



PREPARED FOR
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36 Allawah Ave
Elanora Heights NSW 2101

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ISA Tree Risk Assessment (TRAQ) Qualified

Arboricultural Impact
Assessment

INSPECTION DATE: 6 December 2019



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1 Introduction

- 1.1.1 This report was commissioned by Claire and Alex Lonnen to investigate trees located within or adjacent to 36 Allawah Avenue, Elanora Heights NSW 2101. The report has been prepared to aid in the assessment of a Development Application (DA) for the construction of a new granny flat to the rear of the property.
- 1.1.2 This report is designed to provide information about the relative retention values of all trees within the site, assess the impacts of the proposed development and provide recommendation for alteration to design or construction methods where necessary to minimise negative impacts.
- 1.1.3 The report also provides recommended tree protection measures to ensure the viable, long-term retention of trees to be retained where appropriate.
- 1.1.4 The report has been prepared in accordance with Northern Beaches (Pittwater) Council's Development Control Plan (DCP) Part B4.22 and the Pittwater DCP 21 Appendices Incorporating Amendments 1-22.

2 Scope

- 2.1.1 Detail the health and condition of site trees and those on adjoining properties that may be affected by the proposed works. This will be undertaken to derive tree retention values within the landscape, based on any heritage, ecological and arboricultural principles.
- 2.1.2 Provide as an outcome of the assessment, the following: a description of the trees, observations made, retention values, discussion of the effects the location of the proposed works may have on the trees and make recommendations required for remedial or other works to the trees, if and where appropriate.
- 2.1.3 Determine from the assessment; a description of the works or measures required to ameliorate the impact upon the trees to be retained, by the proposed building works or future impacts the trees may have upon the new building works if and where appropriate, or the benefits of removal and replacement, if appropriate, for the medium to long-term amenity of the site



3 Methodology

- 3.1.1 To record the above-ground health and condition of each tree, a Visual Tree Assessment (VTA), adapted from (Lonsdale, 2009), was undertaken from ground level on 6 December 2019.
- 3.1.2 This involved an inspection of:
- Tree health and structural condition; both long and short term
 - Site conditions
 - Amenity value
 - Habitat value
 - Ecological value
- 3.1.3 All diameter measurements were taken with a diameter tape. All height and canopy spread values were estimated. Any offset measurements were measured with a Lecia distometer.
- 3.1.4 The trees have been allocated a significance rating as determined by using the Tree Significance - Assessment Criteria of the IACA Significance of a Tree, Assessment Rating System (STARS)© (IACA, 2010). An explanation of attributes required to achieve each category can be found in Appendix B.
- 3.1.5 The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) methods have been derived from the Australian Standard 4970–2009: *Protection of Trees on Development Sites* (Standards Australia, 2009). The radius of the TPZ is calculated for each tree by multiplying its Diameter at Breast Height (DBH) by 12.
- $$\text{TPZ radius} = \text{DBH} \times 12$$
- 3.1.6 In the event the crown spread of the tree extends beyond this offset, the TPZ may be adjusted to the outer extent of the crown spread.
- 3.1.7 The SRZ is the area around the base of a tree required for the tree's stability in the ground. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres.
- $$\text{SRZ radius} = (D \times 50)^{0.42 \times 0.64}$$
- 3.1.8 Any pruning as an outcome of this report is to be completed to the Australian Standard AS4373 – 2007 Pruning of Amenity Trees (Standards Australia, 2007).

4 Observations

4.1 The Site

- 4.1.1 The subject property (herein 'the site') is a residential allotment known as LOT 214 in D.P. 13643, known as 36 Allawah Avenue, Elanora Heights. The total area of the site is 804.2 m². The site is zoned as Environmental Living (E4) under the Pittwater Local Environment Plan (LEP) 2014.
- 4.1.2 The site contains an existing two-story dwelling to the western portion of the allotment. Lawn extended from the dwelling to the east of the property. The site possessed a slight southerly aspect.
- 4.1.3 Site soils are likely to deviate from their natural state due to urban development. Remnant soils of this area are classified as Hawkesbury Sandstone; characterised by *shallow (>50 cm), discontinuous Lithosols/Siliceous Sands (Uc1.21) associated with rock outcrop; Earthy Sands (Uc5.11, Uc5.23), Yellow Earths (Gn2.24) and some Yellow Podzolic Soils (Dy4.11) on inside of benches and along joints and fractures; localised Yellow and Red Podzolic Soils (Dy4.11, Dy5.21, Dy5.11, Dr5.21) associated with shale lenses; Siliceous Sands (Uc1.2) and secondary Yellow Earths (Gn2.41) along drainage lines.* (eSpade - State Government of NSW and Department of Planning, Industry and Environment, 2015)
- 4.1.4 Figure 1 shows the site within the greater Elanora Heights area.



