

Succession Plan for Trees in Bangalow Village Streetscape (DRAFT)



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BACKGROUND

During the 1990's Bangalow was bypassed, and the planting of Leopard Trees (*Caesalpinia ferrea*) and Bangalow Palms (*Archontophoenix cunninghamiana*) were planted in the upper section of Byron St. The planting was completed by council, but it's believed the species were selected by the community. *Caesalpinia ferrea* is endemic to Brazil and is a widely used street tree in Australia, valued for its adaptability and general vigour in a variety of soils and climates. The species is semi-deciduous and capable of growing to 12-15m in height with a spread of 10-15m.



PROBLEMS ARISING FROM THIS SPECIES



As can be seen in the above photos, the pavement is being severely disturbed by tree roots, fears have been raised by the Bangalow Historic Society that these roots could also be damaging the foundations of the proximal heritage buildings.

As well as the damage caused by roots, the owners of the neighbouring buildings report that the constant shedding of very fine leaves fills and blocks roof guttering (even with gutter guard) leading to water ingress and damage to stock. Council annually prunes foliage away from these buildings, it is a disruptive and expensive process requiring traffic and pedestrian control.

SUCCESSION PLAN

Option 1

Immediately remove and replace trees 1,4,6 & 7 utilising the same, though refreshed holes. The existing trees in these locations are either in poorly condition or are palms, contributing little to the streetscape.

As the new plantings develop to around 6m (or height of awnings) the remaining three Leopard trees (2, 3 and 5) on Byron Street and the two Liquid Amber on Station Street will be removed and replaced with the preferred species. EW In the interim, detailed survey of underground services will be completed to confirm suitable locations for excavation in positions 2, 3 and 5, adjacent to existing Leopard trees.

- Advantages of this option. Less initial tree removal may be less confronting to the community.
- Disadvantages. Multiple construction areas at once requires more pedestrian control and more disruption. The works may appear piecemeal and disjunct.

Option 2

Address the replacement in 2 distinct stages.

Remove lower section of trees (4, 5, 6 and 7). Install root containment pits and new trees. Remediate pavement using style recommended in the Design Guide.

When new works established to around 6m (or height of awnings), replacement of trees 1, 2 and 3 on Byron Street and the two Liquidambar on Station Street will occur, with proximal pavement upgrades.

- Advantages of this option. Allows a better-defined work area resulting in economy of resources. A complete and uniform section informs the public of what the next section will look like.
- Disadvantages. Removal of mature trees may prove confronting to some members of the public.

Option 3

Remove all Leopard trees (5) on Byron Street and the two Liquid Amber on Station Street at the one time. Prepare tree planting zones in one continual lateral strip and plant advanced quality stock (*grown to AS2303- Tree Stock for Landscape Use*).

- Advantages of this option. This would prove more economical in the long term and would result in a more uniform finish.
- Disadvantages. Removal of all mature trees may prove confronting to some members of the public.

In all options the plantings will be in the outer edge of the footpath as existing. Planting pits will be carefully prepared to accommodate long-term growth with minimal pavement

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disturbance. WSUD measures can be incorporated in the design to divert measured amounts of water from the gutter to the root ball.



TREE PITS



A tree surround like this, allows infiltration of air & water, is pedestrian friendly and can be customised to suit Bangalow heritage themes. Subsurface structural cells protect from soil compaction and accommodates lateral root growth.

Where council has installed this system for a dedicated root zone, trees have performed well and have not lifted pavement.

Some consideration was given to creating new planting zones on the edge of the roadway to reduce tree impact on footpath accessibility and reduce canopy impacts on adjacent buildings. Community feedback was impacts on on-street parking and the smooth operation of the annual Billy Kart Derby over-ride the benefits of planting offset from the footpath.

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Annual Billy Cart Derby - Photographer unknown

WATER SAVING URBAN DESIGN (WSUD)

If construction of planting pits is pursued there is an opportunity to incorporate USUD which will irrigate trees while reducing the volume of stormwater entering local waterways.





Two examples of WSUD

BUDGET

The cost of these proposals will need to be determined by council's Works team following detailed analysis of sub-surface infrastructure (appears to be primarily Telstra)

Some indications of cost (and value) can be speculated from the table below. As can be seen by this example, if following traditional methodology of simply placing a tree in a hole of native material, costs will be lower but the tree will develop much more slowly and problems with pavement disruption are likely to reoccur.

