ARBORICULTURAL ASSESSMENT REPORT

AND TREE PROTECTION SPECIFICATION

1-3 Gondola Road
North Narrabeen
NSW 2101

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Please Note: *This assessment was carried out from the ground, and covers what was reasonably able to be assessed and available to this assessor at the time of inspection. No subterranean inspections were carried out. The preservation methods recommended where applicable are not a guarantee of the tree survival but are designed to reduce impacts and give the trees the best possible chance of adapting to new surroundings.*

Limitations on the use of this report: *This report is to be utilised 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 or the original report is referenced in, and directly attached to that submission, report or presentation.*

Assumptions: *Care has been taken to obtain information from reliable resources. All data has been verified insofar as possible: however, Outdoor Interests can neither guarantee nor be responsible for the accuracy of information provided by others.*

Unless stated otherwise: *Information contained in this report covers only the tree/s that was/were examined and reflects the condition of the tree at the time of the assessment: and -The inspection was limited to visual examination of the subject tree without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject tree/s may not arise in the future.*

1. INTRODUCTION

1.1 Outdoor Interests has been engaged to undertake this Arboricultural Assessment Report for Six (6) trees by the property owners Crowther Investments (NSW) P/L This report is to form part of a Development Application submission for the Northern Beaches Council

1.2 The purpose of this report is to provide a Visual Tree Assessment (VTA) and provide comment upon the potential impact the proposed development may have upon the subject trees.

1.3 This report is based upon:

1.3.1 a site inspection undertaken on 17th March 2022

1.3.2 the supplied plans titled:

1.3.2.1 Plan pack for Development Application, 1-3 Gondala Road North Narrabeen. MacKenzie Architects International. Pacific Highway Gordon NSW 2072 (as issued via email 22/11/2023)

1.3.2.2 Plan of Detail over No.3 Gondola Rd North Narrabeen NSW 2011. Job no. 2368. Drawing No. 2368. True North Survey Group, Narabang Way Belrose NSW 2065

1.3.2.3 Site Survey 1 Gondola Road North Narrabeen. Client Redwood Projects Ref No. 3212 SHT 1. Geographic Solutions Cronulla NSW. 27/03/2017.

2. AIMS (OF THE REPORT)

2.1 Examine the subject trees and identify any trees not included on the survey but applicable due to proximity to proposed works.

2.2 Verify the location and proximity of the subject trees within the location of the proposed works

2.3 Assess Council's Tree Preservation Order and other applicable regulations

2.4 Conduct a Visual Assessment of the trees, provide information on its health and condition, and assess its suitability for retention or removal.

2.5 Provide site protection measures for the trees

3. METHOD

3.1 Each tree was assessed using a Visual Tree Assessment (VTA) method by a Level 5 (AQF) Consulting Arborist. Refer to Appendix 4 for terms and definitions.

3.2 The inspection was limited to a visual examination from ground level and did not include any detrimental investigative methods such as coring, probing or cutting. No root exploration or examination was undertaken.

3.3 The following information was collected for each tree:

3.3.1 Tree Species (Botanical and Common Name),
3.3.2 Height (estimated)
3.3.3 Canopy spread (estimated),

3.3.4 Estimated Trunk Diameter at Breast Height (DBH – measured at 1.4 metres from ground level).
3.3.5 Health, age class, vigour and condition
3.3.6 Tree Protection Zone
3.3.7 Structural Root Zone
3.3.8 Landscape Significance
3.3.9 Safe Useful Life Expectancy (SULE)
3.3.10 Retention Value

This information is presented in Appendix 2. Refer to Appendix 3 for terms and definitions.

4. RESULTS

4.1 The subject site is a mixed-use commercial property comprising office, warehouse and factory spaces. The building structure comprises the whole site.

4.2 The property adjoins two Approved Development Application properties within which five of the subject trees are located.

4.3 The proposed development includes:

4.3.1 Demolition of the existing building structure.

4.3.2 Construction of a new multi-level mixed purpose retail and residential unit complex, basement garage and associated landscaping.

4.4 All subject trees **are** protected as per the New South Wales State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP).

4.5 The property **does not** fall within the NSW Biodiversity Values Map as per the NSW Biodiversity Conservation Act 2016.

