. The trees should be sectioned off using fencing as outlined in the Australian Standards for Tree Protection Zones or Bunting (orange barricade fencing) at a distance of 5 metres so that the earth cannot be compacted by machinery. As general maintenance to sustain the trees current level of health, they require dead wood to be removed by an arborist.



- **Tree 75 White Cedar Tree (*Melia azedarach*):** The tree is next to a building that is to be retained and is shade for an existing BBQ area. The tree has been lopped in the past and will require lopping every year otherwise the new growth becomes too long and heavy for the weak growth point to cope with and it will drop branches. The root system of the tree is lifting the pavers around the BBQ and will require trip hazard markers on the pavers. The tree is a mature tree but has little wood rot in the trunk so has many years of life left.



- **Tree 148 She Oak (*Casuarina cunninghamiana*):** Tree is healthy specimen will need to be sectioned off using fencing as outlined in the Australian Standards for Tree Protection Zones or Bunting (orange barricade fencing) at a distance of 4-5 metres to reduce the risk of large machinery driving under the trees and compacting the ground around the drip zone (see fig 1). Tree is next to maintenance building and offers shade to vehicles.



- **Trees 113-117 & 118 A-O She Oaks (*Casuarina cunninghamiana*):** Trees are very close to where construction of the new road and car parks will occur and the trees will need to be sectioned off using fencing as outlined in the Australian Standards for Tree Protection Zones or Bunting (orange barricade fencing) at a distance of 2-3 metres to reduce the risk of large machinery driving under the trees and compacting the ground around the drip zone (see fig 1). The trees offer a screen to the swimming pool but will require the removal of dead wood to reduce the risk of limbs falling on pedestrians and vehicles.



- **Tree 129 Brush Box (*Lophostemon confertus*):** Tree is healthy specimen will need to be sectioned off using fencing as outlined in the Australian Standards for Tree Protection Zones or Bunting (orange barricade fencing) at a distance of 3-4 metres to reduce the risk of large machinery driving under the trees and compacting the ground around the drip zone (see fig 1).



Tree 129

- **Trees 136-137 & 157-159 Bottle brush (*Callistemon Myrtaceae*):** Trees are positioned next to a fence and under power lines but are able to be pruned so they do not grow close to the power lines. Tree 136 has been lopped from the trunk previously but still has healthy, strong re-growth. Trees are very close to where construction of the new road and car parks will occur and the trees will need to be sectioned off using fencing as outlined in the Australian Standards for Tree Protection Zones or Bunting (orange barricade fencing) at a distance of 2-3 metres.



- **Trees 160-164 Claret Ash (*Fraxinus Raywood*):** The trees are healthy specimens although care will need to be taken when removing the asphalt so that the surface roots are not too disturbed. The trees will need to be sectioned off using fencing as outlined in the Australian Standards for Tree Protection Zones or Bunting (orange barricade fencing) at a distance of 4-5 metres to reduce the risk of large machinery driving under the trees and compacting the ground around the drip zone (see fig 1).



- **Trees 165-167 White Cedar tree (*Melia azedarach*):** These trees are positioned next to a section of the car park that is to be removed and a footpath section to be placed. It is our recommendation that these trees be removed. They are over mature and in the long term will continue to have dieback on sections until they die completely. This will also lead to limbs dropping and leaving open wounds that promote wood rot. The roots of the trees are lifting the current surface and will eventually lift and crack the new footpath sections. Root barriers are not an option in this case due to the proximity of the footpath to the trunk with the recommendations that root barrier be positioned a minimum of 50% within the drip zone of the tree (see fig 2&3). These trees would need root barrier positioned within 1 metre of the trunk and would have all of their structural and feeding roots cut along one side of the trees.

