

Arboricultural Impact Assessment

Prepared For

Kiama Shores PTY LTD
C / O – Kennedy Associates
33 Collins Street, Kiama, NSW

Governing Authority:

Kiama Municipal Council

Prepared by:

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PI/ PL Insurance (2018 – 5M/20M)

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1. Summary

This report has been compiled on behalf of Kennedy Associates, to which are acting on behalf of the owners of, 33 Collins Street, Kiama. This report is in response to a proposed Development Application for 33 Collins Street, with the local governing authority being, Kiama Municipal Council.

This Arborist report refers to ten (10) trees, with two, being a stand*, to which is a *group of trees often of the one kind*¹. Nine (9) trees being outside the subject site, upon neighbouring sites and one (1) stand being upon the site. This report will analyse each trees location, position, Tree Protection Zone, Structural Root Zone and any encroachment that the proposed development may have on any of the ten (10) trees.

The author (Craig Kenworthy) of this report recommends:

- The **removal** of one (1) stand* of *Allocasuarina littoralis* trees, T10, along the western embankment and boundary line.
- The **retention** and **protection** of eight (8) trees named, T1, T2, T3, T4, T5, T6, T7, and T8.
- The **retention** and **protection** of one (1) stand* of trees, T9, located within the backyard of No 30, Minnamurra Street.
- The use of pier and beam or cantilevered construction methods relating to footpaths and or steps that fall within all trees TPZs, nominated for retention and protection, as per AS 4970 – 2009, *Protection of trees on development sites*.
- The Implementation of a Tree Location and Protection Plan, within this report, identifying Tree Protection Fencing measures for all trees to be retained, in accordance to Australian Standards, *Protection of trees on development sites*, AS 4970 - 2009.
- HOLD points shall be implemented and signed off, before, during and after staged works for tree protection measures.
- Compensatory re planting of trees within landscaping, scope of works.
- Site inductions for all tradespersons and visitors to the site, before and during all aspects of the building and excavation works.

2. Introduction

Sydney Landscape Consultants have been engaged to assess the subject site and to locate the footprint of the proposed development, in relation to the subject trees and to ascertain the health and condition of the trees, whilst analysing tree protection measures for all trees that may be affected by the proposed development.

Kiama Municipal Council have requested an Arborist report to support a Development Application for a proposed new development. The items within this request are discussed within this report.

3. Methodology

For the purposes of this report, a Visual Tree Assessment (VTA) method of evaluating structural defects and stability in trees (Mattheck and Breloer, 1994) was undertaken. All inspections were completed from the ground only. No diagnostic devices were used on the subject trees.

Any recommended work relating to pruning and or recommendation / mitigation shall be in accordance with Australian Standard, *Pruning of Amenity trees – AS4373 – 2007*.

Raw data from preliminary assessments for specific dimensions was compiled using binoculars (10 x 50), 8m and 30m measuring tapes and a camera (14x zoom).

Heights of trees taken using a Haglof EC II Clinometer and measured in Metres.

¹ *DICTIONARY for MANAGING TREES in URBAN ENVIRONMENTS, Danny B Draper and Peter A Richards, CSIRO PUBLISHING, 2009, Pg 143, Stand.

Tree diameter, Diameter at Breast Height (DBH) measured at 1.4m above ground level and recorded in metres, using Australian Standard, *Protection of trees on development sites – AS4970 – 2009*, Appendix A.

All ten (10) trees*, have been identified from the site visit conducted and with the aid of the proposed site Plans, elevations and sectionals provided by Kennedy Associates, in conjunction with the S34 Conciliation meeting held on the 28th June 2018.

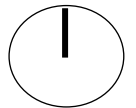
All photographs that appear within this report were taken on the day of the site visit, dated 25/6/18.

Plans provided by Kennedy Associates, Dwg No – 01 through to Dwg No – 40.

These plans have been used to view the positioning of the proposed development. Site calculations used shall be Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) in accordance with the appropriate Australian Standards outlined above.

