1st February 2021

bowden
expertise in urban tree science

Jerry Hutter
Supervisor Horticulture
City of Kalamunda
PO Box 42
KALAMUNDA WA 6926

Dear Jerry,

ARBORICULTURAL ASSESSMENT AT THE KALAMUNDA HISTORY VILLAGE

Please find enclosed the results of the arboricultural assessment undertaken recently for the tree adjacent to the grader shed at the Kalamunda History Village, Kalamunda.

Where recommendations for remedial arboricultural work have been made, it is imperative that it is undertaken as outlined in the Australian Standard 4373-2007: Pruning of Amenity Trees. It is also strongly advised that any remedial pruning works be undertaken by, or supervised by, a qualified arborist (AQF Level 3 in Arboriculture).

If you have any questions regarding the assessment or if I can be of service to you again in the future, please feel free to contact me.

Yours sincerely,

Brad Bowden
Principal
Bowden Tree Consultancy®

B.Sc. Sustainable Forestry
Dip. Arboriculture & Parks Management
ISA Certified Arborist – Municipal Specialist AU-0020AM & Tree Risk Assessment Qualified (TRAQ)

1.0 Introduction

1.1 Scope of Report

1.2 The purpose of this report is to summarise the results of the arboricultural assessment and provide recommendations for the mature northern river red gum tree (*Eucalyptus camaldulensis* var. *obtusa)* located adjacent to the grader shed within the Kalamunda History Village, at Williams Street, Kalamunda. The site visit and visual tree assessment was undertaken from ground level on the 20th January 2021 at 1530hrs and was accurate at the time of inspection. No soil excavation or below ground level inspection was undertaken unless specified. Viewing conditions were fine.

1.3 Concern has been raised regarding tree condition following the identification near (trunk) contact with the shed on the north side of the tree. This report should be read in conjunction with the PiCUS sonic tomography report dated 20th January 2021 which summarises the further investigation testing undertaken at the trunk basal area to evaluate the internal wood condition.

1.4 Executive Summary

1.5 The Australian-native tree identified within this report provides a range of benefits to the ecosystem, to human beings for environmental and health reasons, and to the climate. Assessment has revealed a satisfactory structural condition whilst tree health condition was assessed as high, and is indicative of the capacity of the tree to produce new response growth and maintain stability. Where tree retention is desired, it is recommended to undertake reduction pruning to reduce/ shorten the length of the first order branches on the north side of the tree to reduce crown spread, to alleviate branch elongation, end weight and loading and to mitigate the potential for branch/ rootplate failure.