4.6 The property **is not** located in a designated 10/50 vegetation clearing entitlement area as per the New South Wales Rural Fire Service on line tool.

4.7 **Within the context of the proposed construction works the following trees are proposed to be removed:**

4.7.1 **Tree 1** is a semi mature *Magnolia grandiflora* 'Little Gem' in good health and condition.

4.7.1.1 This tree has been allocated a Low Retention Value based upon:

4.7.1.1.1 Moderate Landscape Significance, and,

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

4.7.1.1.2.1 (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons,

4.7.1.1.2.2 (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting

4.8.1 **Tree 2** is a mature *Phoenix caneriensis* (Canary Island Date Palm) in good health and condition and is located in 1 Gondola Road North Narrabeen.

4.8.1.1 This tree species is an exempt tree species within The Northern Beaches Council

area and may be removed without council permission, subject to the tree owners consent.

4.8.2 **Tree 3** is a mature *Phoenix caneriensis* (Canary Island Date Palm) in good health and condition and is located in 1 Gondola Road North Narrabeen.

4.8.2.1 This tree species is an exempt tree species within The Northern Beaches Council area and may be removed without council permission, subject to the tree owners consent.

4.8.3 **Tree 4** is a self-sown juvenile *Allocasuarina* spp (She Oak) in good health and fair condition and is located in 1 Gondola Road North Narrabeen.

4.8.3.1 The tree is not present in Google Street view Dec 2017 but is in October 2018.

4.8.3.2 This tree has been allocated a **Low Retention Value** based upon:

4.8.3.2.1 Moderate Landscape Significance, and,

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

4.8.3.2.2.1 (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons,

4.8.3.2.2.2 (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting

4.8.4 **Tree 5** is a self-sown semi mature *Acacia pycnantha* (Golden Wattle)

4.8.4.1 The tree is not present in Google Street view Nov 2016 but is in Dec 2017.

4.8.4.2 This tree has been allocated a **Low Retention Value** based upon:

4.8.4.2.1 Moderate Landscape Significance, and,

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

4.8.4.2.2.1 (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons,

4.8.4.2.2.2 (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting

4.8.5 **Tree 7** is a mature Eucalyptus spp in good health and condition. This tree is located in the rear adjoining property (6 Rickard Road North Narrabeen) and is approximately 12500mm to the south east of the southern boundary of the subject site.

4.8.5.1 The Tree Protection Zone for this tree is 12m radius based upon a 1 metre diameter at breast height (DBH). Therefore, the proposed work will occur outside the Tree Protection Zone and is acceptable for the long-term retention of the tree.

4.9 **The proposed works <u>will</u> occur in the Tree Protection Zones of the following trees**:

4.9.1 **Tree 6** is a mature *Eriobotrya japonica* (Loquat Tree) in good health and condition. This tree is located on the rear boundary of the neighbouring property of 2 Rickard Road North Narrabeen.

4.9.1.1 The southern wall of the proposed development will require this tree to be removed.

4.9.1.2 This tree species is an exempt tree species within The Northern Beaches Council area and may be removed without council permission, subject to the tree owners consent.

4.10 Results of the Tree Assessment are shown in Appendix 2.

4.11 Site survey plan and tree numbers are shown in Appendix 1

5. RECOMMENDATIONS

5.1 **Seven (7)** trees have been assessed for this report.

5.2 Prior to the commencement of works a Site Arborist with AQF Level 5 arboricultural qualifications experienced in tree protection on construction sites should be engaged. The site arborist shall regularly report on the condition and protection of the retained trees. The site arborist is to monitor any excavation, mechanical trenching or compacted fill placed within Tree Protection Zones.

5.3 All trees not indicated for removal on the approved plan, unless exempt or noxious in the relevant planning instruments must be retained.

5.4 No tree roots greater than 50mm diameter are to be cut from protected trees unless authorized by the site arborist.

5.5 All structures are to bridge tree roots greater than 50mm diameter unless directed otherwise by the site arborist.

5.6 All tree protection measures, including fencing, are to be in place prior to the commencement of works.

5.7 Any canopy pruning is to be undertaken in accordance with AS 4373-2007 Pruning of Amenity Trees and only after proper approvals have been given by the controlling authority after consultation with the site arborist.

