



TREE MANAGEMENT CONSULTING ARBORICULTURISTS

ARBORICULTURAL IMPACT ASSESSMENT

for

Galen Property Pty Ltd
C/- Turnbull Planning International Pty Ltd
2301/4 Daydream Street
WARRIEWOOD NSW 2102

SITE ADDRESS

37 – 41 BENGAL STREET
COOLONGLOOK

OCTOBER 2019

Prepared by
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**INSTITUTE OF AUSTRALIAN
CONSULTING ARBORICULTURISTS**



ACCREDITED MEMBER™

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1 INTRODUCTION

- 1.1 This Arboricultural Impact Assessment (AIA) was commissioned by Turnbull Planning International Pty Ltd, on behalf of the owners of the site. The site is identified as Lots 7, 8 and 9, Section 10 in D.P. 758278, and known as 37-41 Bengal Road, Coolongolook, New South Wales.
- 1.2 This AIA is to accompany a development application to MidCoast Council (formerly Great Lakes Council) for a proposed Highway Service Centre on the site.
- 1.3 The purpose of this report is to assess the *health* and *condition* of the surveyed trees, and identify the potential impacts the proposed development may have on those trees in proximity to the works.
- 1.4 This report gives recommendations for tree retention or removal and provides guidelines for tree protection and maintenance.
- 1.5 Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible; however, I can neither guarantee nor be responsible for the accuracy of information provided by others.
- 1.6 This AIA is not intended as an assessment of any impacts on trees by any proposed future development of the site other than this current development application.
- 1.7 This report is not intended to be a comprehensive tree *risk* assessment, however, the report may make recommendations, where appropriate, for further assessment, treatment or testing of trees where potential structural problems have been identified, or where below ground investigation may be required.

2 METHODOLOGY

- 2.1** In preparation for this report, ground level, *visual tree assessments*¹ of forty-six (46) trees were undertaken by Catriona Mackenzie and Mark Jamieson for Urban Forestry Australia, on 31 July 2018. Inspection details of these trees are provided in Appendix E—*Schedule of Assessed Trees*.
- 2.2** This AIA takes account of prescribed trees pursuant to Part 12 *Tree and Vegetation Preservation* of the Great Lakes Development Control Plan 2014 (DCP), and non-prescribed (exempt) trees as specified in 12.10, Table 2 of the DCP.
- 2.3** Tree heights and canopy spreads were visually estimated or measured using a Nikon ForestryPro Laser measurer. Unless otherwise noted in Appendix E, all trunk diameters were measured at approximately 1.4 metres above ground level (“the DBH”), using a Yamiyo diameter tape.
- 2.4** Field observations were written down, and photographs of the site and trees were taken using an iPhone 6 and/or Canon EOS SLR digital camera.
- 2.5** No *aerial inspections*, *root mapping* or woody tissue testing were undertaken as part of this tree assessment. Information contained in this tree report covers only the trees that were examined and reflects the condition of those trees at the time of inspection.
- 2.6** Plans and documents referenced for the preparation of this report include:
- Details and Levels Survey, Dwg. No. 3510_DET-A, dated 29/06/2018, by CalCo Surveyors Pty Limited.
 - Preliminary Architectural Plans A01(P3) dated 06/08/2019, A02-03 (P5), dated 22/10/2019, by R.J. Sinclair Pty Ltd Building Design.
 - AS4970-2009 *Protection of trees on development sites*, Standards Australia.
 - Schedule 5 Environmental Heritage of the Great Lakes Local Environment Plan 2014.
 - Great Lakes Development Control Plan 2014 (the DCP).
- 2.7** The subject trees are shown on a marked-up excerpt of the survey plan. This marked-up plan is attached as Appendix F—Tree Location Plan.

¹ Visual Tree Assessment (VTA) is a procedure of defect analysis developed by Mattheck and Breloer (1994) that uses the growth response and form of trees to detect defects.

3 OBSERVATIONS AND DISCUSSION

3.1 Brief Site Details

- 3.1.1 The site is bounded by unformed public roads on its north (Nelson Street) and west (Lombard Lane) sides, Bengal Street (Pacific Highway) to the east, and an adjoining private residence and land to the south. The site is generally rectangular in shape and relatively level, with a fall from the south to the north/northeast, punctuated with low embankments, small dams and drainage lines or ephemeral creek lines.
- 3.1.2 Existing vegetation within the site consists primarily of introduced and/or undesirable species that have been planted, or have self-sown and proliferated, particularly where soil moisture is more reliable. With the exception of a clearly mature and likely remnant tree on the west boundary, the locally indigenous trees are, for the most part, young trees that have generated from seed. There is no understorey vegetation of note. Ground cover is almost entirely exotic turf grass on modified soils, with no shrubs or trees growing at the southeast and central parts of the site. The soil is very moist, almost boggy near the drainage lines to the northeast of the site, but quite compacted and dry along the site's west side.



Figure 1 SITE PLAN

Location of site boundary in red..

Adapted from Survey Plan by CalCp Surveyors. (not to scale).

3.2 Assessed Trees Details

3.2.1 A total of 46 trees were identified at the site visit and tree assessment. Details of the individual trees or tree groups are included in the Schedule of Assessed Trees – Appendix D. I note some deciduous species were unable to be identified at species level due to the lack of reliable identification features at the time of winter inspection.

3.2.2 Of these 46 trees:

- Four (4) are introduced exotic species;
 - Tree 9365 – *Jacaranda mimosifolia* (Jacaranda).
 - Tree 9368 – *Pyrus* sp. (Pear).
 - Trees 9277 and 9376 – *Populus* spp (Poplar, not Lombardy Poplar).

- Fifteen (15) trees are locally indigenous trees;
 - Tree 02 – *Livistona australis* (Cabbage-tree Palm).
 - Tree 07 – *Brachychiton populneus* (Kurrajong).
 - Tree 09 – *Corymbia maculata* (Spotted Gum).
 - Tree 9369 – *Pittosporum undulatum* (Sweet Pittosporum).
 - Tree 9381 – *Melaleuca linariifolia* (Snow-in-summer).
 - Trees 10 and 9317 – *Eucalyptus eugenioides* (Thin-leaved Stringybark).
 - Trees 9377 and 9378 – *Waterhousea floribunda* (Weeping Lillypilly).
 - Trees 04, 05, 9286, 9311, 9314 and 9316 – *Eucalyptus paniculata* (Grey Ironbark).

- Twenty-seven (27) living trees are exempt (non-prescribed) trees, listed in Table 2 at Part 12.10 of the DCP. These trees do not require authority approval to remove.
 - Trees 9041, 9042, 9276, 9351-9356 – *Erythrina x sykesii* (Coral Tree)
 - Trees 01, 03, 6345 and 9380 – *Salix fragilis* (Crack Willow),
 - Trees 08, 9275, 9279, 9284, 9285, 9288, 9315, 9322, 9379 and 9382 – *Pinus radiata* (Radiata Pine).
 - Trees 06 and 9329 – *Cinnamomum camphora* (Camphor Laurel).
 - Trees 9273 and 9274 – *Ligustrum lucidum* (Large-leaved Privet).

- 3.2.3 No tree species identified on the site is listed as vulnerable, endangered, or critically endangered, under Schedules 1 and 2 of the Biodiversity Conservation Act 2016 or the Environment Protection and Biodiversity Conservation Act 1999.
- 3.2.4 The Retention Value of the living assessed trees (detailed at Appendix B) is accorded as follows:
- Low Retention Value (31 trees)—All non-prescribed trees (exempt) species, and prescribed Trees 9277 and 9376 (Poplars), 9365 (Jacaranda), and 9368 (Pear).
 - Medium Retention Value (8 trees)—Trees 04, 05, 9314 (Grey Ironbarks), 09 (Spotted Gum), 9369 (Sweet Pittosporum), 9377 and 9378 (Weeping Lillypillies) and 9381 (Snow-in-summer).
 - High Retention Value (7 trees)—Trees 02 (Cabbage-tree Palm), 07 (Kurrajong), 10 (Thin-leaved Stringybark), 9386, 9311 and 9316 (Grey Ironbarks), and 9317 (Thin-leaved Stringybark).