Figure 1. The subject site indicated with red polygon. (SIX Maps, 2019)



4.2 Environmental/Heritage Significance

- 4.2.1 SEED viewer indicates the site is of no known heritage or environmental significance (SEED - NSW Government, 2019). Review of 1943 imagery suggests no vegetation consistent with subject tree architecture was present at this time.

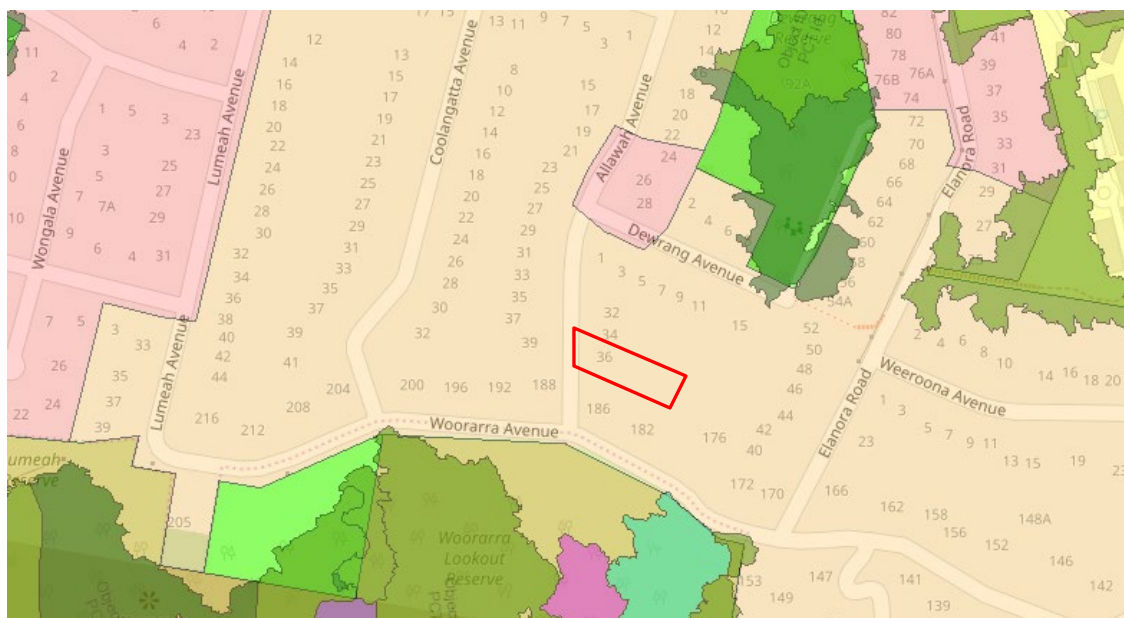


Figure 2. The site indicated with red polygon and associated planning overlays. (SEED - NSW Government, 2019)