5.8 **Trees to be retained and protected outside the property:**

5.8.1 Tree 7

5.8.1.1 This tree is to be protected according to AS4970-2009 (Protection of Trees on Development Sites) and as per Appendix 4 (Tree Protection Specification) during all stages of the construction process.

5.9 **Trees to be removed:**

5.9.1 **Tree 1** whilst healthy and in good condition is situated in an unviable long-term position. It may be removed with no detriment to the landscape intent of the property.

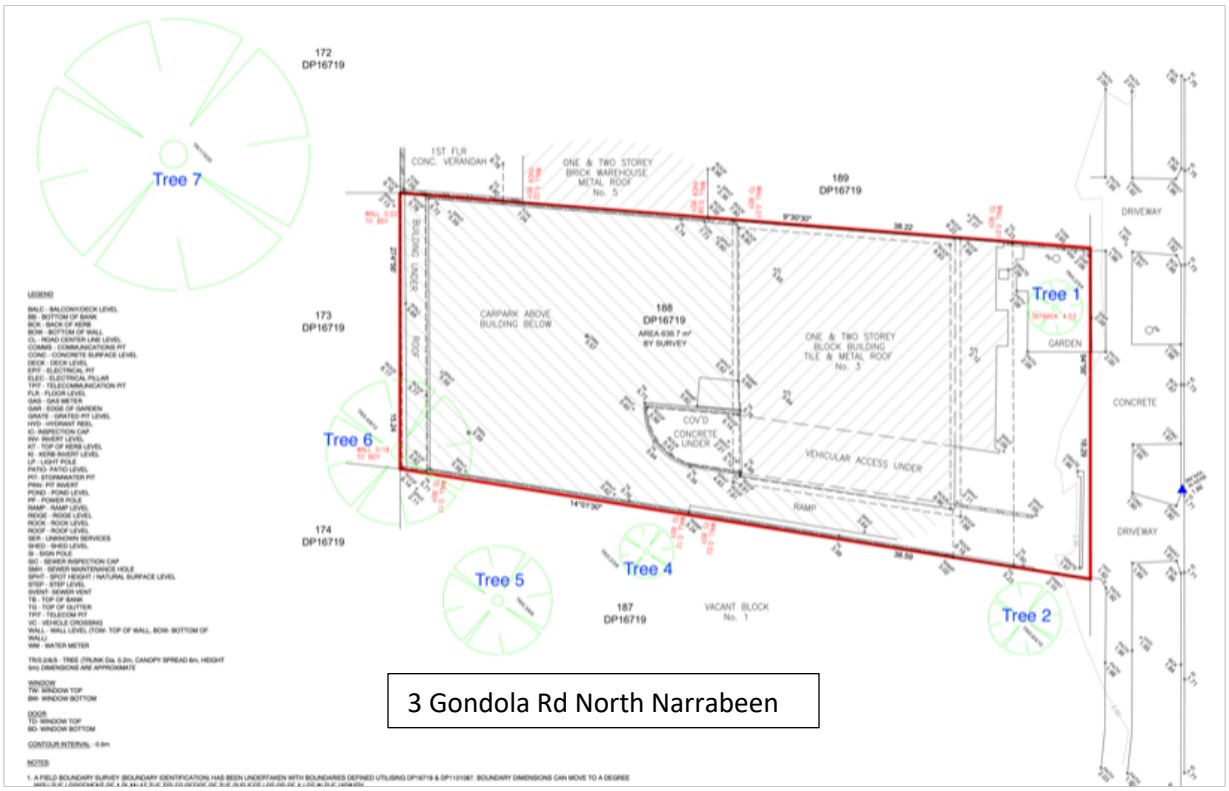
5.9.1.1.1 The tree is visible only from the site and the immediate neighbouring properties. It is not a visually dominating feature to the wider area.