Figure 2

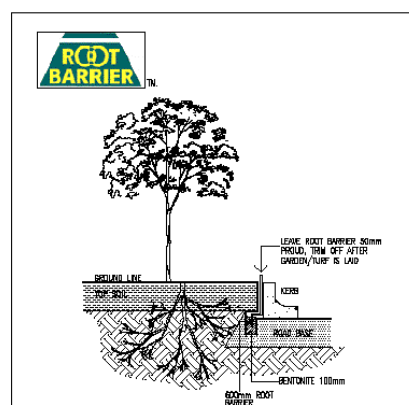


Figure 3- http://rootbarrier.com.au/documents/Rootbarrier_for_roads_PARTB.pdf

DESIGN & INSTALLATION GUIDELINES (INCLUDING TYPICAL)

NORMALLY PLACED BETWEEN THE TREE AND WHATEVER YOU WISH TO PROTECT. TRY NOT TO SURROUND THE TREE. OUR PREFERRED METHOD IS PLACING THE ROOT BARRIER ALONG BESIDE THE PATH, BUILDING, PIPE ETC SO THAT THE TREE ROOTS CAN NOT GAIN ACCESS TO THE STRUCTURE. TO STABILISE MOISTURE IN REACTIVE CLAYS UNDER THE STRUCTURE A DEEPER BARRIER IS REQUIRED.

DEPTH

SODIUM BENTONITE IS USED TO SEAL THE BOTTOM OF THE TRENCH AND BIND THE BOTTOM OF THE ROOT BARRIER TO ROAD BASE. IN SUMMARY, TAKE THE BARRIER DOWN TO ROAD BASE. DO NOT TAKE BARRIER THROUGH ROAD BASE.

SEAL

SODIUM BENTONITE OR OTHER ROOT GROWTH INHIBITOR IS USED TO SEAL THE BOTTOM OF THE TRENCH AND BIND THE BOTTOM OF THE ROOT BARRIER TO THE UNDISTURBED SOIL. IN SUMMARY, TAKE THE BARRIER DOWN TO SOIL THAT NOTHING CAN GROW IN AND BIND THE ROOT BARRIER TO IT.

LENGTH

SUFFICIENT TO STOP THE ROOTS GOING AROUND THE EDGE OF THE BARRIER, NORMALLY 1 OR 2 METRES OUTSIDE THE DRIP LINE OF THE TREE.

TREE CARE

WORKING IN FROM THE DRIP LINE. (THE EDGE OF THE LEAVES) THE CLOSER YOU GET TO THE TRUNK THE HIGHER THE RISK OF DAMAGING OR DESTABILISING THE TREE. 250 OF THE DISTANCE FROM THE DRIP LINE TO THE TRUNK (250 OF THE TREES TOTAL ROOT PLATFORM) IS REGARDED AS THE CLOSEST YOU CAN CUT WITHOUT MAJOR RISK TO PLANTS HEALTH. IF IT IS NECESSARY TO CUT CLOSER THAN HALFWAY TOWARDS THE TRUNK, IT WOULD BE ADVISABLE TO ENGAGE THE SERVICES OF AN ARBORIST TO ASSESS THE TREE PRIOR TO THE WORK BEING CARRIED OUT, AND TO HELP NURSE THE TREE THROUGH THE PERIOD OF INSTALLATION.

BARRIER PLACEMENT

1. DIG A TRENCH TO THE REQUIRED DEPTH, INSERT ROOT BARRIER INTO ROADBASE. ENSURE 50mm OF ROOT BARRIER IS LEFT ABOVE FINISHED GROUND HEIGHT (THIS IS TO ALLOW FOR SETTLEMENT AND MAY BE TRIMMED OFF LATER).
2. IF THE BARRIER IS TO BE PLACED BACK OF KERB INTO ROAD BASE EXCAVATE A 100mm SLOT INTO COMPACTED ROAD BASE, (NOT RIGHT THROUGH BASE).
3. IN THE BASE OF THE TRENCH PLACE A LAYER OF PURE SODIUM BENTONITE 100mm DEEP THEN BACK FILL.

JOINS

OVERLAP 300mm, PLACE A 20mm SPACER VERTICALLY BETWEEN THE TWO LAYERS OF OVERLAPPING BARRIER AND BACK FILL THE TRENCH. THIS WILL CREATE AN ALMOND SHAPED VOID AROUND THE SPACER, POUR BENTONITE INTO THIS VOID AND REMOVE THE SPACER AS IT FILLS. THE RESULT WILL BE A VERTICAL COLUMN OF BENTONITE, WHICH WILL PROVIDE A WATERPROOF BUT FLEXIBLE SEAL.

