Impact Assessment Report

Prepared for: **Mr Peter Stewart**

Date: 8th March 2022

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Our Garden Path Pty Ltd

About this document

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Statement of Authorship

This study and report were undertaken by OGP at 35 Therry St, Avalon. The author of the report is Vicki Beecher with qualifications BSc. majoring in Geology and Climate Science with over 25 years' experience in this field, AQF level 5 Horticulture (Arboriculture), AQF level 8 Horticulture (Arboriculture) and AQF level 6 Landscape Construction, Quantified Tree Risk Assessment (QTRA) certified.

Limitations Statement

Information presented in this report is based on an objective study undertaken in response to the brief provided by the client. Any opinions expressed in this report are the professional, objective opinions of the authors and are not intended to advocate any proposal or pre-determined position.

Contents

1 Introduction

1.1 Background

1.1.1 This Arboricultural Impact Assessment Statement (AIA) was prepared for Mr Peter Stewart of 35 Therry St, Avalon Beach, (the site) with respect to proposed development of the site including construction of a secondary dwelling in the front garden area and associated landscaping works.

1.1.2 Peter Stewart has instructed Our Garden Path Pty Ltd to undertake an inspection of trees greater than five (5) m in height and located within and within three (3) m of the common boundary to site, to assess likely impact to trees, provide recommendations and actions.

i. The following documentation was provided to assist with the onsite assessment of trees and the preparation of this report:

- Site Plan Sheet SP prepared by Drafting Help dated December 2021
- Ground Floor Plan Existing Sheet 1 prepared by Drafting Help dated December 2021
- First Floor Plan Sheet 2 prepared by Drafting Help dated December 2021
- Roof Plan Sheet 3 prepared by Drafting Help dated December 2021
- East Elevations Sheet 4 prepared by Drafting Help dated December 2021
- South Elevations Sheet 5 prepared by Drafting Help dated December 2021
- West Elevations Sheet 6 prepared by Drafting Help dated December 2021
- North Elevations Sheet 7 prepared by Drafting Help dated December 2021
- Ground Floor Plan Proposed Sheet 10 prepared by Drafting Help dated December 2021
- First Floor Plan Proposed Sheet 11 prepared by Drafting Help dated December 2021
- Roof Plan Proposed Sheet 12 prepared by Drafting Help dated December 2021

1.1.3 This report is to be used in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions, or recommendations made in this report may only be used where the whole original report (or a copy) is referenced to and directly attached to that submission, report, or presentation. Information contained in the report covers only the trees that were inspected and reflects the trees condition at the time of the inspection. There is no guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

1.1.4 General guidance notes regarding the protection of trees on development sites have been given as Appendix 7 of this report. These notes contain basic requirements and procedures to ensure that the impacts of construction work on site trees are minimised. Advice from the project arborist is to be sought prior to undertaking works within a tree protection zone.

1.2 The Site

1.2.1 The subject site identified as 35 Therry St, Avalon Beach - Lot Number 6 DCP 209493 where a secondary dwelling and minor alterations to existing house and associated landscaping are to occur.

It is a private residential block of a regular shape. At time of inspection there was an existing residential dwelling, attached garage and informal gardens on the block.

1.2.2 Existing site features previously included:

- A moderately sloping block to the front with original dwelling surrounded by residential properties to the east, south and west.
- Existing informal gardens to the rear and front of the block with existing retaining walls to front of block to accommodate slope of land.
- Hardstand area to the front of the property with driveway and attached garage.
- Covered outdoor area to both the rear and front of existing of dwelling.

1.2.3 The image below shows the subject site (highlighted). Lot number is not shown.

Fig 1: Aerial image (SIX Maps, accessed -13/03/2022) showing site.

2 Inspection Method

2.1 On Wednesday 16th February 2022 - Vicki Beecher attended the site to undertake the tree assessment and collect data.

2.2 The tree (s) were assessed using the principles of a ground based Visual Tree Assessment (VTA)[1] and methods consistent with modern arboriculture. No aerial (climbing) inspection, tissue sampling or diagnostic testing

[1] Mattheck, C. and Breloer, H (2006), *The Body Language of Trees – A Handbook for Failure Analysis*, The Stationary Office. Pages 118-122.

was undertaken as part of the inspection process unless otherwise stated. Weather conditions at the time of the inspection were clear and fine.

2.3 The physical dimensions of the tree(s) including height, radial canopy spread, and trunk diameter have been estimated or measured. Refer Tree Assessment Criteria. Tree data collected at the time of the inspection can be found within the Tree Assessment Schedule, Appendix 1.

2.4 Tree protection zone has been scaled and plotted over the proposed works and can be found as Appendix 2.

2.5 Site images can be found as Appendix 3.

2.6 Methodology for determining vigour, structure and age class can be found as Appendix 5.

2.7 The tree has been given Safe Useful Life Expectancy (SULE) rating. Methodology used to calculate these ratings can be found as Appendix 6.

2.8 The landscape significance of each tree has been assessed using the Institute of Australian Consulting Arborists (IACA) Significance of a Tree Assessment Rating System (STARS). The STARS assessment criteria can be found as Appendix 7.

2.9 Tree protection zone has been scaled and plotted over the proposed works and can be found as Appendix 2.

2.10 This report acknowledges the current Australian Standards 'Protection of Trees on Development Sites' AS4970 – 2009.

3 The Trees

3.1 Twelve (12) trees have been identified on or adjacent to the site.

3.2 The trees are both native and exotic species. Tree data can be found within the tree assessment schedule Appendix 1.

3.3 Trees 1 – 5 are a stand of mature *Archontophoenix alexandrae*, located in the front garden area. As a whole the stand is displaying normal vigour and good condition. No die back evident or fungal fruiting bodies observed. Trees 1 – 5 are a is a landscape planting to form a planting screen.

