



Arboricultural Impact Assessment

Proposed Double Garage and Deck at
28 Woodbine Street, North Balgowlah

Client: Corona Projects

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2 Introduction

2.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Corona Projects in relation to the existing trees located on the Kalau Street verge fronting 28 Woodbine Street, North Balgowlah.

The purpose of this AIA is to assess the likely impacts of the proposed works on the existing site trees and to make recommendations regarding construction methods and tree protection measures to limit adverse impacts on trees recommended for retention.

This AIA has been guided by the principles set out in the Australian Standard 4970-2009, *Protection of trees on development sites*.

2.2 Proposed Works

The proposed works include widening of the existing driveway and garage and construction of a new deck in the rear yard. The focus of this report is the proposed widened section of the driveway adjacent to the Brushbox street tree.

2.3 Subject Tree

The subject tree is a Brushbox, *Lophostemon confertus* located on the Kalau Street verge. The subject tree was assessed as having a High Retention Values due to its prominence within the landscape and contribution to the streetscape.

Refer to Figure A on for location of the subject tree. The location of the subject tree is incorrectly plotted on the Site Survey and Architectural Plans. The location shown in Figure A is based on measurements taken from the existing driveway taken during the tree assessment.

A detailed description of the subject trees is included in the Tree Assessment Table (Section 4 –page 6).

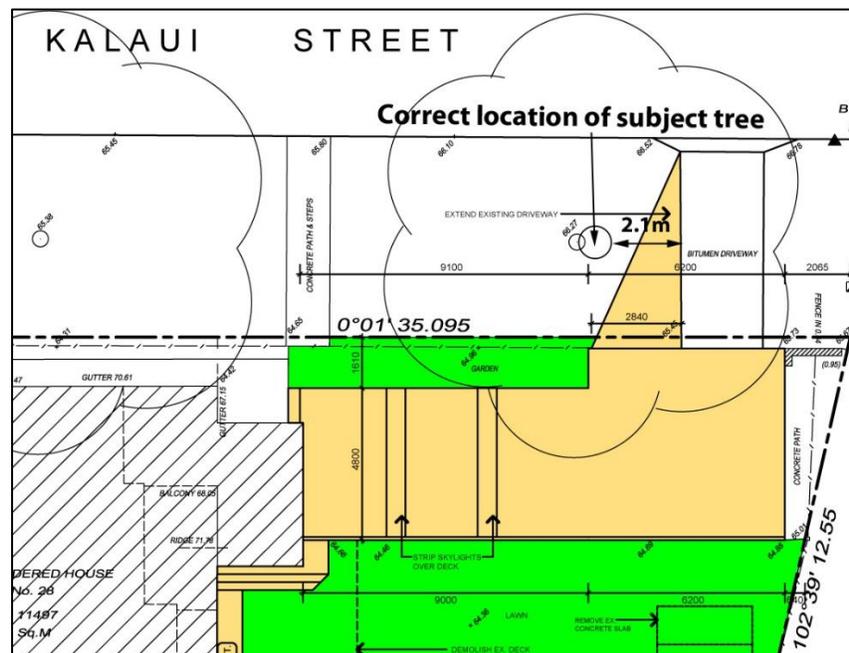


Figure A: Excerpt from the Site Analysis Plan showing tree location.

3 Methodology

3.1 Site Inspection/Tree Assessment

Site inspection and tree assessment was undertaken by Alexis Anderson on the 30th of July, 2019. The trees were assessed from ground level using a Tree Assessment Table, as outlined in Section 4. The definitions and explanations of terms used are outlined in the Tree Table Definitions page which is included at Attachment A.

3.2 Exploratory Excavation

Exploratory excavation and root mapping was undertaken along the southern edge of the proposed new driveway in the area of the grassed verge (Photos A and B). The purpose of this was to determine the extent of root growth in the area of the proposed driveway to guide the driveway design and layout. Exploratory excavation was undertaken with care, using hand tools, to depths ranging between 200-350mm. These depths were sufficient to expose any roots that may be damaged as part of excavation for driveway widening.

