ArborSafe

Arboricultural Impact Assessment

Northern Sydney Asset Management Unit
Narrabeen North Public School

23 June 2020

Assessment and Report prepared by:

Justin Herbert

B. App. Sci. (Hort.), Dip. App. Sci. (Hort.), AQF Level 7

C91912

1 Introduction

1.1.1 ArborSafe Australia Pty Ltd was engaged by Deb Ainsley on behalf of Northern Sydney Asset Management Unit (the Client) to complete an Arboricultural Impact Assessment (report) on four (4) trees located within Narrabeen North Public School at 6 Namona Street, North Narrabeen, NSW.

1.1.2 The report has been requested as part of a Development Application (DA) that involves installation of demountable administration buildings within the current area of staff car parking.

1.1.3 The report was intended to provide information on site trees and how they may be impacted upon by the proposed development. Report findings and recommendations provided are based upon guidance provided within Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*.

1.1.4 Observations and recommendations provided within this report are based upon information provided by the Client and an arborist site visit.

2 Scope

2.1.1 Carry out a visual examination of the nominated trees located within the vicinity of the staff car park.

2.1.2 Inspect the nominated trees and their growing environment in the context of the proposed development.

2.1.3 Provide an objective appraisal of the subject trees in relation to their species, estimated age, health, structural condition and viability within the landscape.

2.1.4 Based on the findings of this investigation, provide independent recommendations on the retention value of the trees.

2.1.5 Nominate subject trees that can be retained or require removal to facilitate this development.

2.1.6 Review the proposed development in the context of Pittwater Local Environment Plan 2014, Northern Beaches Council.

2.1.7 Identify and reduce potential conflicts between subject trees and site development by providing accurate information on the area required for tree retention and methods/techniques suitable for tree protection during construction.

2.1.8 Provide information on restricted activities within the area nominated for tree protection, as well as suitable construction methods to be adopted during construction.

3 Methodology

3.1 Data Collection

3.1.1 Justin Herbert of ArborSafe Australia Pty Ltd carried out a site inspection of the subject trees on 18 June 2020.

3.1.2 Trees that are the subject of this report were identified during discussions with the Client and an onsite meeting with the principal of Narrabeen North Public School.

3.1.3 The subject trees were inspected from ground level. No foliage or soil samples were taken. No aerial or internal investigations were undertaken.

3.1.4 Tree height and canopy width were estimated and have been provided to the nearest whole metre. Trunk Diameter at Breast Height (DBH) was measured with a diameter tape and provided to the nearest centimetre.

3.1.5 Data collected on site was analysed by Justin Herbert, collated into report format, and relevant recommendations were formulated.

3.2 Tree Protection Zones

3.2.1 The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) methods have been derived from the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*.

3.2.2 The TPZ is defined as a specified area above and below ground and at a given distance measured radially away from the centre of the tree's trunk and which is set aside for the protection of its roots and crown. It is the area required to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development. The radius of the TPZ is calculated by multiplying its DBH by 12. TPZ radius = DBH × 12. (Note "Breast Height" is nominally measured as 1.4m from ground level).

3.2.3 The SRZ is the area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. SRZ radius = $(D \times 50)^{0.42 \times 0.64}$.

3.2.4 Retention values are determined based upon the British Standard BS 5837–2012: *Trees in Relation to Design, Demolition and Construction*. This standard categorises tree retention value based upon assessment of the tree's quality (health and structure), and life expectancy. Other criteria such as its physical dimensions, age class, location and its Amenity, Heritage and Environmental significance are also considered. A breakdown of attributes required for each category can be obtained from Appendix B – Explanation of Tree Assessment Terms.

3.3 Images and Site Photographs

3.3.1 All photographs were taken at the time of the site inspection by the inspecting arborist. Photographs have been altered for brightness and/or cropped only. Other images used within this report have been sourced from ArborSite or via the internet. The source of all images has been referenced accordingly.

3.4 Determining Tree Retention Values

3.4.1 Collectively tree attributes are reviewed and used to categorise tree value in a development context. Additional information explaining Tree Retention Value can be found in Appendix C – Tree Retention Values.

4 Observations

4.1 Site Details

4.1.1 The site is located within the Northern Beaches Council Local Government Area (LGA).

4.2 Site Assessment Data

4.2.1 Refer to 'Site Assessment Data' section of this report for data relating to the specific trees covered within this report.