TRIMMING

BARRIER SHOULD BE TRIMMED TO JUST BELOW LAWN MOWER HEIGHT BUT ABOVE GROUND (TOP OF ROOT BARRIER MUST BE EXPOSED ON COMPLETION) OR TOP OF KERB.

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- **Trees 157-167 Jacaranda (*Jacaranda mimosifolia*):** These trees are positioned where the carpark has already been developed and if more are to be added the trees will need barrier fencing around them at a distance of 3-4 metres using fencing as outlined in the Australian Standards for Tree Protection Zones or Bunting

(orange barricade fencing). The trees are very healthy specimens but would benefit from general maintenance to remove the dead wood so that dropping branches not become a hazard.

TREE PROTECTION ZONES — AUSTRALIAN STANDARD PROCEDURE

1.1 The Protective fencing where required may delineate the **TPZ** and should be located as determined by the project arborist in accordance with AS4970 *Protection of trees on development sites*, Section 4, 4.3. “Fencing should be erected before any machinery or materials are brought onto the site and before the commencement of works including demolition. Once erected, protective fencing must not be removed or altered without approval by the project arborist. The TPZ must be secured to restrict access. AS4687 *Temporary fencing and hoardings* specifies applicable fencing requirements. Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter and liquids into the protected area. Fence posts and supports should have a diameter greater than 20 mm and be located clear of roots. Existing perimeter fencing and other structures may be suitable as part of the protective fencing.”

AS4970 Section 4, Tree protection measures, Figure 4 Protective fencing shows examples of such fencing.

““Legend:

- 1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
- 2 Alternative plywood or wooden paling fence panels. The fencing material also prevents building materials or soil entering the TPZ.
- 3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
- 4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots. “

1.2 AS4970 Section 4, Tree protection measures, 4.2 Activities restricted within the TPZ

“Activities generally excluded from the TPZ included but are not limited to-

- (a) Machine excavation including trenching;
- (b) Excavation for silt fencing;
- (c) cultivation;
- (d) storage;
- (e) preparation of chemicals, including preparation of cement products;
- (f) parking of vehicles and plant;
- (g) refuelling;
- (h) dumping of waste;
- (i) wash down and cleaning of equipment;
- (j) placement of fill;
- (k) lighting of fires;
- (l) soil level changes;
- (m) temporary or permanent installation of utilities and signs, and
- (n) physical damage to the tree.”

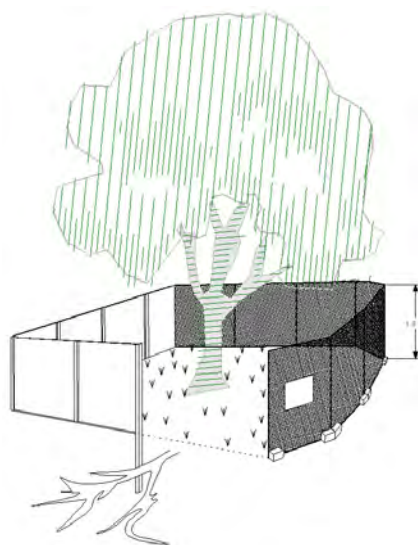


Figure 4

1.3 Tree Protection signage is to be attached to each **Tree Protection Zone** and displayed from within the development site in accordance with AS4970 2009 *Protection of trees on development sites*, example (as shown) and lettering to comply with AS1319.

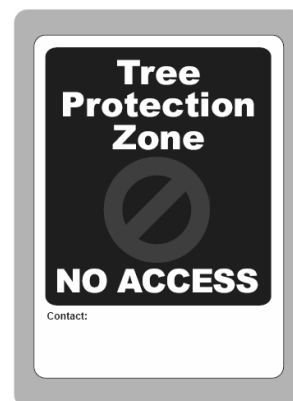


FIGURE C1 TREE PROTECTION ZONE SIGN

1.4 Where a tree is to be retained and a **Tree Protection Zone** cannot be adequately established due to restricted access e.g. tree located along side an access way, the trunk and branches in the lower crown will be protected by wrapping 2 layers of hessian or carpet underfelt around the trunk and branches for a minimum of 2 m or as lower branches permit, then wire or rope secures 75x50x2000 mm hardwood battens together around the trunk (do not nail or screw to the trunk or branches). The number of battens to be used is as required to encircle the trunk and the planks are to extend to the base of the tree (AS4970 2009 *Protection of trees on development sites*).

