Arborist Report – Tree Health and Structure

For:

Property Address

Prepared by:

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Qualifications:

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Report commissioned by: Owner/Occupier

Date:

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Introduction

Daryl's Tree Care and Surgery has been engaged to undertake a tree assessment of one tree at (Property Address), Glen Waverley. A visual tree assessment (VTA) has been completed, tree data collected and recorded and recommendations made.

Report brief

To undertake a VTA of one tree located in the front yard of (Property Address), to assess its health, structural integrity and worthiness of retention.

Methodology

On 6 June 2015 I carried out a VTA of one tree from the ground, observations were recorded and the following tree data collected:

- Tree genus and species
- Common name
- Tree health
- Tree structure
- Tree form
- Tree height and width
- Diameter at breast height (DBH)
- Tree age
- Useful life expectancy (ULE)
- Tree retention value

This information was collected using VTA from the ground only. No underground exploration was done and no liability can be taken for any faults occurring underground, if any. All the information given is in accordance with normal weather conditions and not in severe weather events. The assessment information relates to evidence taken on the day of inspection only, and does not include changes thereafter. Daryl's Tree Care and Surgery recommends reassessing the tree(s) annually or directly after severe weather events or if there is any construction within close proximity to the tree(s).

Tree #1

Tree details

- Tree genus and species – *Casuarina cunninghamiana*
- Common name – River She-oak
- Tree health - Fair
- Tree structure – Fair-poor
- Tree form - Poor
- Tree height and width - ~15x9m
- Diameter at breast height (DBH) – 48cm
- Tree age - Mature
- Useful life expectancy (ULE) – 5-15 years
- Tree retention value - Low

Photo of tree #1

Tree genus and species

Casuarina cunninghamiana - River She-oak

Species information

This is an upright tree almost pine-like, common along fresh water streams in NSW near-coast, and inland slopes. The species can grow 12-30 metres in height, with branchlets dark green in colour and straight. Cones are very small, globular up to 1cm long with valves projecting. Male flower spikes about 2cm long (Costermans 1994).

Location

This tree is located on a suburban property in (XX address), which is approximately 26km east of Melbourne. The tree is positioned within the front yard of the site on the south-west boundary (see figure 1).

Figure 1 – shows the location of tree #1 within the subject site.

Tree height and canopy width

The subject tree has reached a height of approximately 15m with a canopy spread of 9m. The trunk diameter, at breast height (DBH), was measured at 48cm and was taken 1.4m above ground level.

Discussion

Tree structure

Root system

One surface root was seen in the front yard of the subject site. There is a wound on the top side of the root, with some decay present. It appears to have been damaged by a mower (see figure 2).

Figure 2 – shows the damaged and decayed tree root.

Most of the root growth is likely to have developed within the garden bed where the tree is positioned, the front yard of the subject site and adjoining property of (XX Property Address). No other tree root damage was seen.

Tree trunk

The root plate appears stable. There is no indication that the tree is moving or has shifted in the ground.

There are two wounds with decay present at the base of the tree. One on the north side of the lower trunk beginning at ground level and the second is on the west side, also at ground level, see figure 3.

Figure 3 – shows the two wounds at the base on the tree. The blue screwdriver indicates the depth and location of the second.

Wounds and decay such as this could lead to bark delamination in the future and could be the result of a fungal pathogen. A fungal pathogen, or biotic disease, may cause injury to trees through continued irritation of structural timber, which can lead to a reduction in structural strength (Harris, Clark & Matheny 2004).

Scaffold and lower order branches

The structure of the trees main stem and larger scaffold branches appears to be fair-poor. The tree has a single trunk to approximately 10m above natural ground level, where co-dominant stems have developed, see figure 4. Watson (2006) states that co-dominant stems are considered to be weaker than a healthy lateral branch union containing a branch bark ridge. Reaction wood (or ears) have grown on the west side of the co-dominant stems indicating a sign of improved strength, however it still shows actual weakness within this attachment (Watson 2006).

Figure 4 – shows the co-dominant stems in the subject tree.

The overall structure of the scaffold branch network has been assessed as fair-poor. The structure of some of the lower order branches (10-14cm in diameter) is also fair-poor. Some have included bark within their attachments or wounds which are the result of previous branch failures. The included bark and wounds are weakening the structural strength of the lower order branches, which is likely to be a contributing factor in causing many to fail.

As a result of the branch failures, this tree has a significant limb failure history. As many as 12 branches have failed over the last few years. As recently as February this year three

branches, up to 10cm in diameter, have failed with one knocking a Telstra line off the house. There is clear and visual evidence of the significant amount of limb failures within the canopy of this tree, see figure 5.

