

Central Tree Services

Tree Health and Condition Report

Douglas Shire Council
Warner Street, Port Douglas
14th October 2021

Arborist: Jim Scott, B.Sc. (Hons) – Level 8 Arborist

T: 0459 567 298

E: centraltreeservices@hotmail.com

W: Centraltreeservices.com.au

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1.0 Aim

The aim of this assessment was to establish the current health and condition of Rosewood trees as located along Warner Street (between Owen Street and Grant Street), Port Douglas.

Douglas Shire Council (DSC) had initially requested an assessment of the trees following a sudden and rapid dieback of approximately 32 trees, the majority of which (22) were located along the eastern side of Warner Street.

Initial symptoms were first noticed on 9th of March - an assessment was then requested on 16th March, with trees assessed between the 17th and 18th of March. A further assessment on 6th April confirmed that trees had continued to decline and that an increased number of trees were showing additional symptoms of decline.

This assessment (14th October) has been requested as a follow up measure, in order to ascertain the extent of any further dieback and/or potential for recovery.

All observations contained within this report are relevant to the assessment date only. Trees are dynamic organisms, subject to continuous change, and must therefore be re-assessed on a regular basis.

2.0 Site Overview

The assessed trees (Warner Street, between Owen Street and Grant Street) form an avenue of Rosewoods, planted in close proximity to the roadside and street-side parking.

As an avenue of trees, they previously provided a high level of amenity to site users, providing shade and a formal structure to the landscape within the immediate locality.

Recent rapid dieback of almost half the trees within the avenue has significantly reduced the current level of amenity – see Image 1, below.



Image 1 – Warner Street (corner Owen Street looking towards Grant Street)

3.0 Species Overview

Rosewood (*Pterocarpus indicus*) is a fast growing, deciduous tree (up to 30m height) native to South East Asia and commonly planted throughout the tropics as an ornamental / amenity tree.

Depending on the location, level of formative pruning and cultivar, the tree will typically develop into a spreading habit, often multi-stemmed, with foliage in the upper crown taking on a weeping form.

The lower trunk is usually buttressed, and the tree is known to develop extensive prominent surface roots, often beyond the crown's drip line.

Maintenance requirements for this species in the urban environment would include (but not be restricted to):

- Formative pruning from establishment in order to ensure a structurally sound form and enable a long Safe Useful Life Expectancy (SULE).
- Maintenance of a sufficiently large garden bed surrounding the tree, to allow for accommodation of roots (particularly surface roots) without impact upon any adjacent infrastructure.
- Periodic crown lifting for general asset and amenity clearances.
- Periodic removal of significant deadwood (recommended 6 monthly).
- Periodic crown thinning depending on the tree's vigour and/or proximity of adjacent trees.

Rosewoods currently have few pest and disease problems in North Queensland.

4.0 Summary of current health and condition

Tree Number	Comments	Recommendations
1	Located in garden bed, eastern side of Warner Street, corner of Owen Street. Irregular dieback throughout crown (possibly indicative of partial root damage), otherwise reasonable vigour.	Remove significant deadwood. Monitor.
2	Poor form, but reasonable vigour.	Maintain as part of 6 monthly street tree maintenance plan. Remove bitumen surrounding base of tree if to be retained in longer term.
3	Poor form, but reasonable vigour.	Maintain as part of 6 monthly street tree maintenance plan. Remove bitumen surrounding base of tree if to be retained in longer term.
4	Poor form, suppressed by tree 3. Advanced dieback throughout crown, unstable deadwood present. Main leader has significant vascular dysfunction, loss of cambium. Evidence of recent deadwood removal and use of wound paint/dressing.	Remove.
5	Poor form. In advanced decline, with significant vascular dysfunction throughout. Recent removal of deadwood. Recent excavation at base.	Remove.
6	In advanced decline. Sap still present in lower trunk, but complete absence of any foliage and/or bud formation (as with majority of declining trees in this assessment).	Monitor and remove deadwood as appropriate. Unlikely to be suitable for longer term retention. Advise removal.
7	Poor form. In decline, with significant dieback throughout. Some marginal foliage present in upper crown.	Monitor and remove deadwood as appropriate.