1.5 If a tree is growing down slope from an excavation, a silt fence located along the contours of the site in the area immediately above the **Tree Protection Zone** fencing may need to be installed and regularly maintained to prevent burial and asphyxiation of the roots of the tree. To allow for the maintenance of both fences, the silt fence must be constructed separately to the tree protection fence and the 2 fences must be constructed independently of each other and standalone. To reduce competition with the tree the area within the **Tree Protection Zone** is to be kept free of weeds. These are best removed by the application of foliar herbicide with Glyphosate as the active constituent. This is the preferred method rather than removal by cultivation of the soil within the dripline, to minimise root disturbance to the tree. The removal of woody weeds such as Privet should use the cut and paint method of herbicide application. Weeds to be controlled within the **Tree Protection Zone**, for the duration of the project.

1.6 The area of the Tree Protection Zone to be mulched to a depth of 100 mm with organic material being 75% leaf litter and 25% wood, and this being composted material preferably from the same genus and species of tree as that to where the mulch is to be applied, i.e. species specific mulch. The depth of mulch and type as indicated, to be maintained for the duration of the project. Where deep excavation will expose the soil profile to drying out the root plate is to be protected by pegging jute matting across the ground surface 2 m back from the edge of the profile and 2 m down the face of the profile and is to be in one continuous sheet or layers up to 5 mm thick and overlapped 300 mm and pegged. Pegs are to be a minimum length of 200 mm and spaced at 500 mm increments in a grid pattern. Once installed mulch is to be placed on top of the jute matting previously described.

1.7 No services either temporary or permanent are to be located within the **Tree Protection Zone**. If services are to be located within the **Tree Protection Zone**, special details will need to be provided by a qualified Consulting Arboriculturist for the protection of the tree regarding the location of the service/s.

1.8 A tree will not be fertilised during its protection within the **Tree Protection Zone**, as this may hasten its decline if it were to decline. If a tree is to be fertilised this should be in consultation with a qualified Consulting Arboriculturist.

1.9 In the event of prolonged dry periods, or where a tree has been transplanted, or where excavation nearby, especially up slope, leads to drying out of a soil profile, or modification to ground water flow, or flows across an existing ground surface to the tree and its growing environment; deep root watering thoroughly at least twice a week is to be undertaken to irrigate the tree. The need for such watering is determined readily by observing the dryness of the soil surface within the dripline of the tree by scraping back some mulch. Mulch is to be reinstated afterwards. In the event of disrupted ground or surface water flows to the tree due to excavation, filling or construction, a reticulated irrigation system may be required to be installed within the **Tree Protection Zone**. If an irrigation system is to be installed, consideration must be given to volume, frequency, and drainage of water delivered, and this should be in consultation with a qualified Consulting Arboriculturist.

GLOSSARY OF TERMS *Techno Tree Biology Dictionary & Tree Care Information, 2004*

Vigour

Vigour Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g. dormant, deciduous or semi-deciduous trees. Vigour can be categorized as Normal Vigour, High Vigour, Low Vigour and Dormant Tree Vigour.

Normal Vigour Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

High Vigour Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe; water and nutrients from a leaking or disrupted sewer pipe; nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard; a tree subject to a stringent watering and fertilising program; or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Low Vigour Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

Dormant Tree Vigour Determined by existing turgidity in lowest order branches in the outer extremity of the crown, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.

Age

Age Most trees have a stable biomass for the major proportion of their life. The estimation of the age of a tree is based on the knowledge of the expected lifespan of the taxa in situ divided into three distinct stages of measurable biomass, when the exact age of the tree from its date of cultivation or planting is unknown and can be categorized as Young, Mature and Over-mature.

Young Tree aged less <20% of life expectancy, in situ.

Mature Tree aged 20-80% of life expectancy, in situ.

Over-mature Tree aged greater than >80% of life expectancy, in situ, or senescent with or without reduced vigour, and declining gradually or rapidly but irreversibly to death.

