ABNOBA ARBOR
Aboricultural Services

ARBORICULTURAL IMPACT ASSESSMENT| 16 COSTER ST. FRENCHS FOREST

Prepared For Bungalow Homes

30.06.22

Prepared By Liam Strachan

ABNOBA ARBOR
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1 EXECUTIVE SUMMARY

On the 22nd June 2022 Bungalow Homes commissioned Abnoba Arbor to provide an Arboricultural Impact Assessment pertaining to the trees at 16 Coster St. Frenchs Forest. The property lies within the Northern Beaches Council LGA.

The proposed development includes additions and alterations, which consists of a new secondary dwelling being built at the front of the property.

The recommendations and comments in this report are based on the following:

- Conduct a basic ground based visual tree assessment
- Provide information regarding tree species, dimensions, Landscape amenity value, health and vigour assessment, structural condition including potential mitigation options, priority rating for all recommended works.
- Ascertain Tree Protection Zones and Structural Root Zones.
- Determine the impact of the development on all of the trees.
- The amenity of adjoining neighbours and members community is to be considered.
- That report contains all relevant information as outlined in Warringah DCP 2011.

The following trees may be retained and subject to the following tree protection measures;

Tree No	Genus Species (Common Name)	SRZ	TPZ	Landscape Significance	Tree Protection Requirements
1	Bauhinia variegata (Orchid Tree)	2.3	**3.4**	LOW	TPZ FENCING
2	Araucaria columnaris (Cook Island Pine)	2.6	**5.8**	HIGH	TPZ FENCING
3	Corymbia maculata (Broad-leaved Spotted Gum)	2.8	**7.0**	HIGH	TPZ FENCING, TUNK PROTECTION, GROUND PROTECTION. PROJECT ARBORIST SUPERVISION. Root mapping maybe undertaken to determine excavation for driveway.
4	Pittosporum undulatum (Sweet Pittosporum)	1.8	**2.4**	LOW	TPZ FENCING
5	Syagrus romanzoffiana (Cocos Palm)		**3**	LOW	No Measures Required
6	Eucalyptus saligna (Sydney Blue Gum)	2.3	**4.6**	HIGH	No action required
7	Archontophoenix spp. (Alex/Bagalow Palm)		**3**	HIGH	TPZ FENCING
8	Archontophoenix spp. (Alex/Bagalow Palm)		**3**	HIGH	No action required
9	Syagrus romanzoffiana (Cocos Palm)		**3**	LOW	No action required

10	Pittosporum undulatum (Sweet Pittosporum)	1.8	**2.4**	LOW	No action required
11	Ligustrum lucidum (Broad-leafed Privet)	2.0	**3.0**	LOW	No action required
12	Pittosporum undulatum (Sweet Pittosporum)	1.8	**2.4**	LOW	No action required

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3 INTRODUCTION

On the 22nd June 2022 Bungalow Homes commissioned Abnoba Arbor to provide an Arboricultural Impact Assessment pertaining to the trees at 16 Coster St. Frenchs Forest. The property lies within the Northern Beaches Council LGA.

The proposed development includes additions and alterations, which consists of a new secondary dwelling being built at the front of the property.

Site inspection was conducted by Liam Strachan AQF Level 5 Arborist on the 30th June 2022.

3.1 SCOPE

The purpose of this report is to provide information on any trees that may be affected by the proposed demolition and development at 16 Coster St. Frenchs Forest.

The recommendations and comments in this report are based on the following:

- Conduct a basic ground based visual tree assessment
- Provide information regarding tree species, dimensions, Landscape amenity value, health and vigour assessment, structural condition including potential mitigation options, priority rating for all recommended works.
- Ascertain Tree Protection Zones and Structural Root Zones.
- Determine the impact of the development on all of the trees.
- The amenity of adjoining neighbours and members community is to be considered.
- That report contains all relevant information as outlined in Warringah DCP 2011.

In preparing this report, the author has considered the objectives of:

- The State environmental Planning Policy 'Biodiversity and Conservation' 2021
- The State environmental Planning Policy 'Vegetation in Non-Rural Areas' 2017,
- Warringah Local environment Plan 2011
- Warringah Development Control Plan 2011
- AS 4373 'Pruning of Amenity Trees' 2007.

Australian Standard AS4970-2009 Protection of Trees on Development Sites has been used as a benchmark in the preparation of this report.

The report will also assess the on-going viability of the tree and if deemed appropriate, provide recommendations for pruning or the removal of the subject trees. The following report will focus on the trees sustainability within the landscape and will provide recommendations on the most appropriate course of action. The determination will be reached through the assessment of the tree's health, vigour, and structural condition at the time of inspection. The assessment did not include any internal diagnostics such as picus, resistograph, woody tissue examination, nor has any soil testing been conducted.

4 METHOD

4.1 METHODOLOGY SUMMARY

Table 1

Characteristic	Method
Photos	Digital camera
Tree measurements • **Height** • **DBH(Diameter at breast height)** • **SRZ (Structural root zone)** • **TPZ (Tree protection zone)**	• Clinometer, Tape measure • Diameter tape • SRZ = $(DAB \times 50)^{0.42} \times 0.64$ • DBH x 12 (AS4970-2009)
Documents Reviewed	• Warringah DCP 2011 • Warringah LEP 2011
Drawings Reviewed	• RK Designs Proj No. 21-119 Sheet No. 1 • RK Designs Proj No. 21-119 Sheet No. 2 • RK Designs Proj No. 21-119 Sheet No. 3 • RK Designs Proj No. 21-119 Sheet No. 4
Tree retention assessment	ULE (Useful life expectancy) STARS METHOD (IACA, 2010)
Tree health assessment	Visual Tree Assessment, (VTA) as per (Mattheck, et al., 2015) Inspection limited to ground based visual examination of the tree.

4.2 LIMITATIONS

Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible. However, Liam Strachan - Consulting Arborist can neither guarantee nor be responsible for the accuracy of information provided by others. Unless stated otherwise:

- Information contained in this report covers only the trees examined and reflects the health and structure of the tree at the time of inspection. The documented, observations, results, recommendations and conclusions given may vary after the site visit due to environmental conditions. Liability will not be accepted for damage to person or property as a result of natural processes, unforeseeable actions or occurrences.
- Observations recorded for trees located within adjacent properties have been made without entering that property. Deciduous trees inspected during winter and all trees obscured by other vegetation are not able to be properly assessed. As a result, measurements for these trees are estimated. Similarly,

these trees were not subject to a complete visual inspection and defects or abnormalities may be present but not recorded.
- The inspection was limited to visual examination from the base of the subject tree without dissection, excavation, probing or coring (unless specifically noted otherwise).
- There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject tree may not arise in the future.

4.3 SITE INSPECTION

A visual inspection of the tree/s was performed from ground level, data collected includes:

- Genus, Species, Common Name;
- Height, Width, DBH (Diameter at Breast Height), DRB (Diameter above Root Buttress);
- Age, Health & Vigour;
- Significance, Amenity and Ecological Value;
- Form and Structural Condition;
- Visible Defects or Evidence of Wounding.

4.4 MEASUREMENTS

- Tree locations are supplied by client on the survey plan or triangulated using a measuring tape.
- Diameter at breast height (DBH) and Diameter above Root Buttress (DRB) are measured using a diameter tape.
- Height is measured using a clinometer.
- Canopy width is measuerd using a laser measure or tape measure.
- Structural Root Zone (SRZ) and Tree Protection Zone (TPZ) radii are calculated (in accordance with *AS 4970-2009*).
- TPZ or SRZ incursions are measured from the nearest face of the trunk to the face of the structure.

Tree schedule data is recorded in Appendix1.

4.5 REFERENCE DOCUMENTS

This report was written in coordination with:

- Australian Standard AS4970-2009 Protection of Trees on Development Sites
- Warringah DCP 2011
- Warringah LEP 2011
- RK Designs Proj No. 21-119 Sheet No. 1
- RK Designs Proj No. 21-119 Sheet No. 2
- RK Designs Proj No. 21-119 Sheet No. 3
- RK Designs Proj No. 21-119 Sheet No. 4

4.6 DETERMINING A TREES SIGNIFICANCE

Tree health assessments were carried out using VTA as per Mattheck and significance and retention determinations were carried out using the STAR's method which combines ULE (useful life expectancy of subject tree) and significance rating based on characteristics such as health, form, vigour, cultural, heritage and amenity value. The 2 results are placed within a matrix which determines the retention value.

1. Is the tree a locally native remnant; an endangered species; a part of an endangered ecological community; or does the tree provide critical habitat for an endangered species?
2. Is the tree of botanical interest; Is it included in a significant tree register or listed as a heritage item under the Federal State or Local Regulations?
3. Is the tree visually prominent in the locality?
4. Is the tree well structured?
5. Is the tree in good health and/or does it display signs of good vigour?
6. Is the tree typically formed for the species?
7. Is the tree currently located in a position that will accommodate future growth?

Please see Appendix 2: STARS.

4.7 PLANNING GUIDELINES AND SPECIFIC LEGISLATION

Tree management measures are in place for Northern Beaches Council under the provisions of the trees and vegetation preservation for properties covered under Warringah DCP 2011.

- According to the NSW Planning Portal, the site is listed as R2 Low Density Residential.
- The site does not contain, nor does it form part of a heritage item.
- The site is not listed on the terrestrial biodiversity map, nor is it listed as an area of Critically Endangered Ecological Communities.