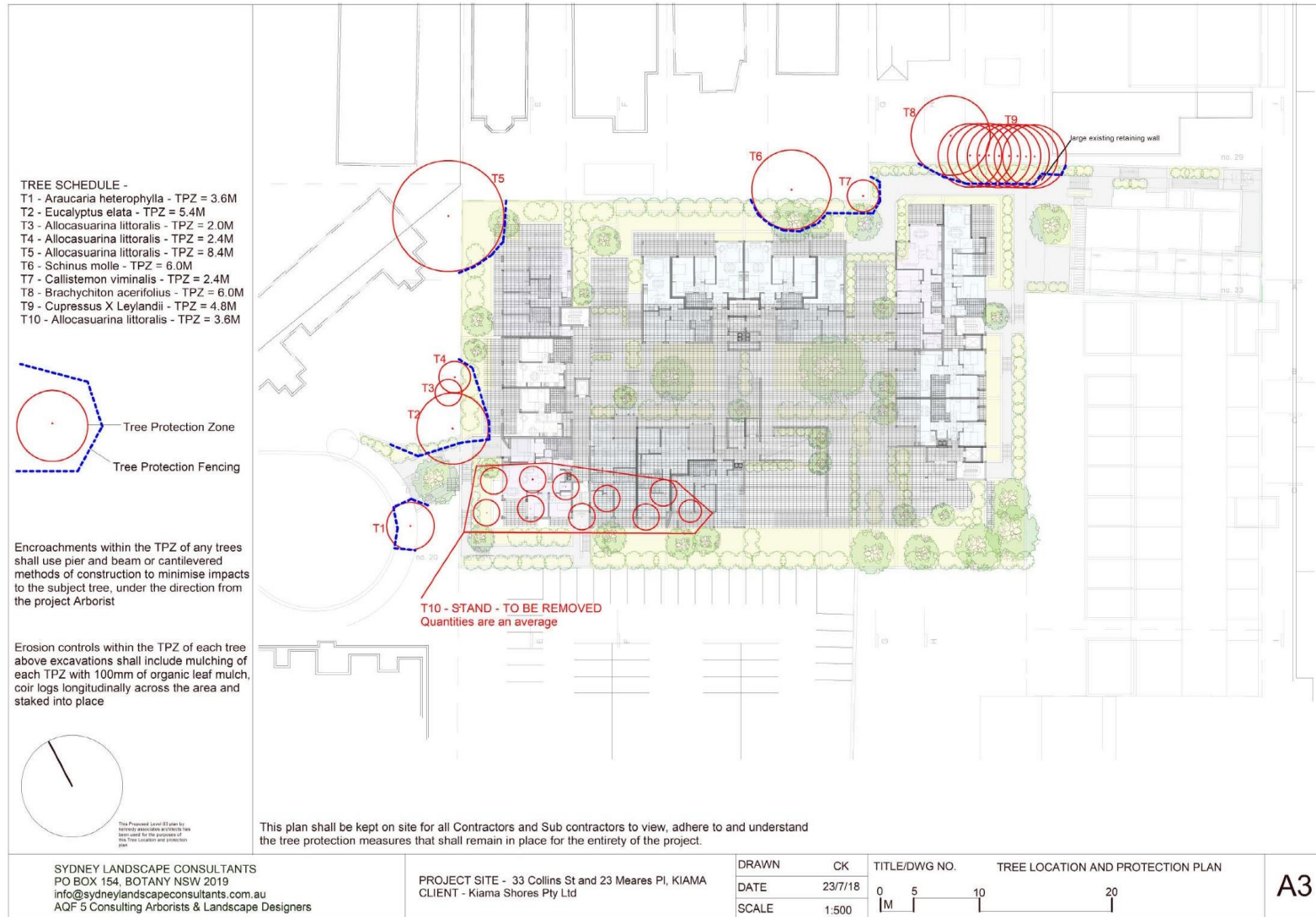
4. Site Locality

33 Collins St, Kiama



Source – www.nearmap.com.au , yellow lines are illustrative of the subject site only

5. Tree Location Plan



6. Report Body

The site visit from this author was undertaken on the 25th of June 2018 at approximately 9.30am. The weather conditions at the time of the site visit were clear and fine and access to the site was granted and unobtrusive.

The subject site is positioned upon a sloping south west facing aspect, with a fall from the northern corner at the highest, down to the south corner at the lowest. The majority of the site is vacant, being overgrown grass, whilst the parcel of land fronting Collins Street are shops/ small business enterprise.

The subject site is bounded to the north by a small strata complex and east, by six (6) residential properties, a car park to the west and shops and small factory type complexes to the south, fronting Collins Street.

6.1 Vegetation

The subject site is overgrown with grass, with the only trees growing upon the site are a stand of *Allocasuarina littoralis* (T10). The remaining trees within this report are located within adjoining properties.

The subject trees relating to this report are as follows:

Tree 1) *Araucaria heterophylla* – **RETAIN** and protect – Street tree fronting, Meares Cul-de-sac

Tree 2) *Eucalyptus elata* – **RETAIN** and protect – Within No 21 Meares PI

Tree 3) *Allocasuarina littoralis* – **RETAIN** and protect – Within No 21 Meares PI

Tree 4) *Allocasuarina littoralis* – **RETAIN** and protect – Within No 21 Meares PI

Tree 5) *Allocasuarina littoralis* – **RETAIN** and protect – Within No 21 Meares PI

Tree 6) *Schinus molle* – **RETAIN** and protect – Within No 34 Minnamurra Street

Tree 7) *Callistemon viminalis* – **RETAIN** and protect – Within No 34 Minnamurra Street

Tree 8) *Brachychiton acerifolius* – **RETAIN** and protect - Within No 32 Minnamurra Street

Tree 9) *Cupressocyparis X Leylandii** – **RETAIN** and protect – Within No 30 Minnamurra Street

Tree 10) *Allocasuarina littoralis** – **REMOVE** – Located within subject site, western embankment.

* - Stand of trees

6.2 Proposed Development

The set of plans provided by Kennedy Associates, Dwg No – 01 through to Dwg No – 40, shows a new Aged Care development for 33 Collins Street, Kiama. The proposed development upon the related plans, show, generous setbacks from adjacent neighbouring boundary fences and allowable areas designated for landscaping within and around the perimeter of the site.

Due to the nature of the site, areas of cut shall be implemented to allow for level areas for the proposal to be blended into the site. The retention and protection of nine (9) trees, has been recommended due to being located within neighbouring properties and for this reason, tree protection measures shall be discussed within this report and within – **8. Mitigations / recommendations**