3.3 Proposed Tree Removal

- 3.3.1 The configuration of the paved areas to accommodate the substantial truck turning paths drives the layout of the driveway entry, exits, parking and service areas.
- 3.3.2 The nineteen (19) prescribed trees would be removed under the development proposal.
- 3.3.3 The 27 non-prescribed (exempt) trees would be removed.
- 3.3.4 In assessing the site's tree assets, the potential for relocating some of the established specimen trees was considered:
- The large Cabbage-tree Palm (T02) could be transplanted to one of the landscape areas near the site boundary. This could provide a mature feature to compliment future landscaping.
 - The Kurrajong (T07) is not a good candidate for transplanting as it is quite large and established; they generally have quite long residual taproots when mature, and dislike cutting or damage to these taproots. Unlike the Bottle Tree (*Brachychiton rupestris*) the Kurrajong does not have a large swollen base that stores water which assists with successful transplanting.

3.4 Potential Impacts on Trees Proposed for Retention.

3.4.1 Under the Australian Standard 4970-2009 *Protection of trees on development sites* (AS4970), encroachments less than 10% of the *Tree Protection Zone* (TPZ) are considered to be minor. There are no specifications provided in AS4970 for potential impacts of 10% or greater. The 10% figure is taken to be a threshold and a trigger where arboricultural investigation into TPZ encroachments beyond this figure need to be considered. However, to assist with understanding the extent of impacts to the trees, the table below can be used as a guide.

| IMPACT LEVEL RATING | |
|---------------------|--|
| 0 | 0 – 1% of root zone impacted – no impact of significance |
| L | >1 to 10% of root zone impacted – low level of impact |
| L - M | >10 to 15% of root zone impacted – low to moderate level of impact |
| M | >15 to 20% of root zone impacted – moderate level of impact |
| M – H | >20 to 25% of root zone impacted – moderate to high level of impact |
| H | >25 to 35% of root zone impacted – high level of impact |
| S | >35% of root zone impacted – significant level of impact |

Table 1: Guideline to the rating of impacts on trees to be retained.
Based on discussions with executive members of the Institute of Australian Consulting Arboriculturists.

3.4.2 One (1) living tree is indicated for retention. This is Tree 9311 – Grey Ironbark, which appears to straddle the west boundary, and is partly located on the adjoining, unformed laneway.

3.4.3 Encroachments into the *Structural Root Zone* (SRZ), and extent of encroachments into the TPZ of the larger and significant trees proposed to be retained, are summarised in the table below.

Table 2: Estimated encroachments into the SRZ and TPZ of trees proposed for retention

| Tree No. | Common Name | Tree located on site? | SRZ affected? | TPZ area (m ²) | TPZ encroachment (approx. m ²) | TPZ encroachment (approx. %) | TPZ Impact Rating |
|----------|---------------|-----------------------|---------------|----------------------------|--|------------------------------|-------------------|
| 9311 | Grey Ironbark | Y (partly) | Y | 308.0 | 139 | 45 | S |

3.4.4 **Tree 311**—Grey Ironbark

Structural Root Zone impacts:

- The proposed driveway pavement is approximately 700mm from its outside edge to the centre of the tree. This is well inside the tree's SRZ. Given the site ground levels, it is anticipated the existing ground would be excavated within the root zone of the tree, and its possible a retaining wall along the boundary might be required.

- Root mapping is not required at this time as the likelihood of encountering woody structural roots crucial to tree stability, is extremely high.

Tree Protection Zone impacts:

- The encroachment is a calculated, notional figure of 45% (about 139m²), which is a significant impact rating; this is well over what could be tolerated for a tree of this age, size and species, and is not supportable from an arboricultural perspective—Figure 2.
- To retain this tree would require all proposed structures and works to be moved at least 6.5m radius from the centre of the tree to reduce the encroachment to less than 15%, which would be supportable provided there were no other encroachments proposed.

Pruning impacts:

- The tree would require removal of the lower structural branches to the north and east to provide a clearance of at least 6m to accommodate generous truck clearances. This would be around 3 – 4 limbs of 150 – 200mm diameters. Whilst these cutting wounds would not be desirable, as any wound disposes the tree to potential pest or disease, the tree would likely tolerate the loss of approximately 15% of its overall live crown volume. These lower limbs hold far less foliage than the upper crown areas.

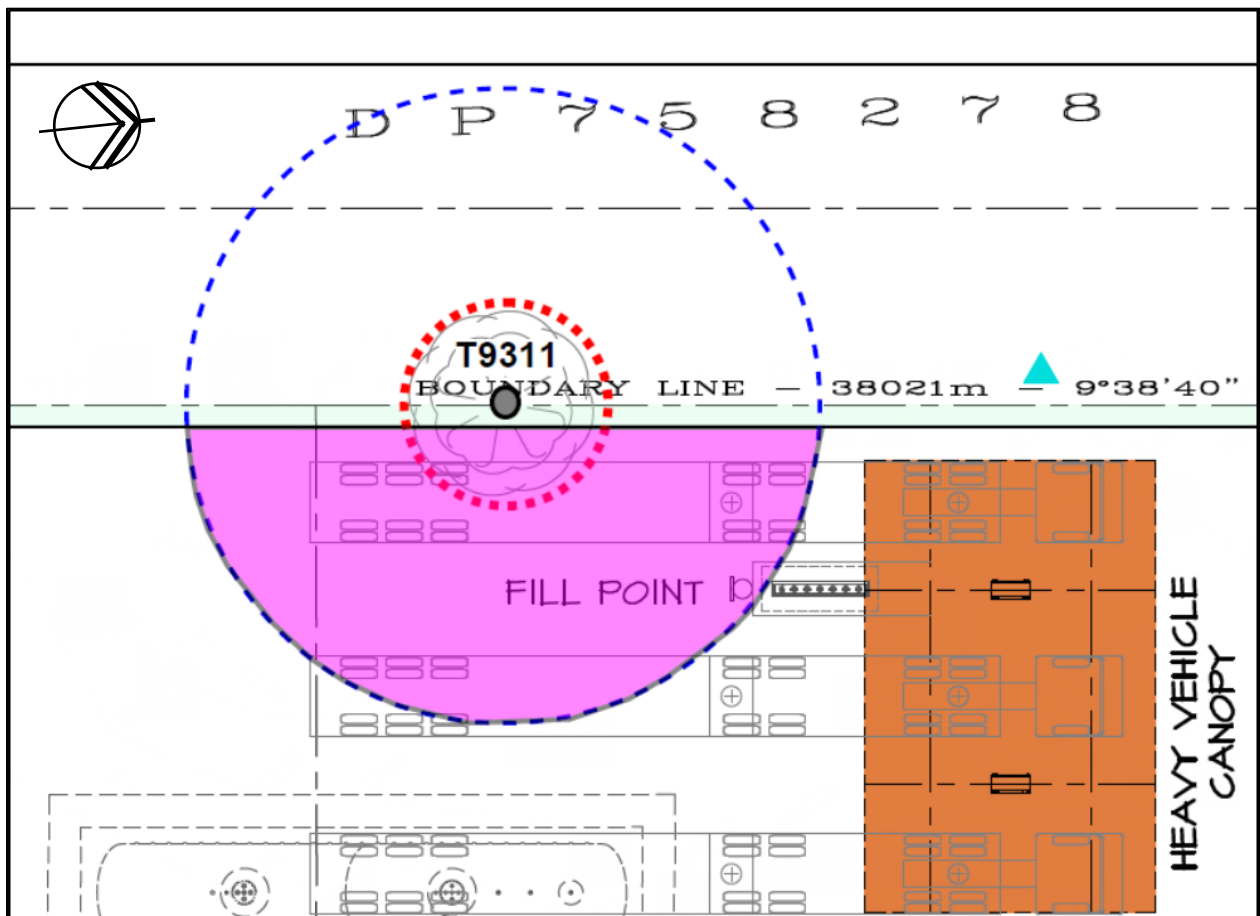


Figure 2

Illustrates the TPZ (dashed blue outer circles) and SRZ (dashed, inner red circle) of Tree 9311 (Grey Ironbark). The pink shaded area depicts the TPZ encroachments from the proposed surface pavement. It is clear a large proportion of the TPZ would be affected by the proposal.