4.8 SIGNIFICANCE IN THE ENVIRONMENT.

Trees are subject to the following legislation:

- Biodiversity Conservation Act NSW (BIO Act 2016): Provides provisions for conserving biodiversity.
- Threatened Species Conservation Act NSW (1995 TCS Act): Provides provisions for conserving threatened species, populations and ecological communities of animals and plants as well as managing key threatening processes.
- Environmental Protection and Biodiversity Conservation Act NSW (EPBC Act 1999): Provides provision to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places.
- Biosecurity Act NSW (BIO Act 2015): Refers to the protection of native plant communities, reducing the risk to human's health and the risk to agricultural production from invasive weeds.
- NSW Bushfire Brigade 10/50 Legislation is not enforced for this site.

4.9 VTA

The VTA system is based on the theory of tree biology, physiology and tree architecture and structure. This method is used by Arborists to identify visible signs on trees that indicate good health or potential problems. Symptoms of decay, growth patterns and defects are identified and assessed as to their potential to cause

whole tree, part tree or branch failure, this system is based around methods discussed by Claus Mattheck in `The Body Language of Trees' (1994). For the purpose of this report, parts of the VTA system will be used along with other industry standard literature and other relevant studies that provide an insight into potential hazards in trees. This assessment is a snapshot of what could be reasonably seen or determined from a basic visual inspection. The VTA system is generally used as a means to identify hazardous trees, it is important to realize that for a tree to be hazardous there must be a target.

4.10 AUSTRALIAN STANDARD AS4970-2009

- The Australian Standard AS4970–2009 Protection of trees on development sites has been used as a benchmark in the preparation of this report and the terminology and impact assessment methodology have been adopted from this document. This AIA complies with 2.3.5 Arboricultural Impact Assessment of AS4970-2009.

- Recommendations have been based on tree Retention Value, Vigour, Condition and ULE. Trees with a high Retention Value should be given greater priority for retention than trees with Medium Retention Value. Trees with Long (40 years +) ULE should be given greater priority for retention than trees with Short (5-15 years) ULE

- **ULE –** Useful Life Expectancy. The length of time from the date of inspection that the Arborist estimates the tree will live and provide a useful positive contribution to the landscape amenity of the site. ULE ratings are Long (retainable for 40 years or more), Medium (retainable for 16-39 years), Short (retainable for 5-15 years) and Removal (tree requiring immediate removal due to imminent risk or absolute unsuitability).

- **VIGOUR –** Good (G), Fair (F) or Poor (P). The general appearance of the canopy/foliage of the tree at the time of inspection. Vigour can vary with the season and rainfall frequency. A tree can have Good vigour but be hazardous due to Poor condition. A tree in Good vigour has the ability to sustain its life processes. Vigour is synonymous with health.

- **CONDITION –** Good (G), Fair (F) or Poor (P). The general form and structure of the trunk/s and branching. Trunk lean, trunk/branch structural defects, canopy skewness or other hazard features are considered.

- Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) are as per Section 3 of AS4970-2009 and are defined in the rear of this report. It should be noted that the TPZs and SRZs indicated on the site drawings are notional areas only and do not reflect actual root locations.

- **SRZ RADIUS –** Structural Root Zone. The area around a tree required for tree stability. Earthworks should be prohibited within the SRZ. The area is calculated from the formula and graph at Figure 1 ofAS4970-2009. The SRZ graph has been adapted from the work of Claus Mattheck (1994). DBH + 10% has been used for the calculation of SRZ. Where DBH is measured at grade or at a height other than 1.4m above grade, 10% has not been added.

- **TPZ RADIUS –** Tree Protection Zone. Radial offset (m) of twelve times (12x) trunk DBH measured from centre of trunk (for trees less than 0.3 metre DBH minimum TPZ is 2.0 metres). To satisfactorily retain the tree, construction activity (both soil cut and fill) must be restricted within this offset. TPZ offsets are rounded to the nearest 0.1 metre. Existing constraints to root spread can vary. Generally, an area

equivalent to the TPZ should be available to the tree post development. Encroachment occupying up to 10% of the TPZ area is acceptable without detailed rootzone assessment. Encroachments greater than 10% require specific arboricultural assessment.

- "Construction" for the purpose of this AIA means excavation (greater than 100mm), compacted fill or machine trenching. "Excavation" includes cut batters, boxing–out for the various pavement types, trenching for utilities and footings for retaining walls.

- Trees within proposed construction footprints are recommended for removal (Rm).

- 3.4.6 Where construction is proposed within Structural Root Zone (SRZ) offsets, those trees have been similarly recommended for removal (Rm). Fully elevated, pier and beam type construction or hand dug services trenches (or horizontal boring) is recommended and an accepted form of construction methodology for this type of structure.

- Trees with greater than 25% of the Tree Protection Zone (TPZ) impacted by construction are generally recommended for removal (Rm). There are however different types of construction incursions proposed (e.g. fill, cut, services, pavement type, retaining walls) with varying tree impacts likely. Existing constraints to root development also vary the notional TPZ. Compacted fill can be equally as damaging to tree longevity: root development is restricted within heavily compacted soils.

- Trees to be retained with construction impacting less than 25% of the TPZ area were rated as. Specific construction monitoring will be required for these trees (refer to Recommendations).

- TPZ encroachments of >10% are defined (3.3.3 of AS4970) as 'major'. This does not mean that the tree will be fatally injured, but that 'the project arborist must demonstrate that the tree(s) would remain viable'.

- Where construction is proposed beyond the TPZ, those trees are rated as Retain (R) with no specific tree protection design or tree protection monitoring required.

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5 FINDINGS

5.1 SITE CONTROL MAPS

According to the NSW Planning Portal, the site is listed as R2 Low Density Residential. Please see Figure 1

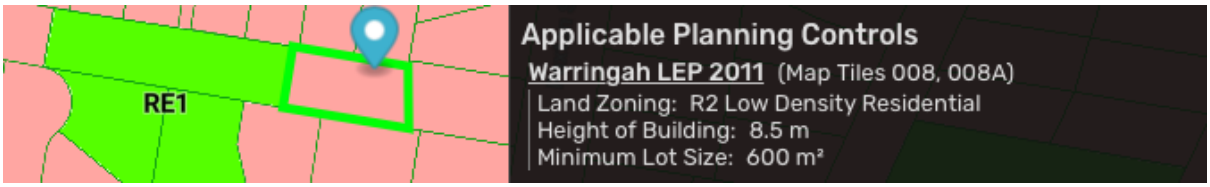


Figure 1

The following relevant Government environmental and heritage mapping overlays have been reviewed (SEED – NSW Government 2020). The site was not listed as a site of Terrestrial Biodiversity, Environmentally Sensitive Land or part of a Critically Endangered Ecological Community. Please see Figure 2.

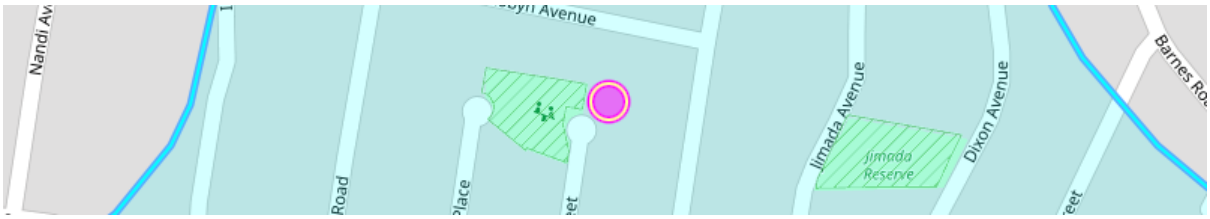


Figure 2

5.2 THE SITE

Figure 3

The sites currently contain one single storey stand-alone fibro dwelling with vehicular access at the Southwest corner of the site.

The site shares a boundary with a park, zoned RE1. All vegetation of which tree protection zones extend into the subject site have been surveyed and plotted on the plans.

The site has a high point R.L of 160.76 in the South west corner at the driveway entrance. The remainder of the site possesses a slight eastern gradient and aspect with a high point R.L of 159.87 at the western boundary and a low point R.L of 158.56 at the eastern boundary.

Site soils are likely to deviate from their natural state due to past urban development, however, site soils are classified as 9130lh (Lucas Heights) Residual soils characterised as;

Landscape – gently undulating crests and ridges on plateau surfaces of the Mittagong formation (alternating bands of shale and fine-grained sandstones). Local relief to 30 m, slopes <10%. Rock outcrop is absent. Extensively or completely cleared, dry sclerophyll low forest and woodland.

Soils – moderately deep (50–150 cm), hardsetting Yellow Podzolic Soils and Yellow Soloths (Dy2.41); Yellow Earths (Gn2.24) on outer edges.

Limitations – stony soil, low soil fertility, low available water capacity.

Vegetation for the site is charecterised as extensively cleared to completely cleared low, eucalypt open-forest and low eucalypt woodland with a sclerophyll shrub understorey. Dominant tree species include turpentine *Syncarpia glomulifera*, smooth-barked apple *Angophora costata*, red bloodwood *Eucalyptus gummifera*, thin-leaved stringybark *E. eugenioides* and scribbly gum *E. haemastoma*. Small scattered areas of native vegetation remain. Larger undisturbed occurrences are found in Ku-ring-gai Chase National Park and Muogamarra Nature Reserve.

5.3 SUMMARY OF SITE INSPECTION DATA

Generally, the sites vegetation was observed to have a mixture of exotic and endemic tree canopy. The existing surveyed trees are shown in Appendix 1.