The findings of the exploratory trench were photographed prior to backfilling.

3.3 Plan Review

This report is based upon a review of the Plans provided by Corona Projects (Issue dated May 2019).

3.4 Tree Protection Zones

Tree assessments in accordance with the Australian Standard 4970-2009, *Protection of trees on development sites*, require calculation of a Tree Protection Zone (TPZ) and Structural Root Zone (SRZ). The terms TPZ and SRZ are used throughout this report. The following is a brief explanation of these terms:

Tree Protection Zone -TPZ: This is the area that should be isolated from construction disturbance so that the tree remains viable. Some disturbance within the TPZ may be possible following arboricultural assessment.

Structural Root Zone -SRZ: This is the area of undisturbed soil and roots required to maintain tree stability. Excavation within the SRZ can lead to whole tree failure.

3.5 Retention Values

Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings.

- **HIGH Retention Value:** These trees are worthy of retention and design consideration should be made where possible to allow their retention. Removal of these trees will have an impact on the landscape amenity or local environment.
- **MEDIUM Retention Value:** These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures,

garden retaining walls, driveway levels). Removal of these trees will not have a significant impact on the landscape amenity or local environment.

- **LOW Retention Value:** These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

The method of determining and defining retention values used in this report has been derived from the ©Retention Index developed by Tree Wise Men® Australia Pty Ltd.

4 Tree Assessment Details

4.1 Tree Assessment Table

Subject Tree –Brushbox, <i>Lophostemon confertus</i>	
Trunk Diameter (above root flare)	820mm.
Height (estimated)	17 metres
Canopy Spread Radius	7 metres
Age-Class	Mature
Health/Vitality	Good.
Structural Condition	Good.
Estimated Life Expectancy (remaining)	Long (30+ years)
Landscape and Environmental Significance	2. The subject tree provides amenity to the site, surrounding properties and provides a significant contribution to the streetscape amenity. This is a commonly planted Australian native. No specific wildlife nesting sites were observed.
Retention Value	High. This tree is worthy of retention and protection during construction.
Comments	The north eastern side of the canopy has been pruned in the past to reduce property overhang.



Photo A: Subject tree taken from Kalau Street facing south east.

5 Exploratory Excavation Findings

Exploratory excavation was undertaken along the southern edge of the proposed driveway layout. The soil in this location consisted of compacted stoney fill. A single 45mm diameter root was encountered within the trench. This root branches into two smaller roots at the trench location. The root was located 4.1m from the existing kerb layback at a depth of 250mm. It is likely that this root will be pruned as part of driveway excavation. Based on the size of the root relative to its proximity to the trunk, it is not considered to be a critical structural root. It is likely that large structural roots critical for tree stability are located beneath the depth of the proposed driveway.



Photo B: Exploratory excavation trench.



Photo C: Exploratory excavation findings and proposed driveway alignment near Tree 1

6 Potential Impacts of Proposed Works

6.1 Potential Impact of the Proposed Works

The stability of the subject tree is unlikely to be compromised by the pruning of the 45mm diameter root.

The root is likely to form less than 5% of the entire root mass of the tree. The impact on the health, vitality and longevity is likely to be negligible.

The widened sections of driveway and garage will result in an additional Tree Protection Zone (TPZ) coverage of less than 10%. It will be possible to direct rainfall from the driveway strip drain back into the garden area of the TPZ. No notable impact is expected.

Shallow excavation within the TPZ is proposed to accommodate the deck level of 64.62. Loss of woody transport roots and fine absorbing roots is likely. Approximately 10% of the TPZ area will be affected. It is likely that roots exist beneath the depth of the proposed excavation and that shallow excavation and root pruning will not have a significant impact on health, vitality or longevity.

