Corymbia Consulting
Arboricultural Consultants

2018

Tree assessment of two *Lophostemon confertus* on the verge of 48 Milton Street, Mt Hawthorn.

Mark Short, Grad Cert Arb, Dip Arb

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0400 532 821
corymbia@outlook.com
corymbiaconsulting.com.au

Contents

1.0 Scope of Report

- To undertake an assessment of two *Lophostemon confertus* (Queensland Box Tree) located on the verge of 48 Milton Street, Mt Hawthorn due to development of the site.

2.0 Introduction

The purpose of this report is to provide advice with regards to the impact that proposed development of 48 Milton Street could have on the two Queensland Box trees located on the adjacent verge. This report takes into consideration the health and condition of the trees and proposed design with the intention of providing unbiased recommendations that are in the best interest of the tree(s), that can be applied practically.

3.0 Limitations

This report is limited to a basic inspection only on the sections of property to which reasonable access was permitted. The inspection is also limited to the discovery or non-discovery of structural faults and observations at the time of inspection only. An aerial inspection was not undertaken on any tree, nor was any soil excavation or a risk assessment. It is recommended that a risk assessment be undertaken using either the Quantified Tree Risk Assessment system (QTRA) or the International Society of Arboriculture's risk assessment system (TRAQ).

4.0 Trees and People

Trees provide a range of benefits to the community, especially in areas of amenity, such as parks and street scapes, by way of social and physiological factors. They add to the sense of place within an area. They improve its atmosphere and ambience, helping to create areas that people want to dwell in. They improve air quality and reduce the effects of wind and sun damage to property and person; Real Estate studies have also found that tree lined street can aid in increasing property prices by up to 20 percent

When assessing trees, they cannot be considered as "safe" or "unsafe" as this is both ambiguous and inaccurate. It should be acknowledged that there are some risks associated with keeping trees in the urban environment and that land managers have a duty of care to insofar as is reasonably practicable to ensure that the property and people using this land are not exposed to unreasonable levels of risk. Whilst trees cannot be "made safe", they can be managed to maintain the many benefits they bring whilst reducing these associated risks.

5.0 Methodology

The inspection consisted of a ground based basic inspection utilising the principals of visual tree assessment, along with guidelines set out in AS4970 – Protection of Trees on Development sites.

The tree has been assessed using the following criteria:

Age Range:
J = Juvenile **SM** = Semi Mature **M** = Mature **FM** = Fully Mature

EV = Early Veteran **V** = Veteran

(See appendix 1 for the descriptions of each category)

Height:
The approximate height of each tree has been provided in meters.

Diameter at Breast Height (DBH):
A measurement of the diameter of the trunk in centimetres (cm) for this tree has been provided, this measuring was taken at 1.4m above ground level and is used to calculate the radius of the Tree Protection Zone (TPZ) for the tree in line with AS 4970.

Diameter at Ground Level (DGL):
A measurement of the diameter of the trunk in centimetres (cm) at ground level has been provided for this tree, this is used to calculate the radius of the Structural Root Zone (SRZ) in line with AS 4970 to enable protection measures for the root zone to be implemented where necessary.

Canopy spread:
An approximate width of the canopy on the North/South and East/West axis has been provided in meters (m) to show the canopy area of the tree.

Condition:
The tree has been given a rating based upon its condition, visual appearance of the tree and its form with regard to what is typical for the particular species. If a tree is found to be exhibiting the usual form for a species it is considered to be "Average" (the majority of trees are regarded as average), where a tree is found to be growing exceptionally well and is in excellent health and condition and is considered to be an ideal example of a species, it would be regarded as Good, A tree with a "Poor" condition would not provide any aesthetic benefit to the area and might have some structural issues.

P = Poor A = Average G = Good

5.1 Methodology

Useful Life Expectancy (ULE)

This category provides a guide as to how long a tree might continue to make a positive contribution to the place in which it dwells based upon its condition and structural integrity.

A. Long (Greater than 40 years)

High quality and high value, these trees would hold such a condition that make them a valuable part of the environment/ landscape, would be considered to hold a Useful Life Expectancy (ULE) of 40 years of greater, thus allowing them to make a substantial contribution.