Other vegetation on site does not meet the dimensions for Northern Beaches Council to consider them as trees, trees as defined on Northern Beaches Council website as being over 5 metres in height.

5.4 SUMMARY OF PROPOSED DEVELOPMENT

The proposed development includes additions and alterations, which consists of a new secondary dwelling being built at the front of the property.

5.5 CURRENT TREE POPULATION

A total of twelve trees were assessed in total. The tree population comprised of:

Table 2

Species	Origin	No. Of Trees
Bauhinia variegata **(Orchid Tree)**	Exotic	T1
Araucaria columnaris **(Cook Island Pine)**	Australian native	T2
Corymbia maculata **(Broad-leaved Spotted Gum)**	Endemic	T3
Pittosporum undulatum **(Sweet Pittosporum)**	Exempt species	T4, T10, T11
Syagrus romanzoffiana **(Cocos Palm)**	Exotic	T5, T9
Eucalyptus saligna **(Sydney Blue Gum)**	Australian native	T6
Archontophoenix spp. **(Alex/Bagalow Palm)**	Australian native	T7, T8
Ligustrum lucidum **(Broad-leafed Privet)**	Noxious Weed	T12

It should be noted that T1 and T2 are located o the council owned nature strip, T5 and T6 are located in the council owned, adjoining park.

T7, T8 and T9 are located in the adjoining property of 5 Robyn Ave. Frenchs Forest and T10, T11 and T12 are located in the neighbouring property; 14 Coster St. Frenchs Forest.

5.6 U.L.E

Useful Life Expectancy (Barrell, 2009). The length of time from the date of inspection that the Arborist estimates the tree will live and provide a useful positive contribution to the landscape amenity of the site. ULE ratings are Long (retainable for 40 years or more), Medium (retainable for 16-39 years), Short (retainable for 5-15 years) and Removal (tree requiring immediate removal due to imminent risk or absolute unsuitability).

Table 3

S.U.L.E	Long (>40yrs)	Medium (15-40yrs)	Short (5-15Yrs)	Removal (<5yrs)
Tree No.	T2, T3, T5, T6, T7, T8, T9, T11	T10, T12	T1, T4	

5.7 TREE SIGNIFICANCE

Retention values were recorded using IACA Significance of a Tree, Assessment Rating System (STARS). Results are published in the table below.

Table 4

Retention Value	Low	Med	High
Tree No.			T1, T2, T3

IACA 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arborculturists, Australia, www.iaca.org.au Appendix 2.

6 PROPOSED DEVELOPMENT IMPACT

Tree Protection Zones (TPZ's) and Structural Root Zones (SRZ's) are defined as per Section 3 of Australian Standard AS4970-2009 Protection of Trees on Development Sites. It should be noted that TPZ's and SRZ's are notional areas only and do not reflect actual root locations. All TPZ's and SRZ's are marked on plans located at the rear of this document. At this time no exploratory root investigation has been undertaken, it may be recommended based on the findings within this report.

6.1 TREES UNAFFECTED BY PROPOSED DEVELOPMENT

Table 5

Tree No	Genus Species (Common Name)	SRZ	TPZ	Landscape Significance	Arborist Notes	Tree Protection Measures
1	Bauhinia variegata (Orchid Tree)	2.3	**3.4**	LOW	Tree located on nature strip	TPZ FENCING
2	Araucaria columnaris (Cook Island Pine)	2.6	**5.8**	HIGH	Tree located on nature strip	TPZ FENCING
4	Pittosporum undulatum (Sweet Pittosporum)	1.8	**2.4**	LOW	Tree located within adjoining park	TPZ FENCING
6	Eucalyptus saligna (Sydney Blue Gum)	2.3	**4.6**	HIGH	Tree located within adjoining park	No action required
7	Archontophoenix spp. (Alex/Bagalow Palm)		**3**	HIGH	Tree located on adjacent property	TPZ FENCING
8	Archontophoenix spp. (Alex/Bagalow Palm)		**3**	HIGH		No action required
9	Syagrus romanzoffiana (Cocos Palm)		**3**	LOW	Tree located on adjacent property	No action required
10	Pittosporum undulatum (Sweet Pittosporum)	1.8	**2.4**	LOW	Tree located on adjacent property, separated by small retaining wall	No action required

11	Ligustrum lucidum (Broad-leafed Privet)	2.0	**3.0**	LOW	Tree located on adjacent property, separated by small retaining wall	No action required
12	Pittosporum undulatum (Sweet Pittosporum)	1.8	**2.4**	LOW	Tree located on adjacent property, separated by small retaining wall	No action required

6.2 TREES WITH MAJOR INCURSIONS

Table 6

Tree No	Genus Species (Common Name)	SRZ	TPZ	Landscape Significance	Arborist Notes	Inc. %	Retainable	TREE PROTECTION MEASURES
3	Corymbia maculata (Broad-leaved Spotted Gum)	2.8	**7.0**	HIGH	13.06m2 (8.5%) Incursion for the dwelling. 19.66m2 (12.8%) for the driveway	21.3%	Tree will survive the impact from the proposed dwelling, driveway should be redesigned, to mis the SRZ and built at grade with no excavation.	TPZ FENCING, TUNK PROTECTION, GROUND PROTECTION. PROJECT ARBORIST SUPERVISION. Root mapping maybe undertaken to determine excavation for driveway.
5	Syagrus romanzoffiana (Cocos Palm)		**3**	LOW	Soft wooded perennial, no impact foreseen.	24%	YES	No Measures Required

6.2.1 DISCUSSION

i. **T3 CORYMBIA MACULATA** is a high retention value, endemic tree that suffers a minor incursion (8.5%) for the proposed dwelling and a major incursion (12.8%) for the proposed driveway, including an incursion to the SRZ. Please see Figure 4.

ii.

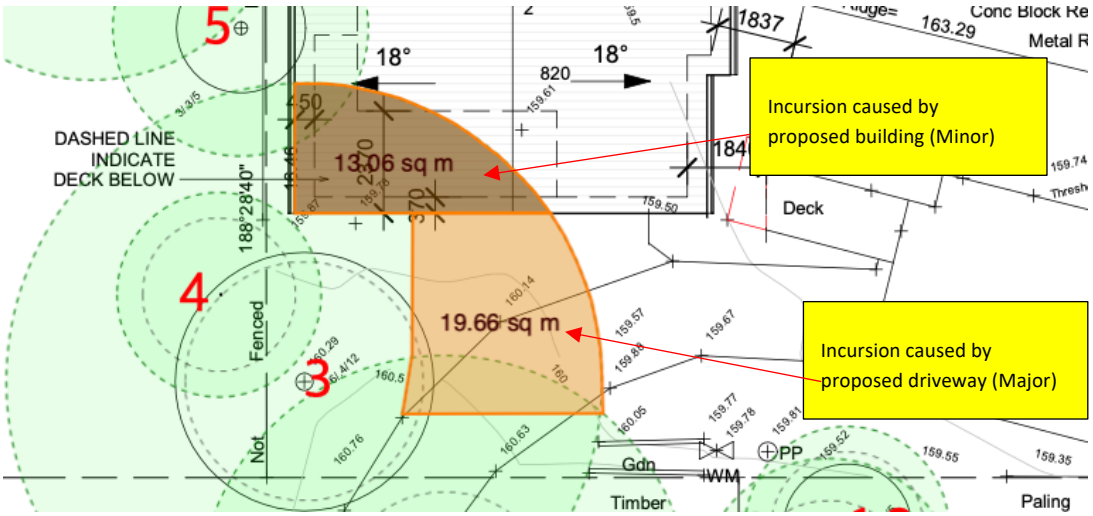


Figure 4

iii. The tree would be expected to survive the incursion caused by the building. When the extent of TPZ incursion is deemed minor as per AS4970 Protection of Trees on Development Sites i.e., less than 10%, excavation may be undertaken using traditional methods. Due to the tree being located within an open park, there is plenty of compensative TPZ.

iv. If Tree Protection Zone and Structural Root Zone areas cannot be excluded, slabs should be engineered with the least intrusive foundation type possible (such as pilings) and attempt to avoid changes to drainage or permeability. Similarly, footpaths should be constructed above grade without an excavated subbase and designed to minimise damage to tree roots.