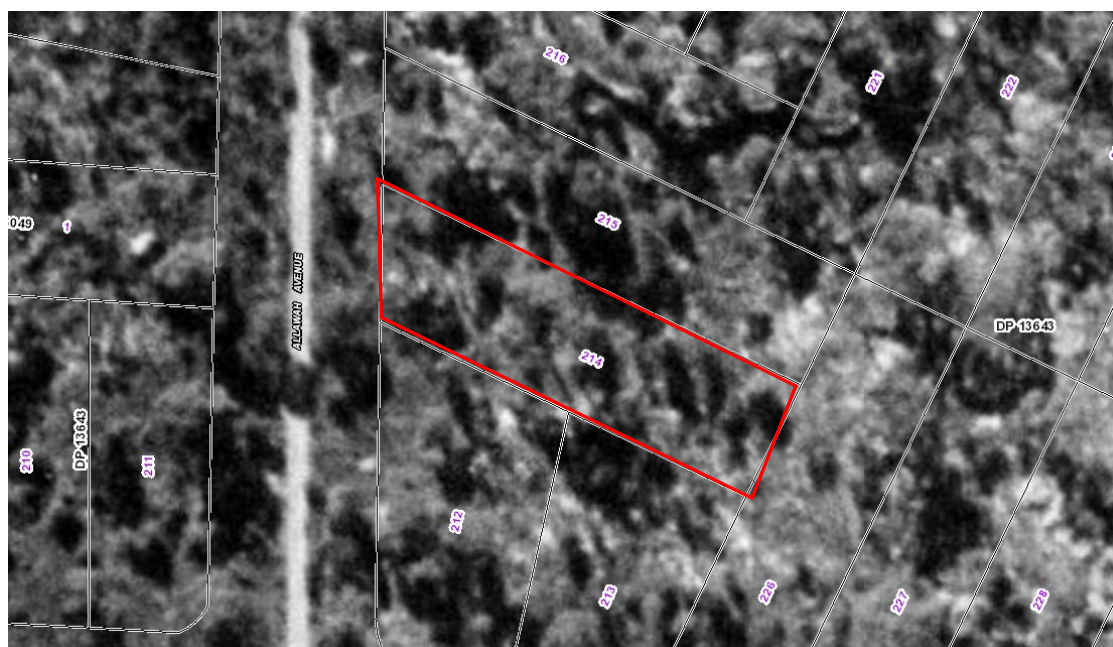


Figure 3. 1943 imagery of the site. (SEED - NSW Government, 2019)

4.3 Tree Location

4.3.1 Figure 4 shows approximate tree locations depicted as green icons within the site.

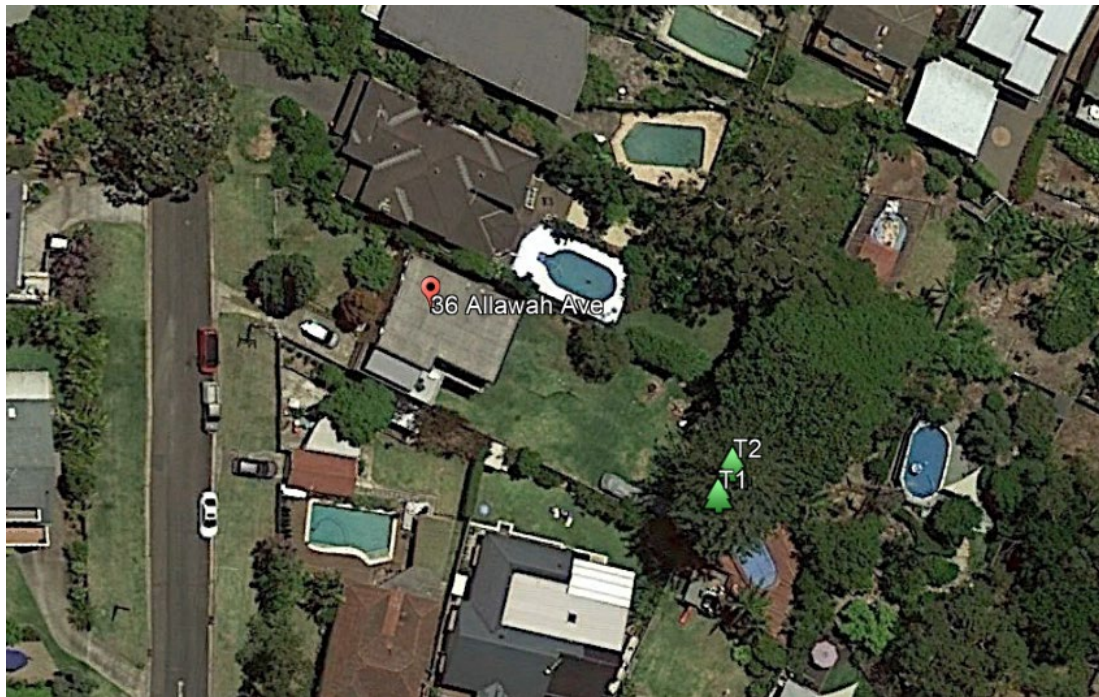


Figure 4. The subject site with green icons depicting approximate tree locations. (Google Earth, 2019)



4.4 Summary of Tree Observations

- 4.4.1 Complete tree attributes and observations can be found in Appendix C - Tree Assessment Schedule.
- 4.4.2 Pursuant with Pittwater Council DCP; any tree greater than 5m height potentially impacted by the proposed development has been assessed.
- 4.4.3 Inspected site vegetation consisted of 2 Australian native trees being *Araucaria heterophylla* (Norfolk Island Pine) (Figure 5) located to the rear (southeast) of the site. The trees were of large size and in good health and structural condition.