Figure 5 – shows the locations of many branch failures.

Canopy health and form

The health of this tree is fair. It does have consistent foliage cover, however some of that is epicormic growth. Epicormic growth mostly consists of short branches and small leaves usually growing on the trunk or upper sides of branches. It is considered to be a symptom indicating a weakened tree affected by a non-infections agent, slow-acting disease or old age (Harris, Clark & Matheny 2004).

The form of the tree is poor, which is a direct result of the limb failures. It is possible that as this tree has been progressively pruned away from the high and low voltage power lines it has left other branches within the crown more exposed to wind loads, which has lead to failures. As even more failures have occurred it again has exposed many remaining branches to wind loads leading to even more branches failing. Given the existing form, limb shed history and open crown, more branch failures are likely.

Based on the limb shed history and form of this tree it has been assessed as having a ULE of between 5-15 years. However, more branch failures are likely within the next 5 years.

Conclusion

The structure of this tree is fair-poor. It has wounds in the lower trunk at ground level and contains co-dominant stems with some included bark at approximately 10m above natural ground. Additionally, there are a number of large scaffold limbs with included bark within their attachments.

Watson (2006) tells us that included bark restricts the formation of common cambium growth that would gradually strengthen an attachment over time. Therefore, where there is included bark attachments they are often weaker, and where they are higher in a tree they can often fail.

The health of this tree is fair. It has consistent foliage cover, however some of that is epicormic growth. The form of this tree is poor, and has a significant limb failure history with many large and smaller branches consistently failing over the last few years.

Due to the structural condition, limb failure history and the potential targets, high and low voltage power lines, service wires, footpath, roadway and dwelling this tree is not worthy of retention. Removal will eliminate the risk associated with it, and replacement in an area on site that supports the long-term development of a new tree will provide a good environmental outcome for the site and broader landscape.

Recommendation

Remove tree.

Tree Retention Value

Assessing whether or not a tree is worthy of retention you need to consider a number of factors. For example:

- Is the tree structurally sound?
- Is the tree healthy?
- What is its limb failure history?
- Does the tree have botanical, cultural, ecological or historical significance?
- Is the tree a good example of the species?
- Is the tree significant and does it have a high amenity value within the site and/or surrounding area?
- Will removal and replacement provide a better long-term environmental outcome?
- Is the species considered to be problematic in any way?

Not all trees can be retained. Retention should focus on trees that offer the best potential for an area now and into the future (Matheny & Clark 1998).

Tree retention values are represented below by four categories, High, Moderate, Low and None. The values are based on a number of factors that relate to the health, structure, tolerances, botanical, cultural, ecological or historical significance. The higher a tree performs against the below criteria the more worthy of retention it becomes.