6.3 Tree Assessment

Tree number	Species	Height (M)	Crown Spread (M)	DBH (M)	Live Crown Ratio %	Vigour	Age Class	TPZ M	SRZ M	SULE	STARS	Recommendations
1	<i>Araucaria heterophylla</i>	12.5	N – 4, S – 4 E – 4, W – 4	.300	85- 100%	FAIR	Semi - Mature	3.6	2.0	1b	HIGH	RETAIN
Semi Mature, symmetrical tree with Crown spread orientation radial. Crown form dominant. Fair vigour. Tree is growing within Council street verge.												
Tree number	Species	Height (M)	Crown Spread (M)	DBH (M)	Live Crown Ratio %	Vigour	Age Class	TPZ M	SRZ M	SULE	STARS	Recommendations
2	<i>Eucalyptus elata</i>	13	N – 6, S – 9 E – 6, W – 5	.450	75%	FAIR	Mature	5.4	2.4	2D	MEDIU M	RETAIN – Neighbours tree
Mature, asymmetrical tree with crown spread, non-radial, deliquescent and suppressed. Tree with two first order branches obtusely divergent, growing into subject site. Tree is located close to north western corner of 21 Meares Place.												
Tree number	Species	Height (M)	Crown spread	DBH (M)	Live Crown Ration %	Vigour	Age Class	TPZ M	SRZ M	SULE	STARS	Recommendations
3	<i>Allocasuarina littoralis</i>	6	N – 0, S – 3 E – 2, W – 2	.100	<50%	LOW	Semi Mature	2.0	1.5	4a	LOW	RETAIN – Neighbours tree
Semi Mature, asymmetrical tree with Crown spread orientation non radial. Crown form suppressed. Tree with very little crown, major lean away from tree 2 and growing close to boundary line and subject site.												
Tree number	Species	Height (M)	Crown Spread (M)	DBH (M)combined	Live Crown Ratio %	Vigour	Age Class	TPZ M	SRZ M	SULE	STARS	Recommendations
4	<i>Allocasuarina littoralis</i>	6	N – 1.5, S – 4.5 E – 4.5, W – 4.5	.200	<50%	LOW	Semi Mature	2.4	1.68	4a	LOW	RETAIN – Neighbours tree
Semi Mature, asymmetrical tree with Crown spread orientation, non-radial. Crown form suppressed. Tree with very little radial crown, vertical, but suppressed from trees to the north. Low vigour and growing close to boundary line and subject site.												
Tree number	Species	Height (M)	Crown Spread (M)	DBH (M)	Live Crown Ratio %	Vigour	Age Class	TPZ M	SRZ M	SULE	STARS	Recommendations
5	<i>Allocasuarina littoralis</i>	13.5	N – 7, S – 4 E – 5, W – 4	.700	50%	FAIR	Mature	8.4	2.85	1b	HIGH	RETAIN – Neighbours tree
Mature, Asymmetrical crown deliquescent tree with Crown spread orientation, non-radial. Crown form dominant, fair vigour. Co dominant tree with two first order trunks. Past pruning evidenced with epicormics sprouting, root flare evidenced. Located within the top north east corner, within 21 Meares Close.												

Tree number	Species	Height (M)	Crown Spread (M)	DBH (M)	Live Crown Ratio %	Vigour	Age Class	TPZ M	SRZ M	SULE	STARS	Recommendations
6	<i>Schinus molle</i>	4.5	N - 4, S - 4 E - 4, W - 3	.500	75%	FAIR	Mature	6.0	2.47	3a	LOW	RETAIN – Neighbours tree, No 34
Mature asymmetrical tree with crown spread orientation radial, crown form dominant. Large base with typical habit for this species. Several dead and dying branches and epicormic sprouting, growing 1.5 metres from back boundary fence within No 34 Minnamurra Street.. Crown has minor deadwood, tree in decline, with fair vigour. The canopy is not extending into the subject site. Peppercorn tree is regarded as an environmental weed in VIC, NSW, SA and NT. <i>Its seeds are dispersed by birds and other animals, it also spreads from suckers</i> as per - http://weeds.dpi.nsw.gov.au/Weeds/Details/222 . This tree is for retention												
7	<i>Callistemon viminalis</i>	3.5	N - 3, S - 2 E - 4, W - 4	.200	50%	FAIR	Semi mature	2.4	1.68	3a	LOW	RETAIN – Neighbours tree, No 34
Semi mature, asymmetrical small tree with Crown spread orientation non radial. Crown form suppressed. Tree growing very close to the back corner fence of No 34 Minnamurra Street. Multi stemmed small tree with fair vigour, dead and dying branches, past pruning evidenced. Branch extending into subject site approximately two (2) metres over fence.												
8	<i>Brachychiton acerifolius</i>	8	N - 3, S - 3 E - 3, W - 3	.500	50 - 75%	GOOD	Semi mature	6.0	2.5	2a	HIGH	RETAIN – Neighbours tree, No 32
Semi mature, symmetrical tree with Crown spread orientation radial. Crown form co dominant. Multi trunked, three (3) first order structural branches forming the frame work of this tree. Tree with occlusions at base, lower branching forming a lower, mid and upper canopy. Tree growing approximately four (4) metres in from the back fence with no canopy extending into subject site.												
9 A Stand	<i>Cupressocyparis X Leylandii</i>	6- 8m	NA	.150 - .400	>75%	GOOD	Semi mature	4.8 (largest)	2.25	2d	LOW	RETAIN – Neighbours tree, No 30
Semi mature, symmetrical small trees with Crown spread orientation non radial. Crown form intermediate - dominant. A stand of trees growing approximately one (1) metre in from the back boundary fence within No 30 Minnamurra St. Trees of approximately 10 years of age possibly planted for hedging / privacy. Trees growing very close to one another, lower canopy is missing with one tree in decline. The most southern trees growing close to a steep formed concrete retaining wall. A vertical drop exists of approximately 2 – 2.0m from the trees base to back of the lower shop on 33 Collins St. Although these trees are within Kiama Councils - http://www.kiama.nsw.gov.au/residents/trees--vegetation/exempt-tree-species , but they shall be retained.												
10 A Stand	<i>Allocasuarina littoralis</i>	8 – 10m	N - 4, S - 4 E - 4, W - 4	.100 - 300	75%	FAIR	Semi Mature	3.6	2.0	small	LOW	REMOVE – western embankment on subject site
Semi mature, asymmetrical trees with Crown spread orientation radial. Trees growing along the western embankment. Trees have self-seeded. Removal for development shall be needed, with compensatory planting recommended.												

combined stem diameter - AS 4970 -2009, *Protection of trees on development sites*, Appendix A, Pg. 23

6.4 Encroachment

Encroachment refers to the likelihood of interference within the SRZ and or TPZ of each tree, and is calculated in a percentage form.