3.4 Tree 6 is a mature *Archontophoenix alexandrae* located in the front garden area adjacent to existing balcony. Tree 6 is displaying normal vigour and good condition. No die back evident or fungal fruiting bodies observed. Tree 6 is a landscape planting

3.5 Tree 7 is a mature *Corymbia maculata* located in the front garden area of the neighbouring property to the east and is displaying normal vigour and good condition. No die back evident or fungal fruiting bodies observed.

3.6 Tree 8 is a mature *Corymbia maculata* located in the front garden area of the neighbouring property to the east and is displaying normal vigour and good condition. Minimal die back with some retained deadwood observed, no fungal fruiting bodies observed.

3.7 Tree 9 is a mature *Jacaranda mimosifolia* located in the front side garden area to the east and is displaying normal vigour and good condition. Twin leaders at ~ 800mm above ground level. No die back evident or fungal fruiting bodies observed. Branches are extending over the public roadway.

3.8 Tree 10 is a mature *Livistonia australis* located within the neighbouring property (west) front garden area. Tree 10 was found to be displaying normal vigour and good condition. No die back evident or fungal fruiting bodies observed.

3.9 Tree 11 is a mature *Corymbia maculata* located in the front garden area of the neighbouring property to the west and is displaying normal vigour and good condition. Minimal die back with some retained deadwood observed, no fungal fruiting bodies observed. No die back evident or fungal fruiting bodies observed. Tree 11 is two trunks that fused at ground level.

3.10 Tree 12 is a mature *Corymbia maculata* located in the front garden area of the property within a garden adjacent to neighbouring property to the west and is displaying normal vigour and good condition. Minimal die back with some retained deadwood observed, no fungal fruiting bodies observed.

3.11 All trees onsite and within 3 meters of the development site boundaries and the impact of the proposed development to these trees are the focus of this report.

4 Impacts of Proposed Development Works

Encroachments:

4.1 Tree 1 - Trunk 1.05m away from structure. 13% encroachment into Tree Protection Zone

4.2 Tree 2 - Trunk 1.1m away from structure. 16% encroachment into Tree Protection Zone

4.3 Tree 3 - Trunk 1.04m away from structure. 18% encroachment into Tree Protection Zone

4.4 Tree 4 - Trunk 0.16m away from structure. 43% encroachment into Tree Protection Zone

4.5 Tree 5 - Trunk 0.1m away from structure. 46% encroachment into Tree Protection Zone

4.6 Tree 6 - within footprint

4.7 Tree 7 - Clear of works

4.8 Tree 8 - 15% into Tree Protection Zone and 5% into Structural Root Zone. Negligible encroachments given structure of piers.

4.9 Tree 9 - 2% into Tree Protection Zone. Negligible encroachment given structure of piers.

4.10 Tree 10 - Clear of works

4.11 Tree 11 - Clear of works

4.12 Tree 12 - Clear of works

5 Conclusions and Recommendations

5.1 Trees 7, 8 and 9 are to be protected throughout the lifetime of the project, with particular emphasis during excavation works. Where these works are to be undertaken within the TPZ, hand demolition/excavation must be used. All excavation into the TPZ of trees 7, 8 and 9 is to be undertaken using non-destructive excavation techniques i.e., hydrovac, airspade or by hand, under the guidance and supervision of the project arborist

5.2 Trees 1 – 5, and 6 cannot be retained under the current design.

5.3 No stockpiling is to occur within the protection zones

5.4 Site Specific Tree Protection Requirements

6 Site Specific Tree Protection

6.1 Prior to the commencement of any construction works a project arborist is to be appointed. The project arborist is to advise on, monitor, inspect and ensure compliance where trees are retained within and where required adjacent to the site. Any work within a designated tree protection zone requires authorisation from the project arborist.

6.2 Trees 7, 8 and 9 are to be protected during construction. Tree Protection shall be 1.8m high chain link fence to the furthest possible point given ground controls to the outer extent of the Tree Protection Zones. Ground protection (see below in 6.3) if access is required within TPZ as per AS 4970 – 2009. Any works within TPZ of Tree 9 is to be undertaken under the supervision of the project arborist.

6.3 The ground protection required to be installed prior to the commencement of any works activities will consist of a layer of geo-textile fabric covered in 100mm of mulch. The mulch will be covered by 100 x 50mm timber planks strapped together or 50mm thick sheets of plywood covering the tree protection zone of this tree, covering the works area. At no time should this protection be removed during construction.

6.4 It is understood that the ability to establish a tree protection zone, to its fullest extent, may be difficult and impractical due to physical site restrictions and the need for a workable area. It is recommended that the protection measures are established under consultation between the property owner, construction contractor and project arborist. Tree protection measures may be altered and adjusted under guidance of the project arborist as construction works progress. Where encroachments through or over a tree protection zone are required appropriate ground protection measures are to be implemented.

6.5 The health and condition of trees retained on the site is to be monitored throughout the duration of construction works by the project arborist. It is recommended that monthly visits are undertaken by the project arborist. All visits are to be documented by the project arborist with a copy of any reporting provided to the construction contractor.

6.6 Any discernible change in the characteristics of any retained tree throughout the construction period is to be referred to the project arborist and an inspection undertaken. These changes can include, but are not limited to:

- A change in foliage colour and or density
- Dieback or death of branches or areas of the tree canopy
- Occurrence of branch failure
- Infestation by pest species

6.2 The project arborist

6.2.1 A project arborist shall be engaged prior to any works commencing on the site. The project arborist shall have a minimum qualification of the Australian Qualifications Framework (AQF) level 5 in Arboriculture.

6.2.2 The project arborist is to advise on, monitor, inspect and ensure compliance where trees are retained within and where required adjacent to the development site.