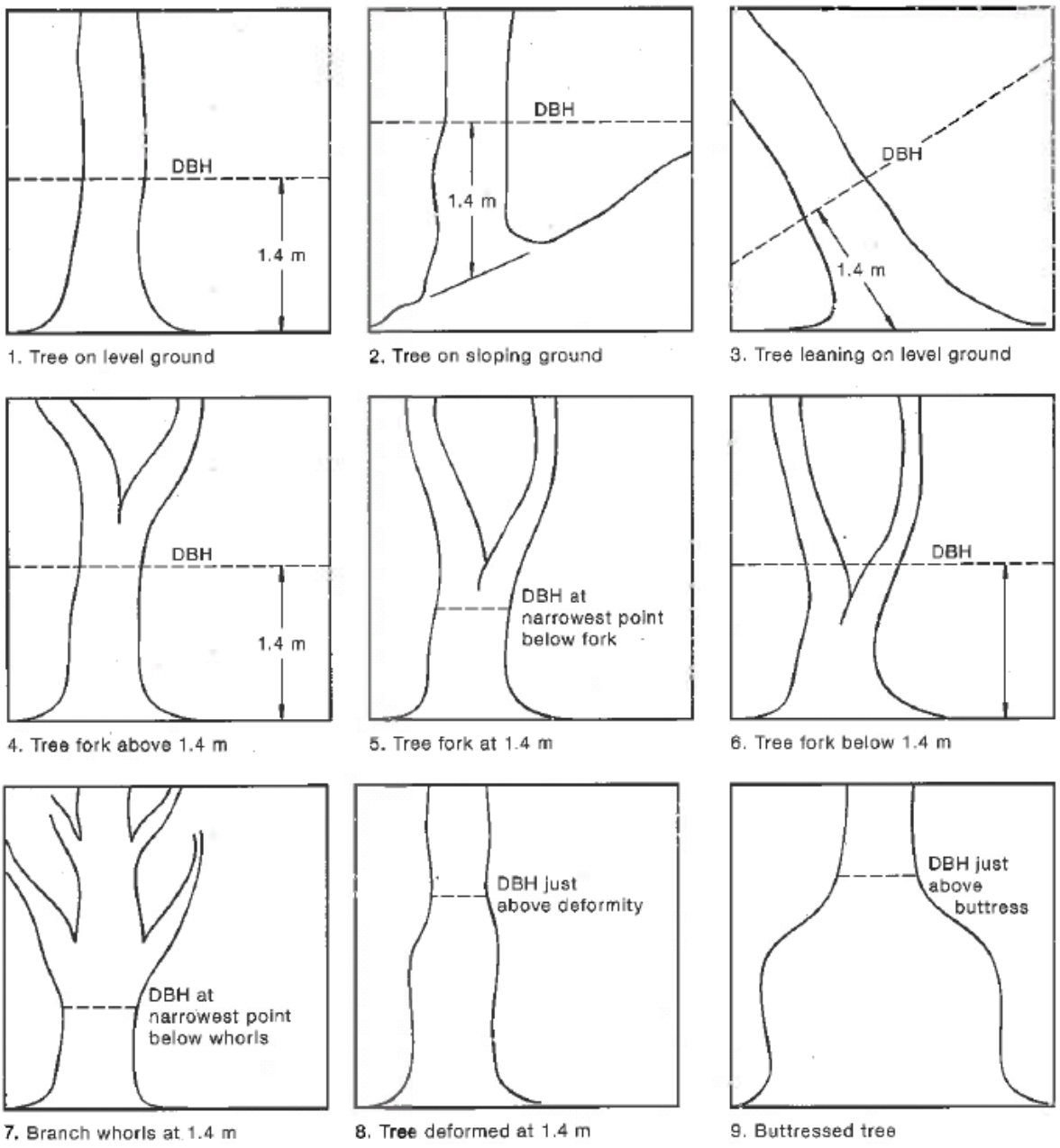
Some allowance needs to be given for the removal of trees that rate high or moderate if replacement planting provides a better environmental outcome. When replanting it is very important that good quality trees are purchased and correctly maintained and planted in locations that support their long term development and contribution to the site and surrounding area.

Tree Retention Value	Rating	Description
1	High	A tree that is good in health and structure and has a safe useful life expectancy of greater than 30 years. It is significant and prominent within the landscape. It could have botanical, cultural, ecological or historical significance.
2	Moderate	A tree that is good to fair in health and structure that has a safe useful life expectancy of between 15-30 years. It is reasonably significant and prominent within the landscape.
3	Low	A tree that is fair to poor in health and structure that has a safe useful life expectancy of between 5-15 years.
4	None	A tree that is in poor health and structure that has a safe useful life expectancy of less than 5 years.

Diameter at Breast Height (DBH)

The radius of the TPZ is calculated for each tree by multiplying its Diameter at Breast Height (DBH) x 12. The DBH is measured at 1.4 m above ground level. And, the radius is measured from the centre of the stem at ground level.

The diversity of trunk shapes, configurations and growing environments requires that the DBH be measured using a range of methods to suit particular situations and the below are examples of where the DBH could be measured from (Protection of trees on development sites 2009).



Source: AS 4970-2009 Protection of Trees on Development Sites.

Glossary of Terms

Arboriculture is both an art and science, which has distinct terminology. The below terms generally present descriptive and explanatory definitions that are used within the arboricultural industry (Glossary of Arboricultural Terms 2007).

Tree – A woody plant, usually with a single stem, and more than 5 metres tall.

Diameter at Breast Height (DBH) – The nominal trunk diameter at 1.4 m above ground level from the circumference of the trunk divided by *pi (*π) (Protection of trees on development sites 2009).

Good -The condition of a tree is described as good when it presents with a full canopy, little or no signs of any insect pests, is free of epicormic growth, no visible signs of decay, little if any deadwood in the canopy, no visible signs of root damage, no obvious structural or morphological problems such as branches with included bark or acutely angled bifurcations. A good tree will have all of these features.

Fair – A tree in fair condition exhibits a less than full canopy, presence of deadwood, minor insect infestations, isolated epicormic growth, no visible signs of decay, minor structural problems such as crossing branches, non-hazardous included bark. A fair tree will exhibit most of these features.