4.3 Tree / Site Images

Figure 1. Tree 38 in its growing environment. (Justin Herbert, 18 June 2020).

Figure 2. Tree 38. (Justin Herbert, 18 June 2020).

Figure 3. Tree 38. (Justin Herbert, 18 June 2020).

Figure 4. Tree 39 in its growing environment. (Justin Herbert, 18 June 2020).

Figure 5. Tree 39. (Justin Herbert, 18 June 2020).

Figure 6. Tree 40 in its growing environment. (Justin Herbert, 18 June 2020).

Figure 7. Tree 40. (Justin Herbert, 18 June 2020).

Figure 8. Tree 41 in its growing environment. (Justin Herbert, 18 June 2020).

Figure 9. Tree 41. (Justin Herbert, 18 June 2020).

4.4 Heritage Status

4.4.1 The heritage listed Binishells (concrete geodesic domes) are approximately 35m from the proposed area for demountable building installation and are very unlikely to be impacted upon, therefore, the Binishells are not discussed in this report.

4.5 Proposed Development

4.5.1 Plans of the existing site and of the proposed development were provided to ArborSafe on 17 June 2020 and include:

- 15008_DET_3B.pdf, plan showing details and levels over part of LOT 3 DP 1018621 North Narrabeen PS, Surveyplus Land Development Consultants, March 2020.