6.2.3 Any work within a designated tree protection zone requires authorisation from the project arborist.

6.3 Site Personnel

6.3.1 It is the principal contractor's responsibility to ensure that all site personnel, including contractors, are to be made aware of the relevant tree protection requirements and the role of tree protection zones on the site.

6.3.2 It is the principal contractor's responsibility to be aware of the development conditions relating to trees retained on the site and provide a program of works to the project arborist prior to works commencing.

6.4 Tree and vegetation removal and pruning

6.4.1 Trees and vegetation approved for removal by the relevant consent authority shall be undertaken prior to any other works commencing on site, including the establishment of tree protection zones.

6.4.2 All tree removal works are to be undertaken by suitably qualified tree workers (minimum AQF level 3) and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing.

6.4.3 All tree pruning works are to be undertaken in accordance with the Australian Standard AS4373-2007 Pruning of Amenity Trees. Page 8 of 18

6.4.4 All care shall be taken to avoid damaging trees identified for retention during removal and pruning works.

6.5 Root Pruning

6.5.1 Root pruning is only to be undertaken when approved by the project arborist.

6.5.2 All tree pruning works are to be undertaken in accordance with Section 9 of the Australian Standard AS4373-2007 Pruning of Amenity Trees.

6.5.3 All root pruning cuts are to be made using sharp clean tools such as secateurs, pruners, or handsaws, into clean woody tissue perpendicular to the direction of root growth.

6.5.4 It should be understood that the effects of root pruning are not always predictable and can result in a decline in tree health and/or condition.

6.6 The Tree Protection Zone (TPZ)

6.6.1 The tree protection zone is the designated area around a tree to protect the trunk, roots, and crown during development works. It should be noted that the establishment of tree protection zones to their fullest extent may not be possible due to environmental or site constraints. Where this occurs, their establishment is to be undertaken under the guidance of the project arborist.

6.6.2 Tree protection fencing is to be installed in compliance with Section 4 of the Australian Standard AS4970-2009 Protection of Trees on Development Sites. 3.5.3 The following activities unless otherwise authorised by the project arborist are restricted within the tree protection zone:

- Machine excavation including trenching
- Excavation for silt/sediment fencing
- Cultivation
- Storage of materials or stockpiling of soil/spoil
- Parking and/or operation of plant machinery
- Preparation of chemicals, including preparation of cement products
- The parking of vehicle and/or plant
- Refuelling
- Dumping of waste
- Washing down and cleaning of equipment
- Placement of fill
- Lighting of fires
- Soil level changes
- Temporary or permanent installation of utilities and signs
- Physical damage to the trees

Any work within a designated tree protection zone requires authorisation from the project arborist.

6.7 Tree protection fencing

6.7.1 Tree protection fencing is to be installed at the limits of the TPZ or as determined by the project arborist. Fencing shall consist of 1.8m high interlocking chain link or plywood fencing panels. The fencing shall be erected in such a way as to prevent building materials, soil and unauthorised personnel entering the TPZ.

6.7.2 Further details regarding tree erection of tree protection fencing can be found as Appendix 8.

6.8 Signage

6.8.1 Signs identifying the TPZ shall be attached to the tree protection fencing and clearly visible from within the development site. The contact details of either the site manager or project arborist shall be displayed on the sign.

6.9 Ground protection

6.9.1 Where temporary access or encroachment into or through a TPZ is required ground protection measures are to be implemented. The purpose of ground protection measures is to avoid damage to tree roots and compaction of the soils within the TPZ.

6.9.2 Ground protection generally consists of 100mm deep layer of mulch overlaid with rumble boards or road plates (light traffic <3t). Where heavy traffic (>3t) through or over the TPZ is required, the existing ground is be protected by a geo-textile fabric covered with a 300mm layer of compacted road base or railway ballast.

6.9.3 Further details regarding tree erection of tree protection fencing can be found as Appendix 3.

6.10 Excavation within the TPZ

6.10.1 Excavations within the TPZ may only be undertaken under the supervision and authorisation of the site arborist.

6.10.2 All excavation within the tree protection zone must be carried out carefully using spades, forks, and trowels, taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using compressed air or hydrovac may be an appropriate alternative to hand digging. All soil removal must be undertaken with care to minimise disturbance of roots beyond the immediate area of the excavation. Where possible, flexible clumps of smaller roots, including fibrous roots, should be retained if they can be displaced temporarily or permanently beyond the excavation without damage. If digging by hand, a fork should be used to loosen the soil and help located any substantial roots. Once roots have been located, the trowel should be used to clear the soil away from them without damaging the bark.

6.10.3 Roots temporarily exposed must be protected from direct sunlight, drying out and extremes of temperature by a 10mm thick wrapping of jute or hessian matting.

6.10.4 Excavations within a TPZ are to be restricted to the footprint of any proposed structure. Battering, benching and over excavation is to be avoided.

6.10.5 Bulk excavation within a TPZ may only be undertaken when all associated root issues have been addressed by the project arborist.

6.11 Trunk and branch protection

6.11.1 Where necessary trunk protection may be required. Trunk protection is installed by first wrapping the stem of the tree in hessian or like material then strapping timber battens over the top. It is recommended that timber battens with the dimensions of length 2000mm, width 75mm and depth 50mm are used. The battens are not to be directly screwed or nailed into the tree

6.11.2 Where necessary branch protection may be required. Branch protection is installed in the same fashion as the trunk protection mentioned above but cut to suit the shape of the branch. Refer diagram point 3.8.

6.11.3 Further details regarding tree erection of tree protection fencing can be found as Appendix 3.

6.12 Scaffolding

6.12.1 Where possible scaffolding shall not be erected or installed within the TPZ nor come into contact with any part of a tree scheduled for retention and protection.

6.12.2 Where scaffolding is required within the TPZ suitable ground protection measures are to be implemented. Flexible branches shall be temporarily tied back to avoid the need for unnecessary pruning or potential tree damage.