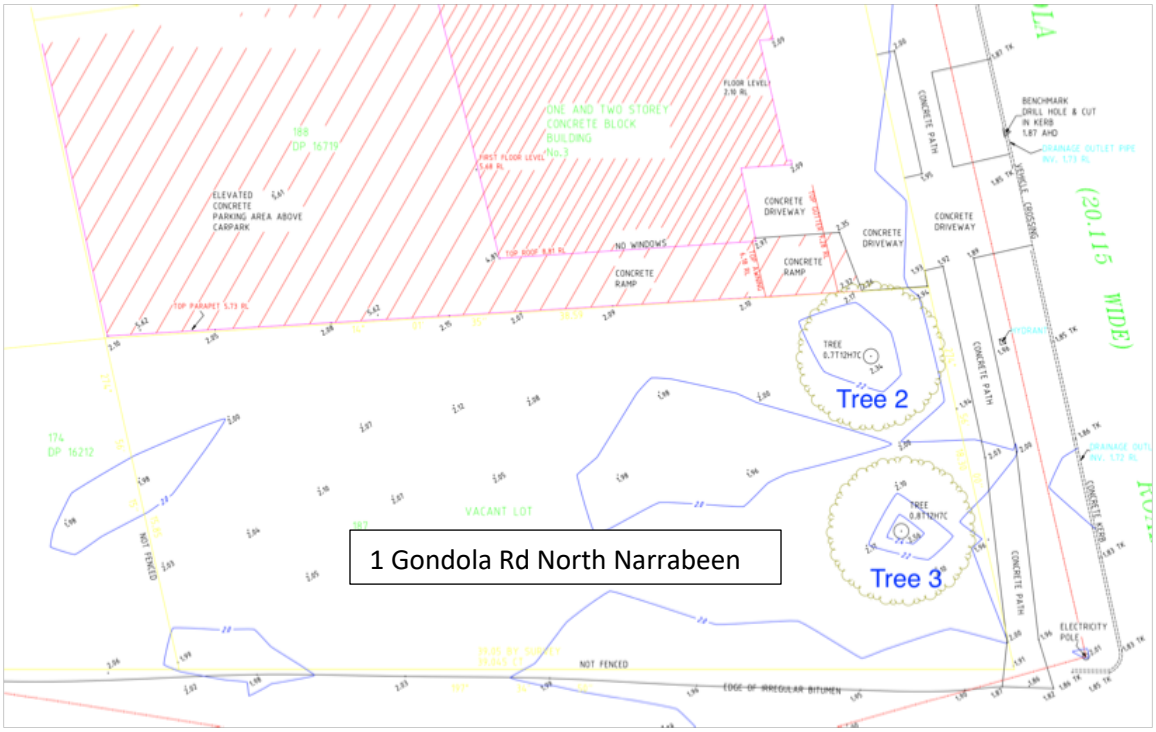
5.9.1.1.2 The tree can be replaced with a more suitable species in a more viable long-term position within the context of the proposed landscape plan.

5.9.2 **Trees 2, 3, 5 and 6** are listed as exempt Tree Species within the Northern Beaches Council area and may be removed without council consent.

5.9.3 **Tree 4** is a self-sown tree that has little long term viability in its current position and can be removed with no detriment to the landscape intent of the property.

APPENDIX 1. SITE SURVEY PLAN AND TREE NUMBERS





APPENDIX 2. TREE ASSESSMENT SCHEDULE

Tree ID No.	Species	DBH (mm)	Height (m)	Spread (m)	Maturity Class	Condition	Health and Vigour	SULE	Landscape Significance Rating	Retention Value	Tree Protection Zone (m R)	Structural Root Zone (SRZ)
1.	***Magnolia grandiflora 'Little Gem'***	200	4	3	M	G	G	L	M	L	2.4	1.85
2.	***Phoenix caneriensis***	800	15	4	M	F	G	S	M	L	8.0	-
3.	***Phoenix caneriensis***	800	12	7	M	F	G	S	M	L	8.0	
4.	***Allocasuarina spp***	200	8	3	SM	G	G	M	M	L	2.4	1.68
5.	***Acacia pycnantha***	300	6	6	SM	P	G	S	M	L	3.6	2.0
6.	***Eriobotrya japonica***	400	12	8	M	G	G	M	M	L	4.8	2.25
7.	***Eucalyptus spp***	1000	20	15	M	G	G	S	M	L	12	3.30

APPENDIX 3 - TREE ASSESSMENT CRITERIA AND GLOSSARY OF TERMS

Basal flare: the rapid increase in diameter that occurs at the confluence of trunk and root crown, associated with both stem and root tissue.

Canopy Spread: measured from one side of the tree to the other, the canopy spread of the tree was estimated.