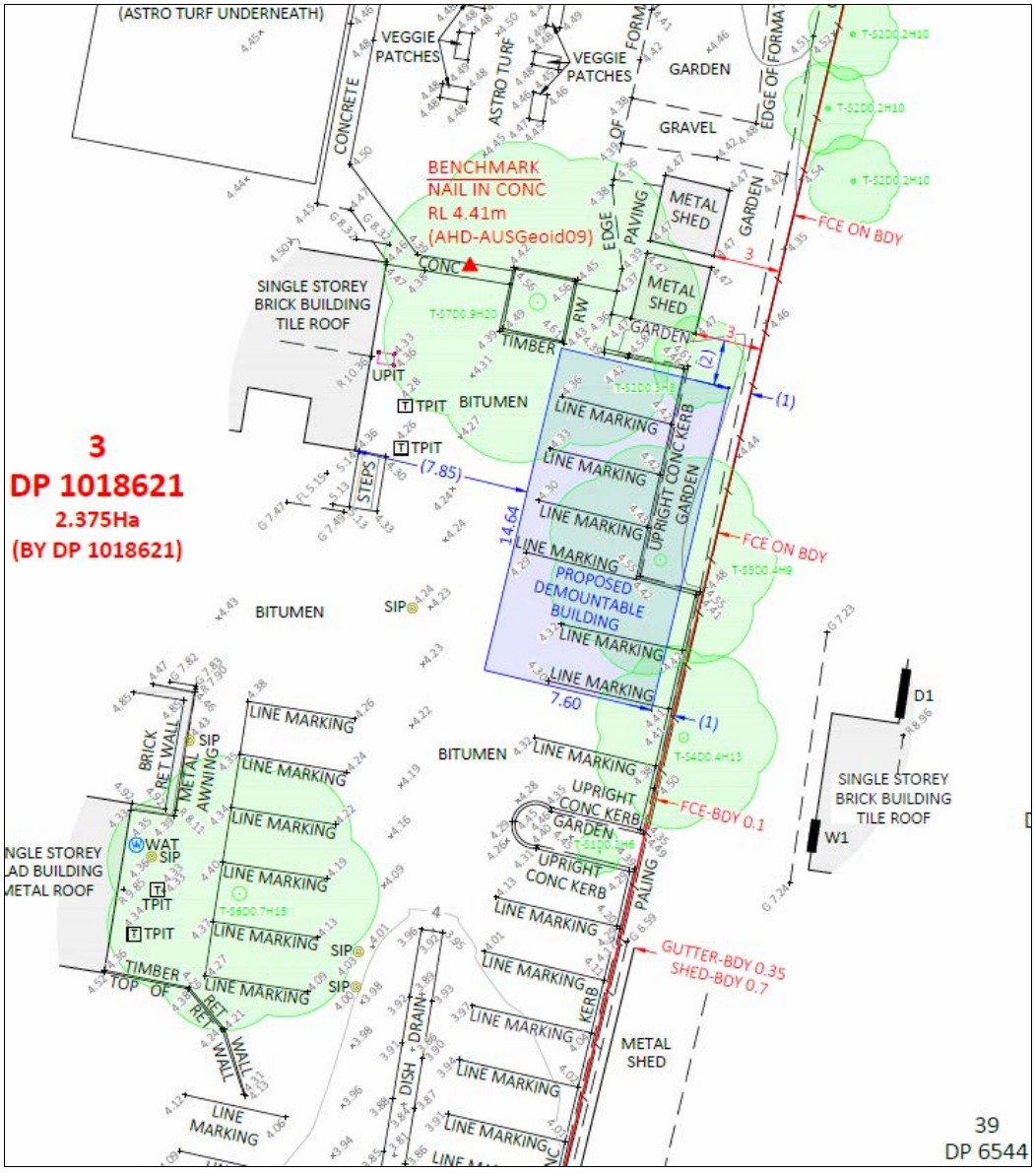


Figure 10. Excerpt from 15008_DET_3B, (Surveyplus Land Development Consultants, March 2020).

4.6 Outline of Site Trees

4.6.1 Four (4) trees were inspected and are the subject of this report. Complete attributes for each tree can be found in the Site Assessment Data section of this report.

4.6.2 Subject trees form part of the existing ArborSite Tree Management System for the entire Narrabeen North Public School and as such have been tagged, positioned on aerial imagery and visually assessed annually since 2018.

4.6.3 The subject trees have been numbered in line with the existing ArborSite tree numbering system. Trees can be identified on site using white tree tags which are typically located at approximately 2.0m from ground level on the trunk. Trees located on neighbouring properties are not tagged.

4.6.4 As these subject trees form part of a previous survey undertaken for the entire site, trees are numbered between 38 and 41.

5 Discussion

5.1 TPZ Encroachment

5.1.1 **Major encroachment**. As per the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites,* a major encroachment into the TPZ of any tree is considered to occur when it is beyond 10% of the total TPZ area.

5.1.2 **Minor encroachment**. A minor encroachment is determined as being less than 10% of the total TPZ area. Trees with minor encroachment may be retained with specific, generic or no protection requirements throughout the construction stage.

5.1.3 **No encroachment**. Trees with no encroachment may be retained with specific, generic or no protection requirements throughout the construction stage.

5.1.4 For the purposes of this report, trees to be removed or retained have been identified as those:

- May require removal due to major encroachment into their TPZ
- Retainable and requiring specific protection requirements throughout construction (i.e. generic requirements plus arborist supervision and careful construction methods within their TPZ)
- Retainable and requiring generic tree protection measures only (i.e. protective fencing and restriction of activities within the TPZ).

5.2 Additional Excavation/Trenching within TPZs

5.2.1 In the event additional excavation is required within the TPZs of retained trees identified within this report, or any other site trees, arborist involvement will be required to ensure works are undertaken in accordance with the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites.*

5.2.2 Excavation/trenching within the TPZs of retained trees should be undertaken using sensitive construction methods such as manual excavation or air spade.

5.3 Demountable building proposed location

5.3.1 The demountable building is currently proposed to be located in the north-east corner of the car park as per Section 4.5.1. This location would impact the TPZs and SRZs of Trees 39, 40 and 41 via the excavation required to install pad footings for the demountable building, therefore this location is **not** recommended. Recommendations regarding a location that promotes minimal potential for damage to retained trees is discussed in Section 6.

5.3.2 The size, location and quantity of any pad footings has not been provided for review, however selection such should be sympathetic to tree protection.

5.3.3 It should be noted that at any subsequent risk assessment may see an increase in risk given that occupancy is likely to increase following the installation of the proposed demountable building.

5.3.4 Neighbouring trees are unlikely to be impacted upon given their estimated sizes and subsequent TPZs.

6 Recommendations

6.1 Demountable building location

6.1.1 The below diagram shows the TPZs of subject trees within this report. The demountable building should be positioned between the two Category A trees, numbered 38 and 41, on the east side of the existing car park to minimise TPZ encroachment and to avoid SRZ encroachment. Distances for this calculation are provided within the Site Assessment Data section of this report. The demountable building and quantity, size and location of pad footings must be definitively located on the plan for review.