6.12.3 Further details regarding the erection of scaffolding within the TPZ can be found as Appendix 4.

6.13 Damage to Trees

6.13.1 Damage to any part of the tree including roots, bark, trunk, branches, and leaf material shall be avoided.

6.13.2 Damage to trees may also be incurred by contamination of the TPZ through chemical, paint, or cement wash out.

6.13.3 The ripping and tearing of roots by excavators or shovels will cause damage and potentially impact tree health. Where roots are accidentally damaged during the works they are to be exposed back to intact woody tissue and pruned in accordance with the arborist's recommendations.

6.13.4 Any damage to any part of a retained tree is to be reported to the project arborist immediately.

6.14 Soft landscaping within the TPZ

6.14.1 Soft landscaping works are regarded as the installation of plants or organic ground covers (mulch).

Excavation within the TPZ. Hard landscaping features such as retaining walls, edging and footpaths are regarded as construction works and require assessment from the project arborist prior to construction.

6.14.2 Where fill is required for planting it is to be of an approved courser grade than the site soils and allow for free gaseous and water exchange into the natural soil profile.

6.15 Utilities and services within the TPZ

6.15.1 Where possible the installation of utilities and services are to be kept out of the TPZ.

6.15.2 Where this is not deemed possible trenchless or underground boring techniques are to be employed. Underground boring should be no less than 600mm below the existing soil level.

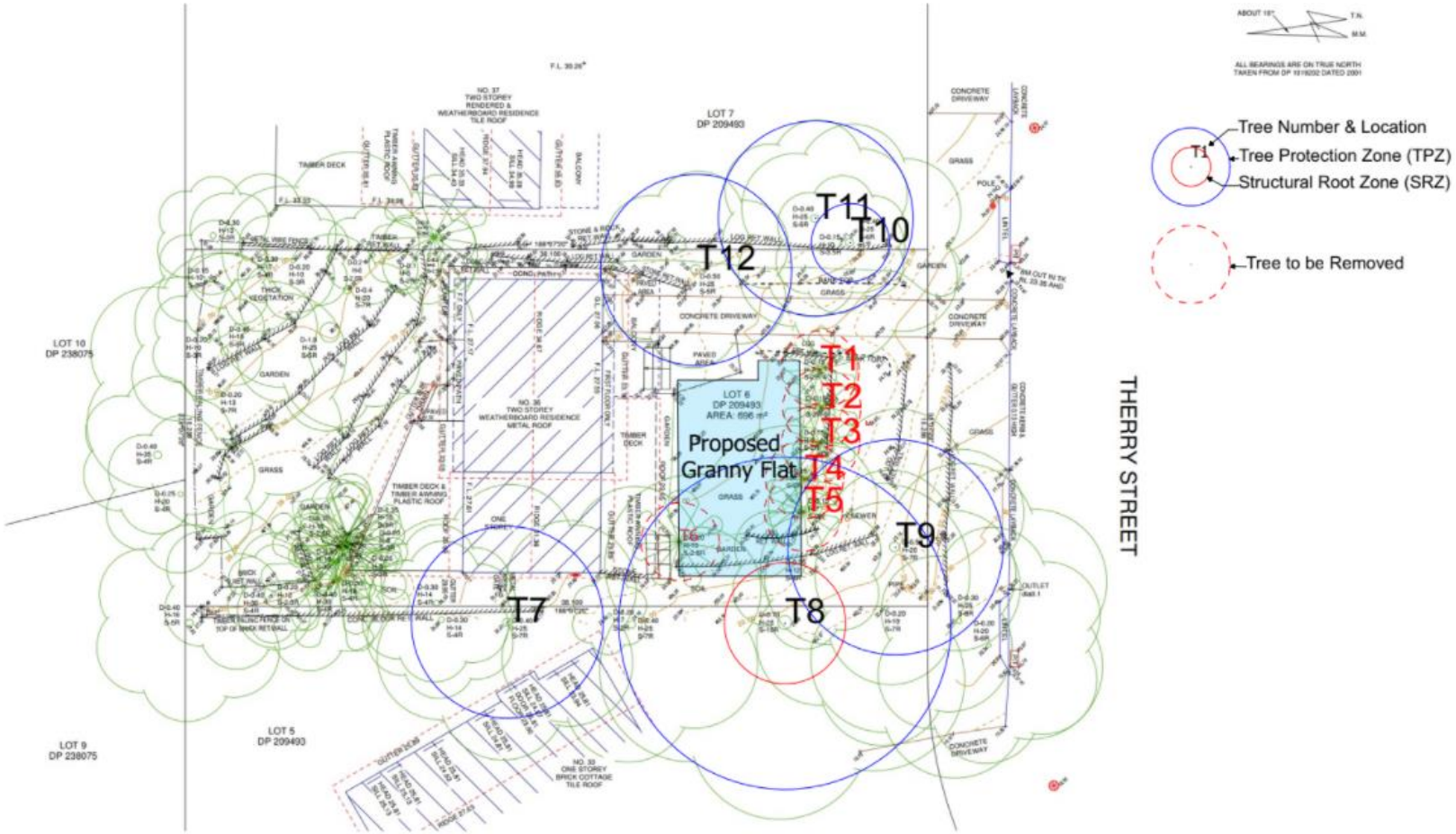
6.15.3 Suspension of service wires through the TPZ should be kept clear of the trees canopy and regulatory safety clearances observed.