1 - TPZ – Tree Protection Zone = DBH X 12 METRES

DBH = Diameter at Breast Height (1.4 metres)

2 – SRZ – Structural Root Zone = $(D \times 50)^{.42} \times .64$

D = trunk diameter measured above the root buttress

Construction impacts to trees often include some degree of root injury, soil compaction, removal of leaf area through pruning, loss of rooting space and changes in soil moisture and microbiology. These impacts do not occur all at once. Rather, a series of changes occur to which the tree must respond and adapt. First, roots are injured and the site micro climate altered by clearing. Then further changes occur during grading and installation of improvements. Construction of adjacent structures causes another series of damages. Finally, finish grading and landscaping further encroach into root area and alter the trees microsite. Trees may respond to these impacts in a variety of ways, from slower growth and poor foliage colour to dieback and death².

TREE 1 – *Araucaria heterophylla*, this tree is growing at the end of Meares Place, in front of a water mains for number 20 Meares Pl. It appears to be within Councils street verge. No works are proposed within the TPZ of T1, 3.6 metres radially from this tree.

Tree protection fencing shall be recommended for T1 from construction impacts for the entirety of the project.

TREE 2 – *Eucalyptus elata*, this tree is growing close to the retaining wall fronting 21 Meares Place. T2 has a TPZ of 5.4 metres radially around its trunk. Area of incursion / encroachment from the proposal is possible from “Proposed Level 01” plans, being calculated at 5.6 metres away. Proposed concrete / paved pathways within the TPZ of 5.4m, shall be placed on the grounds surface, without major excavating within the surface root zone. Pier and beam and or cantilevered construction methods for pathways shall be considered.

Two horizontal branches, southward are recommended to be removed for the purposes of the development and to minimise damage to T2. All pruning practices shall be in accordance with – AS 4737 – 2007, *Pruning of amenity trees*. Owner’s permission is needed, in writing, from the Strata committee of 21 Meares Place as well as Kiama Councils right to provide it as forming part of Conditions of Consent.

Tree protection fencing shall be recommended for T2 from construction impacts for the entirety of the project

TREE 3 - *Allocasuarina littoralis*, this tree is growing several metres from T2, close to the boundary line. This tree has a TPZ of two (2) metres and therefore no construction impacts shall be encountered to T2.

Tree protection fencing shall be recommended for T3 from construction impacts for the entirety of the project and fencing shall incorporate, T2, T3 and T4 collectively.

² Arboriculture, Fourth Edition, Integrated Management of Landscape Trees, Shrubs, and Vines/ Richard W. Harris, James R. Clark, Nelda P. Matheny/ 2004/ Prentice Hall/ Chapter 11, Preserving Existing Trees, Pg. 263

TREE 4 – *Allocasuarina littoralis*, this tree is growing several metres from T3. This tree has a TPZ of 2.4 metres radially and with a setback of six (6) metres, no construction impacts shall be encountered for T4.

Tree protection fencing shall be recommended for T4 from construction impacts for the entirety of the project and fencing shall incorporate, T2, T3 and T4 collectively, to create one large TPZ.

TREE 5 – *Allocasuarina littoralis*, this tree is located at the most northern corner of the subject site, growing within the property of 21 Meares Pl. Tree 5 has a TPZ of 8.4 metres radially. The TPZ does extend into the subject site with a MINOR incursion calculated.

Amendments to the proposed plans within that corner have been considered and altered by the Architects in collaboration with the Author of this report and hence changes to the setbacks from T5 have been extended. As well, a footpath that was originally to be passing around that corner, has been deleted to prevent and to minimise damage to T5.

The TPZ does enter into the subject site and therefore Tree protection fencing shall be recommended for T5, from construction impacts for the entirety of the project. This area shall be isolated from construction impacts and monitored regularly to ensure that the subject tree is not compromised by construction impacts.

TREE 6 – *Schinus molle*, this tree is growing within the backyard of No 34 Minnamurra Street. T6 is approximately 1.5 metres from the back fence. The TPZ for T6 is six (6) metres and with a building setback for the proposed development of approximately six (6) metres, there shall be no incursion/ encroachment within the TPZ of T6. Gardens are proposed along the subject site, fronting T6.

The TPZ does enter into the subject site and therefore Tree protection fencing shall be recommended for T6 from construction impacts for the entirety of the project.

TREE 7 – *Callistemon viminalis*, this tree is growing within the property of No 34, back corner fence line. T7 has a TPZ of 2.4 metres radially around its trunk. The setback for the proposed development is six (6) metres and therefore no incursion /encroachment shall occur within the TPZ of T7. Gardens are proposed along the subject site, fronting T7.

The TPZ does enter into the subject site and therefore Tree protection fencing shall be recommended for T7 from construction impacts for the entirety of the project.

TREE 8 – *Brachychiton acerifolius*, this tree is growing within the property of No 32 Minnamurra Street. T8 is approximately four (4) metres away from the back fence and has a TPZ of six (6) metres, therefore the TPZ is within the subject site. The proposed development has a setback of six (6) metres and therefore no incursion / encroachment is to be encountered.

Tree protection fencing shall be recommended for T8 from construction impacts for the entirety of the project.

TREE 9 – *Cupressocyparis X Leylandii*, these trees as a stand, are growing within the backyard of No 30 Minnamurra Street, close to the back fence. Collectively there are approximately 7/ 8 trees all with varying DBH and the author of this report has calculated the DBH (Diameter at Breast Height) **at the largest** DBH of approximately .400mm. The TPZ for these trees are 4.8 metres radially from the centre of these trees.

- The location of these trees from the back fence, within No 30 = one (1) metre
- The distance from the proposed basement, “substation” – Proposed Level – 01, from the fence of No 30 is approximately three (3) metres.

From these calculations there is an encroachment, and this equates to an incursion of 2.88m² and as a percentage, is 3.98% of the total area of T9s, TPZ of 72.38m². In accordance with AS 4970 -2009, *Protection of trees on development sites*, this equates to a MINOR encroachment.

The author of this report, noticed that whilst attending the site visit, a large retaining wall and change of levels exists very close to the back fence of No 30, southern end, and excavations and level changes appear to be proposed within the immediate area and therefore the existing stand of trees (T9) would have adapted to the current conditions over the years and therefore excavation impacts shall be minimised due to the conditions that exist currently.