Not to scale. Concept Plan SK -01.1. P2.dated June 2018. marked up by C. Mackenzie.

4 CONCLUSIONS

- Forty-six (46) trees were assessed or included in this report for the proposed development.
- The nineteen (19) prescribed trees are proposed to be removed to facilitate the proposed development:
 - Low Retention Value—Trees 9277, 9365, 9368 and 9376 (4 trees).
 - Medium Retention Value—Trees 04, 05, 09, 9314, 9369, 9377, 9378 and 9381 (8 trees).
 - High Retention Value—Trees 02, 07, 10, 9286, 9311, 9316 and 9317 (7 trees).
- One (1) living tree was proposed to be retained, however the calculated root loss and disturbance was deemed too great for the tree to tolerate and remain viable.
 - Tree 9311 (Grey Ironbark).
 - A significant degree of TPZ encroachment for T9311 would result from the works associated with the proposal, and the tree is likely to be destabilised due to loss of structural roots, and experience decline due to a substantial loss of the non-woody root mass supporting its health.
 - A major re-design of the proposal, consisting of at least a 6.5m radius setback (and including any over-excavation, construction access, etc), from the centre of the tree for any development activity, would be required to retain this tree.
- The indigenous Cabbage-tree Palm (T02) can be retained insitu as it is outside the proposed entry driveway alignment, or could be transplanted into the landscape and form part of the future site landscaping.

5 RECOMMENDATIONS

5.1 Tree Removal

- 5.1.1 Removal of trees is subject to authority review of this report, and approval is to be obtained (e.g. by Consent) before any prescribed trees are removed.
- 5.1.2 Tree removals are to be undertaken in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998).

5.2 Project Arboriculturist

- 5.2.1 A Project Arboriculturist (PA) shall be engaged prior to works commencing on the site, including demolition of structures, site clearing and the like.
- 5.2.2 The PA must have a minimum Australian Qualification Framework Level 5 (AQF5) or above in Arboriculture.
- 5.2.3 Duties of the PA shall include, but not be limited to:
- Liaising with the Project Manager/Head Contractor/Site Manager to confirm the tree protection fencing locations, construction access, and other specific tree protection requirements prior to site works commencing.
 - Inspection of Tree Protection Devices and supervision of works as recommended in this report or as specified in any Conditions of Consent associated with an approved development application.
 - Provision of Compliance Certification as and when required.

5.3 Minimising Impacts on Trees to be Retained

- 5.3.1 In the event Tree 9311 (Grey Ironbark) is retained with this proposal, the following recommendations shall apply:

Redesign

- To reduce the extent of instability and non-woody root loss from Tree 9311 (Grey Ironbark) to an acceptable amount will require the proposed truck driveway apron to be at least 6.5m from the centre of the tree's trunk.
the boundary to accommodate construction scaffolding and limit pruning to less than 20% crown volume.
- Any pruning of Tree 9311 will require direct supervision by the PA to ensure pruning is strictly limited to the minimum required to facilitate approved construction works.

5.3.2 Where applicable, and under the advice and supervision of the PA, tree protection devices should accord with those described at Appendix C.

- Tree protection devices (TPD) are to be placed as advised by the PA or Council's Tree Management Officer, prior to any site works commencing.
- The PA is to provide written certification of compliance with this requirement and include confirmation of their inspection of the installed TPD and that they are 'fit-for-purpose'.

Construction

- Refer to sections 5.4 and Appendix D for additional recommendations that may require adoption during development.
- The PA must advise on all aspects of tree protection prior to and during construction.
- The PA is to supervise any works occurring within 7m of the centre of trunk of T9311 (Grey Ironbark).
- The PA is to record any instances where tree roots greater than 30mm diameters are encountered and provide written advice in regard to how these tree roots will be retained and protected during construction of any new retaining structure at the site boundary.
- Irrigation—The PA should determine whether irrigation should be carried out during extended periods of drought.
- Pest management—Monitoring is required as trees under stress are more prone to insect attack.

Post-construction

- Mulching; removal of mulch after construction to remove any contaminants. Replacement with a good quality mulch and addition of 10% organic matter will improve beneficial soil micro-organisms, retain moisture and improve aeration and water infiltration.
- A final inspection is to be undertaken of the tree (T9311) to be retained to assess its health and condition, and to identify any further works required that may assist in retaining its long-term viability. These works might include monitoring advice, corrective pruning, and the like.

5.4 Tree Protection—General Recommendations

5.4.1 The Tree Protection is to be in accordance with the following:

- Tree Protection Devices (TPD) may include mulching, tree guards and other devices other than fencing.
- The TPD must be in place prior to any site works commencing, including clearing, demolition or grading.
- The most appropriate fencing for tree protection is 1.8m chainlink with 50mm metal pole supports. During installation, care must be taken to avoid damage to significant roots. The practicality of providing this fencing on this site must be addressed by the arboriculturist.
- Nothing should occur inside the tree protection fenced areas, so therefore all access to personnel and machinery, storage of fuel, chemicals, cement or site sheds is prohibited.
- Signage should explain exclusion from the area defined by TPD and carry a contact name for access or advice (see Appendix C – Tree Protection Devices).
- The TPD cannot be removed, altered, or relocated without the PA's prior assessment and approval

5.5 Arboricultural advice—General Recommendations

5.5.1 Tree and Root Pruning

- Any pruning required is to be assessed and approved by the PA, prior to undertaking any of this type of work
- Pruning shall not be undertaken by unqualified site personnel at any time.
- Pruning of branches must be undertaken by a minimum AQF Level 3 arborist in accordance with the Australian Standard AS4373-2007 *Pruning of amenity trees*,
- Unless otherwise approved by the Conditions of Development Consent, or by separate application and approval by the consent authority, pruning is to be limited to cutting of limbs less than 100mm diameters, and no more than 10% total live material removed.

5.5.2 Stockpiling and location of site sheds

- The project arboriculturist must be consulted prior to placing any items within a tree's TPZ.
- Where stockpiling must be located within the TPZ offset of trees to be retained, the existing/undisturbed natural ground must be covered with thick, coarse mulch to a minimum 75-100mm thickness.
- Large, or bulky materials (non-contaminating) can be stacked on wooden pallets or boards placed over the mulch.
- Tarpaulins (or similar) placed on boards or pallets on top of mulch shall be used to prevent loose or potentially contaminating materials from moving into the soil profile within the TPZ of trees or within 10m upslope of trees.
- Where site sheds must be located within the TPZ offset of a tree/s, the shed must be fully elevated on all sides with a minimum 300mm between existing ground and the floor/floor bearers. Isolated pad footings must be carefully dug by hand and not damage or sever any roots greater than 20mm diameters.
- Any conflict between footing locations and larger roots (i.e. 20mm Ø plus) must be brought to the attention of the project arboriculturist who is to provide practical alternatives that do not include unnecessary tree root removal.

5.5.3 Fill Material

- Placement of fill material within the TPZ of trees to be retained should be avoided where possible. Where placement of fill cannot be avoided, the material should be a coarse, gap graded material such as 20 — 50mm crushed basalt or equivalent to provide some aeration to the root zone. Note that roadbase or crushed sandstone or other material containing a high percentage of fines is unacceptable for this purpose.
- The fill material should be consolidated with a non-vibrating roller to minimise compaction of the underlying soil.
- Permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade. No fill material shall be placed in direct contact with the trunk.

5.5.4 Pavements

- Pavements should be avoided within the TPZ of trees to be retained where possible.
- Proposed paved areas within the TPZ of trees to be retained is to be placed above grade to minimise excavations within the root zone, avoiding root severance and damage.