- The best hard surfaces to use near trees are permeable, require little to no excavation, and minimise compaction.
- The closer to the trunk the soil compaction or grade change is, the greater the damage will be.
- Preserve existing soil moisture regimes (consider how structured drainage systems i.e. sub soil drains as well as general earthworks may change soil hydrology).
- Loss of load bearing support can be negated through the use of thicker concrete with additional mesh reinforcement for structural strength.
- As a general rule mature and over-mature trees are much more vulnerable to the impacts of hard surfacing over root zones.
- Elevated structures should be erected on well-spaced piled supports. Where open excavations are necessary footings, these should be hand or vacuum excavated near trees.
- If the grade is to be raised over root zones, the fill material should be coarser or more porous than the underlying material (e.g. washed river stone).
- The finished level of fill layers should not exceed 100mm and should be applied loosely (i.e. not a compacted fill layer).

v. A footpath or driveway may be constructed at ground level without any excavation, removing turf by raking, having sprayed with herbicide first if time permits. Where a driveway or footpath is to pass through a TPZ suspended slab is to be constructed or approved similar, to protect the roots that may be encountered at, near, or above ground, and may be constructed on structural soil.

vi. If a driveway is to be constructed near a protected tree, careful excavation is to be undertaken manually by using non-motorized hand tools to determine the location of first order and lower order structural roots with a diameter of 20mm or greater, without damaging them.

vii. A driveway may be constructed at ground level without any excavation, by first killing with herbicide the plants to be removed from the pathway area, and then removing that plant material by cutting the trunks of woody shrubs to ground level and by raking all other plant material to expose the top soil surface without organic matter. This will remove the need for physically disturbing the soil and the roots of the tree.

viii. If excavations are essential, they must not exceed 100mm below the existing grades. The excavations should be supervised by a project Arborist with a minimum AQF level 5 qualification. All excavations for the footpath should be carried out manually to avoid impacting retained tree roots. All tree roots greater than 40mm in diameter should be retained, unless the project Arborist has assessed and advised that the pruning/severing of the root will not impact the condition or stability of the tree. Manual excavation may include the use of pneumatic and hydraulic tools, high- pressure air or a combination of high-pressure water and a vacuum device.

ix. Where tree roots greater than 40mm are encountered that must be retained, the footpath should be elevated over the individual tree root to allow for its retention. An examples method that can be used to bridge individual tree roots has been included below (Figure 5).

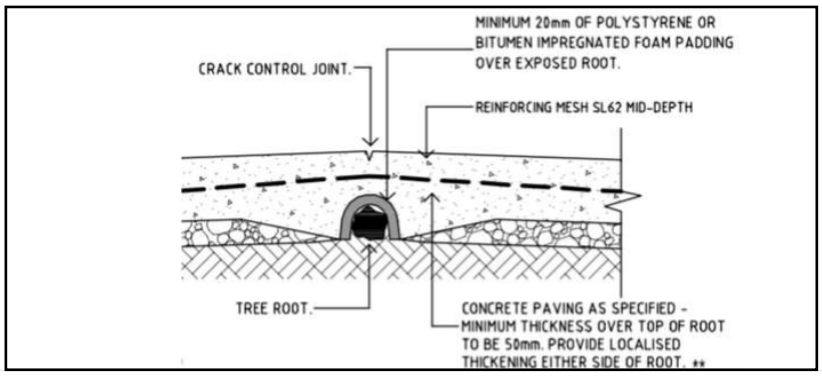
x. 

Figure 5

xi. **IF THE EXISTING DRIVEWAY** is to be demolished and replaced as part of the project, it should be done so using tree sensitive methods, so not to disturb the existing roots.

xii. Existing hardstand surfaces should be retained until just before time of replacement. Removing the slab at the start of the job, carrying out the works within the building and then replacing the driveway can lead to issues including soil contamination and compaction. If the slab is demolished at the start of the project, the TPZ will have to be fenced entirely and ground protection installed which will result in limitations in regard to machinery and material storage at the front of the site.

xiii. The demolition of driveways within the TPZ of a tree to be retained should be undertaken manually using hand tools. Where a driveway is to be demolished being of concrete strip or slab type construction, it should be undertaken by working from the end of the driveway closest to the tree moving backwards whilst utilising the driveway as a stable platform to prevent soil compaction. Where a concrete slab driveway passes less than 1m from the base of a tree and the area beneath the driveway is to be undisturbed and incorporated into the landscape works for the site, the volume of space previously occupied by the driveway must be replaced with local topsoil from the site or otherwise a loamy sand.

xiv. After demolition of an existing driveway, the level of the base for the new driveway should be located at the same existing level as that of the base of the previous driveway and should extend to the outer edge of the TPZ. To prevent excavation from damaging the existing roots which may be located at, near or above the surface of the soil beneath the base of the previous driveway, the new driveway may need to be raised by constructing it on pier or bridge footings between or over them or based on a structural soil and the driveway constructed with any exposed edges concealed to the top of the driveway by minimal filling with a sandy soil and turf, or mulch, or a garden bed with minimal cultivation, or other landscape treatments as appropriate. These works should be undertaken under the supervision of a project arborist. Where roots are to be severed, they are to be cut cleanly with a final cut to undamaged woody tissue.

7 CONCLUSIONS AND RECOMMENDATIONS

The following trees may be retained and subject to the following tree protection measures;

Table 7

Tree No	Genus Species (Common Name)	SRZ	TPZ	Landscape Significance	Tree Protection Requirements
1	Bauhinia variegata (Orchid Tree)	2.3	**3.4**	LOW	TPZ FENCING
2	Araucaria columnaris (Cook Island Pine)	2.6	**5.8**	HIGH	TPZ FENCING
3	Corymbia maculata (Broad-leaved Spotted Gum)	2.8	**7.0**	HIGH	TPZ FENCING, TUNK PROTECTION, GROUND PROTECTION. PROJECT ARBORIST SUPERVISION. Root mapping maybe undertaken to determine excavation for driveway.
4	Pittosporum undulatum (Sweet Pittosporum)	1.8	**2.4**	LOW	TPZ FENCING
5	Syagrus romanzoffiana (Cocos Palm)		**3**	LOW	No Measures Required
6	Eucalyptus saligna (Sydney Blue Gum)	2.3	**4.6**	HIGH	No action required
7	Archontophoenix spp. (Alex/Bagalow Palm)		**3**	HIGH	TPZ FENCING
8	Archontophoenix spp. (Alex/Bagalow Palm)		**3**	HIGH	No action required

9	Syagrus romanzoffiana (Cocos Palm)		**3**	LOW	No action required
10	Pittosporum undulatum (Sweet Pittosporum)	1.8	**2.4**	LOW	No action required
11	Ligustrum lucidum (Broad-leafed Privet)	2.0	**3.0**	LOW	No action required
12	Pittosporum undulatum (Sweet Pittosporum)	1.8	**2.4**	LOW	No action required

7.1 TREE PROTECTION MEASURES

7.1.1 FENCING

It will not be practical or possible to erect a TPZ fence encompassing the entire TPZ as access will be required to perform the works, however, an exclusion zone should be erected around the tree to limit activities that take place within the TPZ. *AS4970-2009 Protection of Trees on Development sites* states that the following activities are prohibited within the TPZs;

- Storage.
- Preparation of chemicals, including preparation of cement products.
- Refueling.
- Dumping of waste.
- Washing down and cleaning of equipment.

AS 4687 specifies applicable fencing requirements, 1.8M Mesh fence. Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter and liquids into the protected area.

Fencing must

- be 1.8m high fully supported chainmesh protective fencing. The fencing shall be secure and fastened to prevent movement. The fencing shall have a lockable opening for access. Roots greater than 40mm in diameter shall not be pruned, damaged or destroyed during the installation or maintenance of the fencing. The fencing shall not be moved, altered or removed without the approval of the Project Arborist;
- have a minimum of two signs that include the words “Tree Protection Zone – Keep Out”. Each sign shall be a minimum size of 600mm x 500mm and the name and contact details of the Project Arborist. Signs shall be attached facing outwards in prominent positions at 10 metre intervals or closer where the fence changes direction. The signs shall be visible within the site;
- be kept free of weeds and, except where the existing surface is grass, grass. Weeds shall be removed by hand; and
- unless the existing surface is grass, have mulch installed and maintained to a depth of 75mm.

Fencing should be installed before any machinery or materials are brought onto the site and before the commencement of works including demolition. Once erected, protective fencing must not be removed or altered without approval by the project arborist. Fencing must be clearly signed and adhere to the standard as outlined in *AS4970-2009 Protection of Trees on Development Sites*.

7.1.2 TRUNK PROTECTION

Trunk protection as outlined in *Australian Standard AS4970-2009 Protection of Trees on Development Sites* should be installed. This should be installed by or signed off by an AQF Level 5 arborist.

Trunk protection is achieved when the vertical trunk of exposed trees is protected by the placement of 1.8m lengths of 50 x 100mm hardwood timbers, spaced vertically, at 150mm centres and secured by 2mm wire at 300mm wide spacing over suitable protective padding material e.g. Jute Matting. The trunk protection shall be maintained intact until the completion of all work on site. Additionally, smaller fences can be erected around the trunks to avoid damage.

Trunk protection should be installed before any machinery or materials are brought onto the site and before the commencement of works including demolition. Once erected, trunk protection should be certified by the project arborist and adhere to the standard as outlined in *AS4970-2009 Protection of Trees on Development Sites*.

7.1.3 GROUND PROTECTION

It is also recommended that the trees are mulched within the TPZ's. Section 4.6 of Australian Standard AS4970-2009 Protection of Trees on Development Sites states that the area within the TPZ should be mulched. The mulch must be maintained to a depth of 50–100 mm using material that complies with AS 4454. Mulch should be applied at no greater depth than 50-75 mm. Mulch should be spread beyond the dripline (Shigo, 1991). The mulch should be no closer than 200mm away from the base of the trunk as this can cause collar rot and increase the incidence of disease.

This will also allow for a favourable root environment for the trees possibly improving tree health throughout the development period. Benefits of mulching include:

- Conservation of soil moisture.
- Soil erosion and runoff are reduced, slowing water movement and keeping water in contact with soil.
- Soil fertility is increased by nutrients from mulch.
- Soil microorganism activity is enhanced.
- Protects surface soil from compactive forces, such as vehicles, people and rain impact.