Figure 5. The subject site with green icons depicting approximate tree locations. (Google Earth, 2019)



4.5 Tree Significance

- 4.5.1 Determined by using the Tree Significance - Assessment Criteria of the *IACA Significance of a Tree, Assessment Rating System (STARS)*© (IACA, 2010).
- 4.5.2 Trees 1 and 2 are of *high* significance due to their substantial dimensions, good health and structure, typical form, prominence within the landscape and visibility from surrounding properties.

Table 1: Tree significance

1 – High
2 - Medium
3 - Low

Significance Scale	1	2	3
Tree Numbers	1, 2		

4.6 Retention Value

- 4.6.1 Determined by using the Retention Value - Priority Matrix of the *IACA Significance of a Tree, Assessment Rating System (STARS)* © (IACA, 2010).

Table 2: Tree retention values

High – Priority for Retention
Medium – Consider for Retention
Low – Consider for Removal
Remove – Priority for Removal

Retention value	High	Medium	Low
Tree Number	1, 2		



4.7 Proposed Development

4.7.1 This report has relied upon the following plans and documents:

Table 3: Reviewed plans and documents

Title	Author	Dwg. No.	Date
Plan Showing Boundaries, Relative Heights & Physical Features over Lot 214 in D.P. 13642 Known as No. 36 Allawah Avenue, Elanora Heights	Bee & Lethbridge Pty Ltd	20298-00	08/11/2016
SITE AND ROOF PLAN	RK Designs	19-68-2-A	20/08/2019
GROUND FLOOR PLAN	RK Designs	19-68-3-A	20/08/2019
LANDSCAPE PLAN	RK Designs	19-68-4-A	0/08/2019

4.7.2 Provided plans have been reviewed. In summary, the proposed development consists of the construction of a new granny flat to the rear of the property and associated enabling and landscaping works. The building is to be constructed above existing grade using pier and beam methodology.

4.7.3 No below ground service plans or documents have been provided or reviewed.

5 Discussion

5.1 Tree Protection Zone (TPZ)

5.1.1 The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk. Application of the TPZ is intended to ensure the protection of the root system and canopy from potential damage incurred from construction works and ensure the long-term health, stability and landscape viability of each tree to be retained.

5.1.2 Incursions into the TPZ may occur due to excavation, modification of existing ground levels, trenching or inverting the soil profile. Such works may damage part or all of the root system or affect soil structure and growing conditions required for long-term growth.



5.2 Structural Root Zone (SRZ)

- 5.2.1 The Structural Root Zone (SRZ) is the area required for mechanical support and anchorage of a tree. The woody root growth and soil cohesion in this area are required to hold a tree upright.
- 5.2.2 Incursions into the SRZ are not recommended as they are likely to result in loss or damage to woody roots which may significantly affect stability.

5.3 Acceptable Encroachments into the TPZ

- 5.3.1 An encroachment of less than 10% of the entire TPZ is considered minor provided it is outside the SRZ and the area lost is compensated for elsewhere and contiguous to the TPZ.
- 5.3.2 A major encroachment is considered to be greater than 10% of the entire TPZ area. Where unavoidable, exploratory excavation using non-destructive methods such as pneumatic, hydraulic or hand digging may be required to evaluate the extent of potential damage to the root system and determine whether the tree(s) will remain viable. The area lost to encroachment should be compensated for elsewhere and contiguous to the TPZ.

5.4 Impact Assessment

- 5.4.1 The proposed new granny flat is to be constructed as close to the rear property boundary as possible. Based on provided plans, it appears the dwelling is to be sited approximately 3m from the centre of trees 1 and 2. This is consistent with Northern Beaches Council (Pittwater) P21DCP Appendix 9 Section 3.3.4 which allows provision for building construction near significant trees when construction utilises pier and beam methodology. Offset distances should be confirmed by the relevant architectural/survey consultant to ensure the proposed development is within acceptable parameters.
- 5.4.2 The proximity of the proposed granny flat is to result in an encroachment of approximately 25% for tree 1 and 29% for tree 2. However, the use of pier and beam construction, hand digging of pier holes and the acceptance of flexible pier locations to bridge woody roots is expected to significantly reduce the impact to the trees. Further, trunk protection boarding should be installed to avoid inadvertent damage to the trees.
- 5.4.3 Site access is limited to pedestrian movement only due to the position of the existing dwelling. Contractors have indicated all building materials are to be hand-carried to the construction site. Therefore, the potential implications of soil compaction as a result of heavy machinery movement is likely to be minimal.



- 5.4.4 As no below-ground service diagrams have been reviewed, the impacts of this work cannot be assessed. It is recommended that below ground services are suspended beneath the proposed building until outside the TPZ's if trees 1 and 2.