Figure 11. Estimated TPZs, Narrabeen North Public School. (ArborSafe, 18 June 2020).

6.2 Tree Removal

6.2.1 Pending the approved location of the demountable building between Trees 38 and 41, Category B Tree 39 may require removal should pad footings be located within its SRZ. Should this tree require removal a suitable species of similar crown potential must be replanted within the subject site.

6.3 Tree Retention

6.3.1 Trees 38 and 41 were recommended for retention and require specific protection measures during construction to ensure they remain viable following the completion of works. Tree 40 is deemed to be retainable due to its location inside the TPZ of Tree 41.

6.3.2 Excavation for pad footings is to be carried out **only** under arborist supervision. Should any roots be located during the works, advice will be provided at the time of inspection. Excavation must not occur within the SRZ of any retained tree. Given the extent of hard surfaces surrounding all of the subject trees it was not possible to estimate the location of any roots on the day of assessment.

6.3.3 Works should be undertaken using techniques that are sensitive to tree roots to avoid unnecessary damage. Such techniques include:

- Excavation using an Air Spade with vacuum truck
- Excavation by hand.

6.3.4 Machine excavation should be prohibited within the TPZs of retained trees unless undertaken at the direct consent from the project arborist.

6.3.5 Roots discovered are to be treated with care and minor roots (<40mm diameter) pruned with a sharp, clean handsaw or secateurs. All significant roots (>40mm diameter) are to be recorded, photographed and reported to the project arborist.

6.3.6 Other proposed assets within the TPZs must be installed above existing grade and be of a permeable nature to allow the passage of air and moisture. If any asset is to be load bearing, then it is suggested that a geogrid/web or similar is incorporated to ensure the rooting area below does not become compacted.

6.4 Tree Pruning and Site Access

6.4.1 Information on site access and vehicle size has not been provided for review. However, it is anticipated that the access point will be the main driveway to the car park as shown in Figure 12.

Figure 12. Recommended access point, Narrabeen North Public School. (Justin Herbert, 18 June 2020).

6.4.2 Should pruning for access be required to the site, it must be undertaken in accordance with the Australian Standard AS 4373–2007: *Pruning of Amenity Trees* (Standards Australia, 2007) and undertaken by a suitably qualified arborist (minimum AQF 3 arborist). A pre-inspection in conjunction with the project arborist is likely to avoid unnecessary and poor pruning to retained trees.

6.4.3 Any reduction pruning required should focus on the removal of smaller diameter branches where feasible and remove no greater than 10% of the total crown. Branches no greater than 50mm diameter are to be removed unless specifically approved by the project arborist.

6.4.4 Pruning of the subject trees is not anticipated provided that the demountable building is positioned as previously recommended.

6.5 Tree Protection Fencing

6.5.1 Tree protection fencing should be installed as per the specification in Appendix D to ensure protection of above and below ground tree parts during the installation of the demountable buildings.

7 References

- Standards Australia, 2007. AS 4373–2007 Pruning of Amenity Trees, GPO Box 476 Sydney NSW 2001: Standards Australia.
- Standards Australia, 2009. AS4970–2009: Protection of Trees on Development Sites, Sydney: Standards Australia.
- The British Standards Institution, 2012. BS5837–2012: Trees in relation to design, demolition and construction, London: BSI Standards Limited.
- 15008_DET_3B.pdf, plan showing details and levels over part of LOT 3 DP 1018621 North Narrabeen PS, Surveyplus Land Development Consultants, March 2020.