Co-dominate Stems: stems that originate at about the same position on a stem and grow to about the same diameter. The stems may push against each other form cracks below the stems. Cracking can lead to a very high risk of stem failure.

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

Decay: is the result of invasion by fungal diseases through a wound.

Decline: is the response of the tree to a reduction of energy levels resulting from stress. Recovery from a decline is difficult and slow; is usually irreversible.

Diameter at Breast Height (DBH): refers to the tree trunk diameter at breast height (1.4 metres above ground level).

Dieback: refers to the withdrawal of energy by the tree from some areas of the crown. Symptoms are leaf drop, bare twigs, dead branches and tree death, in order of progression. This can be caused by root damage, root disease, severe bark damage, intensive grazing by insects, abrupt changes in growth conditions, drought, water logging or over maturity. Dieback often implies stress or decline.

Epicormic shoots: are sprouts produced from dormant buds in the bark. Production can be triggered by fire, pruning or root damage but may also be as a result of stress or decline.

Hazard: refers to anything with the potential to harm health, life or property.

Height of tree: refers to the height of the tree from ground level to the highest point of the tree. This is estimated with the use of a clinometer.

Included Bark: Areas of bark on adjacent parts of a tree, typically on the inner faces of a narrow fork, which become grown over to occupy part of the internal joint. A compression fork may develop in which continued radial growth results in pressure which tends to push the limbs of the fork apart.

Sparse crown: refers to reduced leaf density, often a precursor to dieback and may imply stress or decline. Also possibly a response to drought or root damage.

Trees and Development: Tree Protection Zones, Tree Protection Measures and Sensitive Construction Methods for the subject trees are based upon methods outlined in Australian Standard 4970-2009 Protection of Trees on Development Sites.

The Tree Protection Zone (TPZ) as per the standard is the combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance so the tree may remain viable. For palms and other monocots, cycads and tree ferns the TPZ should not be less than 1 metre outside the crown projection (as per AS4970-2009)

The Structural Root Zone (SRZ) as per the standard is the area radially around the base of a tree required for the trees structural ground stability. Disturbance or cutting of structural roots within the SRZ is not recommended as it may lead to structural destabilization and/or demise of the tree.

- In some cases it may be possible to encroach into or make variation to the standard. A Minor Encroachment is less than 10% of the area of the TPZ and is outside the SRZ. The area lost to this encroachment should be compensated for elsewhere in the TPZ.

- A Major Encroachment is greater than 10% of the TPZ or inside the SRZ. In this situation the project arborist must demonstrate that the tree/s remain viable. This may require root investigation by non destructive methods or the use of sensitive construction methods.

Topping: or heading is a pruning practice that results in removal of terminal growth leaving a cut stub end. Topping causes serious damage to the tree.

Weak junctions: are points of possible failure in the scaffold. They are usually caused by the trunk or branch bark being squeezed within the junction so that the necessary interlocking of the wood fibres does not occur and the junction is forced open by the annual increments in growth. This is often a genetic problem.

Weed species: are plants that are known to invade native remnant bushland. The species concerned may be exotic or may be native species from other parts of Australia.

Wounds: are areas where the bark has been damaged by branch breakage, impact or insect attack. Some wounds decay and cause structural defects or weakness. Healthy trees are able to resist and contain infection by walling off areas within the wood. Tree wounds are often eventually covered over by new bark but the walled off or infected areas still remain internally and may lead to weakness of the heartwood

Health, Vigour and Condition codes:

	Health & Vigour	Condition (Structure Stability & Damage)
VG	Very Good health and vigour, exhibiting no apparent or minor pest/disease, good extension growth, normal foliage size, colour and density.	Very good structure – stable and free from, or with minor visible defects and damage. Appears stable with no visible evidence of instability.
G	Good health and vigour – exhibiting minor pest / disease, fair extension growth, minor abnormalities in foliage size, colour or density.	Good structure – may contain minor defects and/or damage that can be successfully remediated or do not required treatment with an acceptable level of risk.
F	Fair health and vigour – may exhibit moderate (non-life threatening) pest/disease, fair extension growth, small foliage size, abnormal colouration, thin foliage cover.	Fair structure – containing defects and/or damage that may be able to be remediated to provide an acceptable level of risk.
P	Poor health and vigour – exhibiting extensive or untreatable pest/disease, poor extension growth, significant deadwood and dieback, evidence of rapid decline, sparse foliage cover, abnormal foliage colour and size.	Evidence of instability or contains defects and/or damage which may render the tree potentially hazardous / prone to failure or cannot be successfully remediated.