Appendix 1: Tree assessment schedule

Tree number	Tree name		Tree dimensions			Vigour (Low, Normal, Excellent)	Condition (Poor, Fair, Good)	Age class (Young, Mature, Old, Dead)	SULE category	Landscape Significance	TPZ radius (m)	SRZ radius (m)	Retention Value	Remove / Retain	Comments
	Botanical name	Common name	Height (m)	Spread (m)	D.B.H. (mm)										
1	*Archontophoenix alexandrae*	Alexandra palm	5-7	2 x 2	070, 080, 090	N	G	M	M	M	2	1.94	M	Remove	Trees 1 – 5 are a stand of landscaping screen plantings in informal garden area to front garden. Typical form for the species.
2	*Archontophoenix alexandrae*	Alexandra palm	5-7	2 x 2	080, 110	N	G	M	M	M	2	1.94	M	Remove	Trees 1 – 5 are a stand of landscaping screen plantings in informal garden area to front garden. Typical form for the species
3	*Archontophoenix alexandrae*	Alexandra palm	5-7	2 x 2	110, 090	N	G	M	M	M	2	1.94	M	Remove	Trees 1 – 5 are a stand of landscaping screen plantings in informal garden area to front garden. Typical form for the species
4	*Archontophoenix alexandrae*	Alexandra palm	5 - 7	2 x 2	060, 060	N	G	M	M	H	2	1.5	M	Remove	Trees 1 – 5 are a stand of landscaping screen plantings in informal garden area to front garden. Typical form for the species
5	*Archontophoenix alexandrae*	Alexandra palm	5-7	2 x 2	070, 080	N	G	M	M	M	2	1.6	M	Remove	Trees 1 – 5 are a stand of landscaping screen plantings in informal garden area to front garden. Typical form for the species
6	*Archontophoenix alexandrae*	Alexandra palm	5-7	2 x 2	130	N	G	M	M	M	2	1.5	M	Remove	Tree located in garden adjacent to front balcony. Typical form for this species.
7	*Corymbia maculata*	Spotted gum	10-15	3 x 3	410	N	G	M	M	M	4.92	2.47	H	Retain	Tree located in neighbouring property to the east. Typical form for the species. No dieback or fungal fruiting bodies observed.
8	*Corymbia maculata*	Spotted gum	10-15	4 x 5	710	N	G	M	M	M	8.52	3.11	H	Retain	Tree located in neighbouring property to the east. Typical form for the species. No dieback or fungal fruiting bodies observed.
9	*Jacaranda mimossifolia*	Jacaranda	5 - 10	6 x 5	200, 410	N	G	M	M	M	5.52	2.63	H	Retain	Tree located in front garden lower area. Twin leaders at 800mm. Typical form for

Tree number	Tree name		Tree dimensions			Vigour Low, Normal, Excellent	Condition Poor, Fair, Good	Age class Young, Mature, Old, Dead	SULE category	Landscape Significance	TPZ radius (m)	SRZ radius (m)	Retention Value	Remove / Retain	Comments
	Botanical name	Common name	Height (m)	Spread (m)	D.B.H. (mm)										
															the species. No dieback or fungal fruiting bodies observed.
10	*Livistonia australis*	Cabbage tree palm	1-5	2 x 2	120	N	G	M	M	M	2	1.5	H	**Retain**	Tree located in neighbouring property to the west. Typical form for the species. No dieback or fungal fruiting bodies observed.
11	*Corymbia maculata*	Spotted gum	10-15	3 x 4	360, 210	N	G	M	M	M	5	2.6	H	**Retain**	Tree located in neighbouring property to the west. Typical form for the species. No dieback or fungal fruiting bodies observed.
12	*Corymbia maculata*	Spotted gum	10-15	4 x 3	410	N	G	M	M	M	4.9	2.6	H	**Retain**	Tree located in garden adjacent to boundary of neighbouring property to the west. Typical form for the species. No dieback or fungal fruiting bodies observed.

Appendix 2 Tree location plan showing tree protection zones and structural root zones



Appendix 2: Tree location plan	Extract from Site Plan – December 2021 . Indicative protection zones shown in green have been calculated as per AS4970 scaled and plotted. Red dashed circle indicates Structural Root Zone. Drawn by OT 13/03/2022 Scale 1:100 @ A2

Appendix 3: Site Photographs

Image 1: Trees 1-5 located in informal garden to front of property planted as a landscape screen

Image 2: Trees 6, 7 and 8. Tree located adjacent to existing balcony. Trees 7 and 8 located on neighbouring block to the east.

Image 3: Tree 9 located in front garden area with trees 1 – 5 shown in upper garden area.

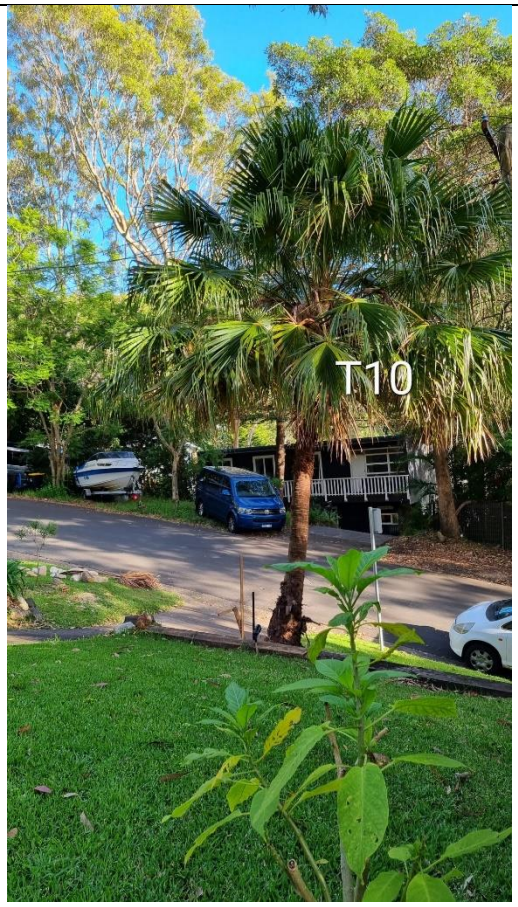


Image 4: Tree 10 located in neighbouring garden to the west.