Tree Number	Comments	Recommendations
8	In advanced decline, significant dieback throughout. Recent removal of heavy deadwood. Some marginal foliage present mid-crown.	Monitor and remove deadwood as appropriate. Unlikely to be suitable for longer term retention. Advise removal.
9	In advanced decline, significant dieback throughout. Approximately 40% of crown has been removed due to deadwood. Marginal foliage (2 shoots) mid-crown.	Monitor and remove deadwood as appropriate. Unlikely to be suitable for longer term retention. Advise removal.
10	In advanced decline, significant dieback and vascular dysfunction throughout. Recent heavy reduction and removal of deadwood.	Remove.
11	In advanced decline. Some marginal foliage present mid-crown.	Monitor and remove deadwood as appropriate.
12	Poor form. In advanced decline. Some marginal foliage present mid-crown.	Monitor and remove deadwood as appropriate.
13	Poor form. In advanced decline. Recent removal of deadwood. Some marginal foliage present mid-crown.	Monitor and remove deadwood as appropriate.
14	In advanced decline, significant dieback and vascular dysfunction throughout. Recent heavy reduction and removal of deadwood.	Remove.
15	In advanced decline, significant dieback and vascular dysfunction throughout. Recent reduction and removal of deadwood.	Monitor and remove deadwood as appropriate. Unlikely to be suitable for longer term retention. Advise removal.
16	Poor form. In advanced decline, significant dieback throughout. Recent removal of deadwood.	Monitor and remove deadwood as appropriate. Unlikely to be suitable for longer term retention. Advise removal.

Tree Number	Comments	Recommendations
17	<p>In advanced decline, significant dieback throughout. Some marginal regrowth mid-crown. Recent removal of deadwood.</p>	<p>Monitor and remove deadwood as appropriate.</p>
18	<p>In advanced decline, significant dieback and vascular dysfunction throughout. Recent reduction and removal of deadwood.</p>	<p>Monitor and remove deadwood as appropriate. Unlikely to be suitable for longer term retention. Advise removal.</p>
19	<p>In advanced decline, significant dieback and vascular dysfunction throughout. Recent heavy reduction and removal of deadwood. Previous large basal wound exceeds normal tolerances.</p>	<p>Remove.</p>
20	<p>Poor vigour. Marginal regrowth present throughout.</p>	<p>Monitor and remove deadwood as appropriate.</p>
21	<p>In advanced decline, significant dieback and vascular dysfunction throughout. Recent heavy reduction and removal of deadwood.</p>	<p>Remove.</p>
22	<p>In advanced decline, significant dieback throughout. Marginal indications of regrowth in lower crown. Recent removal of deadwood.</p>	<p>Monitor and remove deadwood as appropriate.</p>
23	<p>In advanced decline, significant dieback throughout. Marginal indications of regrowth in lower crown. Recent removal of deadwood.</p>	<p>Monitor and remove deadwood as appropriate.</p>
24	<p>Poor form. Significant dieback, but with marginal indications of regrowth throughout. Large (old) basal wound with signs of progressive decay. Wound size and extent of cross-sectional decay both exceed tolerated thresholds (reference AS4373). Basal fluting indicative of possible further decay.</p>	<p>Monitor and remove deadwood as appropriate. Maintain below current crown dimensions if tree is to be retained in longer term. Monitor any progression of basal decay.</p>

Tree Number	Comments	Recommendations
25	In advanced decline, significant dieback throughout. Recent reduction and removal of deadwood.	Monitor and remove deadwood as appropriate.
26	Poor form but with reasonable vigour (in comparison to adjacent trees).	Monitor and remove deadwood as appropriate. Tree would benefit from formative-type pruning once returned to full vigour.
27	In decline, significant dieback throughout. Marginal foliage mid-crown.	Monitor and remove deadwood as appropriate.
28	Located at corner of Grant Street, eastern side of Warner Street. Isolated dieback in mid-upper crown, otherwise good vigour.	Monitor and remove deadwood as appropriate.
29	Located at corner of Grant Street, western side of Warner Street. Good vigour and reasonable form. Notably typical vigour for time of year considering species, age and location.	Maintain as part of 6 monthly street tree maintenance plan.
30 – 37	Poor form but reasonable vigour	Maintain as part of 6 monthly street tree maintenance plan.
38	Indications of dieback throughout most of upper crown, but with reasonable regrowth present. Recent removal of deadwood.	Monitor and remove deadwood as appropriate.
39	Indications of dieback in upper crown. Reasonable foliage present in mid-lower crown. Suppressed by trees 38 and 40.	Monitor and remove deadwood as appropriate.
40	In advanced decline, significant dieback throughout. Extensive vascular dysfunction in upper crown. Marginal regrowth present.	Monitor and remove deadwood as appropriate.
41	In decline. Marginal regrowth present.	Monitor and remove deadwood as appropriate.