Although a MINOR encroachment has been calculated, garden beds have been proposed within the subject site adjacent to T9, as the proposal is sympathetic to the growing area within the subject site.

Tree protection fencing shall be recommended for T9 from construction impacts for the entirety of the project.

TREE 10 – *Allocasuarina littoralis*, these trees are growing as a stand, along the western embankment overlooking the carpark to the west. All these trees are self-seeded with several weed species growing as understorey plants. The proposed development shall utilise this area and major excavations shall be undertaken within this area for the development to blend into its locality. The setbacks proposed around the development shall provide opportunities for compensatory re planting of mature tree and plant species.

7. Photographs of trees

Photo 1 below, looking west, to T1 and T2. Two horizontal branches recommended for pruning for T2.



Photo 2, below looking north east at T2, T3 and T4.

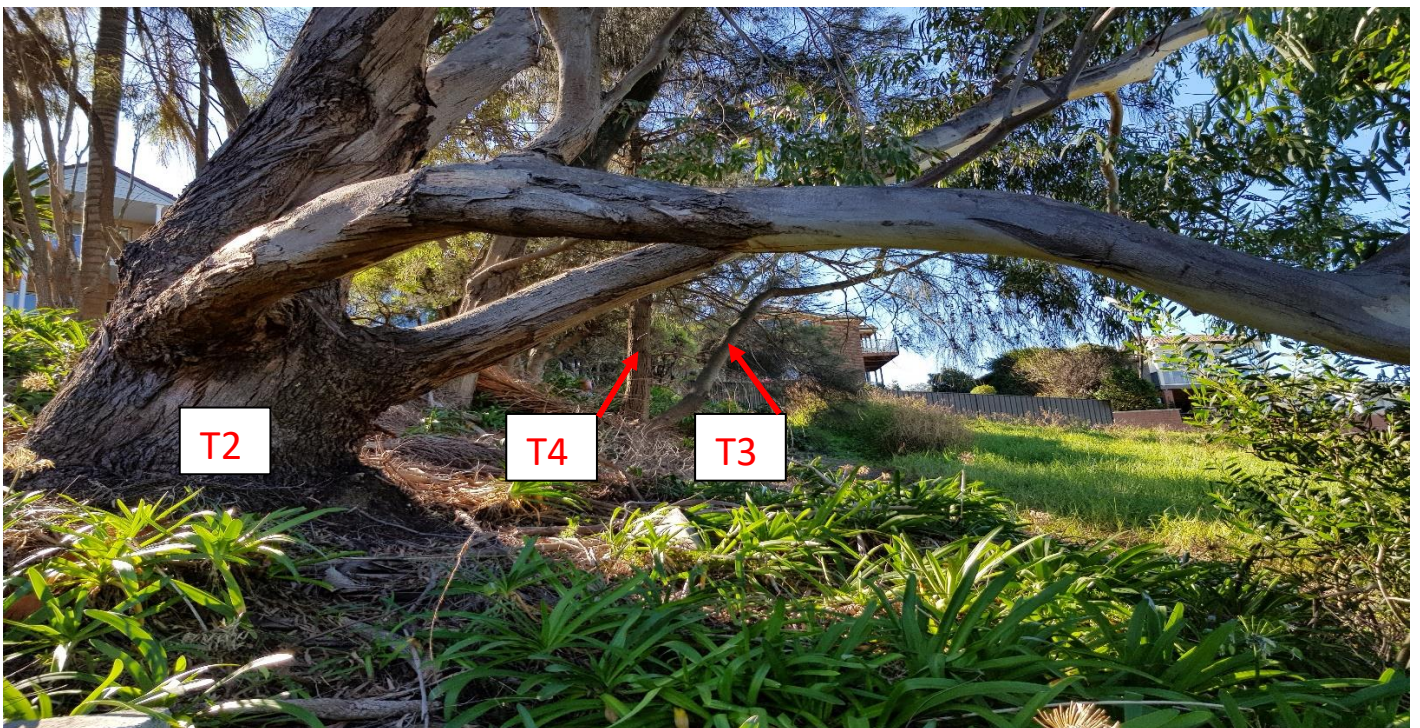


Photo 3, below looking north up into the corner of the subject site. T5 is within, 21 Meares Pl



Photo 4, below looking north over fence into No 34, Minnamurra St. No canopy is extending into subject site



Photo 5, Looking north at T6 and T7 within backyard of No 34 Minnamurra St



Photo 6, below looking east at T8 (No 32) and T9 (No 30).



Photo 7, below looking south east along the boundary fence. T9s canopy does extend into subject site for approximately 2.5 metres. Tree Protection Measures need to be addressed.



Photo 8, below looking at the stand of T9. Notice tree in decline within middle of stand (red rectangle). Large drop in ground levels within the right of the photo at the back of the shop premises



8 Mitigation / Recommendations:

- Prior to ANY works commencing upon this site, Tree Protection measures must be implemented to T1, T2, T3, T4, T5, T6, T7, T8 and T9. All Tree works must be in accordance with – AS, *Protection of trees on development sites, AS 4970 – 2009* and ‘Tree Location and Protection Plan” within this report.
- The **removal** of T10 for the reasons of development, change in levels / excavation and a varied planting scheme favoured within landscaping works proposed.
- The **removal** of two (2) horizontal branches upon T2, extending southward into the proposed development site, by an AQF minimum Level 3, insured, financial member of Arboriculture Australia, climbing arborist to - AS 4373 – 2007, *Pruning of Amenity trees*.
- All excavations within the TPZ of T2, T5 and T9 shall be in attendance by an AQF Level 5 Consulting Arborist, for the management and overseeing of excavations within the TPZs of these three (3) trees.
- Erosion and sediment controls shall be implemented to Trees – T2, T3, T4, T5 and T9. These trees are located **ABOVE excavations** and whilst bulk earth works are being completed the possibility of the area beneath each of these trees being washed away by consistent and regular rainfall events. These events and conditions around these trees shall be monitored thoroughly whilst works are being carried out. Shoring up of the exposed open cuts, close to these trees shall be implemented.
- The Project Arborist shall be engaged, prior, during and after construction works have ceased, and in conjunction with the builder and landscaper.
- The site visits and meetings with all stakeholders, shall be formulated at key stages and times throughout the project.
- All tree work shall be carried out by qualified Arborists with minimum Certificate 3 Qualifications. Work shall be completed following AS 4373, *Pruning of Amenity Trees, 2007*.
- All site tradesperson’s, visitors and all key stakeholders shall be inducted onto the subject site, and in accordance to Australian Standards, *Protection of trees on development sites, AS 4970 – 2009*. All site tradesperson’s, visitors and key stakeholders shall be aware of their responsibilities whilst working amongst trees to, be removed and trees to be retained.