2.0 Site Observations

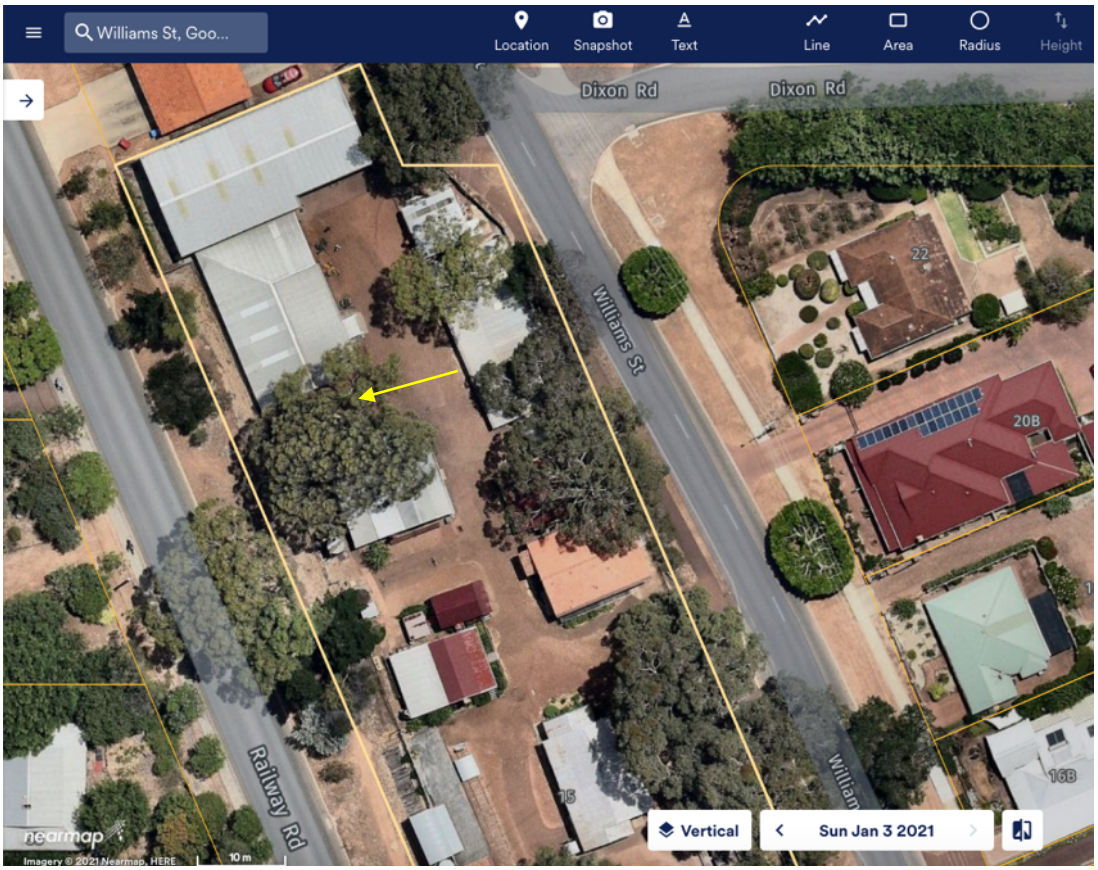

Figure 1. Aerial photo of site and location of the assessed tree (see arrow).

Figure 2. Assessed tree (see arrow); looking towards the southwest.

Assessed Tree:	**Botanical Name:** *Eucalyptus camaldulensis* var. *obtusa*
Common Name:	northern river red gum
Location:	Adjacent grader shed - south side
Height:	18m
DBH:	86cm
Crown Spread (NS/ EW):	11/15m
Structure:	Fair
Health:	High
Comments:	

- Adequate trunk basal flare was evident with buttressing visible and satisfactory rootplate stability deduced
- The previous severance of a woody root of 100mm diameter (approx.) was observed on the south side of the tree, with subsequent adventitious growth evident at the cut section to maintain water/ nutrient uptake and stability
- Cracking within the bark was observed at the trunk basal area, typical for the species and age-class of tree, however is likely to be superficial only and not extend into the structural wood of the tree
- No major cavities, significant radial cracking, noteworthy decay in the plane of lean, exudate indicating bacterial/ fungal infection or infestation by wood destroying insects (termites) was evident
- Further investigation using PiCUS sonic tomography at the trunk basal section revealed the test cross-section to have 96% solid wood and <1% damaged wood
- Trunk lean was natural, towards the north and attributable to the close proximity of the adjacent mature brown mallet tree (*Eucalyptus astringens)* and subsequent competition for sunlight and growing space
- Subsequently, the trunk section was in very-near contact with the grader shed roof on the north side and is likely to make contact during periods of high wind energy
- No structurally compromised v-shaped unions or cluster branch attachments were visible throughout the lower crown of the tree
- Previous and recent reduction pruning works were observed on the north side and northwest side of the tree and is likely to have been undertaken to clear the roof and alleviate crown extension, with minor epicormic regrowth branches evident present
- Naturally occurring dead branches to approximately 40mm in diameter were evident throughout the crown, with such branches predominantly overhanging and/ or with an orientation of fall towards the adjacent roof
- Lateral stem/ branch extension on the north side was assessed as excessive, and due to the adjacent large tree and competition for growing space
- Foliage size, colour and density was normal, and no significant foliar insect infestation and/ or disease infection symptoms were visible on sample foliage within the lower crown

Figure 3. **The previous severance of a woody root was observed (see dashed line) on the south side of the tree, with subsequent adventitious root growth evident at the cut section to maintain water/ nutrient uptake and stability; looking towards the north.**

Figure 4. **Cracking within the bark was observed at the trunk basal area, typical for the species and age-class of tree, however is likely to be superficial only and not extend into the structural wood of the tree; looking towards the south.**

Figure 5. **Trunk lean was natural towards the north and attributable to the close proximity of the adjacent tree, with the trunk section in very-near contact with the grader shed roof on the north side, and is likely to make contact during periods of high wind energy; looking towards the northeast.**