Tree Number	Comments	Recommendations
42	In decline. Marginal regrowth present. Recent removal of deadwood	Monitor and remove deadwood as appropriate.
43	In decline but with laterals showing indications of increased foliage.	Monitor and remove deadwood as appropriate.
44	In advanced decline, with significant dieback throughout. Marginal regrowth in lower crown. Recent reduction and removal of deadwood.	Monitor and remove deadwood as appropriate.
45	In advanced decline with significant dieback throughout. Marginal regrowth present. Recent removal of deadwood.	Monitor and remove deadwood as appropriate.
46	In decline. Reasonable foliage mid-crown. Recent removal of deadwood.	Monitor and remove deadwood as appropriate.
47	In advanced decline, with significant dieback throughout. Marginal regrowth mid-crown. Recent reduction and removal of deadwood.	Monitor and remove deadwood as appropriate.
48	In decline, significant dieback present. Regrowth confirmed mid-crown.	Monitor and remove deadwood as appropriate.
49	In decline. Some regrowth mid-upper crown.	Monitor and remove deadwood as appropriate.
50	Poor vigour but with evidence of leaf re-emergence throughout.	Monitor and remove deadwood as appropriate.
51	Poor vigour but with evidence of leaf re-emergence throughout.	Monitor and remove deadwood as appropriate.
52	In decline with significant dieback in upper crown. Regrowth present mid-lower crown.	Monitor and remove deadwood as appropriate.

Tree Number	Comments	Recommendations
53	Poor form, in decline.	Monitor and remove deadwood as appropriate.
54	In decline, with significant dieback and vascular dysfunction in upper crown. Some regrowth present in lower crown.	Monitor and remove deadwood as appropriate.
55	Good vigour and high amenity.	Maintain as part of 6 monthly street tree maintenance plan.
56	In advanced decline, with significant dieback throughout crown. Regrowth/epicormics in lower crown. Recent reduction and removal of deadwood	Monitor and remove deadwood as appropriate.
57	In advanced decline, with significant dieback throughout crown. Some regrowth present mid-crown. Recent reduction and removal of deadwood.	Monitor and remove deadwood as appropriate.
58	In decline. Some regrowth present mid-crown. Recent removal of deadwood.	Monitor and remove deadwood as appropriate.
59	In advanced decline, significant dieback and vascular dysfunction throughout. Marginal regrowth mid-crown. Recent reduction and removal of deadwood.	Monitor and remove deadwood as appropriate.
60	In advanced decline, significant dieback and vascular dysfunction throughout. Marginal regrowth lower crown. Recent heavy reduction and removal of deadwood	Monitor and remove deadwood as appropriate. Unlikely to be suitable for longer term retention given extent of structural damage to date. Advise removal.
61	In decline, but with marginal signs of regrowth throughout.	Monitor and remove deadwood as appropriate.
62	Located at corner of Owen Street, western side of Warner Street. In advanced decline, significant dieback and vascular damage throughout. Previous heavy lopping on lower trunk. Recent heavy reduction and removal of deadwood.	Monitor and remove deadwood as appropriate. Unlikely to be suitable for longer term retention given extent of structural damage to date. Advise removal.

5.0 Recommendations and Conclusions

Previous assessments had confirmed that a total of 32 trees were considered as being either dead/dying/in advanced decline and that this was most likely due to application of a woody weed herbicide (please refer to previous reports dated 19th March and 6th April).

This assessment has confirmed that a total of 49 (out of 62) trees now show some degree of decline, with almost the entirety of trees along the eastern side of Warner Street assessed as being in advanced decline. Overall, a total of 14 trees have been assessed as currently being in a critical condition (due to the extent of decline, dysfunction and significance of current structural defects), and in these cases removal has been advised as the most appropriate option.



Image 2 – Tree 14 (14th October 2021). Extensive dieback, tree in advanced decline. A large section of the eastern side of Warner Street can also be seen, with trees displaying similar symptoms.



Image 3 – Tree 29 (14th October 2021). Tree is showing typical foliage and vigour for time of year, species, age and location. This typically healthy tree can be seen in stark contrast to the remainder of trees assessed along Warner Street.

As stated in the previous reports, decline of the trees has been rapid and if it is the case that this is due to herbicide application, the observed affects are likely to be terminal. Laboratory analysis conducted since the two initial reports has confirmed that traces of herbicide were identified in proximity to the trees. It continues to be my opinion that this is the main reason for decline, and that in a number of cases this has been accelerated by previous damage to roots and/or alterations to the trees' surrounds.