8.1 Pre Construction

- The erection of temporary fencing in the form of chain wire fencing panels at 2.4m x 1.8m high increments stabilised with concrete movable feet, similar to – *SBS Fencing or ATF* (Australian Temporary Fencing), shall be installed for Trees 1, 2, 3, 4, 5, 6, 7, 8 and 9, in the locations noted upon the “5 - Tree Location Plan” – IN BLUE, at their designated TPZ measurements, within this report. See Appendix 10.7 Tree Protection Fencing.
- Several Tree Protection Signs shall be erected upon the fencing of each tree to be protected, for all to adhere to. See Appendix 10.8 Tree Protection Signage

8.2 During Construction

- Regular monitoring of the site by the project builder, the builders work crew, Subcontractors and Home owners to ensure the control measures are kept in working order for the intended purpose of protection of the trees to be retained.
- The following are prohibited within each trees TPZ, to be retained:
 - 1) Cultivation
 - 2) Storage of anything
 - 3) Preparation of any building products or items of building nature
 - 4) Refuelling
 - 5) Dumping of waste

- 6) Wash down and cleaning of equipment
- 7) Soil level changes
- 8) Physical damage to the tree³
 - A monthly visit from a consulting Arborist to ensure the measures are being adhered to. The protection of these trees are paramount and it is every person's responsibility before entering the site to understand the restrictions placed on activity surrounding the subject trees.

8.3 Hold Points

TIMING / SITE VISITS	PROCEDURE	AUTHORITY	CERTIFICATION
1 - Before ANY works	Tree Protection establishment to T1, T2, T3, T4, T5, T6, T7, T8, T9 as per Arborist report	Project Arborist	Certificate of Compliance for Certifier
2 – Excavations within TPZs of T2, T5, T8 T9	Monitor possible Root / canopy damage	Project Arborist	Report of findings / actions
3 - Periodically	Monitor maintenance to protection measures	Project Arborist	Certificate of Compliance for Certifier
4 – Occupation Certificate	To view condition of TPZs and each trees surrounds are as per plans	Project Arborist	Certificate of Compliance for Certifier

9 Disclaimer

The tree (s) referred to in this report are / were living entities and are therefore subject to natural processes. They will be also be subject to changes to their environment caused by human activities, and to ever changing weather conditions.

Sydney Landscape Consultants inspection for this report was ground based and hidden defects which are not readily visible may not be detected and therefore we cannot wholly guarantee the condition and safety of the trees inspected. We recommend regular inspections by a qualified AQF level 5 Arborist.

This report does not constitute a report unless all page numbers are sequenced and read in conjunction as a sequenced report.

Sydney Landscape Consultants cannot be liable for any excavation, building and general building works that may occur day to day upon this subject building site and to the subject trees within this report, by person, machine or act of nature.

10 Conclusion

This report has focused on the subject site at 33 Collins Street and 23 Meares Place Kiama. The site is subject to a proposed development with ten (10) trees being assessed for potential construction impacts and encroachments from the proposed development.

This report is to make aware of issues relating to protecting trees on neighbouring properties and understanding methods that can be implemented to reduce stress on them and continue to ensure the subject trees remain viable.

³Australian Standard, AS4970 – 2009 *Protection of trees on development sites*, Standards Australia, 2009, 4.2 ACTIVITIES RESTRICTED WITHIN THE TPZ, PG17

11. Appendices

11.1 Tree protection zones (TPZ)

The Tree Protection Zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. This is an area that is prohibited from any construction work. TPZs have been calculated for each tree (3) within this report. The TPZ for each tree has been formulated using calculations based on the Australian Standard, *Protection of trees on development sites, AS 4970 - 2009*

11.2 Structural Root Zone (SRZ)

The SRZ is a specified distance measured from the trunk that is set aside for the protection of the trees structural roots. This zone is paramount for protection measures as is necessary for the stability of a tree. The SRZ is a radial measurement from the trunk. Roots within the SRZ are not to be touched. The SRZ have been calculated using the Australian Standard, *Protection of trees on development sites, AS 4970 – 2009*

11.3 SULE (Safe Useful Life Expectancy)

SULE categories (after Barrell, 2001)¹

SULE Category	Description
Long	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.
1a	Structurally sound trees located in positions that can accommodate for future growth
1b	Trees that could be made suitable for retention in the long term by remedial tree care.
1c	Trees of special significance that would warrant extraordinary efforts to secure their long term retention.
Medium	Trees that appeared to be retainable at the time of assessment for 15-40 years with an acceptable level of risk.
2a	Trees that may only live for 15-40 years
2b	Trees that could live for more than 40 years but may be removed for safety or nuisance reasons
2c	Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide for new planting.
2d	Trees that could be made suitable for retention in the medium term by remedial tree care.
Short	Trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable level of risk.
3a	Trees that may only live for another 5-15 years
3b	Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
3c	Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
3d	Trees that require substantial remedial tree care and are only suitable for retention in the short term.
Remove	Trees that should be removed within the next five years.
4a	Dead, dying, suppressed or declining trees.
4b	Dangerous trees because of instability or loss of adjacent trees
4c	Dangerous trees because of structural defects
4d	Damaged trees not safe to retain.
4e	Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
4f	Trees that are damaging or may cause damage to existing structures within 5 years.
Small	Small, or young trees that can be reliably moved or replaced.
5a	Small trees less than 5m in height.
5b	Young trees less than 15 years old but over 5m in height.