Site Map

ArborSafe Australia Pty Ltd ACN 114 924 346 ABN 37 114 924 346
Email: enquiries@arborsafe.com.au www.arborsafe.com.au Tel: 1300 272 671

Site Assessment Data

Tree no.	*Botanical Name*	Common Name	Trees in group	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	TLE (Yrs.)	Defects	Significance	Action (irrespective of development)	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
38	*Corymbia citriodora*	Lemon-scented Gum	1	79	93	**9.5**	282.34	**3.2**	15-20	15-20	Good	Good	Mature	25-50	Deadwood/stubs < 30mm;Hanger(s);Mechanical damage to root(s);Previous failure(s);Soil compaction;Soil problems;Wound(s);	Amenity value/shade;Attractive landscape feature;Significant due to age/size;Dominant landscape feature;	Remove hanging limb(s);	- 18-06-2020 : Justin Herbert : Tree assessed.	A	12	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
39	*Corymbia citriodora*	Lemon-scented Gum	1	44	63	**5.3**	87.58	**2.7**	10-15	10-15	Fair	Fair	Semi-Mature	15-25	Co-dominant stems;Resin exudation/kino;Soil compaction;Wound(s);	Amenity value/shade;		- 18-06-2020 : Justin Herbert : Tree assessed. - 27-08-2019 : Alex Austin : Tree assessed. - 04-05-2018 : Andy Clark : Tree assessed. Tree overhanging staff car park.	B	12	Refer Section 6.2.1
40	*Eucalyptus tereticornis*	Forest Red Gum	1	24	29	**2.9**	26.06	**2.0**	5-10	<5	Good	Fair	Semi-Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Soil compaction;Suppressed;Wound(s);	Amenity value/shade;		- 18-06-2020 : Justin Herbert : Tree assessed. - 27-08-2019 : Alex Austin : Tree assessed.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
41	*Corymbia citriodora*	Lemon-scented Gum	1	104	94	**12.5**	489.30	**3.2**	10-15	15-20	Good	Fair	Mature	25-50	Co-dominant stems;Epicormic growth;Mechanical damage to root(s);Previous failure(s);Resin exudation/kino;Soil compaction;Soil grade changes;Wound(s);	Amenity value/shade;Attractive landscape feature;Significant due to age/size;Dominant landscape feature;		- 18-06-2020 : Justin Herbert : Tree assessed. - 18-06-2020 : Justin Herbert : Tree assessed. - 27-08-2019 : Alex Austin : Tree assessed.	A	12	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).

Appendicies

Appendix A. Arboricultural Reporting Assumptions and Limiting Conditions

1. Any legal description provided to the consultant is assumed to be correct. Any titles and ownership of any property are assumed to be good. No responsibility is assumed for matters legal in character.
2. It is assumed that any property/project is not in violation of any applicable codes, ordinances, statutes or other government regulations.
3. Care has been taken to obtain all information from reliable sources. All data has been verified in so far as possible, however, the consultant can neither guarantee nor be responsible for the accuracy of the information provided by others.
4. The consultant shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.
5. Loss or alteration of any part of this report invalidates the entire report.
6. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by anyone but the person to whom it is addressed, without the prior written consent of the consultant.
7. Neither all nor any part of the contents of this report, nor any copy thereof, shall be used for any purpose by anyone but the person to whom it is addressed, without the written consent of the consultant. Nor shall it be conveyed by anyone, including the Client, to the public through advertising, public relations, news, sales or other media, without the written consent of the consultant.
8. This report and any values expressed herein represent the opinion of the consultant and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
9. Sketches, diagrams, graphs and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise.
10. Information contained in this report covers only those items that were examined and reflect the condition of those items at the time of inspection.
11. Inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee expressed or implied that the problems or deficiencies of the plants or property in question may not arise in the future.

Appendix B. Explanation of Tree Assessment Terms

Tree name: Provides the botanic name, (Genus, species, sub-species, variety and cultivar where applicable) in accordance with the International Code of Botanical Nomenclature (ICBN), and an accepted common name.

Age: Refers to the life cycle of the tree

Category	Description
Young	Newly planted tree not fully established may be capable of being transplanted or easily replaced.
Juvenile	Tree is small in terms of its potential physical size and has not reached its full reproductive ability.
Semi-mature	Tree in active growth phase of life cycle and has not yet attained an expected maximum physical size for its species and/or its location.
Mature	Tree has reached an expected maximum physical size for the species and/or location and is showing a reduction in the rate of seasonal extension growth.
Senescent	Tree is approaching the end of its life cycle and is exhibiting a reduction in vigour often evidenced by natural deterioration in health and structure.