B. Medium (Between 20 and 40 years)

Medium quality and medium value, trees of this category are thought of as making a significant contribution to the area they dwell in and would be considered to hold a ULE of a minimum of 20 years.

C. Short (Between 5 and 20 years)

Low quality and low value. These trees would be regarded as being in an adequate condition that would see them being retained for a period that would allow new plantings to establish. They would be considered as having a ULE of 5 to 10 years.

D. Transient (Less than 5 years)

Very Low quality and very low value, these trees would be regarded as having a poor form, displaying a low vitality and may be exhibiting initial signs of structural decline. They would be considered to have a ULE of less than 5 years and are to be included in a plan for replacement.

R. Dead or hazardous (no remaining ULE)

Removal is required. Trees in this category would be considered to hold such a condition that would potentially hold no value in their current state and it would be reasonable to undertake their removal for reasons of sound Arboricultural management and / or due to a high level of risk.

Species Origin:

This section advises whether or not an identified tree is Endemic, Native or an Exotic species.

Endemic = This is a species of tree that is known to grow naturally within the location of the tree survey and is not introduced from other parts of Australia.

Native = This is a species of tree that is Native to Australia, but is not found naturally within the location of the survey.

Exotic = A species of tree that has been introduced to Australia from other countries.

6.0 Location

48 Milton Street, Mt Hawthorn.

6.1 Subject Trees

7.0 Tree Assessment

Tree 1

Species: *Lophostemon confertus*

Age class: Semi Mature

Height: 5m

Trunk diameter (DBH): 35cm

Trunk diameter at Ground level (DGL): 35cm

Canopy Spread **N/S:** 6.5m **E/W:** 5.5m

Tree Protection Zone (TPZ): 4.2m

Structural Root Zone (SRZ): 2.13m

Condition rating: Poor

ULE: R

Species Origin: Native

7.1 Tree Assessment

Tree 2

Species: *Lophostemon confertus*

Age class: Semi Mature

Height: 8m

Trunk diameter (DBH): 94.5cm

Trunk diameter at Ground level (DGL): 81cm

Canopy Spread **N/S:** 9m **E/W:** 5.5m

Tree Protection Zone (TPZ): 11.34m

Structural Root Zone (SRZ): 3.03m

Condition rating: Average

ULE: A

Species Origin: Native

7.3 Tree Assessment

Root Zone

The root zone of tree 1 was found to have been disturbed in recent times, with excavation appearing to have been carried out recently for the installation of underground power (Photo 1 & 2). This is evidenced by sand on the verge between the road and tree, where a pit has been dug to facilitate under road boring to the power pole on the opposite side of the road. Excavation has been undertaken to the North East of tree 2 to install the new power dome. This excavation is 6.5m from the tree which is outside of its structural root zone.

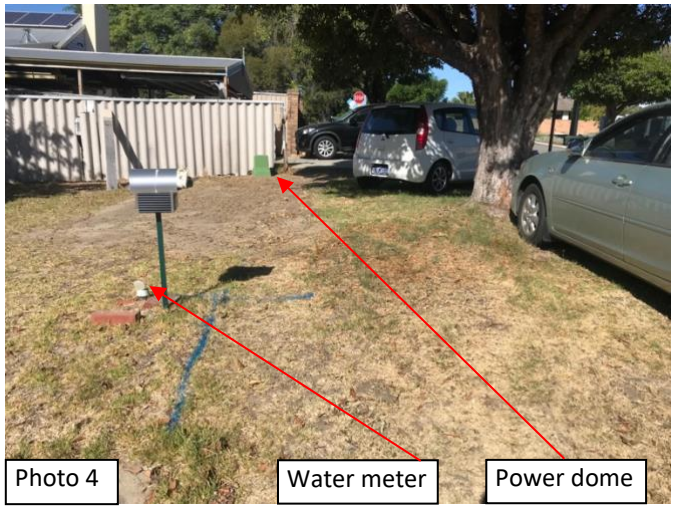
Photo 1 – view from the south

Tree 1 was found to have diminished signs of life with little cambial activity. It is not known if the excavation has had anything to do with its decline.