¹ (Barrell,J. (2001) "SULE: Its use and status into the new millennium" in *Management of mature trees*, Proceedings of the 4th NAAA Tree Management Seminar, NAAA, Sydney.

11.4 IACA Significance of a Tree Assessment Rating System (STARS)

Criteria for Assessment of Landscape Significance

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.

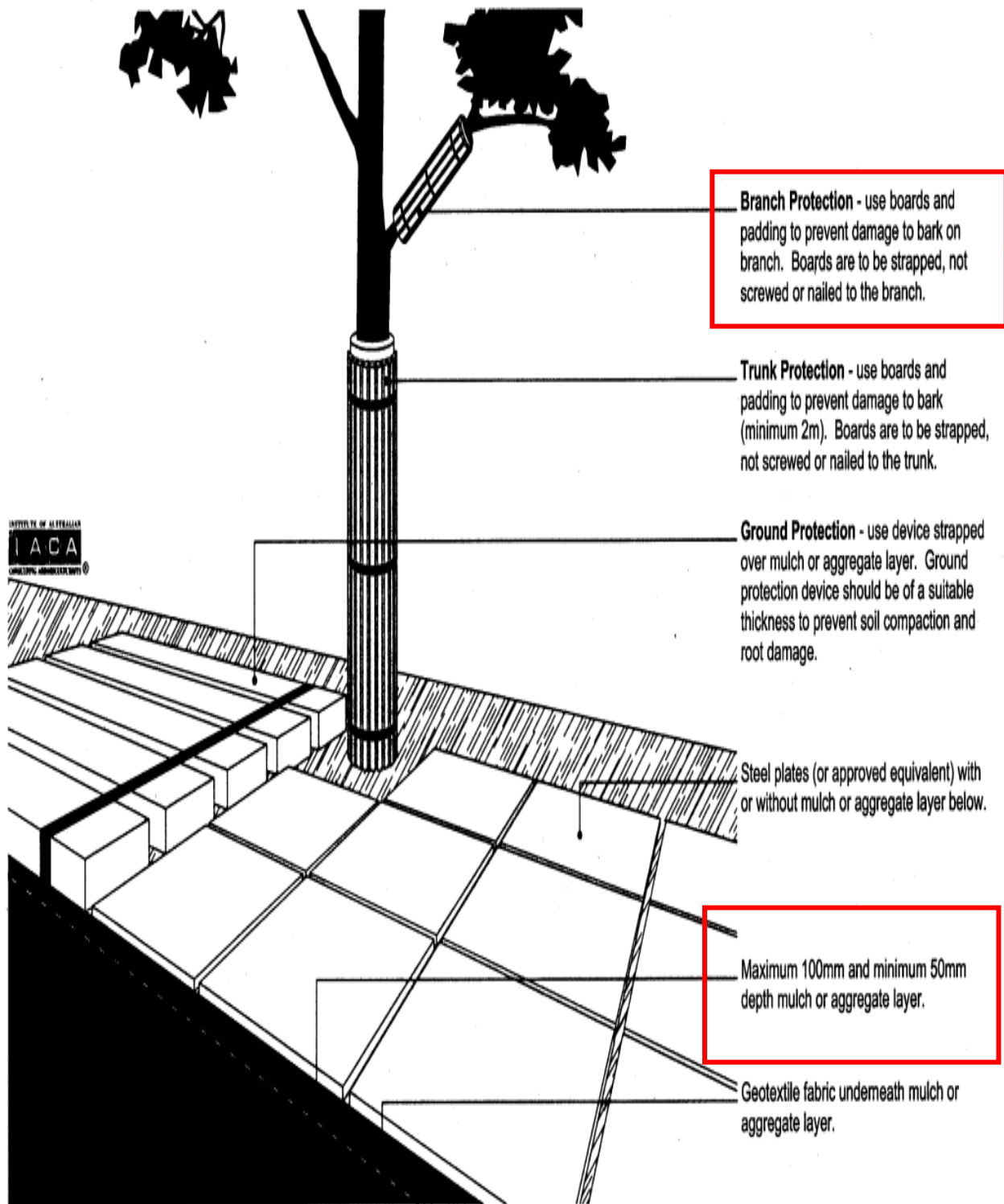
		Significance				
		1. High	2. Medium	3. Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1. Long >40 years	[Grey]		[Grey]	[Grey]	[Grey]
	2. Medium 15-40 Years					
	3. Short <1-15 Years	[Grey]		[Grey]	[Grey]	[Grey]
	Dead	[Grey]		[Grey]	[Grey]	[Grey]