Health: Summarises the health and vigour of the tree

Category	Description
Excellent	Canopy full with dense foliage coverage throughout, leaves are entire and are of an excellent size and colour for the species with no visible pathogen damage. Excellent growth indicators, e.g. seasonal extension growth.
Good	Canopy full with minor variations in foliage density throughout, leaves are entire and are of good size and colour for the species with minimal or no visible pathogen damage. Good growth indicators.
Fair	Canopy with moderate variations in foliage density throughout, leaves not entire with reduced size and/or atypical in colour, moderate pathogen damage. Reduced growth indicators, visible amounts of deadwood/dieback, and epicormic growth.
Poor	Canopy density significantly reduced throughout, leaves are not entire, are significantly reduced in size and/or are discoloured, significant pathogen damage. Significant amounts of deadwood and/or epicormic growth, noticeable dieback of branch tips, possibly extensive.
Dead	No live plant material observed throughout the canopy, bark may be visibly delaminating from the trunk and/or branches.

ArborSafe Structure Descriptors

Structure: Summarises the structure of the tree from roots to crown

Category	Description
Good	Good form and branching habit. Minor structural defects that are insignificant and typical or common within the species. e.g. included bark, co-dominant stems. No fungal pathogens present. No visible wounds to the trunk and/or root plate.
Fair	Moderate structural defects present that impact longevity e.g. apical leaders sharing common union(s). Minor damage to structural roots. Small wounds present where decay could begin. No fungal pathogens present. A fair representation of the species.
Poor	Significant structural defects present that have a significant impact on longevity and result in a poor representation of the species e.g. Branch/stems with included bark with failure likely within 0–5 years. Wounding evident with cavities and/or decay present. Damage to structural roots.
Hazardous	Serious structural defects with failure determined to be imminent (<12 months). Defects may include active splits and/or partial branch or root plate failures. Tree requires immediate arboricultural works to alleviate the associated risk.

Useful Life Expectancy (ULE): Useful Life Expectancy refers to an expected period of time the tree can be retained within the landscape before its amenity value declines to a point where it may detract from the appearance of the landscape and/or becomes potentially hazardous to people and/or property. ULE values consider tree species, current age, health, structure and location. ULE values are based on the tree at the time of assessment and do not consider future changes to the tree's location and environment which may influence the ULE value.

Category
0–5 Years
5–10 Years
10–20 Years
20–30 Years
30–50 Years
>50 Years

Appendix C. Tree Retention Values

Tree Retention Value: (based upon BS 5837–2012: *Trees in relation to design, demolition and construction – recommendations)*

Category and definition	Criteria (including sub-categories where appropriate)		
Category U			
Trees in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than 5 years.	• Trees that have a severe structural defect that are not remediable such that their failure is expected within 12 months. • Trees that will become unviable after removal of other Category U trees (e.g. where for whatever reason the loss of companion shelter cannot be mitigated by pruning). • Trees that are dead or are showing signs of significant, immediate and irreversible overall decline. • Trees infected with pathogens of significance to the health and or safety of other trees nearby • Low quality trees suppressing adjacent trees of better quality. • Noxious weeds or species categorised as weeds within the local area. **Note:** Category U trees can have existing or potential conservation value* which might make it desirable to preserve.		
	1. Arboricultural Qualities	**2. Landscape qualities**	**3. Cultural and environmental values**
Category A			
Trees of High Quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years.	Trees that are particularly good examples of their species, especially if rare or unusual (in the wild or under cultivation); or those that are important components of groups or avenues.	Trees or groups of significant visual importance as arboricultural and/or landscape features. (e.g. feature and landmark trees).	Trees, groups or plant communities of significant conservation, historical, commemorative or other value (e.g. remnant trees, aboriginal scar trees, critically endangered plant communities, trees listed specifically within a Heritage statement of significance).
Category B			
Trees of Moderate Quality with an estimated remaining life expectancy of 15–25 years and of dimensions and prominence that cannot be readily replaced within 10 years.	Trees that might be included within Category A but are downgraded because of diminished condition such that they are unlikely to be suitable for retention beyond 25 years.	Trees that are visible from surrounding properties and/or the street but make little visual contribution to the wider locality.	Trees with conservation or other cultural value (trees within conservation areas or landscapes described within a statement of significance, locally indigenous species).
Category C			
Trees of Low Quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable.	Trees of very limited value or such impaired condition that they do not qualify in higher categories.	Trees offering low or only temporary/transient landscape benefits.	Trees with no material conservation or other cultural value.