The mulch should be suitably coarse and broken down to ensure a Carbon: Nitrogen ratio of no more than 25:1 or less and should be no less than 75mm and no more than 100mm in depth. It is important to choose the correct mulch for improving soil fertility. The mulches must have high C:N ratios. Mulches with low C:N ratios may develop nitrogen deficiency (Carlson, 2001) Mulching should be arranged by a project arborist.

Soil moisture levels should be regularly monitored by the project arborist. "Benefits of mulch to the soil environment and ultimately plant health and growth are accrued both immediately after application as the mulch protects the soil surface, and over time as the organic mulch decomposes. Immediate benefits include conserving soil moisture, reducing salt build up in the surface soil, reducing soil erosion and water runoff, protection from compactive forces, insulating the soil from temperature extremes, reducing reflection and reradiation of heat, and suppressing weed growth. Benefits that accrue over time from the use of organic mulches involve improvements to soil structure, permeability, aeration, fertility, and biological activity. Improved aeration, temperature, and moisture conditions near the surface encourage rooting and other biological activities that enhance soil structure. Just the absence of cultivation and the low amount of compaction will allow soil structure to improve through wetting and drying cycles and biological activity.

Improved soil structure increases the infiltration rate and allows more uniform water distribution and less soil erosion, all of which favour plant growth." (Harris, Clark & Matheny, 2004)

If access for machinery is required within the TPZ ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ.

Although heavy machinery is not permitted within the TPZ, access is permitted when additional ground protection measures are employed in accordance with *AS4970-2009 Protection of Trees on Development sites* specifically section 4.5.3 Ground Protection . A permeable geotextile membrane should be laid over the required area beneath a layer of coarse mulch and then covered with rumble boards. The boards should be placed on their flat edge, side by side with a 30-50mm gap to form a rumble strip. The boards are to be held together with a metal bracing straps.

7.1.4 PRUNING RETAINED TREES

Trees that require pruning in order to facilitate the new build should be directed by an AQF Level 5 project arborist and undertaken by a minimum AQF Level 3 arborist adhering to *AS4373-2007* and NSW Workcover Code of Practice *Amenity Tree Industry 1998* and Safe Work *Guide to Managing Risks of Tree Trimming and Removal Work 2016*.

7.1.5 EXCAVATION WITHIN THE TPZ

When the extent of TPZ incursion is deemed minor as per AS4970 Protection of Trees on Development Sites i.e., less than 10%, excavation may be undertaken using traditional methods. Excavation for Benching and Shoring must be considered.

When the encroachment is deemed to be major i.e., greater than 10% of the TPZ of trees to be retained; exploratory root investigation using non-destructive root sensitive techniques should be undertaken at the perimeter of the required penetration point nearest the tree, bearing in mind compensation for benching and battering.

Techniques include:

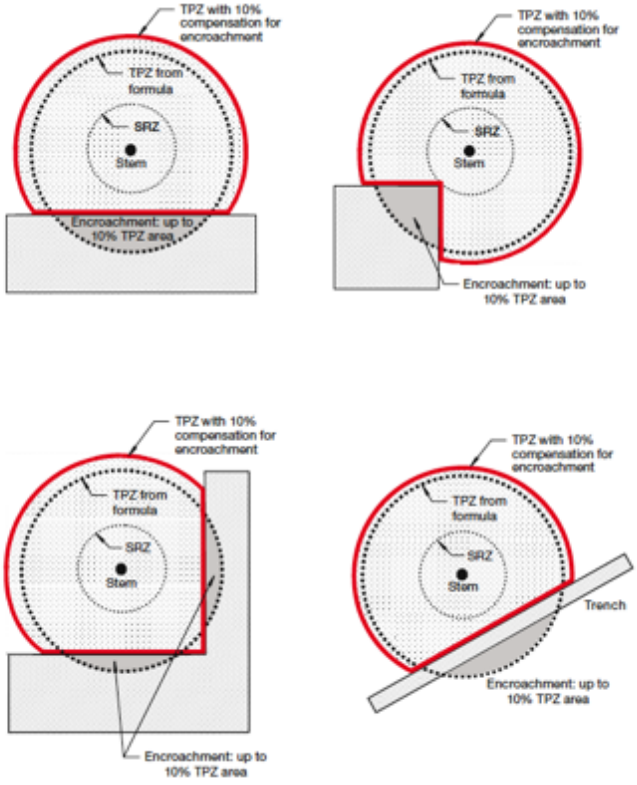
- Hand excavation
- Vacuum excavation
- High pressure water jet excavation
- Air Spade

The exploratory root investigation should be undertaken at the outer limits of the of the penetration point to a maximum of 700mm or when compacted sub-soil or rock bed is encountered. Roots greater than 50mm in diameter should be retained and advice from a project arborist sought.

Any roots less than 50mm in diameter that will require pruning should be undertaken by a suitably qualified arborist using sharp tools to ensure clean cuts. "When intentionally cutting roots, it is important to make clean cuts, perpendicular to the line of the root. Clean cuts offer a smaller surface for drying and compartmentalize better. Roots that are torn by large grading equipment can develop cracks that run laterally along the root, increasing the extent of damage. When grading near trees, always prune the roots in advance." (Urban 2008)

7.1.6 TPZ COMPENSATION

TPZ area lost to incursions should be compensated for elsewhere on the site and contiguous to the TPZ.



7.1.7 INSTALLATION OF SERVICES WITHIN TPZ

All underground services should be placed outside the TPZs of the retained trees. When routing services outside the TPZ becomes unavoidable, trenching must be undertaken using tree sensitive excavation.

Techniques include:

- Hand excavation
- Vacuum excavation
- High pressure water jet excavation
- Air Spade
- Horizontal Directional Drilling (Entry and exit pits must be located outside of the TPZ)

All excavation should be undertaken or supervised by an AQF Level 5 Arborist.

7.1.8 PIER PLACEMENT WITHIN TPZ

When placing piers in the TPZ, the first 800mm should be undertaken by hand digging only. Care should be taken not to damage roots 50mm and over. Pier holes should be flexible in design and be placed in such a manner that significant roots are bridged rather than severed.

7.1.9 DEMOLITION OF HARDSTAND AREAS WITHIN TPZ

Demolition of hardstand areas within the TPZ's of trees may be undertaken using machinery but must be done so with care. Demolition should commence at the outer most point of the hard stand area nearest the tree working backwards away from the tree, with the machinery remaining on hard stand surfaces.

Where hard stand surfaces aren't available for machinery ground protection will be required.

This should be done under the supervision of a project arborist.

Once the hardstand surface has been demolished, ground protection as per AS4970 should be installed to limit the incidence of compaction and soil contamination.

7.1.10 LANDSCAPING WITHIN THE TPZ

Any landscaping works that require excavation within the TPZ should be done so using the methods outlined in 7.1.4.

Any pier holes for retaining walls should be done so by hand prior to piling.

Any excavation within the SRZ of trees should be done so under the direct supervision of a project arborist.

7.1.11 FILL WITHIN THE TPZ

Fill placed in the TPZ of trees to be retained shall be well-drained material equivalent or finer in texture than the existing site topsoil material and should comply with AS4419:2003 (Soils for Landscaping and Garden Use).

In order for the root conditions to remain favourable all vegetation should be removed, including sod and underbrush beneath the branch spread of the tree. Organic matter, as it decomposes beneath a soil fill, can create noxious gases detrimental to the tree roots. The top 75 to 150 mm of the soil surface should be cultivated or broken up carefully using non-motorized hand tools only, so as to disturb the least possible number of roots. This treatment allows better contact with the fill soil and prevents a sharp line of demarcation between the existing soil surface and the fill and where internal soil drainage is good. The fill should consist of large aggregate or sandy soil so that aeriation and drainage is achieved and then the organic layer on top.

7.2 HOLD POINTS, INSPECTION AND CERTIFICATION

To ensure all plans are implemented hold points have been specified in a schedule of works (below). Once each stage is reached the work will be inspected and certified by the project arborist and the next stage may commence.

7.2.1 SCHEDULE OF WORKS AND RESPONSIBILITIES

Table 5

Hold Point	Task	Responsibility	Certification	Timing of Inspection
1	Review service diagrams and update AIA	Principle Contractor	Project Arborist	Prior to CC being granted
2	Install TPZ Fencing, trunk and branch protection.	Principle Contractor	Project Arborist	Prior to site establishment.
3	Install ground protection.	Principle Contractor	Project Arborist	Prior to site establishment.
4	Fortnightly inspection of site	Principle Contractor	Project Arborist	Fortnightly as required
5	Supervise excavation and installation for driveway	Principle Contractor	Project Arborist	As required
6	Final inspection of Trees by Project Arborist	Principle Contractor	Project Arborist	Prior to issue of occupancy certificate.

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9 GLOSSARY OF TERMS

Borers: larvae beetles, moths or wasps that cause damage within the phloem/cambium, sapwood and heartwood of the tree. Borers generally attack weakened trees or stressed trees.

Cambium: The layer of cells between the exterior bark and the inner wood which control cell division, hence stem, branch and shoot expansion.

Cavity: A void, initiated by a wound within the trunk, branches or roots. These voids are referred to as hollows.

Co-dominant: Stems or branches equal in size and relative importance.

Crown: The width of the foliage in the upper canopy of the assessed tree to the four cardinal points.

Crown lifting: The removal of the lower branches of the tree.

Crown thinning: The portion of the tree consisting of branches and leaves and any part of the stem from which branches arise.

Drip line: Where the canopy releases water shed from the foliage during precipitation.

DBH/Diameter: Diameter of trunk at 14meters in height of assessed tree.