In almost all the assessed trees, remnant signs of sap were identified on lower sections of the trees' trunks – it must be remembered that this alone is not a good indication of potential for tree recovery or viability. Presence of sap does not guarantee recovery when the remainder of the tree has been subjected to such extreme vascular dysfunction, and this measure should not be used as a justification for any individual tree's longer-term viability and/or retention.

Where there remains potential for at least some degree of tree recovery (and without consideration to the level of amenity which may result), interim remedial pruning has been advised in order to allow removal of deadwood in progressive stages, whilst also gauging the degree of any return to vigour in the trees' upper crowns. In this case, it is critical that any removal of deadwood takes care not to breach barrier zones already laid down by the tree as it declines – as such, “collar cutting” at pruning sites is not advised.

Once deadwood has formed, the tree will initiate compartmentalisation at an appropriate distance from the area of deadwood/decline. Collar cutting then has the potential to breach barrier zones (proximal to the collar) leading to further dieback/decay within the trunk/associated limb. This consequently has the potential to accelerate decline. Similarly, wound paint should not be used on pruning wounds. Rather than seal out infection, wound dressings often seal in moisture and decay, with the potential to produce further defects and/or accelerate decline.

In summary, the entirety of the surveyed area is a high use (high target) area, and as such there can be no tolerance for retention of trees where continued decline and the presence of significant structural defects means that (in the absence of any feasible remedial measures) they are not safe for retention. As such, it has been advised that a total of 14 trees should now be removed at this stage.

If it is decided that trees are to be removed, then planning should be put in place to allow for replacement. Factors to consider in this process should include (but not necessarily be limited to):

- Species suitability for the location, considering growth characteristics and final crown dimensions at this location.
- Appropriate preparation of the area to be planted.
- Replacement of current soil / surface surrounds with fresh material which is appropriate for species and location.
- Allowance for a sufficient area within which roots can develop up to maturity and without any impact upon adjacent infrastructure.
- Installation of root barriers and root anchors where appropriate.
- Implementation of long-term management plans (such as pruning, nutrition and routine inspection) to ensure that the above outcomes are achieved.

If contractors are to be engaged for remedial/removal work, they should be fully qualified and experienced, being able to demonstrate a comprehensive OHS policy specific to tree work, with relevant insurances in place.

Appendix 1: Index of Arboricultural terms used

The following terms are widely used in tree assessment (*as adapted from "Principles of tree hazard assessment and management" - Lonsdale, D. 1999*):

Arboriculture – the culture and management of trees as groups and individuals, primarily for amenity and other non-forestry purposes.

Assessment – in relation to tree hazards, the process of estimating the risk that a tree or group of trees poses to persons or property.

Bifurcated – having two co-dominant stems (forked).

Branch collar – a swelling at the base of a branch.

Crown – the main foliage-bearing portion of a tree.

Crown reduction - the overall reduction of both the height and spread of a crown. The extent of reduction is dependant on tree species, tree health and site requirements.

Crown thinning – the reduction of the volume of a crown without changing the overall height and spread. Often referred to as reducing the "sail area". The extent of thinning is dependant on tree species, tree health and site requirements.

Decline – a deterioration of a tree's general condition and vigour.

Defect – in relation to tree hazards, any feature of a tree which detracts from the uniform distribution of stress.

Dieback – the death of part of a tree, often progressive.

Epicormic growth – growth arising on mature stems, often following previous pruning or injury.

Failure – in relation to tree hazards, a partial or total fracture of wood or loss of cohesion between tree and soil

Included union – branch union where there is bark to bark contact which results in a structural weakness.

Leader – the dominant stem

Lopping – removal of branches, now generally applied to heavy or excessive trimming.

Phototropic lean – lean due to a tree's growth towards available light.

SRZ - The Structural Root Zone (SRZ) is the area required for tree stability, and should not be subjected to any disturbance during construction / any excavation activity.

SULE – Safe Useful Life Expectancy. A term (expressed in years) which summarises a tree's suitability for retention once factors such as current health, species characteristics and site specifics have been considered.

Topping – the removal of all or a large portion of a tree's canopy.

Trifurcated – having three co-dominant stems

VTA – Visual Tree Assessment. A term used to encompass the range of techniques which an Arborist uses during ground-based tree assessment.

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