The root crown of tree 2 is showing signs of basal flare and the production of annualised response growth, indicating that these trees are maintaining a structurally firm root plate at this time. There is a road 2.7m to the south, with no signs of root damage from this tree, and A water meter is 4.7m to the North West (Photo 4). It is important this should any excavations be required around the water meter, they are not undertaken any closer than 3m from the tree.

Photo 2 – view from the north

Photo 3 – View from the north



7.4 Tree Assessment

Trunk

The trunk of tree 1 is showing minimal signs of cambial activity due to its decline in health.

Photo 5

Tree 2 has a single trunk to a height of 1.5m where it bifurcates to form multiple leaders. The union of the bifurcation was found to be sound with little included bark. Sounding of this trunk with and acoustic hammer found it to have an adequate wall thickness at this time. The tree was observed to be applying annualised wood to maintain optimal structural integrity.

Photo 6 – View from the south

7.5 Tree Assessment

Canopy

The canopy of tree 1 was observed to be in significant decline, with few living leaves. (photo 7 & 8)

Photo 7 – View from the north

Photo 8 – View from the south

Tree 2 was found to have a normal density in its crown (photo 9, 10, 11 & 12) and displays a good level of health and condition. There were no signs of pest, disease or fungal attack present at this time.

Photo 9 – View from the south

Photo 10 – View from the north

Photo 11 – View from the east

Photo 12 - View from the west

8.0 Discussion

Tree 1 was found to be in poor condition and is effectively moribund. It would be recommended to remove this tree and replace it with a species in line with the City of Vincent's street tree planting list. The tree should ideally be of a 100 litre bag size. The new tree should be watered for a minimum of two summers following planting with a minimum of 150 litres of water per week.

Tree 2 was found to hold a good level of health and condition. The driveway proposed to be installed to the west of this tree will intrude into the Structural Root Zone (SRZ) by approximately 1.32m^2, totalling 4.58% of the total SRZ. This is acceptable on the provision that excavation is undertaken in line with the advice in section 9.0 and 9.1 of this report and that the tree is provided with supplemental watering during the period of construction and for two summers following the completion of construction. A minimum of 1000 litres per week should be applied to this tree across the week. I.e. 143 litres each day of the week or 200 litres per week day.
(The start of each summer can be regarded as 1 November to 31 March)

It will be recommended that Protection fencing is erected around tree 2 during the period of construction to form a Tree Protection Zone (TPZ). This should be a temporary steel mesh fencing that is rigid and stands to a minimum height of 1.6m. TPZ signage is to be installed on all sides of the fencing, advising of the purpose of this fencing and all personnel working on the site are to be informed of its purpose during their site induction. The fencing should be installed on all sides of the tree to form a complete circle, square or rectangle, where there is open ground it should be placed 0.5m outside of the canopy of the tree. On the road side, it should be placed inside of the kerb to run parallel with it. Whilst this does not encompass the total area of the calculated TPZ, it allows for a reasonable area to be left for the storage of building materials and access to the site.

<u>Rules of the TPZ</u>

- The fencing is not to be moved during the period of construction, without seeking permission from the City of Vincent, except to allow for the construction of the new driveway, after which is can be placed alongside the new driveway
- Building materials are not to be stored within the TPZ
- Waste materials are not to be placed/ disposed of within the TPZ
- Excavation is not to be undertaken within this area (exception point 1)
- Soil or fill is not to be placed within this area

9.0 Protecting Trees During Excavation

The Australian standard for Protection of trees on development sites, AS 4970 – 2009, which serves to set out protection measures for trees during the period of excavation and construction and is comprised of two zones.