Dead wooding: The removal dead branches from a tree.

Dieback: Tree deterioration where the branches and leaves die.

Flush cut: A cut that damages or removes the branch collar or removes the branch and stem tissue and is inconsistent with the branch attachment as indicated by the bark branch ridge.

Genus/ Species: Identified using its scientific name. Where the species name is not known, species is used. The common name for trees may vary considerably in each area of geographical differences and so will not be used in the field survey.

Height: Height has been estimated to + / - 2 meters.

Maturity: Tree age, Assessed as over mature (last 1/3 of life expectancy), mature (1/3 to 2/3 life expectancy) and semi mature (less than 1/3 life expectancy).

Remedial (restorative) pruning: includes: Removing damaged, deadwood; trimming diseased or infested branches. Trimming branches back to undamaged tissue in order to induce the production of shoots from latent or adventitious buds, from which a new crown will be established.

SRZ- Structural Root Zone: An area within the trees root zone in which roots stabilize the tree. Roots cut in this zone can cause instability and lead to anchorage loss.

Structural Integrity: Describes the internal supporting timber. (Substantial to frail)

Target: risk targets are people, property or activities that could injure, damage or disrupted.

Tree Numbering: All trees listed in the tree survey have been numbered and plotted.

TULE- Tree Useful Life

Expectancy: An estimation of the trees useful life expectancy using appropriate industry methods with an inspection regime.

Vigour: This is an indication of the tree health. Trees have either been assessed as Good Vigour, Normal Vigour or Low Vigour.

10 APPENDIX 1: TREE SCHEDULE

Tree No	Genus Species (Common Name)	Height (m)	Canopy Spread (m)				Diameter (m)		SRZ	TPZ	Age Class	Health	Condition	E.L.E	Landscape Significance	Arborist Notes
			N	E	S	W	@1.4m	Base								
1	Bauhinia variegata (Orchid Tree)	8	2	5	4	3	0.28	0.41	2.3	**3.4**	MATURE	POOR	FAIR	<1-15	LOW	
2	Araucaria columnaris (Cook Island Pine)	20	3	3	3	3	0.48	0.55	2.6	**5.8**	MATURE	GOOD	GOOD	>40	HIGH	
3	Corymbia maculata (Broad-leaved Spotted Gum)	20	6	6	5	4	0.58	0.7	2.8	**7.0**	MATURE	GOOD	GOOD	>40	HIGH	
4	Pittosporum undulatum (Sweet Pittosporum)	6	2	1	2	2	0.2	0.22	1.8	**2.4**	SEMI MATURE	FAIR	FAIR	<1-15	LOW	
5	Syagrus romanzoffiana (Cocos Palm)	8	2	2	2	2	0.2	0.3	2.0	**2.4**	SEMI MATURE	GOOD	GOOD	>40	LOW	
6	Eucalyptus saligna (Sydney Blue Gum)	15	5	6	5	5	0.38	0.44	2.3	**4.6**	SEMI MATURE	GOOD	GOOD	>40	HIGH	
7	Archontophoenix spp. (Alex/Bagalow Palm)	12	2	2	2	2	0.23	0.4	2.3	**2.8**	MATURE	GOOD	GOOD	>40	HIGH	
8	Archontophoenix spp. (Alex/Bagalow Palm)	9	2	2	2	2	0.23	0.4	2.3	**2.8**	MATURE	GOOD	GOOD	>40	HIGH	
9	Syagrus romanzoffiana (Cocos Palm)	10	2	2	2	2	0.23	0.4	2.3	**2.8**	MATURE	GOOD	GOOD	>40	LOW	
10	Pittosporum undulatum (Sweet Pittosporum)	6	3	2	1	3	0.2	0.25	1.8	**2.4**	SEMI MATURE	GOOD	FAIR	15>40	LOW	
11	Ligustrum lucidum (Broad-leafed Privet)	9	3	3	3	3	0.25	0.31	2.0	**3.0**	SEMI MATURE	GOOD	GOOD	>40	LOW	
12	Pittosporum undulatum (Sweet Pittosporum)	6	3	2	1	3	0.2	0.25	1.8	**2.4**	SEMI MATURE	GOOD	GOOD	>40	LOW	

11 APPENDIX 2: STARS

IACA Significance of a Tree, Assessment Rating System (STARS)© (IACA 2010)©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

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.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. 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. An example of its use in an Arboricultural report is shown as Appendix A.

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 *in situ* - 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 form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local 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 or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of 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 *in situ* - 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.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

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

Tree Life Expectancy	Tree Significance				
	High	Medium	Low		
Long >40 years					
Medium 15-40 years					
Short <1-15 years					
Remove / Dead					

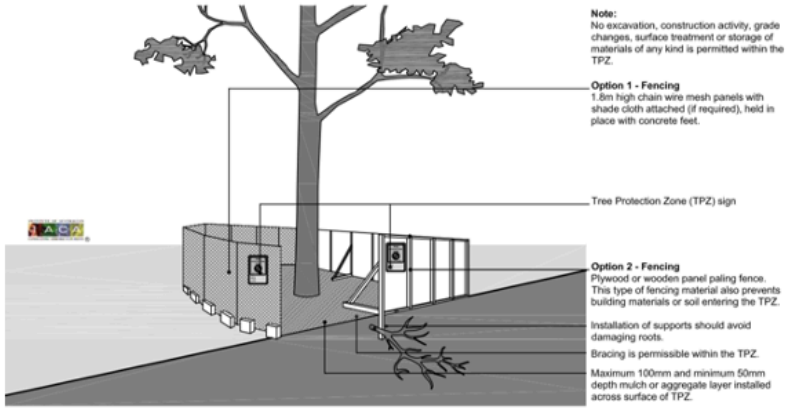
Legend for Matrix Assessment	
	Priority for Retention (High) – These trees are considered important for retention and should be retained and protected. Design modification and re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard 4970 *Protection of tree on development sites*. Tree sensitive construction measures must be implemented if works are to proceed within the Tree Protection Zone.
	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.
	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.
	Priority for Removal – These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

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

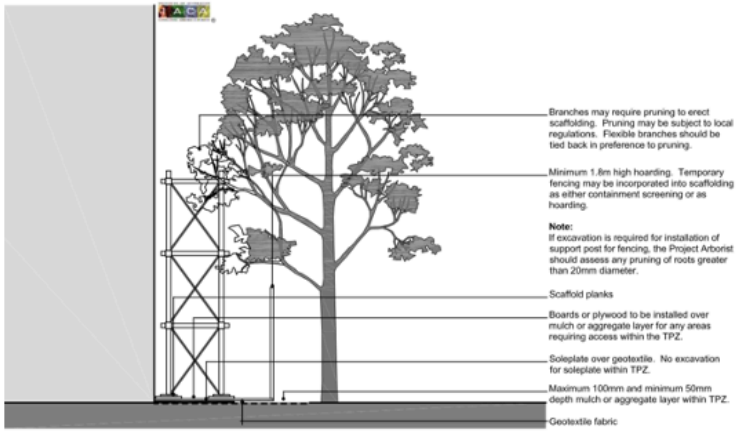
12 APPENDIX 3: SULE

	1. Long	2. Medium	3. Short	4. Removal	5. Moved or Replaced
	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 15 – 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 5 – 15 years with an acceptable level of risk.	Trees that should be removed within the next 5 years.	Trees which can be reliably moved or replaced.
A	Structurally sound trees located in positions that can accommodate future growth.	Trees that may only live between 15 and 40 years.	Trees that may only live between 5 and 15 more years.	Dead, dying, suppressed or declining trees through disease or inhospitable conditions.	Small trees less than 5m in height.
B	Trees that could be made suitable for retention in the long term by remedial tree care.	Trees that may live for more than 40 years but would be removed for safety or nuisance reasons.	Trees that may live for more than 15 years but would be removed for safety or nuisance reasons.	Dangerous trees through instability on recent loss of adjacent trees.	Young trees less than 15 years old but over 5m in heights
C	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.	Trees that may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees that may live for more than 15 years but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Damaged trees through structural defects including cavities, decay, included bark, wounds or poor form.	Trees that have been pruned to artificially control growth.
D		Trees that could be made suitable for retention in the medium term by remedial tree care.	Trees that require substantial remedial tree care and are only suitable for retention in the short term.	Damaged trees that are clearly not safe to retain.	
E				Trees that may live for more than 5 years but should be removed to prevent interference with more suitable individuals or to provide space for new plantings.	
F				Trees that are damaging or may cause damage to existing structures within 5 years.	
G				Trees that will become dangerous after removal of other trees for reasons given in (A) to (F).	