Figure 6. **Previous and recent reduction pruning works were observed on the north side and northwest side of the tree and is likely to have been undertaken to clear the roof and alleviate crown extension, with minor epicormic regrowth branches evident present.**

3.0 Discussion and Recommendations

3.1 Discussion

3.2 Tree benefits: Mature urban trees confer many benefits including shade and cooler air temperatures, screening (privacy) and noise reduction, built form aesthetic amelioration, energy conservation, mitigation of the urban heat island effect, air quality improvement and oxygen production, carbon uptake/ storage and greenhouse gas reduction, minimisation of storm water run-off and improvement of water quality, fauna habitat and food source. In general, they enhance our built and natural environments with larger trees providing more benefits.

3.3 Tree risk: Tree failure is an infrequent occurrence and serious damage, injury or death from tree failure is rare (Lilly *et al*, 2011). Research finds that for Britain, with a population of 60 million people, the risk of any tree causing a fatality is exceedingly small (Ball & Ball-King, 2011). It is impossible to maintain trees completely free of risk and some level of risk must be accepted to experience the benefits that trees provide. The use of 'safe' or 'unsafe' when assessing trees is both imprecise and ambiguous, as a tree cannot be free from defects or potential hazards - such a state is simply unattainable. It is essential to maintain a balance between the benefits and costs of risk reduction, not only financial cost but also the loss of amenity and other tree related benefits.

3.4 Recommendations

3.5 Where tree retention is desired, it is recommended to undertake reduction pruning by 2-3m to reduce/ shorten the length of the first order branches on the north side of the tree to reduce crown spread, to alleviate branch elongation, end weight and loading and to mitigate the potential for branch/ rootplate failure. N.B. Reduction pruning should occur back to lateral branches that are at least one-third the diameter of the branch being reduced and should leave the tree/ branches looking as natural as possible. Internal growth including minor epicormic regrowth branches should also be retained, as the excessive removal of foliage (photosynthetic material) has the potential to increase tree stress and may initiate a decline spiral.

3.6 Consideration could also be given to modification of the adjacent roof to increase the distance between the trunk section and the grader shed.

4.0 Appendix I

4.1 Arboricultural Terminology

4.2 Crown – the leaves and branches of a tree measured from the lowest branch on the trunk to the top of the tree, whilst crown lifting involves pruning of the lower branches to improve clearance for buildings, pedestrians, vehicles etc.

4.3 DBH - diameter of the main trunk, measured at breast height approximately 1.4m above ground level for urban trees.

4.4 Deadwooding – the removal of dead, diseased or damaged branch wood from the crown of the tree.

4.5 Dripline – the width of the crown of the tree measured by the lateral extent of the foliage, with the crown spread measurement indicating the widest part.

4.6 Fall zone – is the area in which the tree or tree part is likely to fall when it fails, often calculated as 1.5 times the tree height where brittle dead branches etc. may break up and scatter debris.

4.7 First order structural branch – the large branches arising from the trunk that form the main structure of the crown.

4.8 Reduction prune – pruning to reduce the extension of a branch, back to a lateral branch that is at least one-third the diameter of the branch being removed.

4.9 Root collar – area at the base of the tree were the roots and trunk merge.

4.10 Targets – an object, person or structure that would be damaged or injured in the event of tree or branch failure is referred to as the target or target area. The hazard evaluation of the target area is relative to the expected use and occupancy of that area.

4.11 Topping and Lopping – deleterious tree height and branch reduction work often at indiscriminate points and generally resulting in weakly-attached regrowth branches prone to failure as subsequent growth occurs.

4.12 Tree Protection Zone (TPZ) – the zone of the root plate most likely to contain roots that are critical for anchorage and stability (structural root zone – SRZ, generally calculated as trunk diameter x 5) and the absorbing roots responsible for the uptake of water and nutrients collectively; calculated as trunk diameter (DBH) x 12.

4.13 V-shaped union – ingrown bark from adjacent parts of the tree that are in contact with each other; usually branch forks, acutely-angled branch attachments or basal stems – often a high failure potential.