5.5.5 Fencing and walls within the SRZ and TPZ of retained trees.

- Where fencing and/or masonry walls are to be constructed along site boundaries, they must provide for the presence of any living woody tree roots greater than 50mm diameter.
- Hand digging must occur within the SRZ of trees to be retained.
- For masonry walls/fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (e.g. steel or timber pickets, lattice etc) fixed to pillars.

5.4.6 Landscaping within tree root zones.

- The level of introduced planting media into any proposed landscaped areas within the TPZ is not to be greater than 75mm depth, and be of a coarse, sandy material to avoid development of soil layers that may impede water infiltration.
- Appropriate container size of proposed plants within the SRZ of trees should be determined prior to purchase of plants. Otherwise, any proposed landscaping within the SRZ must consist of tubestock only. This is required to ensure that damage to tree roots is avoided.
- Mattocks and similar digging instruments must not be used within the TPZ of the trees. Planting holes should be dug carefully by hand with a garden trowel, or similar small tool.
- Where possible, do not plant canopy trees beneath, or within 6 - 8m of overhead lines.

5.4.7 Other

- No washing or rinsing of tools or other equipment, preparation of any mortars, cement mixing, or brick cutting is to occur within 8m upslope of any palms or trees to be retained.
- Regular monitoring of the trees during development works for unforeseen changes or decline will help maintain the trees in a healthy state.

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August 2018




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Tree Risk Assessment Qualified 2014 (TRAQ) / Certificate of Horticulture *Honours*

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Member of the International Society of Arboriculture (ISA) / Founding Member of the Institute of Australian Consulting Arboriculturists (IACA) ACM0052003

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APPENDIX A

TERMS AND DEFINITIONS



TERMS AND DEFINITIONS

The following relates to terms or abbreviations that may have been used in this report and provides the reader with a detailed explanation of those terms.

Aerial inspection Where the subject tree is climbed by a professional tree worker or arborist specifically to inspect and assess the upper stem and crown of the tree for signs or symptoms of defects, disease, etc.

Age classes

| | |
|-----------|--|
| Y | <i>Young</i> refers to a well-established but juvenile tree |
| SM | <i>Semi-mature</i> refers to a tree at growth stages between immaturity and full size |
| EM | <i>Early-mature</i> refers to a tree that is more or less full sized and vigorously growing. |
| M | <i>Mature</i> refers to a full sized tree with some capacity for further growth |
| LM | <i>Late Mature</i> refers to a full sized tree with little capacity for growth, not yet about to enter decline |
| OM | <i>Over-mature</i> refers to a tree about to enter decline or already declining. |

Buttress A flange of adaptive wood occurring at a junction of a trunk and root or trunk and branch in response to loading.

Condition refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

Crown All the parts of a tree arising above the trunk where it terminates by its division forming branches, e.g. the branches, leaves, flowers and fruit: or the total amount of foliage supported by branches.

Crown raise pruning Pruning technique where lower limbs are removed, thereby lifting the overall crown above the ground.

Deadwood refers to any whole limb that no longer contains living tissues (e.g. live leaves and/or bark). Some dead wood is common in a number of tree species.

Diameter at Breast Height (DBH) refers to the tree trunk diameter at breast height, i.e. measured at 1.4 m above ground level.

Dieback Death of growth tips/shoots and partial limbs, generally from tip to base. Dieback is often an indicator of stress and tree health.

Form refers to the crown shape of the tree as influenced by the availability or restriction of space and light, or other contributing factors within its environment. Crown form may be determined by tree shape, species and habit and described as Dominant, Codominant, Intermediate, Emergent, Forest and Suppressed, as well as Forest Form or Open Grown. May also be described qualitatively as Good Form or Poor Form.

Growth crack / split Longitudinal crack/split that may develop as a rupture in the bark from normal growth. Longitudinal crack/split that may develop in the trunk of some fast growing palms.

Habit The shape of a tree when its growth is unencumbered by constraints for space and light, e.g. idealized by an isolated field grown specimen with consideration of the species and the type of environment in which it evolved e.g. rainforest, open forest, etc.

Habitat A habitat is an ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism. It is the natural environment in which an organism lives, or the physical environment that

surrounds (influences and is utilised by) a species population. In restoration ecology of native plant communities or habitats, some invasive species create monotypic stands that replace and/or prevent other species, especially indigenous ones, from growing there.

Health (syn. vigour) refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Inclusion - the pattern of development at branch or stem junctions where bark is turned inward rather than pushed out. This fault is located at the point where the stems/branches meet. This is normally a genetic fault and potentially a weak point of attachment as the bark obstructs healthy tissue from joining together to strengthen the joint.

Indigenous Native to an area, and not introduced.

Impact Level Rating (ILR) refers to the estimated percentage of the Tree Protection Zone (TPZ) affected by development impacts. These figures may vary due to the specific conditions and constraints on a particular site, tree species tolerance to impacts, age, vigour, condition of the tree, etc.

| IMPACT LEVEL RATING | |
|---------------------|--|
| 0 | 0 – 0.9% of root zone impacted – no impact of significance |
| L | 1 to 10% of root zone impacted – low (minor) level of impact |
| L - M | >10 to 15% of root zone impacted – low (minor) to moderate level of impact |
| M | >15 to 20% of root zone impacted – moderate level of impact |
| M – H | >20 to 25% of root zone impacted – moderate to high level of impact |
| H | >25 to 35% of root zone impacted – high level of impact |
| S | >35% of root zone impacted – significant level of impact |

Note: This is a general guide only. These figures may vary due to the specific conditions and constraints on a particular site, tree species tolerance to impacts, age, vigour, condition of the tree, etc.

Lopping Cutting between branch unions (not to branch collars), or at internodes on a tree, with the final cut leaving a stub. Lopping may result in dieback of the stub and can create infection courts for disease or pest attack.

Root Mapping The exploratory process of recording the location of roots usually in reference to a datum point where depth, root diameter, root orientation and distance from trunk to existing or proposed structures are measured. It may be slightly invasive (disturbs or displaces soil to locate but not damage roots, e.g. hand excavation, or use of air or water knife), or non-invasive (does not disturb soil, e.g. ground penetrating radar).

Scaffold branch/root A primary structural branch of the crown or primary structural root of the tree.

Structural Root Zone (SRZ) Refers to the radial distance in metres, measured from the centre of the tree stem, which defines the critical area required to maintain stability of the tree. Only thorough investigation into the location of structural roots within this area can identify whether any minor incursions into this protection zone are feasible. Note: The SRZ is calculated on the diameter measured immediately above the root/stem buttress (DAB). Where this measurement is not taken in the field, it is calculated by adding 12.5% to the stem diameter at breast height (DBH). Note: The SRZ may not be symmetrical in shape/area where there is existing obstruction or confinement to lateral root growth, e.g. structures such as walls, rocky outcrops, etc).

Snub-nosed rib Adaptive wood formed over a crack, included bark or enclosed bark and may be a round edged (snub-nosed) rib where a broad convex swelling is formed over the crack by the addition of new growth increments, and the cracking is slowed or prevented from developing further (Or, may be a sharp-edged rib as an elongated protuberance where a crack continues to develop).

Suppressed In crown class, trees which have been overtopped, whose crown development is restricted from above.

Sweep A curve in the trunk, generally near the ground. This usually occurs when a tree is partially wind thrown when young, but then stabilises itself and straightens due to reaction wood. Stem sweep can also be a naturally developed feature of some tree species. e.g. *Araucaria columnaris* (Cook Pine), that has no relationship to a defect or partial windthrow.

Tree Protection Zone (TPZ). Refers to the radial distance in metres, measured from the centre of the tree stem which defines the *tree protection zone* for a tree to be retained. This is generally the minimum distance from the center of the tree trunk where protective fencing or barriers are to be installed to create an exclusion zone. The **TPZ** surrounding a tree aids the tree's ability to cope with disturbances associated with construction works. Tree protection involves minimising root damage that is caused by activities such as construction. Tree protection also reduces the chance of a tree's decline in health or death and the possibly damage to structural stability of the tree from root damage.