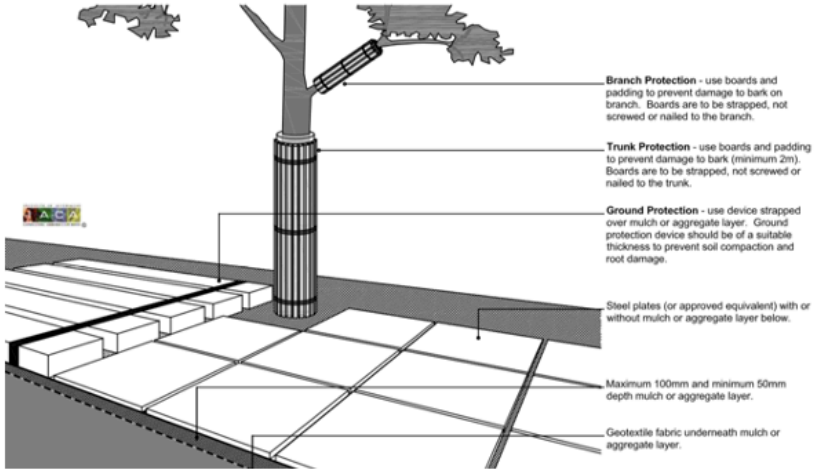
13 APPENDIX 4: TREE PROTECTION (GENERIC)