Poor – A tree is considered to be in poor condition when it exhibits extensive tip dieback in branches, a depleted canopy, extensive epicormic growth, obvious fungal decay, insect infestations, extensive included bark and extensive deadwood. A poor tree may have all or most of these features.

Decline – Describes a tree that may be prematurely senescence.

Senescence – The process of aging; physiological decline. In a tree, the time at which there is little if any new annual growth. The onset of senescence is dependent on the species and cultural conditions in which the tree is growing.

Mature – Describes the condition of a tree that has grown to a stage where it shows only minor annual growth and has reached close to its maximum size. The onset and duration of maturity is dependent upon the species and cultural conditions in which the tree is growing.

Semi-Mature – Describes a tree that shows active annual growth but has reached close to its genetic potential with regards to height and width of canopy. The onset and duration of semi-maturity is dependent on the species and cultural conditions in which the tree is growing.

Young – Describes a tree that is actively growing and shows significant increases in annual growth. The duration and extent of the growth of a young tree depends on the species and environmental conditions in which it is growing.

Juvenile – A tree that is not yet semi-mature or mature.

Compaction – Where soil is compressed so that the infiltration of oxygen and water is reduced. Compacted soil restricts gaseous exchange to the roots thus limiting respiration in the root cells. The ability of water to permeate is also restricted, and the tree may die or can in time, react by shedding limbs in order to accomplish an equilibrium with the available water and nutrient supply. Compaction can be caused by vehicle, human and animal traffic;

it is difficult to alleviate, with the accepted method of alleviation being removal of the cause and the mulching of the root zone.

Indigenous – A tree originating in and naturally living, growing, or occurring in a region or country.

Native – A plant originating in the country where found.

Bifurcated – Where two trunks or branches of near equal diameter emerge from a single point on a tree.

Included Bark –The condition occurs where the angle of branch connection to a trunk or where bifurcated trunks join, is so acute as to prevent a sound biological union of the two sections. The resulting union can become unstable and could fail in moderate storms.

Epicormic Growth - Growth emanating from adventitious buds located along branches or at the site of heavy pruning or lopping. A feature of epicormic growth is the nature of the ongoing attachment of these branches. Unlike conventional branches that have developed an interlocking lamination between trunk and branch, epicormic growth develops quickly on the surface of a branch or trunk in reaction to the reduction of photosynthetic capacity. As the attachment is poor, epicormic branches are likely to fail in moderate storms.

Environmental Conditions – Describes the basic requirements for sound tree or plant growth – adequate water and nutrient availability, exposure to sufficient sun light, access to clean air and suitable soil to supply positive growing conditions.

Hazard Assessment - Where danger represented by the tree's presence or condition is quantified in relation to the targets present such as people, buildings or property.

Callus – Undifferentiated tissue that develops on or around an injured or cut plant surface or in tissue culture. The tissue is formed by the tree at the perimeters of a wound to branch, trunk or root and in some instances, with time, tends to seal the wound site completely.

Callus Material – As part of the external wound isolation process trees tend to create, via the cambium layer, new cells at the edge of the wound that in time tend to cover the wound area. This effect is dependent on the trees condition and the extent of this process is species related.

Lopping and Topping – As defined in the Australian Standard AS 4373–2007 is the random cutting of branches or stems between branch unions and internodes on young trees. This is an unacceptable practice for the following reasons -

- It increases the rate of shoot production and elongation
- The resulting regrowth is weakly attached and becomes prone to failure or collapse
- The stubs may decay
- The natural habit of the tree is destroyed
- It may reduce the lifespan of the tree
- It predisposes trees to fungal infections and insect attack
- It is considered undesirable to lop mature trees for the reasons stated above.

Form – Shape of a tree.

Useful Life Expectancy (ULE) – ULE is the length of time that the arborist has estimated an individual tree can be retained in its existing environment, with an acceptable level of risk.

The estimated ULE is based on the information available at the time of inspection (Barrell, J 2009).

Long ULE – The tree appears to be retainable for greater than 30 years.

Medium ULE - The tree appears to be retainable for greater than 15-30 years.

Short ULE - The tree appears to be retainable for greater than 5-15 years.

Remove – A tree that should be removed within the next 5 years.

Visual Tree Assessment (VTA) – Matthack and Breloer (1994) developed a procedure of defect analysis called Visual tree assessment (VTA) that uses the growth response and form of trees to detect any defects in tree structure. The VTA is based in part on observations and measurement indications that trees grow to evenly distribute mechanical stress. Generally, any attached material on and within a trees structure which seems out of place should be treated as a sign of defect (Harris, Clark & Matheny 2004).

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