To limit damage to the tree, protection within a specified distance of the tree's trunk must be maintained throughout the proposed development works. No excavation, stockpiling of building materials or the use of machinery is permitted within the TPZ. Note: In many circumstances the tree root zone does not occupy a symmetrically radial area from the trunk, but may be an irregular area due to the presence of obstructions to root spread or inhospitable growing conditions.

Tree Risk Assessment is the systematic process to identify, analyze, and evaluate tree risk. A tree risk rating of Low, Moderate, High or Extreme is derived by categorising or quantifying both the *likelihood* (probability) of tree or tree part(s) failure and impact on a target(s) and the severity of consequences of the impact on the target(s).

USEFUL LIFE EXPECTANCY (ULE) In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. ULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. ULE categories are easily verifiable by experienced personnel without great disparity. A tree's ULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give the life expectancy); then by economics (i.e. cost of maintenance - retaining trees at an excessive management cost is not normally acceptable); and finally, effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population). ULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short ULE may at present be making a contribution to the landscape, but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons. For details of ULE categories see Appendix B, modified from Barrell 2001.

Vigour (syn. health) refers to the tree's health as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Woody roots usually used in reference to the first order roots i.e. structural (anchor) roots and woody lateral roots within the Structural Root Zone. Damage, disturbance to, or severing of these roots can compromise the stability of the tree.

APPENDIX B

TREE RETENTION VALUE ASSESSMENT



APPENDIX B—TREE RETENTION VALUE ASSESSMENT

Part 1 of 3—Useful Life Expectancy (ULE)

In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. ULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. ULE categories are easily verifiable by experienced personnel without great disparity. A tree's ULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give the life expectancy); then by economics (i.e. cost of maintenance - retaining trees at an excessive management cost is not normally acceptable); and finally, effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population). ULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short ULE may at present be making a contribution to the landscape, but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons.

ULE categories (modified from Barrell 2001) The five categories and their sub-groups are as follows:

1. **Long ULE** - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. structurally sound trees located in positions that can accommodate future growth
 - B. trees which could be made suitable for long term retention by remedial care
 - C. trees of special significance which would warrant extraordinary efforts to secure their long term retention
2. **Medium ULE** - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. trees which may only live from 15 to 40 years
 - B. trees which may live for more than 40 years but would be removed for safety or nuisance reasons
 - C. trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - D. trees which could be made suitable for retention in the medium term by remedial care
3. **Short ULE** - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:
 - A. trees which may only live from 5 to 15 years
 - B. trees which may live for more than 15 years but would be removed for safety or nuisance reasons
 - C. trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - D. trees which require substantial remediation and are only suitable for retention in the short term
4. **Removal** - trees which should be removed within the next 5 years.
 - A. dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
 - B. dangerous trees through instability or recent loss of adjacent trees
 - C. dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
 - D. damaged trees that are clearly not safe to retain.
 - E. trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.
 - F. trees which are damaging or may cause damage to existing structures within the next 5 years.
 - G. trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).
 - H. trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. **Small, young or regularly pruned** - Trees that can be reliably moved or replaced.
 - A. small trees less than 5m in height.
 - B. young trees less than 15 years old but over 5m in height.
 - C. formal hedges and trees intended for regular pruning to artificially control growth

Part 2 of 3—IACA Significance of a Tree, Assessment Rating System (STARS)©

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.



Tree Significance - Assessment Criteria

| |
|---|
| 1. HIGH SIGNIFICANCE IN LANDSCAPE |
| The tree is in good condition and good vigour |
| The tree has a form typical for the species |
| The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age |
| The tree is listed as a Heritage Item, Threatened Species or part of an Endangered Ecological Community, or listed on Councils Significant Tree Register |
| The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity |
| The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values |
| The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa <i>in situ</i> - tree is appropriate to the site conditions |
| 2. MEDIUM SIGNIFICANCE IN LANDSCAPE |
| The tree is in fair-good condition and good or low vigour |
| The tree has a form typical or atypical for the species |
| The tree is a planted locally indigenous or a common species with its taxa commonly planted in the area |
| The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street. |
| The tree provides a fair contribution to the visual character and amenity of the local area. |
| The tree's growth is moderately restricted by above and/or below ground influences, reducing its ability to reach dimensions typical for the taxa <i>in situ</i> . |
| 3. LOW SIGNIFICANCE IN LANDSCAPE |
| The tree is in fair-poor condition and good or low vigour |
| The tree has a form atypical for the species |
| The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings |
| The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area. |
| The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen |
| The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa <i>in situ</i> - tree is inappropriate to the site conditions |
| The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms |
| The tree has a wound or defect that has potential to become structurally unsound. |
| Environmental Pest / Noxious Weed Species |
| –The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties |
| –The tree is a declared noxious weed by legislation |
| Hazardous/Irreversible Decline |
| –The tree is structurally unsound and/or unstable and is considered potentially dangerous |
| –The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term |

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge. In the development of this document IACA acknowledges the contribution and original concept of the Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd and Andrew Morton in June 2001.

Part 3 of 3—Tree Retention Value Priority Matrix

| | | SIGNIFICANCE | | | | | | | | | | |
|------------------------------|-----------------------|--|--|--|----------------------------|--|--|----------------------------|--|---|--|----------------------------------|
| | | 1. High | | | 2. Medium | | | 3. Low | | | | |
| | | Significance in landscape | | | Significance in landscape | | | Significance in landscape | | Environmental pest / Noxious weed species | | Hazardous / Irreversible decline |
| ESTIMATED LIFE EXPECTANCY | 1. Long >40 years | [Vertical lines pattern] | | | | | | [Horizontal lines pattern] | | [Grid pattern] | | [Grey shaded area] |
| | 2. Medium 15–40 years | [Vertical lines pattern] | | | [Horizontal lines pattern] | | | [Grid pattern] | | [Grid pattern] | | |
| | 3. Short <1–15 years | [Grid pattern] | | | [Grid pattern] | | | [Grid pattern] | | [Grid pattern] | | |
| | Dead | [Grid pattern] | | | [Grey shaded area] | | | [Grid pattern] | | [Grid pattern] | | |
| LEGEND FOR MATRIX ASSESSMENT | | | | | | | | | | | | |
| [Vertical lines pattern] | | Priority for Retention (High) -These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by AS4970 <i>Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented e.g. pier and beam etc. if works are to proceed within the Tree Protection Zone. | | | | | | | | | | |
| [Horizontal lines pattern] | | Consider for Retention (Medium) -These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted. | | | | | | | | | | |
| [Grid pattern] | | Consider for Removal (Low) -These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention. | | | | | | | | | | |
| [Grey shaded area] | | Consider for Removal (Low) -These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention. | | | | | | | | | | |

IACA, 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

REFERENCES

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Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

APPENDIX C
TREE PROTECTION DEVICES



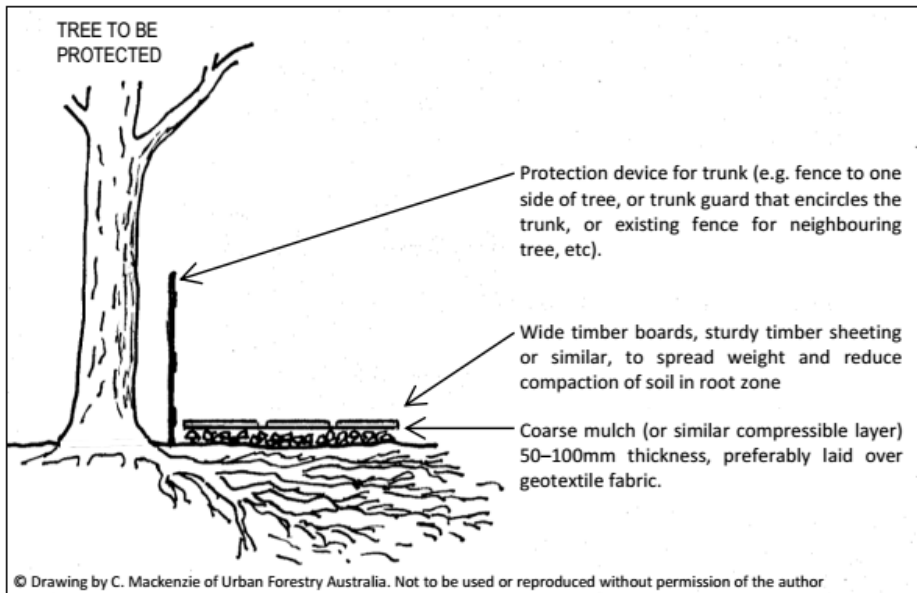


Figure 1
A method of reducing risk of root damage and soil compaction within the tree's Structural Root Zone.