*Where trees would otherwise be categorised as U, B or C but have significant identifiable conservation, heritage or landscape value even though only for the short term, they may be upgraded, although they might be suitable for retention only.

Tree Quality

		Health**			
		Excellent/ Good	Fair	Poor	Dead
Structure	Good	A	B	C	U
	Fair	B	B	C	U
	Poor	C	C	U	U
	Hazard*	U	U	U	U

*Structural hazard that cannot be remediated through mitigation works to enable safe retention.

** Trees of short term reduced health that can be remediated via basic, low cost plant health care works (e.g. mulching, irrigation etc.) may be designated in a higher health rating to ensure correct retention value nomination.

Appendix D. Tree Protection Measures

All trees to be retained require protection during the construction stage. Tree protection measures include a range of:

- Activities restricted within the TPZ
- Protective fencing
- Trunk and ground protection
- Tree protection signage
- Involvement from the project arborist
- Project milestones
- Compliance reporting

Activities Prohibited within the TPZ:

1. Machine excavation including trenching
2. Storage
3. Preparation of chemicals, including cement products
4. Parking of vehicles and plant
5. Refuelling
6. Dumping of waste
7. Wash down and cleaning of equipment
8. Placement of fill
9. Lighting of fires
10. Soil level changes
11. Temporary or permanent installation of utilities and signs
12. Physical damage to the tree

Protective Fencing Specification

Protective fencing is to be installed as far as practicable from the trunk of any retained trees. Fencing should be erected as per the image below before any machinery or materials are brought to site and before commencement of works (including demolition).

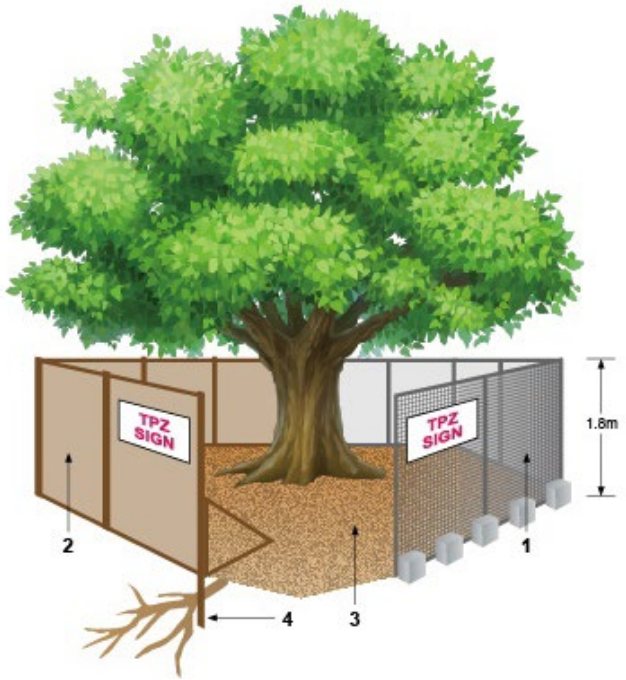
In some areas of the site (i.e. protection of trees on neighbouring properties) existing boundary fencing may be used as an alternative to protective fencing.

Once erected, protective fencing must not be removed or altered without approval from the project arborist. The TPZ fencing should be secured to restrict access.

TPZ fencing is to be a minimum of 1.8m high and mesh or wire between posts must be highly visible – an example is shown in Appendix Figure 1. Fence posts and supports should have a diameter greater than 20mm and should ideally be freestanding, otherwise be located clear of the roots. See image below.

Tree protection fencing must remain intact throughout all proposed construction works and must only be dismantled after their conclusion. The temporary dismantling of tree protection fencing must only be done with the authorisation of a consulting arborist and/or the responsible authority.

The subject trees themselves must also not to be used as a billboard to support advertising material. Affixing nails or screws into the trunks of trees to display signs of any type is not a recommended practice in the successful retention of trees.