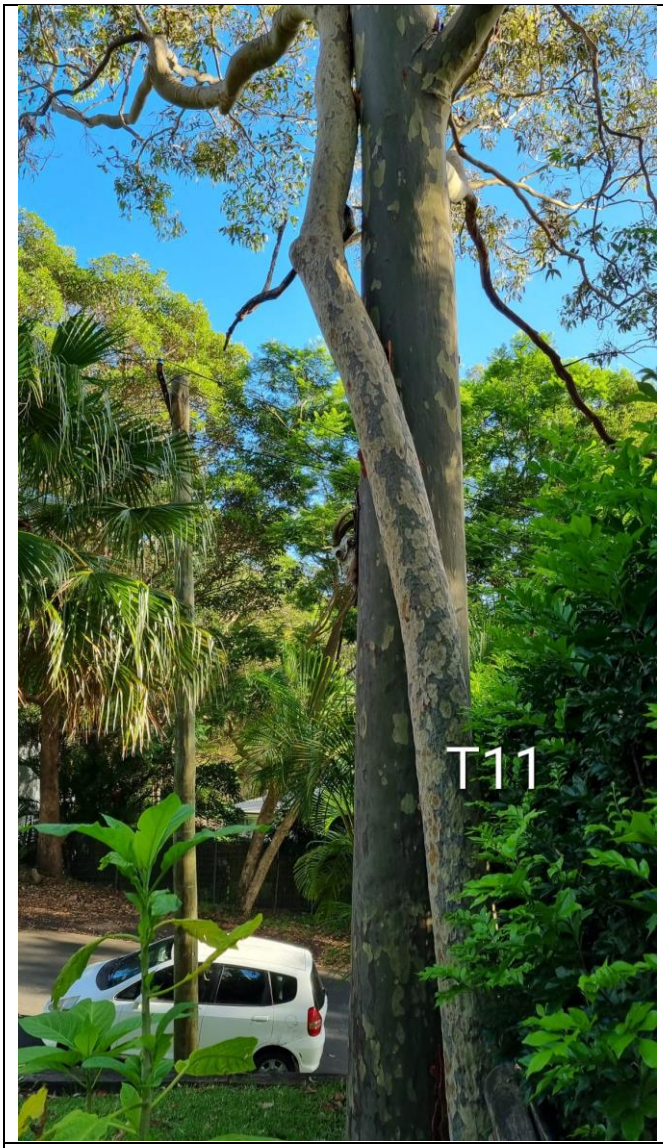


Image 4: Tree 11 located in front area of neighbouring garden to the west.

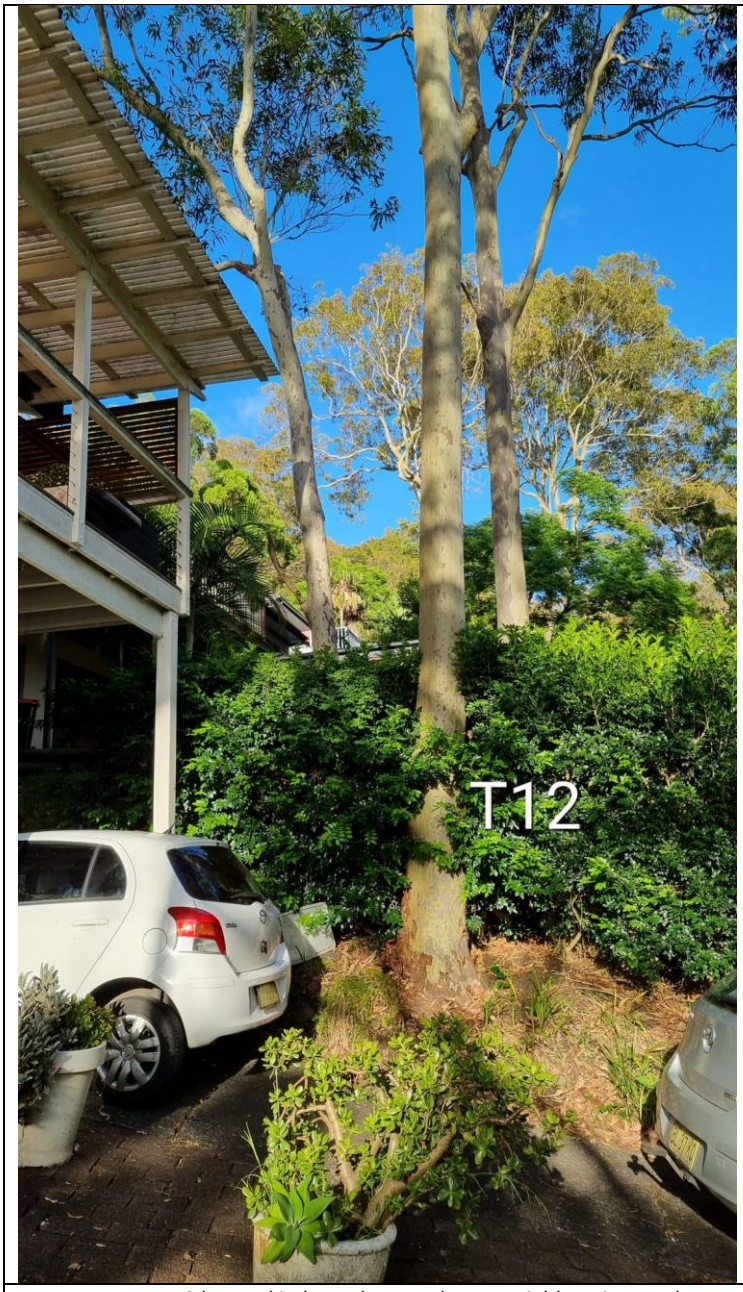


Image 5: Tree 12 located in boundary garden to neighbouring garden to the west.