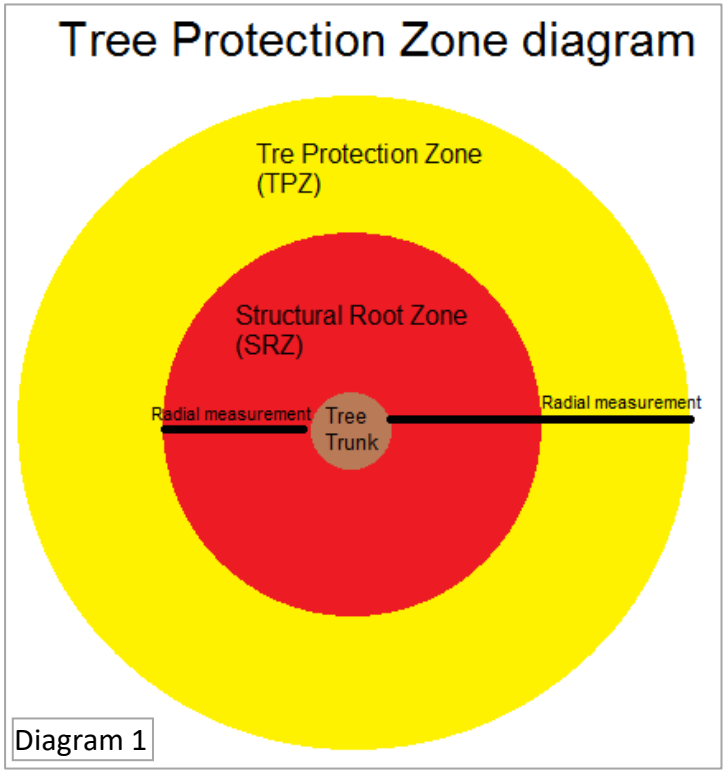


Diagram 1

The first is the Tree Protection Zone (TPZ) (Diagram 1) which considers protection of the canopy and roots. This is best set up with the use of temporary mesh fencing around the tree, it is ideal that no plant and equipment enter this area in order to prevent any damage to the canopy, trunk and roots through excavation works and use of plant end equipment. It is imperative that any excavation immediately around the temprorary fencing be undertaken inline with the excavation methodology as set out in 9.1 to protect the structural root zone of the tree.

The second zone is the Structural Root Zone (SRZ) which is ultimately a no dig zone for excavation works in instances where it is found that there is an absolute need to dig within the TPZ. (Diagram 2) and is the closest you can possibly get to a tree without causing significant structural damage to the structural roots of the tree.

Please note that the TPZ is inclusive of the SRZ measurement.

Even when working outside of the TPZ. It is important that any excavation works carried out around these trees is done in a radial pattern and not across the root plate of the trees (Diagram 2). When any mechanical equipment digs across a root plate they have a tendency to catch any roots in their path and pull against it. This action leads to damage further along the root and possible fracturing of the root crown where the root joins onto the base of the tree. This can then lead to death of the root and possible decline or even death of the tree. By digging radially along the roots this lessens the possibility of this type of damage occurring and will help to maintain the good condition of the trees into the future.

9.1 Protecting Trees During Excavation

Excavation should begin by gently removing the top layers of soil in a radial pattern from the trunk outwards (Diagram 2) to identify any roots that may be in the area to be excavated. These roots must then be cut with a sharp clean saw v to make a clean cut. (Not torn with machinery or cut with an axe). The cut end of the root can be sealed with a wound sealant (but it is not essential), this can help to prevent disease or fungal infections from entering the tree.

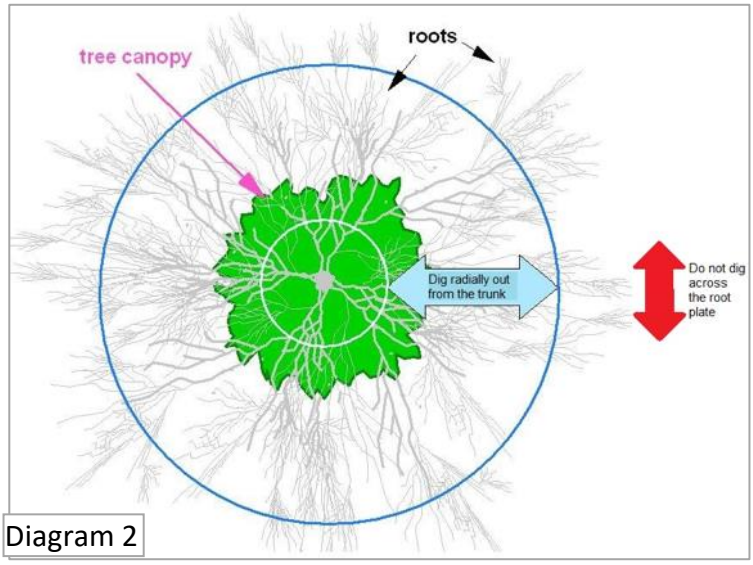


Diagram 2

Once all roots have been identified and cleanly cut, excavation can the take place by normal methods and the cut ends can be dug out. This will then allow construction to procced as normal.