Periods of Time

Periods of Time The life span of a tree in the urban environment may often be reduced by the influences of encroachment and the dynamics of the environment and can be categorized as Immediate, Short Term, Medium Term and Long Term.

Short Term Period of time less than <1 - 15 years.

Medium Term Period of time 15 - 40 years.

Long Term Period of time greater than >40 years.

Condition

Condition A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils), the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly second (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorized as Good Condition, Fair Condition, Poor Condition and Dead.

Good Condition Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Fair Condition Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.

Poor Condition Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.

Dead Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms;

Processes

Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves);

Osmosis (the ability of the roots system to take up water);

Turgidity (the ability of the plant to sustain moisture pressure in its cells);

Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber);

Symptoms

Permanent leaf loss;

Permanent wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots);

Shedding of the epidermis (bark desiccates and peels off to the beginning of the sapwood).

Form of Trees

Crown Form The shape of the crown of a tree as influenced by the availability or restriction of space and light, or other contributing factors within its growing environment. Crown Form may be determined for tree shape and habit generally as *Dominant*, *Codominant*, *Intermediate*, *Emergent*, *Forest* and *Suppressed*. The habit and shape of a *crown* may also be considered qualitatively and can be categorized as *Good Form* or *Poor Form*.

Crown Form Codominant Crowns of trees restricted for space and light on one or more sides and receiving light primarily from above e.g. constrained by another tree/s or a building.

Crown Form Dominant Crowns of trees generally not restricted for space and light receiving light from above and all sides.

Crown Form Emergent Crowns of trees restricted for space on most sides receiving most light from above until the *upper crown* grows to protrude above the canopy in a stand or forest environment. Such trees may be *crown form dominant* or transitional from *crown form intermediate* to *crown form forest* asserting both *apical dominance* and *axillary dominance* once free of constraints for space and light.

Crown Form Forest Crowns of trees restricted for space and light except from above forming tall trees with narrow spreading crowns with foliage restricted generally to the top of the tree. The trunk is usually erect, straight and continuous, tapering gradually, crown often excurrent, with first order branches becoming structural, supporting the live crown concentrated towards the top of the tree, and below this point other first order branches arising radially with each *inferior* and usually temporary, divergent and ranging from horizontal to ascending, often with internodes exaggerated due to competition for space and light in the *lower crown*.

Crown Form Intermediate Crowns of trees restricted for space on most sides with light primarily from above and on some sides only.

Crown Form Suppressed Crowns of trees generally not restricted for space but restricted for light by being *overtopped* by other trees and occupying an understorey position in the canopy and growing slowly.

Root Systems

Root Crown- where the tree's tissue changes from roots to trunk (i.e. the part to be below ground and the part to be above ground)

Adventitious – roots that are short lived and can form along the stems of plants and trees.

Basal Flare- the rapid increase in diameter that occurs at the junction of the trunk and root crown.

Buttress a flange of adaptive wood as an upright extension of the first order roots and the trunk adding to the stability of rainforest and many tall trees. The flange tapers up the trunk and out along the first order root where it may extend several metres from the trunk.

First Order Roots (FOR) Initial woody roots arising from the *root crown* at the base of the *trunk*, or as an *adventitious root mass* for structural support and *stability*. Woody roots may be buttressed and divided as a marked gradation, gradually tapering and continuous or tapering rapidly at a short distance from the root crown. Depending on soil type these roots may descend initially and not be evident at the root crown, or become buried by changes in soil levels. Others can become surface roots that grow along the surface around the tree and become exposed which may result in damage to the roots and damage to the surrounding environment.

REFERENCES

Australian Standards, AS 4970- 2009, *Protection of Trees on Development Sites*, Council of Standards Australia

Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.
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Appendix 1.0 www.iaca.org.au

Tree Class	Vigour Class and Condition Class					
	Good Vigour	Good Vigour &	Good Vigour &	Low Vigour &	Low Vigour &	Low Vigour &