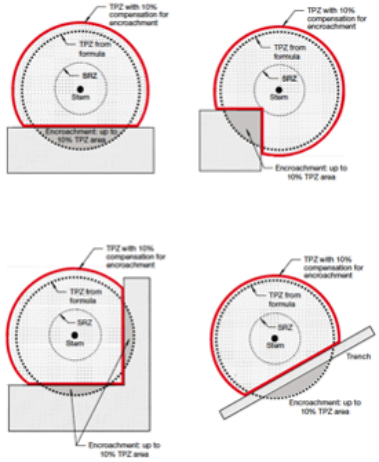
1. Tree Protection Fencing



2. Scaffolding Within TPZ

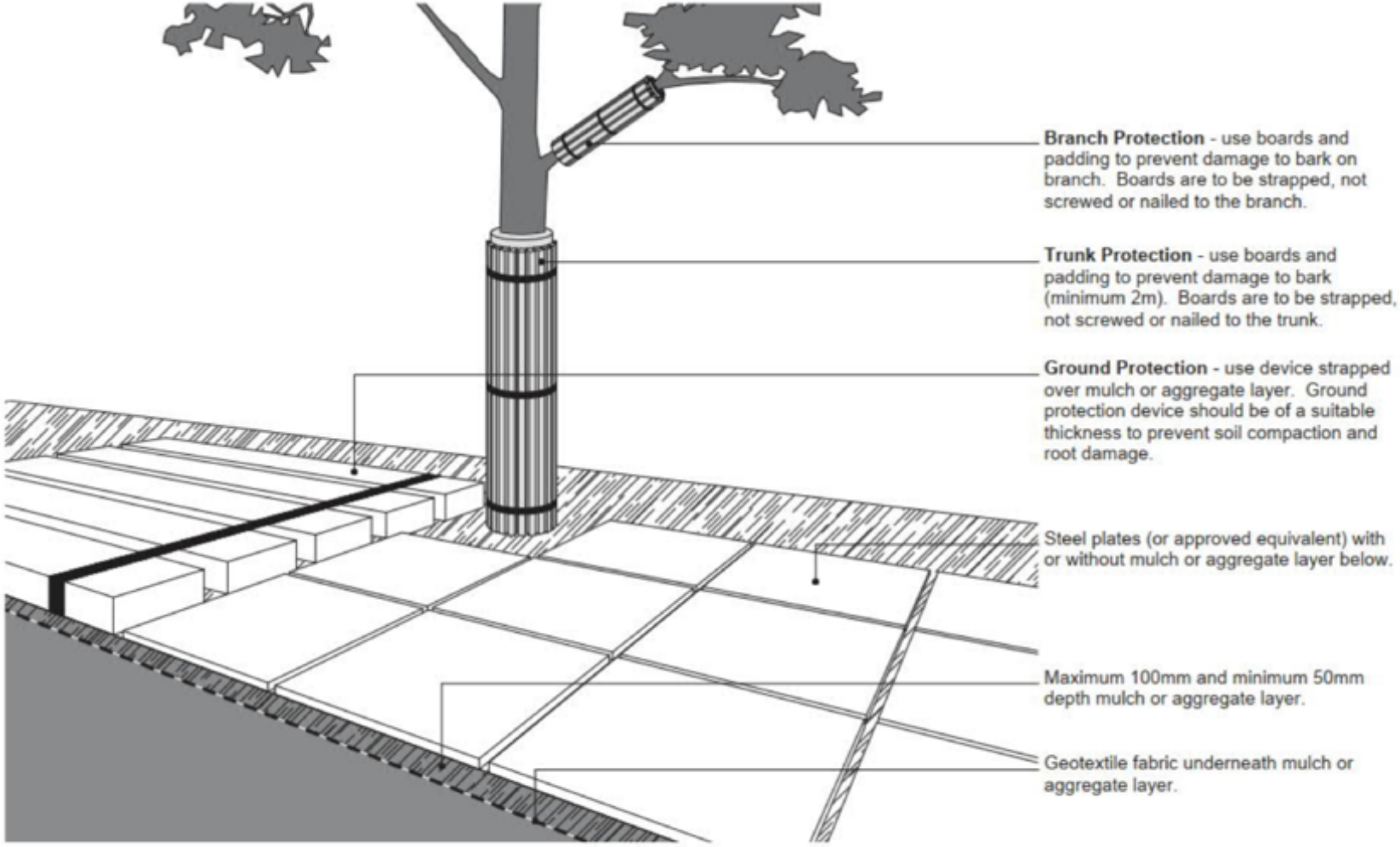


3. Examples Of Trunk, Branch and Ground Protection

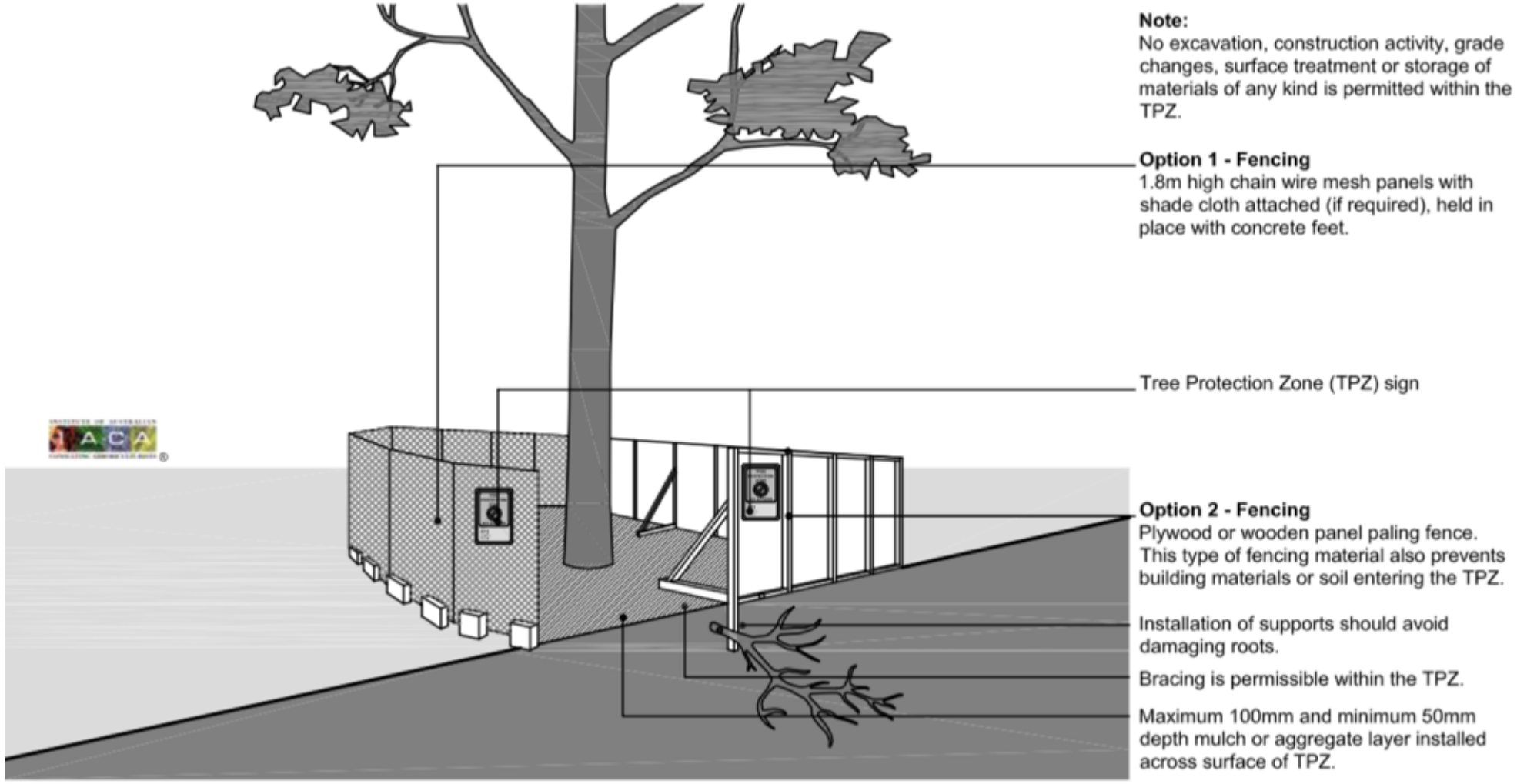


4. TPZ Encroachment Compensation

14 TRUNK AND GROUND PROTECTION



15 TPZ FENCING

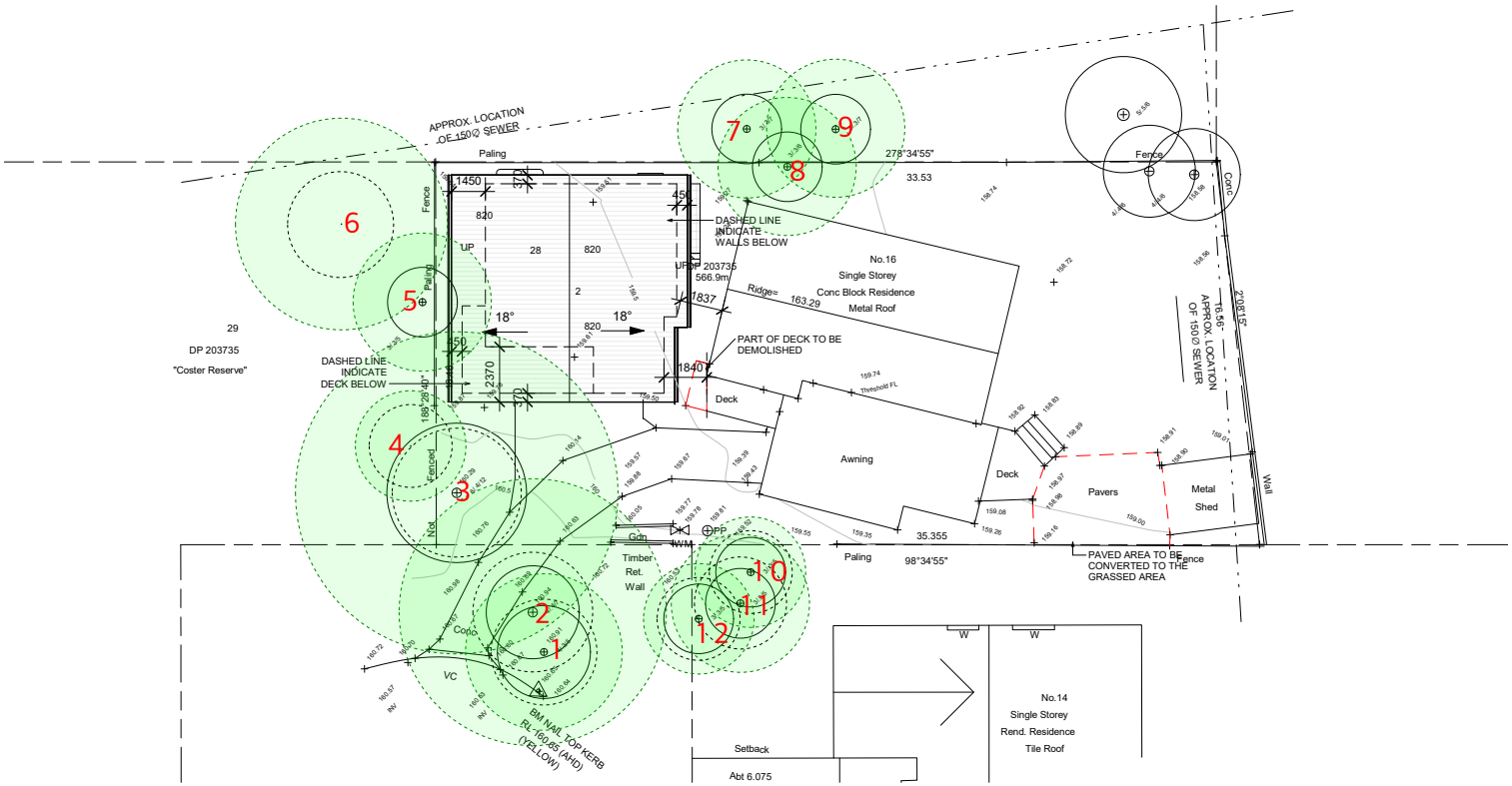


16 SITE DRAWINGS

DRAWING 1: TREE LOCATION PLAN

DRAWING 2: TREE PROTECTION PLAN

SITE DRAWING LEGEND



1 SITE AND ROOF PLAN

1 : 200

PRELIMINARY
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GENERAL NOTES
. All dimensions are to be confirmed on site by the builder/subcontractor, any incongruencies must be reported to the Designer before commencement of any work.
. No Survey has been made on the boundaries, all bearings, distances and areas have been taken from the contour survey plan. A Survey must be carried out to confirm the exact boundary locations.
. No construction work shall commence until a site survey confirming the site boundaries has been completed. The contractor is to ensure that the boundary setbacks are confirmed and used, the boundary setbacks take precedence over all other dimensions. The Survey work must be performed by a registered Surveyor.
. In the event of encountering any discrepancies on these drawings, specification or subsequent instructions issued, the Builder/Subcontractor shall contact the designer before proceeding further with any work.
. All construction, control joints and expansion joints in the wall, floors, other locations shall be in strict accordance with the Structural Engineering details. No joints or breaks other than specified, are allowed without written permission from the Engineer.
. Measurements for the fabrication of secondary components such as, windows, doors, internal frames, structural steel components and the like, are not to be taken from these documents. Measurements must be taken on site to suit the work as constructed.
. All structural components shall be in strict accordance to details and specifications as prepared by a structural engineer.
. All existing structures need to be examined for structural adequacy, and it is the Contractor's responsibility to ensure that a certificate of structural adequacy is available prior to the start of any work.

drawn	date	issue	amendment
EC	22/11/21	A	ISSUE FOR DA

project
PROPOSED CONSTRUCTION OF A GRANNY FLAT AND ATTACHED GARAGE AT 16 COSTER STREET, FRENCHS FOREST 2086 LOT 28 DP 203735.

bdaa ACCREDITED BUILDING DESIGNER

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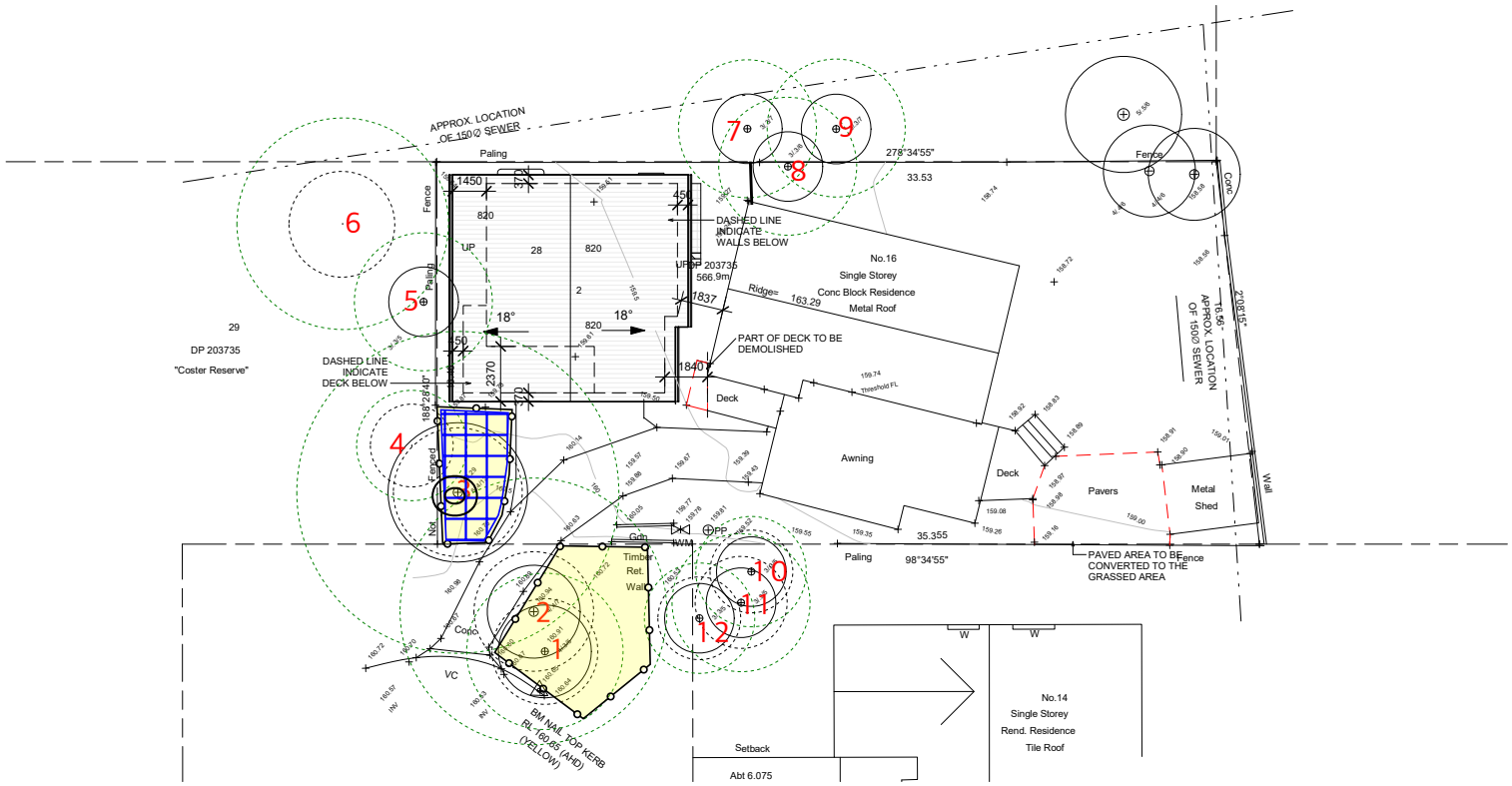
client
HELEN AND TOM COONEY
Bungalow Homes

true north

drawing
SITE AND ROOF PLAN

project no	date	sheet no.	scale @ A3	issue	drawn
21-119	22/11/21	1	1 : 200	A	RK

RK DESIGNS



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