Maturity Class:

- (I) = immature or young and refers to a well established but juvenile tree.
- (SM) = semi-mature and refers to a tree at growth stages between immaturity and full size.
- (M) = mature and refers to a full sized tree with some capacity for further growth.

- (OM) = over-mature and refers to a tree about to enter decline or already declining.

Landscape Significance: The significance of a tree in the landscape is a combination of its environmental, amenity and heritage values. These values may be subjective and difficult to assess consistently, it is necessary to provide a means to determine a retention value for each tree. The assessment criteria is outlined below:

Retention Value.

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
1. SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register	The subject tree is scheduled as a Threatened Species as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999	The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species
	The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
2. VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m²; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence	The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value	The subject tree has a large live crown size exceeding 100m²; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of this DCP.	The subject tree has a medium live crown size exceeding 40m²;The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% (thinning to normal); and
			The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
5. LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item	The subject tree is scheduled as exempt (not protected) under the provisions of this DCP due to its species, nuisance or position relative to buildings or other structures.	The subject tree has a small live crown size of less than 40m² and can be replaced within the short term (5-10 years) with new tree planting
6. VERY LOW	The subject tree is causing significant damage to a heritage item.	The subject tree is listed as an Environment Weed Species in the Leichhardt Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
7. INSIGNIFICANT	The tree is completely dead and has no visible habitat value	The tree is a declared Noxious Weed under the Noxious Weeds Act (NSW) 1993 within the relevant Local Government Area.	The tree is completely dead and represents a potential hazard.

The retention values shown in the Assessment Schedule (Appendix3) are determined on the basis of the estimated longevity of the trees and their landscape significance rating. Following is the assessment methodology. This information, together with the Tree Protection Guidelines in Appendix 5, should be used to determine the appropriate placement of building footprints and other infrastructure, with due consideration to other site constraints, to minimize the impact of those trees assessed as worthy of preservation.

	Landscape	Significance	Rating				
SULE Rating	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Long - >40yrs	High	High	High	Moderate	Moderate	Low	Very Low
Medium – 15 to 40 Years	High	High	Moderate	Moderate	Low	Low	Very Low
Short – 5 to 15 years	High	Moderate	Moderate	Low	Low	Very Low	Very Low
Transient – Less than 5 Years	Moderate	Low	Low	Very Low	Very Low	Very Low	Very Low
Dead or potentially Hazardous	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

Safe Useful Life Expectancy (SULE) of a tree is an estimate of the sustainability of the tree in its landscape. This is calculated based upon an estimate of the average age of the species in an urban area in Sydney, less its current age. The life expectancy is further modified as appropriate to take into consideration its current health and vigour, condition and suitability to the site. The following ranges have been allocated to each tree:

Safe Useful Life Expectancy Categories:

1. **Long SULE:** Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.
   a. Structurally sound trees located in positions that can accommodate future growth.
   b. Trees that could be made suitable for retention in the long term by remedial tree care.
   c. Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. **Medium SULE:** Trees that appeared to be retainable at the time of assessment for 15–40 years with an acceptable level of risk.
   a. Trees that may only live between 15 and 40 more years.
   b. Trees that could live for more than 40 years but may be removed for safety or nuisance reasons.
   c. Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
   d. Trees that could be made suitable for retention in the medium term by remedial tree care.
3. **Short SULE**: Trees that appeared to be retainable at the time of assessment for 5–15 years with an acceptable level of risk.
   a. Trees that may only live between 5 and 15 more years.
   b. Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
   c. Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
   d. Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. **Remove:** Trees that should be removed within the next 5 years.
   a. Dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
   b. Dangerous trees because of instability or recent loss of adjacent trees.
   c. Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
   d. Damaged trees that are clearly not safe to retain.
   e. Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
   f. Trees that are damaging or may cause damage to existing structures within 5 years.
   g. Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. **Small, young or regularly pruned:** Trees that can be reliably moved or replaced.
   a. Small trees less than 5m in height.
   b. Young trees less than 15 years old but over 5m in height.
   c. Formal hedges and trees intended for regular pruning to artificially control growth.

