ABN: 69 631 537 641

# Central Tree Services

# **Tree Health and Condition Report**

Douglas Shire Council Warner Street, Port Douglas 18<sup>th</sup> March 2021

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#### 1.0 Aim

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

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

Initial symptoms were first noticed on 9<sup>th</sup> of March - an assessment was then requested on 16<sup>th</sup> March, with trees assessed between the 17<sup>th</sup> and 18<sup>th</sup> of March.

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.

#### 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

As an avenue of mostly mature trees, the assessed trees form a significant part of the local landscape.

Initial assessment confirmed extensive dieback / rapid death of trees along the eastern side of Warner Street (22 trees on 18<sup>th</sup> March), with a further number of trees along the western side either in advanced decline or showing initial symptoms of decline (10 trees on 18<sup>th</sup> March).

With the exception of a number of trees located within garden beds (corners of Grant and Owen Streets), the entirety of trees along the eastern side displayed advanced symptoms of rapid decline/death. Symptoms were uniform and consistent in nature, indicating an event which has impacted upon all of the affected trees within a short timeframe (see Image 1, below)



Image 1 – Avenue of Rosewoods along Warner Street, 18th March 2021

The severity of current damage to the trees is immediately apparent from Image 1, and can be seen in stark contrast when compared to the condition of the trees in a previous assessment (see Image 2, below).



Image 2 – Avenue of Rosewoods along Warner Street, 17<sup>th</sup> October 2017

The size and form of trees along Warner Street has considerable variation, summarised as follows:

Species	DBH (cm)	Height	Spread	TPZ (m)	TPZ (m) less 10%	SRZ (m)
Rosewood	17 - 112	Av 14	Av. 7	2.0 – 13.4	1.8 – 12.1	1.5 – 3.5
Pterocarpus						
indicus						

# 5.0 Analysis of factors which may have contributed to decline

The consistent nature of decline and uniform symptoms observed, particularly along the eastern side of Warner Street, would indicate a rapid event which has led to almost instant dieback/death of the assessed trees (see Image 3, below).



Image 3 – Tree located next to 32 Warner Street (18/03/21). Rapid "brown out" of leaves indicating a sudden impact upon the tree.



Image 4 – Typically healthy Rosewood tree located in garden bed at corner of Warner Street and Grant Street (18/03/21). Tree is in good vigour, with typically dense crown profile. No indications of dieback, brown out or otherwise

The main aim of this report is to investigate all possible factors which may have contributed either directly or indirectly to decline of the assessed trees. Potential causes of decline have therefore been analysed as follows.

#### **Chemical impact**

The sudden and consistent nature of death/dieback would most likely suggest a uniform chemical impact event such as application of a woody weed herbicide around the base of affected trees.

Observed crown symptoms (rapid death of almost all foliage, also referred to as brown out) is consistent with the effects of woody weed herbicides such as Grazon (although this could only be accurately confirmed following laboratory analysis of affected plant tissue).

There was no evidence of basal damage or other means of application, so it must be assumed that any herbicide had been applied to areas surrounding the tree, and that the main mode of uptake has been via roots. If this is the case, then the following factors should be considered:

- Affected trees along the eastern side of Warner Street are mostly surrounded by aggregate material (as opposed to soil / mulch as in a garden bed). This is likely to have led to a greater degree of uptake and more rapid contact with the trees' roots, therefore resulting in more rapid crown symptoms (as observed).

- Variation of symptoms on the western side of Warner Street could be explained by different surfaces surrounding the trees. There may therefore be a time lag in crown symptoms presenting if these trees have also been treated with herbicide (a herbicide such as Grazon can remain present and effective in soil for many months).
- The extent of damage (as observed) is irreversible. Once a large part of the tree's vascular system has been affected, there is no means of reversing the effect.
  Treatments such as inundating the tree surrounds with water may in fact accelerate uptake. Other options such as application of charcoal to soil are unfeasible at this location and may also be dependent upon the chemical used.
- Where there is the potential for basal growth to re-emerge, it is unlikely to successfully establish.

From initial assessment, the damage to the affected trees appears to be terminal. If the damage has been initiated by application of herbicide, the affected trees are unlikely to recover.

#### Potential root damage during recent civil construction works

There was the potential for recent civil works along Warner Street to have impacted upon the trees as assessed in this report, however this is not thought to be the main cause of decline in this case, as outlined below:

- A pre-planning tree health and condition report was completed on 17<sup>th</sup> October 2017, and this included clear recommendations relating to the appropriate protection of trees during any construction activity. SRZ and TPZ areas were established and monitored throughout works.
- Any un-intentional damage to roots during construction would produce different crown symptoms in affected trees. Where root damage occurs, crown symptoms are typically isolated with a gradual progression of dieback from tips in advanced cases. In the case of trees assessed in this report, death of foliage has been almost instant throughout the trees' crown.
- The observed crown symptoms are uniform and consistent along a large part of the eastern side of Warner Street. Given the large variation in tree DBH (and therefore differing SRZ and TPZ values), construction activity is unlikely to produce symptoms of such severity.
- The trees have had follow up planned maintenance works on two occasions following completion of all civil works. On both occasions the trees were noted to be in good health and with no major defects identified.

#### Impact from pest or disease

An initial inspection of the affected trees failed to identify any significant pest or disease issues (18/03/21).

There was no evidence of significant insect attack, similarly no obvious presence of pathogenic fungal activity.

The speed at which the trees have died/declined, and the extent/location of affected trees in proximity to each other would also mean that pest or disease impact is an unlikely explanation.

#### **Tree dormancy**

Whilst Rosewood trees are known to be deciduous, this is not the cause of sudden foliage loss in this case.

Ordinarily, the trees would typically start to lose leaves in June/July, and over a more gradual period than in the timeframe observed (in this assessment).

More importantly, a comparison between trees within the street on the day of assessment clearly shows that this is not a factor (see Images 3 and 4 in section 5 of this report).

### 6.0 Recommendations and Conclusions

Initial assessment has confirmed that a total of 28 trees are either dead/dying/in advanced decline and that this is most likely due to application of a woody weed herbicide.

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. The precise details of herbicide used can only be accurately confirmed via laboratory analysis.

Given the above, there are no feasible options for remedial works at this stage.

Woody weed herbicides generally act on both foliage and roots to produce a rapid brown out of leaves, dry down of stems and destruction of root mass in order to prevent regrowth. Consequently, where such herbicide has been effective, the tree's structural integrity will rapidly degenerate, with associated potential for deadwood failure and ultimately total tree failure if left un-managed.

With no precise detail of the events which have led to death/decline of the assessed trees, it is difficult to put a timeframe on any future management objectives. As of the date of assessment, the following would be recommended as a minimum:

- Closely monitor all trees for any further signs of decline
- Once individual trees have been confirmed as being dead, prioritise removal. This is particularly important given species characteristics Rosewood trees typically have highly unstable deadwood.

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 would include:

- 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 dependent 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 dependent 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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