Incidental Impacts: Trees are commonly impacted on construction sites in the following ways. These impacts can be easily avoided through awareness and basic tree protection measures.

- Stripping of existing ground cover, topsoil and removal of organic material from the soil surface.
- Compaction of the topsoil and damage to surface roots through use of heavy machinery and frequent foot traffic.
- Soil contamination through washing out barrows and disposal or spillage of chemical materials.
- Root loss due to unforeseen excavation for plumbing upgrades and landscape construction.
- Bark/trunk and branch injuries from accidental contact with machinery.

7 Recommendations

7.1 Prior to Commencement of Work

Appointment of a Project Arborist: An Arborist with an AQF Level 5 qualification should be engaged prior to the commencement of work on the site. The Project Arborist may be required at the following times:

- Following installation of trunk battening.
- During earthworks as part of driveway construction.
- At project completion to verify tree protection and retention.

Trunk Battening: Trunk protection is recommended for the subject tree. The purpose of this is to prevent accidental trunk injury during construction.

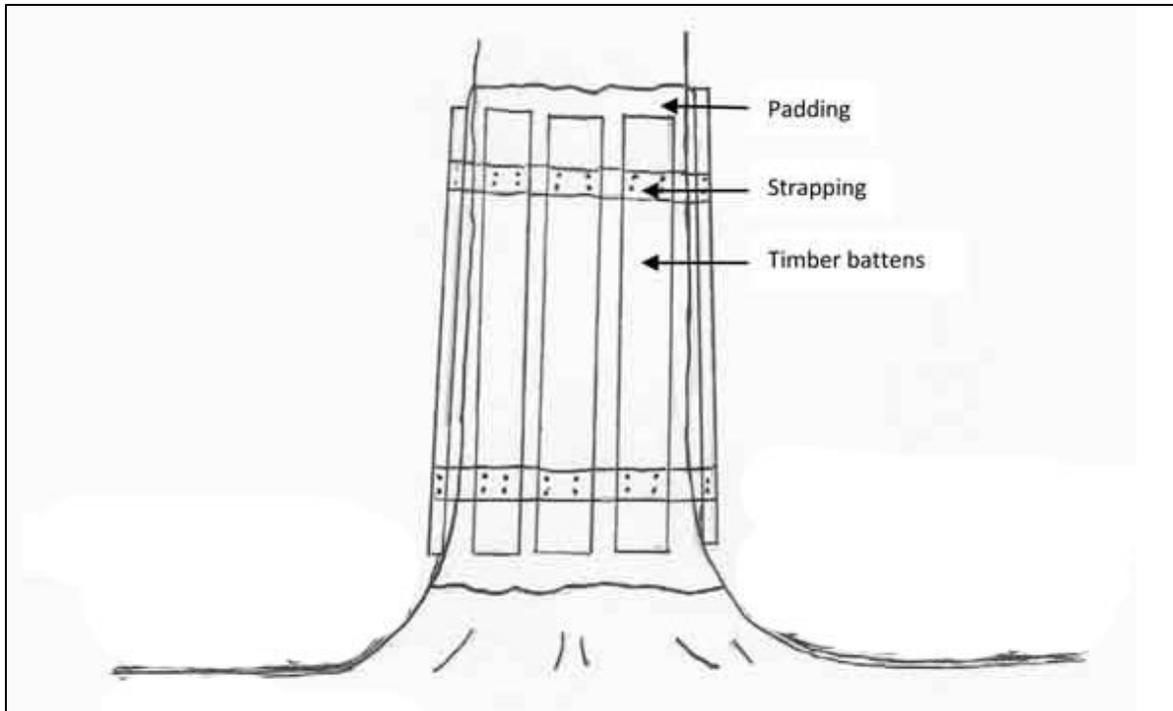


Figure B: Example of adequate trunk protection.