APPENDIX 4 - TREE PROTECTION SPECIFICATION

1. **A site arborist must be appointed prior to the commencement of works on site. The site arborist shall monitor the trees to be retained and supervise the tree protection measures. The site arboristshall be AQF Level 5 or above in Arboriculture.**

   1.1. The location of tree protection fencing and other specific tree protection measures will be finalised in consultation between the Project Manager and Site Arborist prior to the commencement of site works.

2. Activities Restricted within the TPZ

The trees to be retained shall be protected prior to and during construction from activities that may result in adverse effects on their health and structure.
Activities generally excluded from the **TPZ** include but are not limited to -

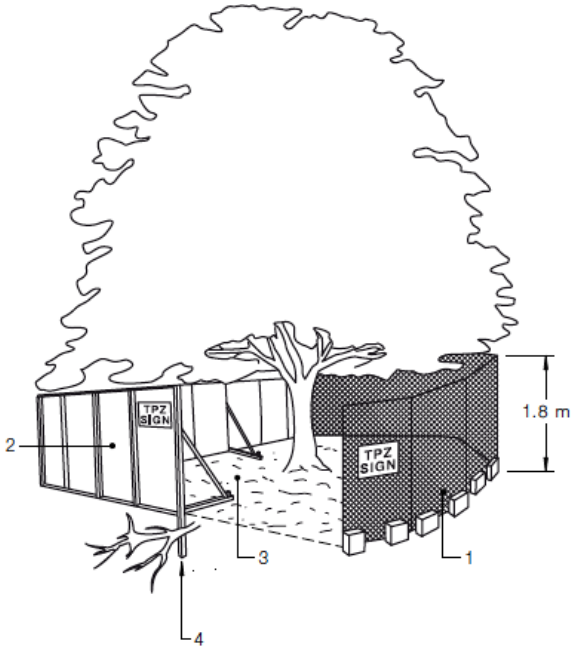
- Machine excavation including trenching;
- Excavation for silt fencing;
- cultivation;
- storage;
- preparation of chemicals, including preparation of cement products;
- parking of vehicles and plant;
- refuelling; (h) dumping of waste;
- wash down and cleaning of equipment;
- placement of fill;
- lighting of fires;
- Soil level changes;
- Temporary or permanent installation of utilities and signs, and
- Physical damage to the tree.

3. Tree Protection Fencing

3.1. Protective fencing must be located as determined by the project or council arborist in accordance with AS4970 Section 4, 4.3.

3.2. Fencing must be erected before any machinery or materials are brought onto the site and before the commencement of works including demolition. Once erected, protective fencing must not be removed or altered without approval by the project or council arborist. The **TPZ** must be secured to restrict access."

3.3. The Tree Protection Fence will consist of 1.8 m high chainlink wire panels supported by concrete feet. Each panel will be fastened together and supported to prevent lateral movement. A lockable opening must be allowed for. The trees root system must not be damaged during installation



LEGEND:

1 Chain wire mesh panels with shade cloth (if required) attached, 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 the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

4. Other Tree Protection Measures

4.1. When tree protection fencing cannot be installed or requires temporary removal, other tree protection measures shall be used.