10.0 Recommendations

- That tree 1 be removed and a replacement be planted following completion of construction at a minimum distance of 2m from the new driveway.
- That the new tree be watered for 2 summers following planting with a minimum of 150 litres of water per week.

- That tree 2 be retained and protected
- That tree 2 receive supplemental watering as described in section 8.0
- That protection fencing be placed 0.5m around the outside of the canopy in order to allow for some usable area of the verge.
- That any required excavation is undertaken outside of the Structural Root Zone for Tree 1 (3.03m). With the exception of the additional crossover that will encroach the SRZ.
- That all excavation undertaken around the tree is done so in line with the methodology described in sections 9.0 and 9.1.

11.0 Appendix 1- Age Category Chart

	Non Veteran				Veteran	
Age Class	**Juvenile**	**Semi Mature**	**Mature**	**Fully Mature**	**Early Veteran**	**Veteran**
Definition	From seedling to 10 years of age	Trees older than 10 years, but less than one third of their life expectancy for the species, with annual-increment volume increasing	Trees between one third and two thirds of their life expectancy for their species. Early stage of escape from apical dominance. And usually at full height with their DBH increasing	Trees beyond two thirds of their life expectancy, no significant growth being applied. Onset of natural decline in DBH. At later stage of Fully Mature: development of branch reiteration (incipient independent branch functioning). Start of retrenchment stage. Hollows are beginning to form.	Loss of apical dominance. Proliferation of deadwood from redundancy. Decline in annual-incremental volume. Hollows beginning to form. The tree is of a sizeable DBH and high habitat value and is thought to be over 100 years of age	Rounded and significantly retrenched large hollows that have formed. The tree holds a significant DBH and habitat value

Adapted from Defining and Surveying Veteran and Ancient Trees, Fay, N (2007)

12.0 Appendix 2 - Arboricultural Terminology

Term	Explanation
ALARP	As Low as Reasonably Practicable.
AQF	Australian Qualification Framework
Bifurcation (Bifurcates)	This is where a trunk splits into two leaders to continue forming the canopy of the tree.
Cambium (Cambial Material)	A layer of delicate meristematic tissue between the inner bark or phloem and the wood or xylem, which produces new phloem on the outside and new xylem on the inside in stems, roots, etc., originating all secondary growth in plants and forming the annual rings of wood.
Clinometer	A device that uses geometry to aid the calculation of a height of an object.
Compression (Compression Fork)	In mechanics, a force which pushes and tends to compress. The material fails by being crushed or by buckling (following sideways deflection). Often occurs in a narrow fork with included bark in which continued radial growth results in pressure which tends to push the limbs of the fork apart.
Crown/Canopy	The main foliage bearing section of the tree.
Crown lifting	The removal of limbs and small branches to a specified height above ground level.
Crown thinning	The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure.
DBH (Diameter at Breast Height)	Stem diameter measured at a height of 1.3 metres or the nearest measurable point. Where measurement at this height meters is not possible, another height may be specified.
Deadwood	Dead branch wood.
Dead wooding	The removal of deadwood from the canopy.

First order branch	The large branches arising from the trunk that form the main structure of the crown.
Heartwood	The hard central wood of a tree
Included bark (ingrown bark)	Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact.
Leaders	A dominant shoot, this can be at the uppermost tip of the tree or a side branch.
Occlusion/Occluding	To close up or over – usually where new wood is formed over a wound or pruning cut
Quantified Tree Risk Assessment (QTRA)	A systematic process of assessing the risks that trees pose to particular targets.
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.
Retrenchment	A process of self reduction in the size of the trees canopy to maintain structural integrity
Root crown	The transitional area between the trunk and roots.
Root Protection Zone (RPZ)	This is a designated area around a tree in which any form of excavation is prohibited from occurring without instruction form an Arborist on how to proceed.
Saprophytic	Any organism that lives on dead matter
Second order branch	A branch arising from a first order structural branch.
Structural root zone (SRZ)	The zone of the root plate most likely to contain roots that are critical for anchorage and the stability of the tree.
Subtend	Pruning of a stem of lateral back to a growth point in order to remove its apical tip.