Legend:

1. Chain wire mesh panels with shade cloth attached (if required), held in place with concrete feet
2. Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ
3. Mulch installation across surface of TPZ (at discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage materials of any kind are permitted within the TPZ
4. Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

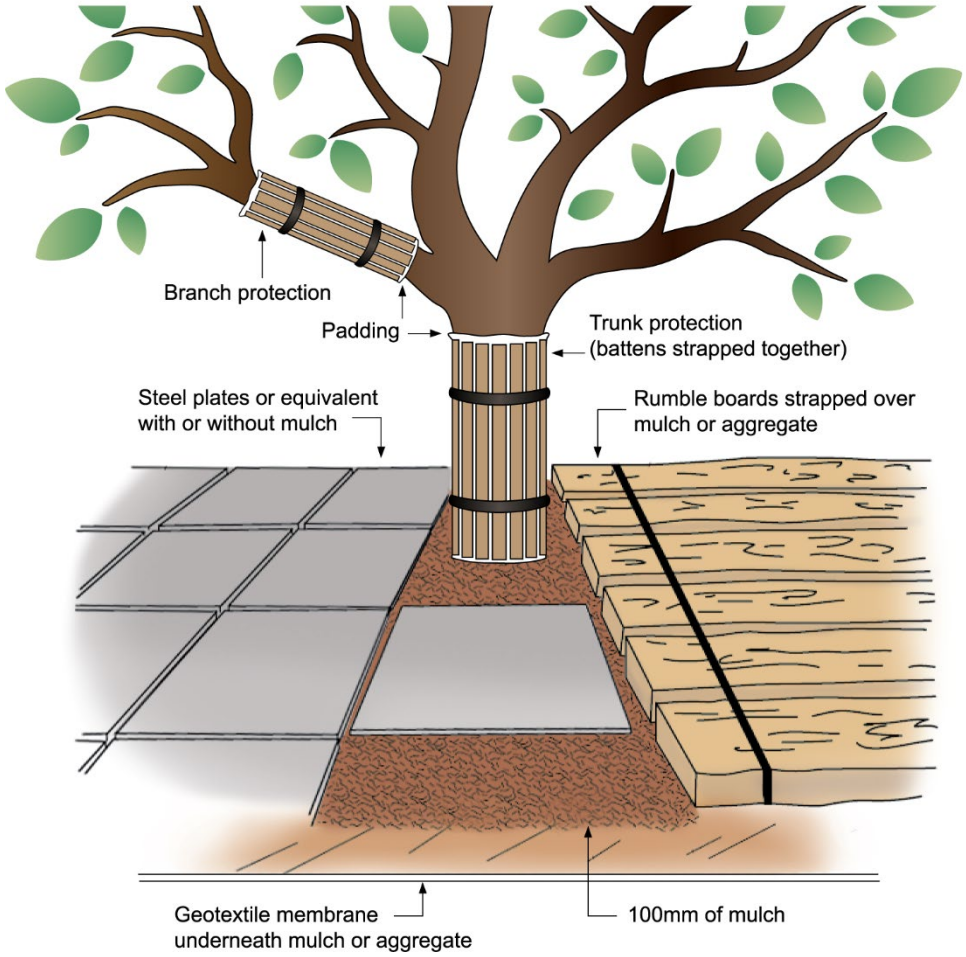
Appendix Figure 1. Depicts standard fencing techniques. (AS 4970–2009)

Trunk and Ground Protection

Given that proposed works are often within the TPZs of retained trees, standard protective fencing may not always be a viable method of protection. In these areas trunk protection and ground protection should be installed prior to the commencement of works and remain in place until after construction works have been completed.

Where construction access into the TPZ of retained trees cannot be avoided, the root zone of each tree must be protected using either steel plates or rumble board strapped over mulch/aggregate until such a time as permanent above ground surfacing (cellular confinement system or similar) is to be installed as shown in Appendix Figure 2.

Trunk and ground protection should be undertaken in line with the Australian Standard AS 4790–2009: *Protection of Trees on Development Sites* as per the image below:



Notes:

1. For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
2. Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

Appendix Figure 2. Depicts trunk and ground protection techniques. (AS 4970–2009).

Tree Protection Signs

D.1.1 Signs identifying the TPZ should be placed at 10m intervals around the edge of the TPZ and should be visible from within the development site. An example is shown below in Appendix Figure 3.

Appendix Figure 3. Depicts standard fencing techniques. (AS 4970–2009).

ArborSafe

For further information
Telephone 1300 272 671
Email info@arborsafe.com.au
www.arborsafe.com.au

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