	& Good Condition (GVG)	Fair Condition (GVF)	Poor Condition (GVP)	Good Condition (LVG)	Fair Condition (LVF)	Poor Condition (LVP)
	Able to be retained if sufficient space available above and below ground for future growth. No remedial work or improvement to growing environment required. May be subject to high vigour. Retention potential - Medium - Long Term.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work may be required or improvement to growing environment may assist. Retention potential - Medium Term. Potential for longer with remediation or favourable environmental conditions.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work unlikely to assist condition, improvement to growing environment may assist. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. No remedial work required, but improvement to growing environment may assist vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment may assist condition and vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	Unlikely to be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment unlikely to assist condition or vigour. Retention potential - Likely to be removed immediately or retained for Short Term. Potential for longer with remediation or favourable environmental conditions.
(Y)	YGVG - 9 Index Value 9	YGVF - 8 Index Value 8	YGVP - 5 Index Value 5	YLVG - 4 Index Value 4	YLVF - 3 Index Value 3	YLVP - 1 Index Value 1
Young	Retention potential - Long Term. Likely to provide minimal contribution to local amenity if	Retention potential - Short - Medium Term. Potential for longer with improved growing conditions.	Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to	Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to	Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to	Retention potential - Likely to be removed immediately or retained for Short Term. Likely to provide

	height <5 m. High potential for future growth and adaptability. Retain, move or replace.	Likely to provide minimal contribution to local amenity if height <5 m. Medium-high potential for future growth and adaptability. Retain, move or replace.	provide minimal contribution to local amenity if height <5 m. Low-medium potential for future growth and adaptability. Retain, move or replace.	provide minimal contribution to local amenity if height <5 m. Medium potential for future growth and adaptability. Retain, move or replace.	provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace.	minimal contribution to local amenity if height <5 m. Low potential for future growth and adaptability.
(M)	MGVG - 10 Index Value 10	MGVF - 9 Index Value 9	MGVP - 6 Index Value 6	MLVG - 5 Index Value 5	MLVF - 4 Index Value 4	MLVP - 2 Index Value 2
Mature	Retention potential - Medium - Long Term.	Retention potential - Medium Term. Potential for longer with improved growing conditions.	Retention potential - Short Term. Potential for longer with improved growing conditions.	Retention potential - Short Term. Potential for longer with improved growing conditions.	Retention potential - Short Term. Potential for longer with improved growing conditions.	Retention potential - Likely to be removed immediately or retained for Short Term.
(O)	OGVG - 6 Index Value 6	OGVF - 5 Index Value 5	OGVP - 4 Index Value 4	OLVG - 3 Index Value 3	OLVF - 2 Index Value 2	OLVP - 0 Index Value 0
Over-mature	Retention potential - Medium - Long Term.	Retention potential - Medium Term.	Retention potential - Short Term.	Retention potential - Short Term. Potential for longer with improved growing conditions.	Retention potential - Short Term.	Retention potential - Likely to be removed immediately or retained for Short Term.

Appendix 2.0

IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010)©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for

terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

Tree Significance - Assessment Criteria

1. High Significance in landscape

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

2. Medium Significance in landscape

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

3. Low Significance in landscape

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

Environmental Pest / Noxious Weed Species

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

Hazardous/Irreversible Decline

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

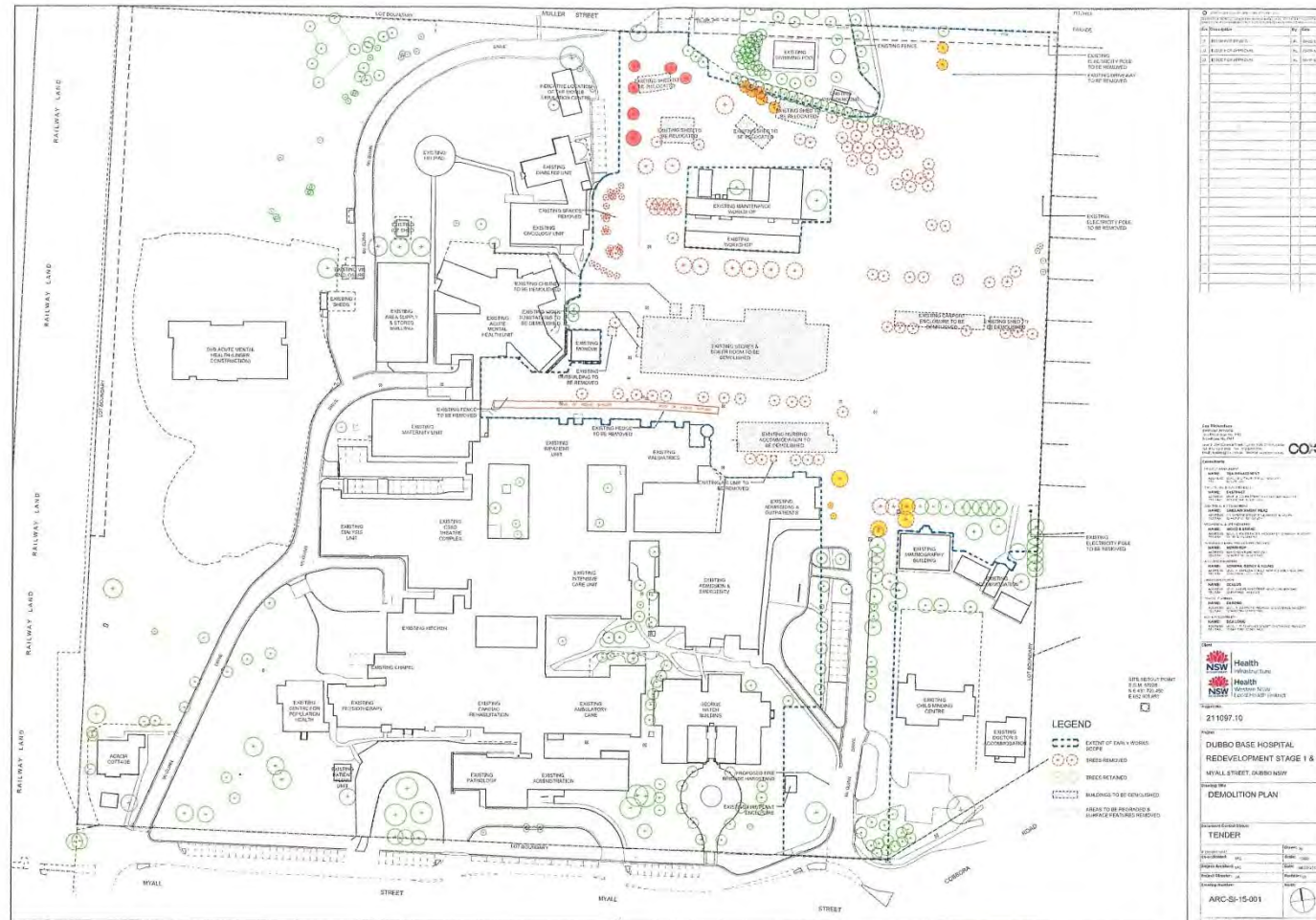
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

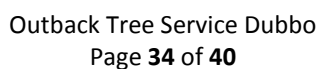
The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

Dictionary for Managing Trees in Urban Environments

Appendix 3.0





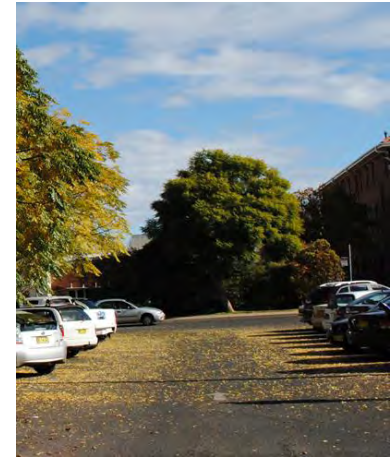
Appendix 5.0- Photos of trees to be removed



Tree 18



Trees 19, 17 & 16



Tree 20



Trees 21-25



Tree 26



Tree 27-36



Trees 37-38



Tree 39



Trees 42-46



Trees 47 & 47A



Trees 48-52



Trees 53-58



Tree 59



Tree 60-67



Tree 68



Tree 69, 70 & 71



Tree 72



Tree 73



Tree 75



Trees 82-86



Tree 87



Trees 90-109



Trees 110-112



Trees 119-125



Tree 126



Trees 127 & 128



Trees 130 & 131



Trees 132 & 133



Tree 135



Trees 138 & 139



Trees 140- 147



Trees 150- 156