7.2 Driveway Construction

Driveway Levels: The driveway levels must be no deeper than the existing driveway. It may be possible to gently ramp the new southern section of driveway to be slightly above the level of the existing driveway to minimise the depth of excavation required for installation. This will increase the distance between large underlying structural roots and the driveway underside and minimise the likelihood of future cracking.

Driveway Construction: All excavation for the new driveway must be undertaken under guidance of the Project Arborist. If the 45mm diameter roots requires pruning, it must be cleanly cut using a sharp hand saw by the Project Arborist. The purpose of this is to minimise the surface area of the pruning wound and to avoid additional root damage (splintering/tearing) that typically occurs when roots are pruned using an excavator.

Tree Protection Zones: The following should be prohibited within the Tree Protection Zone of the trees on the street verge:

- Removal or stripping of topsoil / organic surface material outside of the driveway cross-over.
- Storage of materials or machinery.
- Disposal of solid, liquid or chemical waste.
- Any excavation, fill or other construction activity other than that discussed in this report.

8 Statement of Impartiality

- This report prepared by Bluegum Tree Care & Consultancy (BTCC) reflects the impartial and expert opinion of Alexis Anderson.
- BTCC is acting independently of and not as the advocate for the owners of the subject trees.
- BTCC does not undertake tree pruning and removal works and will not have any involvement with pruning or removing trees which are the subject of this report.

9 Limitations

- The tree assessment was undertaken for the purpose of pre-development planning. Detailed tree risk assessment was not requested or included in the scope of works.
- The findings of this report are based upon and limited to visual examination of trees from ground level without any climbing, internal testing or root crown excavation.
- This report reflects the health and structure of trees at the time of inspection. Bluegum cannot guarantee that a tree will be healthy and safe under all circumstances or for a specified period of time. There is no guarantee that problems or defects with assessed trees, will not arise in the future. Liability will not be accepted for damage to person or property as a result of failure of assessed trees.
- This report must be read in its entirety. No part of this report may be referred to, verbally or in writing, unless taken in full context of the whole report.

Attachment A: TREE ASSESSMENT DEFINITIONS

Height. Tree height is estimated from ground level. This assessment is made independently of data plotted on survey plan. These measurements have not been confirmed with clinometer or other surveying instrument.

Diameter at Breast Height (DBH). Trunk diameter is measured at 1.4 metres above ground level. A diameter tape is used which calculates the diameter from a measurement of the circumference. DBH is primarily used for the calculation of the TPZ. The trunk diameter above the root buttress is measured to calculate the Structural Root Zone. If a tree has more than 4 trunks, the diameter of the four largest trunks is recorded. For irregular trunk formations the DBH is calculated as outlined in Appendix A of AS4970-2009 - *Protection of Trees on Development Sites*.

Canopy Spread Radius. Average canopy spread radius is estimated from the centre of trunk to the outer edge of canopy. Refer to Comments column for detail of heavily skewed canopy spread.

Age Class - This is an estimation of the tree's current age class based on size, growth habit, local environmental conditions and comparison with surrounding trees.

- **Immature (IM):** This is a juvenile specimen that is likely to have germinated within the previous 5 years.
- **Early Mature (EM):** This is a tree that is established within its growing environment, though has not reached an age of reproductive maturity or the natural growth habit of a mature individual.
- **Mature (M):** This is a tree has reached both reproductive maturity and a physical form and shape typical for the species. Trees can have a Mature Age Class for the majority of their life span.
- **Late-Mature (LM):** These trees show early signs of senescence with symptoms such as reduced canopy density and an accumulation of dead branches.
- **Over-mature (OM):** These trees show symptoms of irreversible decline such as canopy dieback with dead branches concentrated in the upper canopy.

Health/Vitality - Good (G), Fair (F) or Poor (P). This is primarily based on the extent of vigorous new foliage growth at branch tips and the colour, size and density of foliage generally. The percentage of live branches to dead branches is considered. The location of any dead branches is also considered. The presence of any pest or disease is considered as part of this assessment. Health can vary with climatic conditions.