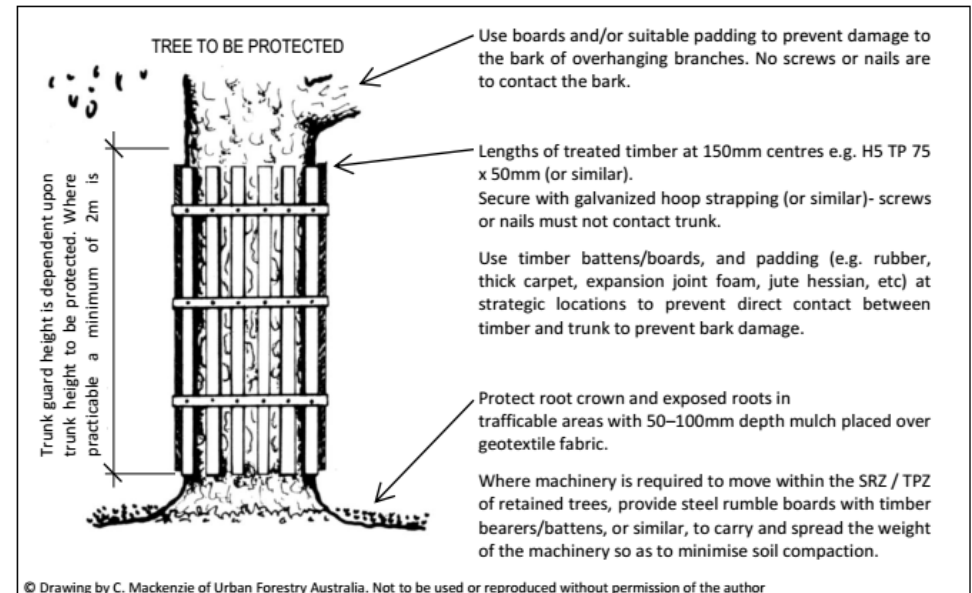


Figure 2
Example of tree trunk and tree branch protection.

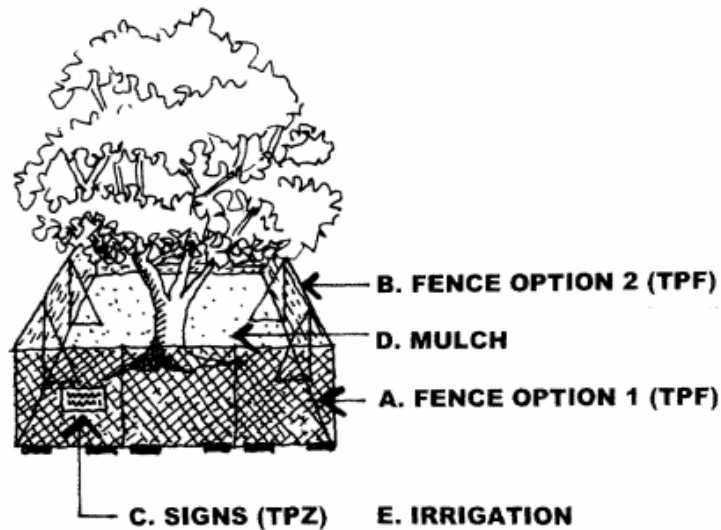


Figure 3
TREE PROTECTIVE FENCING (TPF)

A. Fence Option 1 (TPF)
1.8 metre high chain wire mesh panels with shade cloth attached if required, to be held in place with concrete blocks.

B. Fence Option 2 (TPF)
1.8 metre high plywood or wooden panel/paling fence (prevents soil or building contaminants from coming under fence when panels are laid flush to ground).

C. Signs (TPZ)
Tree Protection Zone Signs

D. Mulch
50mm to 100mm thick layer of organic mulch, or aggregate, installed across surface area of TPZ.

E. Irrigation
Irrigation to arborist's advice.

© Drawing by Selena Hannan. Used with permission.

TREE PROTECTION ZONE SIGNAGE

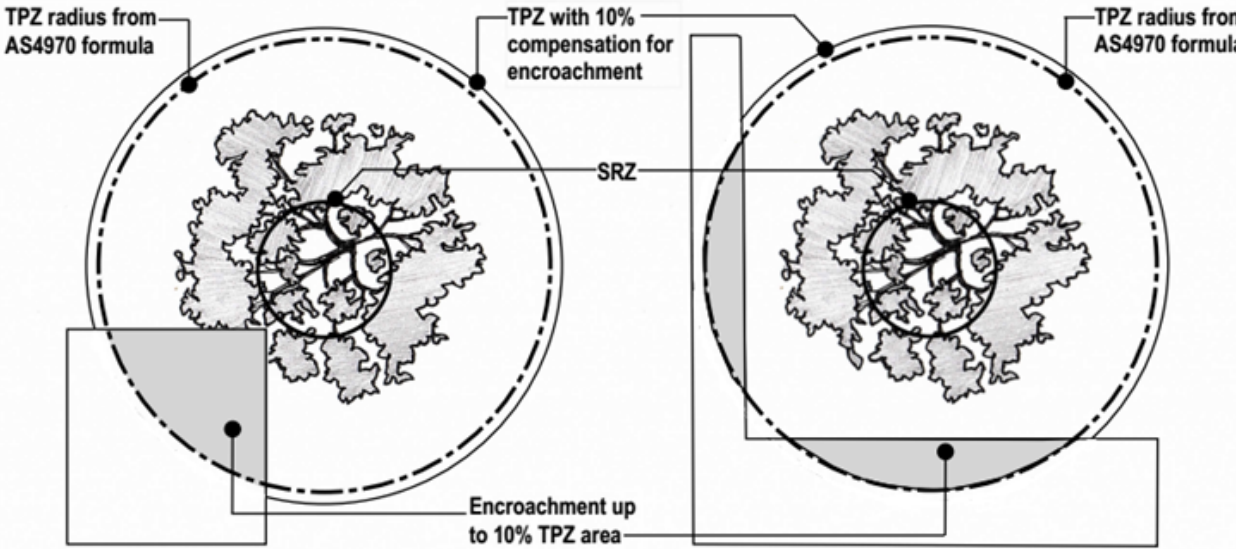


Tree Protection Zone

NO ACCESS

Contact:

Size: Approximate dimensions 225 x 300mm.
Material: Polypropylene or colourbond steel.



TPZ radius from AS4970 formula

TPZ with 10% compensation for encroachment

TPZ radius from AS4970 formula

SRZ

Encroachment up to 10% TPZ area

NOTE: This example is based on a tree with a DBH of 1.0m, and a DAB of 1.1m.

TPZ = Tree Protection Zone
 referred to as the radius in metres and calculated using the following formula:

$$TPZ = 12 \times DBH$$

where: *DBH* = Diameter at Breast Height (i.e. measured at 1.4m above ground level).

SRZ = Structural Root Zone
 Referred to as the radius in metres and calculated using the following formula:

$$RSRZ = (D \times 50)^{0.42} \times 0.64$$

where: *RSRZ* = Radius of Structural Root Zone
D = Stem Diameter (measured directly above the buttress i.e the DAB).