Legend for Matrix Assessment

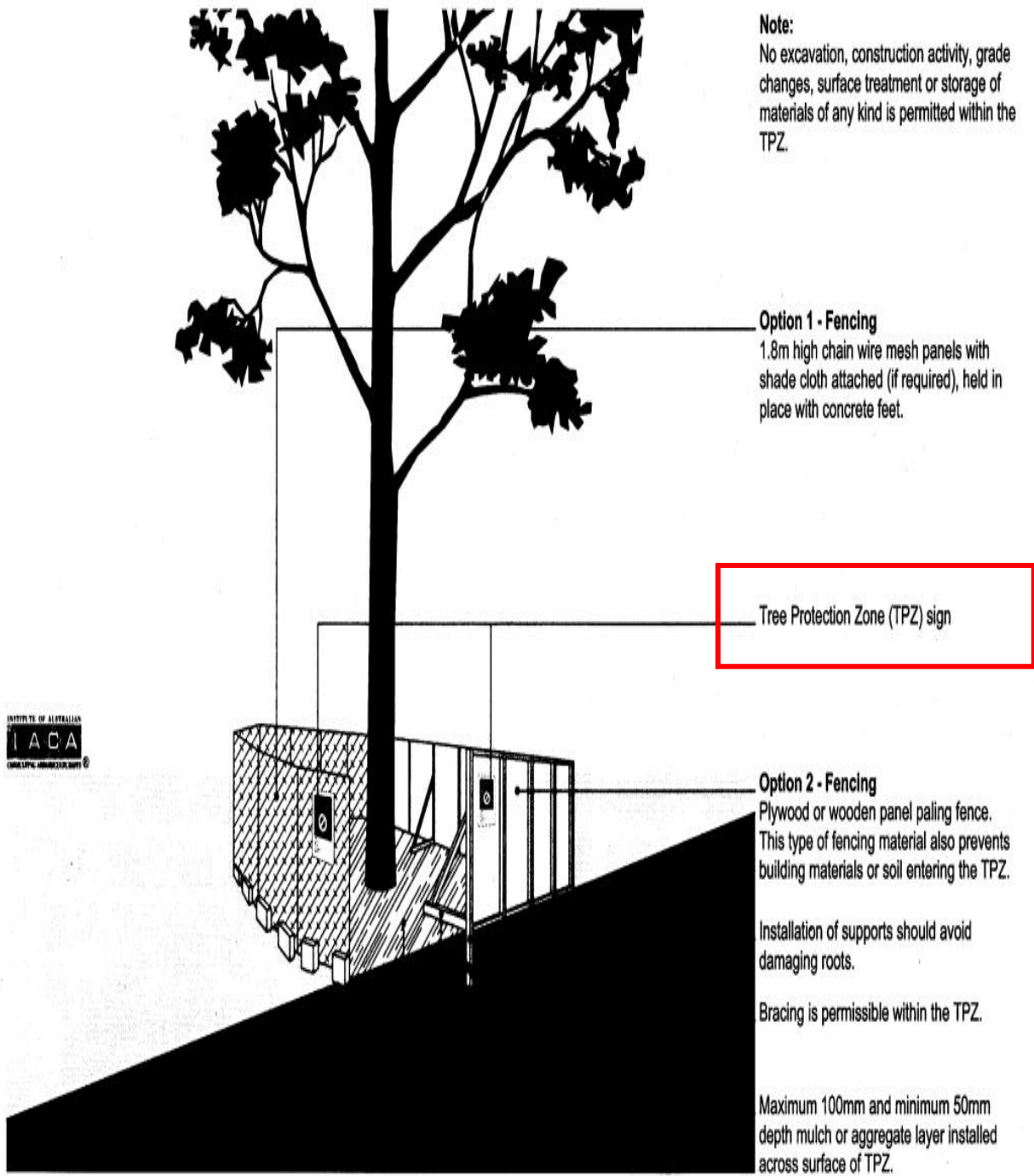


	<p>Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 <i>Protection of trees on development sites</i>. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.</p>
	<p>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.</p>
	<p>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.</p>
	<p>Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.</p>

11.5 Trunk and Ground Protection



11.6 Tree Protection Fencing



03

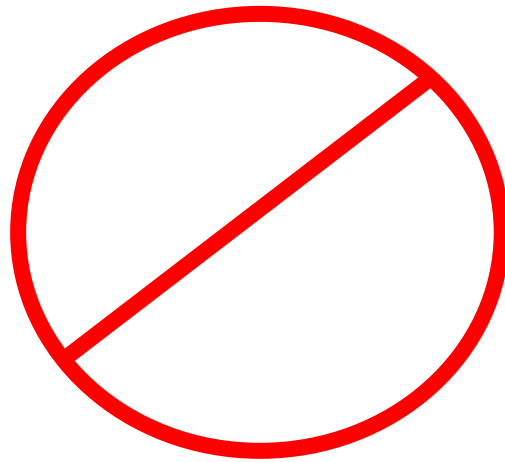
Tree Protection Fencing

Not to Scale

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11.7 Tree Protection Signage

TREE
PROTECTION
ZONE



NO ACCESS

Contact: Sydney Landscape Consultants - 0432 965 678
PO Box 154, Botany, Sydney NSW

Recommended to be A4 size, laminated and cable tied to every second / third fencing panel at 1.5m high

12. Bibliography

- 1 - Arboriculture, Fourth Edition, Integrated Management of Landscape Trees, Shrubs, and Vines/ Richard W. Harris, James R. Clark, Nelda P. Matheny/ 2004/ Prentice Hall.
- 2 – DICTIONARY FOR MANAGING TREES in URBAN ENVIRONMENTS/ Danny B Draper and Peter A Richards/ 2009/ CSIRO Publishing.
- 3 - Australian Standard *Protection of trees on development sites, AS 4970 - 2009*/ Standards Australia/ 2009.
- 4 - Australian Standard *Pruning of amenity trees, AS 4373 – 2007*/ Standards Australia/ 2007.
- 5 – Weed wise - <http://weeds.dpi.nsw.gov.au/>
- 6 – Chapter 3 – Kiama Development Control Plan 2012 – Preservation & Management of Trees & Vegetation
- 7 – Near maps subscription program/ <https://www.nearmap.com>
- 8 - http://www.treetec.net.au/TPZ_SRZ_DBH_calculator.php

Regards



Craig Kenworthy - RH

Registered Horticulturist (RH) – Australian Institute of Horticulture - 2018

Registered Consulting Arborist – Tier 1, Arboriculture Australia – AA - 2018

Member of International Society of Arboriculture – ISA - 2018

AQF Level 5 - Arboriculture

AQF Level 5 – Landscape Design

AQF Level 4 – Workplace Training and Assessment

AQF Level 3 – Landscape Construction, NSW

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