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INSTALLATION METHOD TREE VALUATIONS			
Soil Vault System Tree Age: 4 years		Conventional Installation Tree Age: 15 years	
INVESTMENT	ROI	INVESTMENT	ROI
Contractor & staff wages: \$10,122 Trees: \$3,010 Stratacells: \$33,139 Soil: \$4,136 Miscellaneous: \$2,000 Total cost per tree: AU\$10,481.40 <small>(Civil costs not included)</small>	Canopy coverage: 50m ² /538.20ft ² per tree Tree volume (cone): 150m ³ /5,297.20ft ³ per tree Monetary value per tree: AU\$17,500 <small>(as at May 2017)</small>	Contractor and staff wages: \$200 Trees: \$250 Soil: \$100 Total cost per tree: AU\$650 <small>(Estimates only. Civil costs not included)</small>	Canopy coverage: 7.5m ² /80.73ft ² per tree Tree volume (cone): 11m ³ /388.46ft ³ per tree Monetary value per tree: AU\$510 <small>(as at May 2017)</small>
 <p>Trees planted using Citygreen soil vault after 4 years.</p>		 <p>Trees planted conventionally after 15 years.</p>	

A formula that can be used to calculate required volume beneath the pavement for each tree is;

Diameter of tree canopy at maturity x 0.6m soil depth, this can be prepared in a linear arrangement. Strata Cell® can be assembled around existing services.

TREE SELECTION

The selection and planting of street trees is a considerable investment and a long-term legacy. Considerations in Byron St Bangalow are;

- Suitability to the character of the street, aesthetic quality
- Low maintenance, low water needs
- Appropriate scale at maturity
- Does not drop hard seeds or fleshy fruit that become a pedestrian hazard.
- Does not possess allergenic properties.
- Drought and frost tolerant, will adapt to a warming climate.
- Resistance to pests and Myrtle Rust.
- Have a degree of transparency to deter hidden activity.
- A local native species is preferred to exotic.

Only 2 local species are considered to have all these attributes, the *Waterhousia* is preferred as it will grow and provide shade more quickly.

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Species	Profile	Foliage detail	Other
<p>Weeping Lilli Pilli</p> <p><i>Waterhousia floribunda</i></p> <p>Some hybrid forms such as 'Sweeper' reported to be resistant to Myrtle Rust. Well behaved root system. Lower branches can be removed to allow access.</p>			 <p>Perfumed flowers</p>
<p>Firewheel</p> <p><i>Stenocarpus sinuatus</i></p> <p>An attractive local species unlikely to exceed 8-10m in cultivation.</p> <p>Slow growing</p>			 <p>Flower detail</p>

LIQUIDAMBERS ON STATION ST

Other trees in the Bangalow streetscape that are causing problems are 2 *Liquidambar styraciflua* on Station St. These trees have a vigorous root system renowned for disrupting pavement and services. Approximately 10 years ago the pavement became so uneven that the whole surface was removed to allow pruning of roots and then relayed, timber surrounds were built to keep pedestrians away from root flares emanating from the trees.

The problem is reoccurring, and the owner of the adjacent premises has concerns that the roots may be damaging his building. To reduce the cost of ongoing maintenance it is suggested that they are removed and replaced by a less aggressive local species. There is

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ample space to accommodate a dedicated tree pit and the landscape feature could be enhanced by containing them in a basalt surround.









These trees could double in size in coming years if allowed to remain.

Replace planter boxes on Station St with local basalt at seating height to match the feature wall opposite.



SUGGESTED REPLACEMENT TREES FOR STATION ST

Species	Profile	Foliage detail	Other
<p>Ivory Curl Tree</p> <p><i>Buckinghamia cellisissima</i></p> <p>Has a symmetrical shape suited to the area.</p> <p>Spectacular flowering, bird attracting.</p>			 <p>flowers</p>
<p>Firewheel</p> <p><i>Stenocarpus sinuatus</i></p> <p>An attractive local species unlikely to exceed 8-10m in cultivation.</p> <p>Slow growing</p>			 <p>Flower detail</p>

PAVEMENT TREATMENTS FOLLOWING TREE PLANTING

Refer to Draft Bangalow Streetscape Plan 2023. Plummer & Smith



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