These examples illustrate a tree with a DBH of 1.0m and DAB of 1.1m. A minor encroachment is less than 10% of the total TPZ area and is outside the SRZ. Any loss of TPZ is to be compensated for elsewhere and contiguous with the TPZ, as indicated in the examples.

NOTE: Trees that do not have a symmetrical crown require the TPZ to be altered to protect the crown projection by at least 1m outside the crown's perimeter. This must be identified and addressed by the Project Arboriculturist prior to installing tree protection devices, including fencing.

Examples of Minor Encroachment into Tree Protection Zone (TPZ) (c) Catriona Mackenzie.

Include the Project Arboriculturist's details in the 'Contact' panel.

APPENDIX D
PHOTOGRAPHS





Plate 1
Tree 01 (Crack Willow), Tree 02 (Cabbage-tree Palm), and Trees 9351 – 9356 (Coral Trees), and 9382 (Radiata Pine at far right).



Plate 2
Looking south towards Trees 04, 05 (Grey Ironbarks-mid frame), 9284, 9285, 9288, 9315 (Radiata Pines) and 9316 (Grey Ironbark to far right).



Plate 3
Looking east towards Tree 9381 (Snow-in-summer), Tree 9382 (Radiata Pine at right) and 9379 (Radiata Pine to left).



Plate 4
Looking north towards Tree 9311 (Grey Ironbark).



Plate 5
Looking south towards Tree 9311 (Grey Ironbark).



Plate 6
Looking north towards Tree 09 (Spotted Gum), with T9311 (Grey Ironbark beyond).



Plate 7
Looking northeast towards Tree 07 (Kurrajong) and Tree 06 (Camphor Laurel) to its right.



Plate 8
Looking northwest towards Tree 9317 (Thin-leaved Stringybark) with 9322 (Radiata Pine) to the right.



Plate 9
Looking northwest towards Trees 9377, 9378 (Weeping Lillypillies) with 9379 (Radiata Pine) to the right.



Plate 10
Looking west towards Tree 9365 (Jacaranda).



Plate 11
Looking northeast towards Trees 9273, 9274 (Privets) with 9275 (Radiata Pine) and 9276 (Coral Tree) to the right.



Plate 12
Looking west towards Trees 9369 (Pittosporum) at far left, 9368 (Pear) with 6345 (Crack Willow) to the right, and 9041 (Coral Tree) at centre, background.

APPENDIX E

SCHEDULE OF ASSESSED TREES



SCHEDULE OF ASSESSED TREES—37-41 Bengal Road, Coolongolook. August 2018

NOTE: Trees 01 – 10 have been added by UFA to the tree audit. The locations of these ten trees on the Tree Location Plan (Appendix F) are approximate only. All other tree numbers in this tree audit correspond with those on the detailed survey by CalCo Surveyors.

| Tree No. | Genus and species Common Name | Ht (m) | Sp (m) | DBH (mm) | Age | V | C | Observations/Comments | ULE | TSR | RV | SRZ (m) | TPZ (m) | TPZ (area) |
|----------|--|--------|--------|----------|-----|-----|-----|--|-----|-----|----|---------|---------|------------|
| 01 | <i>Salix fragilis</i> Crack Willow | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. Lopped for power lines. Not plotted on survey. | - | - | L | - | - | - |
| 02 | <i>Livistona australis</i> Cabbage-tree Palm | 12 | 4 | 300 | SM | G | G | Locally indigenous species (rainforest). No special problems visibly apparent at time of inspection. Can be retained or transplanted. | 1A | M | H | - | 3.0 | 28.0 |
| 03 | <i>Salix fragilis</i> Crack Willow | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. Collapsed into dam. | - | - | L | - | - | - |
| 04 | <i>Eucalyptus paniculata</i> Grey Ironbark | 9 | 4 | 125 | Y | G | G | Locally indigenous species Possibly <i>E. fibrosa</i> – no readily observable fruits for identification. Slight stem kink (phototropic response). | 1A | L | M | 1.6 | 2.0 | 8.0 |
| 05 | <i>Eucalyptus paniculata</i> Grey Ironbark | 7 | 2 | <100 | Y | F-G | F | Locally indigenous species. Suppressed to some degree by adjacent Pines. | 2D | M | M | 1.5 | 2.0 | 7.0 |
| 06 | <i>Cinnamomum camphora</i> Camphor Laurel | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. Self-sown. | - | - | L | - | - | - |
| 07 | <i>Brachychiton populneus</i> Kurrajong | 7 | 8 | 350 | M | G | F-G | Locally indigenous species. Located at/near top of bank. Very established specimen – appears quite old. Branching @ 3m AGL. Small <i>Pittosporum</i> and Camphor Laurels nearby. | 2A | M | H | 2.3 | 4.2 | 55.0 |
| 08 | <i>Pinus radiata</i> Radiata Pine | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 09 | <i>Corymbia maculata</i> Spotted Gum | 14 | 6 | 250 | SM | G | F | Locally indigenous species. Codominant stems @ 4m AGL. bleeding' at junction of acutely angled, included stems. Potential to 'prune-out' lesser stem to improve structure. | 2B | M | M | 2.0 | 3.0 | 28.0 |
| 10 | <i>Eucalyptus eugenioides</i> Thin-leaved Stringybark | 11 | 4 | 300 | SM | G | F-G | Locally indigenous species. Possibly <i>E. globoidea</i> – no readily observable fruits for identification. Small tree at/close to boundary. No special problems observed at time of inspection. | 1A | M | H | 2.2 | 3.6 | 41.0 |
| 6345 | <i>Salix fragilis</i> Crack Willow | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |

URBAN FORESTRY AUSTRALIA - TREE MANAGEMENT & CONSULTING ARBORICULTURISTS

| Tree No. | Genus and species Common Name | Ht (m) | Sp (m) | DBH (mm) | Age | V | C | Observations/Comments | ULE | TSR | RV | SRZ (m) | TPZ (m) | TPZ (area) |
|----------|---|--------|--------|----------------------|-----|---|-----|--|-----|-----|----|---------|---------|------------|
| 9041 | <i>Erythrina x sykesii</i> Coral Tree | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. Lopped, and badly affected with Sooty Mould . | - | - | L | - | - | - |
| 9042 | <i>Erythrina x sykesii</i> Coral Tree | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. Large tree with Privet nearby. | - | - | L | - | - | - |
| 9273 | <i>Ligustrum lucidum</i> Large-leaved Privet | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9274 | <i>Ligustrum lucidum</i> Large-leaved Privet | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9275 | <i>Pinus radiata</i> Radiata Pine | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9276 | <i>Erythrina x sykesii</i> Coral Tree | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9277 | <i>Populus</i> sp. indet. Poplar | 13 | 16 | 2 x *400 (575) | M | G | F-P | Introduced exotic species (not the exempt Lombardy Poplar). Several large branch failures . Deadwood >100mm Ø and >5m long. Pocket decay . Mistletoe. Vines. Basal suckers . | 3D | M | L | 2.8 | 7.0 | 152.0 |
| 9279 | <i>Pinus radiata</i> Radiata Pine | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9284 | <i>Pinus radiata</i> Radiata Pine | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9285 | <i>Pinus radiata</i> Radiata Pine | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9286 | <i>Eucalyptus paniculata</i> Grey Ironbark | 13 | 5 | 225 | SM | G | G | Locally indigenous species. Very slight crown suppression to W. No major deadwood or dieback noted. | 1A | M | H | 1.9 | 2.7 | 23.0 |
| 9288 | <i>Pinus radiata</i> Radiata Pine | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9311 | <i>Eucalyptus paniculata</i> Grey Ironbark | 22 | 24 | 825 | M | G | F-G | Locally indigenous species. Substantial tree appears to straddle boundary. Large Ø deadwood to S (upper crown area), but moderate volume of small to medium Ø deadwood overall. | 1A | H | H | 3.3 | 9.9 | 308.0 |