Structural Condition - Good (G), Fair (F) or Poor (P). This is an assessment of tree structure and stability. Root anchorage, trunk lean, structural defects, canopy skew and any hazardous features are considered. Dead branches can be considered as part of Structural Condition if they are of a size and location that could cause injury or property damage.

Tree Protection Zone (TPZ). This is a radial distance of (12X) the DBH measured from centre of trunk. TPZ is rounded to the nearest 0.1 metre. A TPZ should not be less than 2m or greater than 15m. The TPZ for palms and other monocots should not be less than 1m outside of the crown projection. Existing constraints to root spread can vary the TPZ. For a tree to remain viable, construction activity should be excluded or undertaken with care within the TPZ. Disturbance within up to 10% of the TPZ area is considered to be a minor encroachment. Disturbance to more than 10% of the TPZ area is considered a major encroachment. Major encroachment into the TPZ is possible depending on the type of disturbance, and species tolerance to disturbance. Exploratory excavation may be required to quantify the presence of roots at the alignment of proposed ground disturbance. This is based upon the Australian Standard AS 4970, 2009, *Protection of trees on development sites* and the Matheny & Clarke "Guidelines for adequate tree preservation zones for healthy, structurally stable trees".

Structural Root Zone (SRZ). This is a radial distance based on the findings of the exploratory excavation. It was determined based on the radius at which roots were had tapered down in diameter so as to longer be critical for in ground anchorage. The Structural Root Zone is the area of soil and roots required to maintain tree stability. Excavation within the SRZ can result in whole tree failure. Fully elevated construction is possible within SRZ with specific rootzone assessment. Existing constraints to root spread can vary the SRZ. This method of determining SRZ is outlined at Section 3.3.5 of Australian Standard AS 4970, 2009, *Protection of trees on development sites*.

Estimated Remaining Life Expectancy: This gives a length of time that the Arborist believes a particular tree can be retained from the time of assessment with an acceptable level of risk based on the information available at the time of the inspection. This system of rating does not take into consideration the likely impacts of any proposed development. Ratings are **Long** (retainable for 30 years or more with an acceptable level of risk), **Medium** (retainable for 10-30 years), **Short** (retainable for 0-10 years) and **Removal** (tree requiring removal due to risk/hazard or absolute unsuitability).

Landscape & Environmental Significance*: This is an assessment of the impact of the tree on the surrounding landscape amenity and natural environment. Rarity, habitat value, physical prominence, historical and cultural significance of the tree are considered in this rating system. The Landscape & Environmental Value ratings used in this report are:

- 1. Very High Value:** This is an outstanding specimen that holds irreplaceable environmental, landscape or cultural value.
- 2. High Value:** An excellent specimen that holds environmental, landscape or cultural value that is present in other site trees or that could be replaced.
- 3. Moderate Value:** Can be a good to fair specimen with environmental, landscape or cultural value that is common within other trees in the locality.
- 4. Low Value:** Removal would not result in any loss of site amenity or environmental value. Can include undesirable or weed species or trees growing in unsuitable locations.
- 5. Very Low Value:** Dead or hazardous with no other environmental or cultural value. Could also include weed species. These trees should be removed or pruned in a way to make safe irrespective of any development.

***Note:** The concept of using a five (5) point scale to assess tree significance was derived from the Tree Wise Men® Australia Pty Ltd ©Significance Rating Scale.

Retention Value*: Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings.

		Estimated Life Expectancy			
		Long	Medium	Short	Removal
Significance	Environmental Landscape & Significance	Very High (1)	HIGH		MEDIUM
		High (2)			
		Medium (3)	MEDIUM		LOW
		Low (4)			
		Very Low (5)			

HIGH Retention Value: These trees are worthy of retention and major design consideration should be made where feasible to allow this.

MEDIUM Retention Value: These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures, garden retaining walls, driveway levels).

LOW Retention Value: These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

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