Appendix 5 Tree assessment criteria

Tree number: Identifying number given to individual (or group) trees.

Botanical Name: Latin name for tree showing genus and species.

Common Name: The common name given to the tree.

Tree Dimensions: The physical dimensions of the tree.

- Height: Estimated or measured height of tree in meters.
- Spread: Estimated or measured radial canopy spread of tree in meters.
- Diameter at Breast Height (DBH): The diameter of trunk in given in millimetres measured at 1.4m from ground. The D.B.H of trees/shrubs with multiple or groups of stems are given as a range or defined by the number of stems defined by the preceding smaller text. DBH is estimated where full access to the tree is restricted.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous, or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

Dormant Vigour – Determined by the existing turgidity in the lower order branches in the outer extremity of the crow, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.

Low Vigour – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

Normal Vigour – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

High Vigour – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable

conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk, and structural branches (first (1^{st}) and possibly (2^{nd}) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour, and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

Dead Condition – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).

Poor Condition - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from or contributed to by vigour.

Fair Condition - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without

intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from or contributed to by vigour.

Good Condition - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability, or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from or contributed to by vigour.

Estimated Age – The estimated age of each tree has been assessed based on its species, size, location, health, and condition. Age ranges are given as less than fifteen years (<15), fifteen to forty years (15-40), forty to eighty (40-80) and eighty plus (80+). Where possible historical imagery has been used to classify tree age.

Safe Useful Life Expectancy – Refer Attachment 5

Comments: Any noteworthy or significant points regarding the tree.

Appendix 6: Safe Useful Life Expectancy description and categories

Safe Useful Life Expectancy (SULE)

SULE is the length of time that the arboriculturist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. SULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the SULE assessment. Consequently, the reliability all SULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

SULE Assessment Categories

Long SULE (L): Trees that appear to be retainable at the time of the assessment for more than 40 years with an acceptable level of risk.

Medium SULE **(M)**: Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.

Short SULE **(S)**: Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.

Remove (R): Trees that should be removed within the next 5 years.

Young or Small Trees (Y): Trees that can be reliably moved or replaced.

Appendix 7: Tree Significance Assessment Criteria and Retention Value Matrix

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 2010.

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 quantative 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.

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 council's 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 the 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 dimensions 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 the 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 in 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 monoculture stand in its entirety e.g., hedge.

References

Australia ICOMOS Inc. 1999, The Burra Charter – The Australian OCOMOS Charter for Places of Cultural Significance, International Council of Monuments and Sites, www.icomos.org/australia

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 8: General guidance notes for protecting trees on development sites

1.0 Purpose of this guidance note

1.1 This guidance note details the basic general requirements that must be followed when trees are retained on and in some cases adjacent to development sites. The tree protection requirements are determined by the tree species, the existing physical constraints of the growing environment both above and below ground and the development proposal itself.

1.2 This guidance note should always be used in conjunction with the tree assessment information specific for the particular site.

1.3 The aim of this guidance note is to provide site personnel with a basic understanding of the requirements needed to successfully protect and maintain trees whilst development works are undertaken. All personnel working adjacent to or within tree protection zones must be properly briefed about their responsibilities towards the trees and their retention.

1.4 This guidance note is based on the Australian Standard AS4970 – *2009 Protection of Trees on Development Sites* and AS 4373 – 2007 *Pruning of Amenity Trees*.

2.0 Site Personnel

2.1 All site personnel including contractors are to be made aware of the relevant tree protection requirements and the role of tree protection zones on the site.

3.0 The project arborist

3.1 A project arborist shall be engaged prior to any works commencing on the site. The project arborist shall have a minimum qualification of the Australian Qualifications Framework (AQF) level 5 in Arboriculture.

3.2 The project arborist is to advise on, monitor, inspect and ensure compliance where trees are retained within and where required adjacent to the development site.

3.3 Any work within a designated tree protection zone requires authorisation from the project arborist.

4.0 Tree and vegetation removal and pruning

4.1 Trees and vegetation approved for removal by the relevant consent authority shall be undertaken prior to any other works commencing on site, including the establishment of tree protection zones.

4.2 All tree removal works are to be undertaken by suitably qualified tree workers (minimum AQF level 2) and in accordance with the NSW Workcover Code of Practice for the Amenity Tree Industry 1998.

4.3 In addition, all tree pruning works (including roots) are to be undertaken in accordance with the Australian Standard AS4373-2007 *Pruning of Amenity Trees*.

4.4 All care shall be taken to avoid damaging trees identified for retention during removal and pruning works.

5.0 Tree Protection Zone (TPZ)

5.1 The tree protection zone is the designated area around a tree to protect the trunk, roots, and crown during development works.

5.2 Tree protection fencing is to be installed in compliance with Section 4 of the Australian Standard AS4970-2009 *Protection of Trees on Development Sites*.

5.3 The following activities unless otherwise authorised by the project arborist are restricted within the tree protection zone:

- Machine excavation including trenching
- Excavation for silt/sediment fencing
- Cultivation
- Storage
- Preparation of chemicals, including preparation of cement products
- The parking of vehicle and/or plant
- Refuelling
- Dumping of waste
- Washing down and cleaning of equipment
- Placement of fill
- Lighting of fires
- Soil level changes
- Temporary or permanent installation of utilities and signs
- Physical damage to the trees

5.4 Any work within a designated tree protection zone requires authorisation from the project arborist.

6.0 Signage

6.1 Signs identifying the TPZ shall be attached to the tree protection fencing and clearly visible from within the development site. The contact details of either the site manager or project arborist shall be displayed on the sign.

6.2 Further reference to the Australian Standard AS4970-2009 *Protection of Trees on Development Sites* should be made regarding signage.