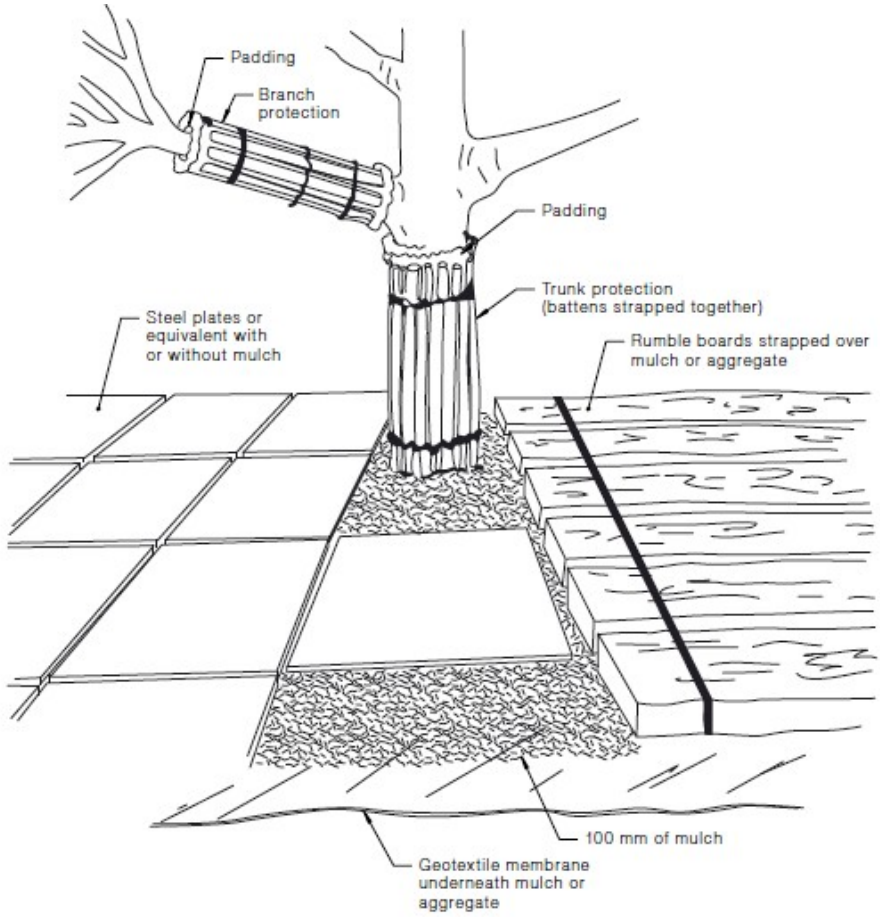
4.2. Trunk and Branch Protection

4.2.1. Where necessary, install protection to the trunk and branches. 2 metre lengths of 75mmx75mm hardwood timber shall be spaced at 80mm and secured in place with galvanized wire.

4.2.2. Do not attach temporary powerlines, stays, guys etc to the tree. Do not drive nails into the trunks or branches.

4.3. Ground Protection

4.3.1. If temporary access for machinery is required within the TPZ ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction. Measures may include a permeable membrane such as geotextile fabric beneath and layer of mulch or crushed rock below rumble boards as per the below figure.



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.

5. Works Within the Tree Protection Zones

5.1. Some works within the TPZ may be authorized by the determining authority. These works must be supervised by the site arborist.

5.2. These works must avoid damage to the trees root system, trunk/s and lower branches.

5.3. If structural roots (>50mm diameter) are exposed during any works, these roots shall be retained in an undamaged condition and advice sought from the Site Arborist

6. Root protection during works within the TPZ

6.1. Some approved works within the TPZ, such as re-grading, installation of piers or landscaping may have the potential to damage roots.

6.2. If the grade is to be raised the material should be coarser or more porous than the underlying material. Depth and compaction should be minimized.

6.3. Manual excavation should be carried out under the supervision of the project arborist to identify roots critical to tree stability. Relocation or redesign of works may be required.

6.4. Where the project arborist identifies roots to be pruned within or at the outer edge of the TPZ, they should be pruned with a final cut to undamaged wood. Pruning cuts should be made with sharp tools such as secateurs, pruners, handsaws or chainsaws. Pruning wounds should not be treated with dressings or paints. It is not acceptable for roots within the TPZ to be 'pruned' with machinery such as backhoes or excavators.

6.5. Where roots within the TPZ are exposed by excavation, temporary root protection should be installed to prevent them drying out. This may include jute mesh or hessian sheeting as multiple layers over exposed roots and excavated soil profile, extending to the full depth of the root zone. Root protection sheeting should be pegged in place and kept moist during the period that the root zone is exposed.

6.6. Other excavation works in proximity to trees, including landscape works such as paving, irrigation and planting can adversely affect root systems. Seek advice from the project arborist.

7. Maintaining the TPZ

7.1. The area within the TPZ should be mulched to a maintainable depth of 50-100mm using material that complies with AS4454. Where the existing landscape within the TPZ is to remain unaltered, mulch mat not be required.

7.2. Soil moisture levels should be monitored regularly.

8. All weeds should be removed by hand without soil disturbance

APPENDIX 5 - BIBLIOGRAPHY

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