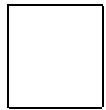
URBAN FORESTRY AUSTRALIA - TREE MANAGEMENT & CONSULTING ARBORICULTURISTS

| Tree No. | Genus and species Common Name | Ht (m) | Sp (m) | DBH (mm) | Age | V | C | Observations/Comments | ULE | TSR | RV | SRZ (m) | TPZ (m) | TPZ (area) |
|----------|--|--------|--------|----------------------|-----|---|-----|---|-----|-----|----|---------|---------|------------|
| 9314 | <i>Eucalyptus paniculata</i> Grey Ironbark | 16 | 7 | 300 | SM | G | F | Locally indigenous species. Codominant stems @ 6m – these included, with compression fork ('ears') forming. | 2D | M | M | 2.2 | 3.6 | 41.0 |
| 9315 | <i>Pinus radiata</i> Radiata Pine | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9316 | <i>Eucalyptus paniculata</i> Grey Ironbark | 19 | 10 | 325 | SM | G | G | Locally indigenous species. No special problems observed at time of inspection. | 1A | H | H | 2.2 | 3.9 | 48.0 |
| 9317 | <i>Eucalyptus eugenioides</i> Thin-leaved Stringybark | 17 | 10 | 250, 400 (475) | M | G | F-G | Locally indigenous species. Possibly <i>E. globoidea</i> – no observable fruits for identification. Subordinate stem and larger stem being 'squeezed' at junction. Small Ø deadwood scattered thru crown. | 2A | M | H | 2.6 | 5.7 | 104.0 |
| 9322 | <i>Pinus radiata</i> Radiata Pine | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9329 | <i>Cinnamomum camphora</i> Camphor Laurel | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9351 | <i>Erythrina x sykesii</i> Coral Tree | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9352 | <i>Erythrina x sykesii</i> Coral Tree | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9353 | <i>Erythrina x sykesii</i> Coral Tree | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9354 | <i>Erythrina x sykesii</i> Coral Tree | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9355 | <i>Erythrina x sykesii</i> Coral Tree | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9356 | <i>Erythrina x sykesii</i> Coral Tree | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9365 | <i>Jacaranda mimosifolia</i> Jacaranda | 10 | 11 | 475 | EM | F | P | Introduced exotic species. Past ringbarking damage to lower stem. Sprouting below. Heavy crown bias to N. Overtopped by nearby Pine and poorly pruned in the past. Can be a 'weedy' species | 3B | M | L | 2.6 | 5.7 | 104.0 |

URBAN FORESTRY AUSTRALIA - TREE MANAGEMENT & CONSULTING ARBORICULTURISTS

| Tree No. | Genus and species Common Name | Ht (m) | Sp (m) | DBH (mm) | Age | V | C | Observations/Comments | ULE | TSR | RV | SRZ (m) | TPZ (m) | TPZ (area) |
|----------|--|--------|--------|------------------------------------|-----|---|-----|---|-----|-----|----|---------|---------|------------|
| 9368 | <i>Pyrus</i> sp. indet. Pear | 12 | 14 | *800 DGL (700) | M | G | F-P | Introduced exotic species. Multi stemmed @ base. Suckers. Rubbing and crossing branches. Tightly squeezed stems, etc. | 3A | M | L | 3.1 | 8.4 | 222.0 |
| 9369 | <i>Pittosporum undulatum</i> Sweet Pittosporum | 9 | 10 | *700 DGL (625) | M | G | G | Locally indigenous species. Large, mature specimen. Minor native borer damage. No major issues. Can be 'weedy' in some situations. | 2D | M | M | 2.9 | 7.6 | 180.0 |
| 9376 | <i>Populus</i> sp. indet. Poplar | - | - | - | - | - | VP | Introduced exotic species (not the exempt Lombardy Poplar). Collapsed (root and lower stem failure). Large fruiting bodies of <i>Ganoderma applanatum</i> . | 4D | L | L | - | - | - |
| 9377 | <i>Waterhousea floribunda</i> Weeping Lillypilly | 10 | 8 | 1 x 100, 2 x 250 (375) | EM | G | F | Locally indigenous species (rainforest creeks). Some branch borer damage and bark splits. Tight stems, some inclusion or bark at junctions. | 2D | M | M | 2.4 | 4.5 | 64.0 |
| 9378 | <i>Waterhousea floribunda</i> Weeping Lillypilly | 12 | 8 | 200, 275, 400 (525) | EM | G | F | Locally indigenous species (rainforest creeks). As above. Some interference from nearby trees. | 2D | M | M | 2.7 | 6.3 | 124.0 |
| 9379 | <i>Pinus radiata</i> Radiata Pine | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9380 | <i>Salix fragilis</i> Crack Willow | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |
| 9381 | <i>Melaleuca linariifolia</i> Snow-in-summer | 9 | 6 | 1 x 200, 2 x 225 (375) | EM | G | F | Locally indigenous species (swampy ground). Overtopped by Pine, with dieback to N. Up to 40% crown suppression and decline | 2D | M | M | 2.4 | 4.5 | 64.0 |
| 9382 | <i>Pinus radiata</i> Radiata Pine | - | - | - | - | - | - | Exempt species – Table 2, Part 12.10 of the Great Lakes DCP2014. | - | - | L | - | - | - |

KEY



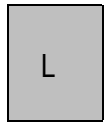
Prescribed trees to be retained



Prescribed trees proposed to be removed.



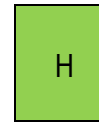
Non-prescribed trees exempt from preservation controls under Great Lakes DCP2014.



LOW Retention Value-These trees are not considered important for retention.



MEDIUM Retention Value-These trees may be retained and protected.



HIGH Retention Value -These trees are considered important for retention and should be retained and protected.

DETAILS FOR HEADINGS AND SYMBOLS USED IN TREE SCHEDULE

* Denotes those situations where the tree's Diameter at Breast Height (DBH) has been visually estimated (usually adjoining trees or those that are hard to access and/or physically measure). The numerical figure in parentheses is the calculated DBH for a multiple stemmed tree using the AS4970 formula, or, is the calculated DBH where the measurement cannot be made at the standard 1.4m above ground level, e.g. where the diameter of the stem is measured at ground level (DGL) or above the buttress (DAB). All calculated figures are rounded up to the nearest 25mm to determine the TPZ offsets.

sp. indet. = species indeterminate (not determined).

DAB—The trunk/stem diameter measured *above the buttress*/root and trunk confluence, using a diameter tape

DGL—The trunk/stem diameter measured *at ground level*, using a diameter tape.

AGL—*above ground level*.

? —a tentative result due to inspection limitations, e.g. limited visual access to an adjoining tree, very dense vegetation obscuring tree parts or preventing visual access, a tree that requires more detailed assessment, such as an aerial inspection, decay diagnostic tests, pathology tests, etc.

H refers to the approximate height of a tree in metres, from base of stem to top of tree crown.

Sp refers to the approximate and average spread in metres of branches/canopy (the 'crown') of a tree.

DBH refers to the approximate diameter of tree stem at breast height i.e. 1.4 metres above ground (unless otherwise noted) and expressed in millimetres.

Age refer to Appendix A -Terms and Definitions for more detail.

V refers to the tree's vigour (health) Refer to Appendix A -Terms and Definitions for more detail.

C refers to the tree's structural condition. Refer to Appendix A -Terms and Definitions for more detail.

ULE refers to the estimated *Useful Life Expectancy* of a tree. Refer to Appendices A and B for details.

TSR The *Tree Significance Rating* considers the importance of the tree as a result of its prominence in the landscape and its amenity value, from the point of public benefit. Refer to Appendix B. Significance of a Tree Assessment Rating for more detail.

RV Refers to the retention value of a tree, based on the tree's ULE *and* Tree Significance. Refer to Appendix B – Significance of a Tree Assessment Rating for more detail.

SRZ Structural Root Zone (SRZ) refers to the critical area required to maintain stability of the tree. Refer to Appendix A -Terms and Definitions for more detail.

TPZ Tree Protection Zone (TPZ) refers to the *tree protection zones* for trees to be retained. Refer to Appendix A -Terms and Definitions for more detail.

APPENDIX F
TREE LOCATION PLAN