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.
Topping and Lopping	Work often at indiscriminate points and generally resulting in weakly-attached regrowth branches.
Tree Protection Zone (TPZ)	This is an area left around a tree to ensure protection of the above and below ground parts of the tree during construction works. It will usually include the RPZ, and is usually recommended to be fenced off for the period of the works.
Under pruning	The removal of the lower (hanging) portions of a trees canopy to provide sufficient room for vehicles or persons to pass beneath.

13.0 Appendix 3 - Tree Protection Zone Sign (example)

14.0 References

Standards Australia. AS 4970 – 2009 Protection of Trees on Development Sites, Sydney, Australia.

Standards Australia. AS 4373 – 2007 Pruning of amenity Trees, Sydney, Australia.

Mattheck, C. and Breloer, H. 1994. The body language of trees - a handbook for failure analysis. The Stationery Office, London England. PG: 110, 126, 178,

Harris, R,H. Clark, J,R. Matheny, N,P. 2004 Arboriculture, Integrated management of Trees, Shrubs and vines. Pearson education, Upper Saddle River, New Jersey, USA.

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Shigo, A, L. 1979. Tree Decay; An expanded Concept. USDA Forest Service Agricultural Information. Bulletin No 419

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15.0 Authors Qualifications and Training

Qualifications

- 2015: Graduate Certificate in Arboriculture - University of Melbourne
- 2012: Diploma in Arboriculture - Murdoch College of Tafe
- 2012: Certificate IV in Frontline Management – Leadership Management Australia
- 2011: Certificate IV in Arboriculture - Murdoch College of Tafe
- 2010: Certificate III in Arboriculture - Murdoch College of Tafe
- 2008: Certificate III in Irrigation - Murdoch College of Tafe
- 2003/2004: RFS Certificate in Arboriculture
- 2003: Botanic Horticulture (Botanical Gardens management) Birmingham Botanical Gardens (*England*)
- 2003: Herbarium techniques and management - University of Birmingham (*England*)
- 2001: Diploma of Horticulture - Murdoch College of Tafe
- 1999: Certificate III of Horticulture - Murdoch College of Tafe

Professional development training

- 2016 – QTRA – Advanced user training (QTRA)
- 2014 Tree Risk Assessment Qualification – (International Society of Arboriculture)
- 2013: QTRA intermediate workshop (QTRA)
- 2013: QTRA – Visual Tree Assessment (QTRA)
- 2013: License to Operate a boom type elevating work platform
- 2010: Quantified Tree Risk Assessment System Training (QTRA)
- 2006: Level 2 Tree Care (Arbor Logic)
- 2010: Local Government Safety Induction – Outdoor Environments (EMRC)
- 2010: Guidelines for Effective Accident Investigations (EMREC)
- 2008: Tree Pruning Near Powerlines (Western Power)
- Conflict resolution training
- Urban Tree Management in WA (TMI)
- Worksafe High Risk Ticket Licence for Fork Lift and EWP
- Basic Traffic Management
- Asbestos awareness
- Royal Life Saving Society Senior First Aid
- White Card

16.0 Disclaimer and Limitations

This report does not constitute a risk assessment in any way and does not cover identifiable defects present at the time of inspection. Corymbia Consulting accepts no responsibility or can be held liable for any structural defect or unforeseen event/situation that may occur(s) report will only be concerned with above ground inspections, that will be undertaken visually from ground level. Trees are living organisms and as such cannot be classified as “safe” under any circumstances. Nor can the author accept responsibility for recommendations in this report not being followed.

Failure events can occur for any number of reasons at any time and cannot always reasonably be foreseen, as any number of circumstances can come about at any time before or after an inspection, that the Arborist may not be aware of. The recommendations are made on the basis of what can be reasonably identified at the time of inspection therefore the author accepts no liability for any recommendations made.

Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the author can neither guarantee nor be responsible for the accuracy of information provided by others.

Booking of re-assessment or for additional Risk assessment after the prescribed period is the responsibility of the Land manager/owner only. Corymbia Consulting is not responsible for providing reminders or notification that re assessment may be due.