4.14 Tree Structure and Health

4.15 The structural condition ('Structure') for each tree or group of trees has been assessed using the following qualitative criteria:

- Good – generally free of structural defects
- Fair – defects evident that may be typical for the species and age class, and which could be corrected through remedial pruning works
- Poor – significant defects that are not likely to be corrected through remedial pruning or arboricultural works
- TBA – to be assessed, requiring further investigation to evaluate tree structural condition

4.16 The vitality ('Health') for each tree or group of trees has been assessed using the following qualitative criteria:

- High – consistent crown density and foliage colour, good shoot extension and an insignificant number of naturally-occurring internal dead branches
- Average – crown condition that may representative for the species and/ or seasonal, possessing satisfactory shoot extension and/ or minimal decline and dead branches
- Low – poor shoot extension, sparse crown density and not likely to be corrected through improvement of site resources and plant nutrition
- Moribund – final stages of a decline spiral

5.0 Appendix II

5.1 Author Formal Qualifications

5.2 Bachelor of Science (Sustainable Forestry) – 2012
Edith Cowan University, Joondalup & Murdoch University, Murdoch, WA.

5.3 Diploma of Applied Science (Horticulture) – 2000
Major studies Arboriculture and Parks/ Gardens management
University of Melbourne, Burnley campus, VIC.

5.4 Certificate IV (TAE40110) in Training & Assessment – 2014
Plenty Training, Robina, QLD.

5.5 Certificate of Horticultural Practice – 1994
Challenger TAFE, Murdoch campus, WA.

5.6 Additional Certifications

5.7 ISA Certified Arborist Municipal Specialist (AU-0020AM) – 2012 (recertified 2018)
International Society of Arboriculture
www.isa-arbor.com/certification/benefits/credentialsExplained.aspx

5.8 ISA Tree Risk Assessment Qualification (TRAQ) – 2013 (recertified 2018)
International Society of Arboriculture
http://www.isa-arbor.com/certification/becomequalified/becomequalified.aspx

5.9 Limitation of Liability

5.10 Bowden Tree Consultancy are tree specialists who use their qualifications, education, knowledge, training, diagnostic tools and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of this assessment and report.

5.11 Bowden Tree Consultancy cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways that the arboriculture industry does not fully understand. Conditions are often hidden within trees and below ground. Unless otherwise stated, observations have been visually assessed from ground level. Bowden Tree Consultancy cannot guarantee that a tree will be healthy or a low risk of harm under all circumstances, or for a specified period of time. Likewise, remedial treatments cannot be guaranteed.

5.12 Treatment, pruning and removal of trees may involve considerations beyond the scope of Bowden Tree Consultancy's service, such as property boundaries and ownership, disputes between neighbours, sight lines, landlord-tenant matters and other related incidents. Bowden Tree

Consultancy cannot take such issues into account unless complete and accurate information is given prior or at the time of the site inspection. Likewise, Bowden Tree Consultancy cannot accept responsibility for the authorisation or non-authorisation of any recommended treatment or remedial measures undertaken.

5.13 In the event that Bowden Tree Consultancy recommends retesting or inspection of trees at stated intervals, or installs any cable/s, bracing systems and support systems, Bowden Tree Consultancy must inspect the system installed at intervals of not greater than 12 months, unless otherwise specified in written reports. It is the client's responsibility to make arrangements with Bowden Tree Consultancy to conduct the re-inspection.

5.14 Trees can be managed, but they cannot be controlled. To live or work near a tree involves a degree of risk. All written reports must be read in their entirety; at no time shall part of the written assessment be referred to unless taken in full context with the whole written report. If this written report is to be used in a court of law, or any other legal situation, Bowden Tree Consultancy must be advised in writing prior to the written assessment being presented in any form to any other party.

5.15 Business Details

5.16 Bowden Tree Consultancy®
ABN: 51925884945
Post Office Box 104 Darlington W.A. 6070
M: 0438 936 679
E: info@bowdentree.com.au
W: www.bowdentree.com.au

5.17 Literature Cited

5.18 Ball, D.J. & Ball-King, L. (2011). *Public Safety and Risk Assessment.* Great Britain: Earthscan

5.19 Lilly, S., Matheny, N. & Smiley, E., (2011). *Best Management Practices - Tree Risk Assessment*, Champaign, IL: International Society of Arboriculture

5.20 Mattheck, C. & Breloer, H. (1994). *The Body Language of Trees - A Handbook for Failure Analysis*. London, England: The Stationery Office.

5.21 Standards Australia, (2007). *AS4373-2007 Pruning of Amenity Trees*, Sydney: SAI Global