7.0 Tree protection fencing

7.1 Tree protection fencing is to be installed at the limits of the TPZ or as determined by the project arborist. Fencing shall consist of 1.8m high interlocking chain link or plywood fencing panels. The fencing shall be erected in such a way as to prevent building materials, soil and unauthorised personnel entering the TPZ.

8.0 Trunk and branch protection

8.1 Where necessary trunk protection may be required. Trunk protection is installed by first wrapping the stem of the tree in hessian or like material then strapping timber battens over the top. It is recommended that timber battens with the dimensions of length 2000mm, width 75mm and depth 50mm are used. The battens are not to be directly screwed or nailed into the tree.

8.2 Where necessary branch protection may be required. Branch protection is installed in the same fashion as the trunk protection mentioned above but cut to suit the shape of the branch.

8.3 Reference to Section 4.5.2 of the Australian Standard AS4970-2009 *Protection of Trees on Development Sites* should be made for further details.

9.0 Ground protection

9.1 Where temporary access or encroachment into the TPZ is required ground protection measures are to be implemented. The purpose of ground protection measures is to avoid damage to tree roots and compaction of the soils within the TPZ.

9.2 Ground protection generally consists of 100mm deep layer of mulch overlaid with rumble boards or road plates (light traffic). Where heavy traffic through or over the TPZ is required, the existing ground is be protected by a geo-textile fabric covered with a 300mm layer of compacted road base or railway ballast.

9.3 Reference to Section 4.5.3 of the Australian Standard AS4970-2009 *Protection of Trees on Development Sites* should be made for further details.

10.0 Excavation within the TPZ

10.1 Excavations within the TPZ may only be undertaken under the supervision and authorisation of the site arborist.

10.2 All excavation within the tree protection zone must be carried out carefully using spades, forks, and trowels, taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using compressed air may be an appropriate alternative to hand digging, if available. All soil removal must be undertaken with care to minimise disturbance of roots beyond the immediate area of the excavation. Where possible, flexible clumps of smaller roots, including fibrous roots, should be retained if they can be displaced temporarily or permanently beyond the excavation without damage. If digging by hand, a fork should be used to loosen the soil and help located any substantial roots. Once roots have been located, the trowel should be used to clear the soil away from them without damaging the bark.

10.3 Roots temporarily exposed must be protected from direct sunlight, drying out and extremes of temperature by appropriate covering.

11.0 Fill within the TPZ

11.1 Where possible soil levels are not to be raised within the TPZ. Retaining walls and alternate engineering solutions are to be considered to avoid over battering and encroachment into the TPZ.

11.2 Where fill is required within the TPZ it is to be of an approved courser material than the existing site soil and allow for free gaseous and water exchange into the natural soil profile.

12.0 Pier and beam footings within the TPZ

12.1 Where footings are required within the TPZ they are to be of pier and beam type construction. Excavation shall be restricted to pier/post holes only. All other footing and foundation parts shall be constructed and installed above the existing ground level.

12.2 Pier locations within the TPZ are to be excavated using non-destructive techniques and where possible to their full extent. Where this is not achievable a minimum depth of 600mm shall be excavated. Any further excavation that is then to be undertaken mechanically is to be of a diameter less than that excavated by hand whilst avoiding compaction of the soils within the TPZ.

12.3 A degree of flexibility should be built into the design to allow for the pier locations to be moved if structural or significant roots are found. A minimum clearance distance of 100mm shall be allowed around significant roots.

13.0 Scaffolding

13.1 Where possible scaffolding shall not be erected or installed within the TPZ nor come into contact with any part of a tree scheduled for retention and protection.

13.2 Where scaffolding is required within the TPZ suitable ground protection measures are to be implemented. Flexible branches shall be temporarily tied back to avoid the need for unnecessary pruning or potential tree damage.

13.3 Further reference to section 4.5.6 of the Australian Standard AS4970-2009 *Protection of Trees on Development Sites* should be made for further details.

14.0 Damage to Trees

14.1 Damage to any part of the tree including roots, bark, trunk, branches, and leaf material shall be avoided.

14.2 Damage to trees may also be incurred by contamination of the TPZ through chemical, paint, or cement wash out.

14.3 The ripping and tearing of roots by excavators or shovels will cause damage and potentially impact tree health. Where roots are accidentally damaged during the works they are to be exposed back to intact woody tissue and pruned in accordance with the arborist's recommendations.

14.4 Any damage to any part of a retained tree is to be reported to the project arborist immediately.

15.0 Demolition of structures and surfaces within the TPZ

15.1 The demolition of existing structures and surfaces within the TPZ is to be supervised by the project arborist.

15.2 Where possible existing structures are to be dismantled manually using hand tools. Demolition works should start closest to the tree and work backwards moving out of the TPZ avoiding damage or compaction to the soil. Heavy machinery such as excavators should not be used within the TPZ unless they can be positioned on and work from existing hard surfaces such as concrete slabs.

15.3 Tree roots exposed by the demolition of existing site structures are to be kept in place and advice sought from the project arborist.

16.0 Soft landscaping within the TPZ

16.1 Soft landscaping works are regarded as the installation of plants or organic ground covers (mulch). New tree plantings requiring excavation should refer to section 10.0 *Excavation within the TPZ*. Hard landscaping features such as retaining walls, edging and footpaths are regarded as construction works.

16.2 Where possible trees to be retained shall be incorporated into the landscape design.

16.3 Where fill is required for planting it is to be of an approved courser grade than the site soils and comply with section 11.2.

17.0 Utilities and services within the TPZ

17.1 Where possible the installation of utilities and services are to be kept out of the TPZ.

17.2 Where this is not deemed possible trenchless or underground boring techniques are to be employed. Underground boring should be no less than 600mm below the existing soil level.

17.3 Suspension of service wires through the TPZ should be kept clear of the trees canopy and regulatory safety clearances observed.