6 Conclusion

- 6.1.1 2 trees within 36 Allawah Avenue, Elanora Heights facility were inspected and assessed in the context of the proposed development.
- 6.1.2 2 trees were assessed as 'high' retention value and are to be retained through construction.
- 6.1.3 Pier and beam construction and hand excavation of pier holes are expected to minimise the potential impacts to the trees.

7 Recommended Tree Protection Measures

7.1 Tree Protection Plan

- 7.1.1 The following Tree Protection Measures are to be read in conjunction with the Tree Protection Plan (TPP). The TPP indicates the position of tree protection devices and other measures to ensure the protection of trees within the site to be retained as part of the proposed development.

7.2 Prohibited Activities within the TPZ

- 7.2.1 Activities generally excluded from the TPZ included but are not limited to-
- a) Machine excavation including trenching;
 - b) Excavation for silt fencing;
 - c) cultivation;
 - d) storage;
 - e) preparation of chemicals, including preparation of cement products;
 - f) parking of vehicles and plant;
 - g) refuelling;
 - h) dumping of waste;
 - i) wash down and cleaning of equipment;



- j) placement of fill;
- k) lighting of fires;
- l) soil level changes;
- m) temporary or permanent installation of utilities and signs, and
- n) physical damage to the tree.

7.3 Trunk and Branch Protection

7.3.1 Provision of tree protection fencing is impractical due to its proximity to the proposed building footprint. Therefore, trunk protection shall be erected around nominated trees to avoid accidental damage. The trunk and affected branches of these trees are to be protected from possible damage from collision with trucks or plant equipment and are to be wrapped with hessian around the subject stems for a minimum of 1.8m and extending to first-order branches where necessary, then wire or steel strapping is to be used to secure appropriately sized hardwood battens to the trunk and branches.

7.3.2 All tree protection measures are to be installed prior to any construction works and must be in compliance with the prescribed Tree Protection Plan – Appendix E and are to be certified by the project arborist.

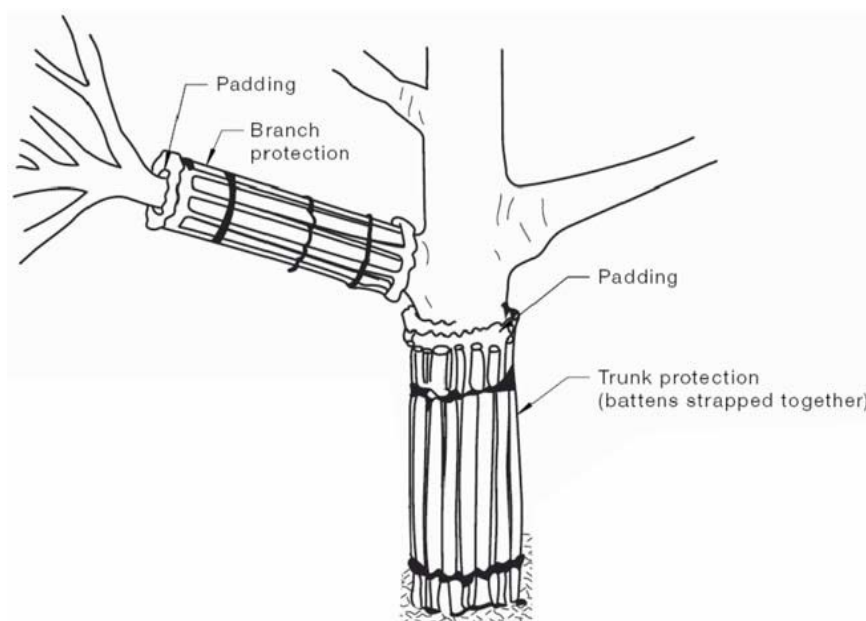


Figure 6. Detail of trunk and branch protection. (Standards Australia, 2009)



7.4 Mulching

- 7.4.1 Mulch is required within the within the TPZ of each tree to a minimum depth of 50-100 mm and is to be watered, maintained to installed depth and kept weed free for the duration of works on the site. Mulch is to be placed over a geotextile fabric to minimise compaction and limit transference of mulch into the underlying soil profile. Mulch and geotextile fabric may be removed once the base pier and beam structure has been erected.

7.5 Tree Protection Signs

- 7.5.1 Signs identifying the TPZ should be placed at on installed trunk and branch protection. An example is shown below in Figure 7.



Figure 7. Example of tree protection signage.

7.6 Trenching for Installation of Underground Services

- 7.6.1 Where excavation or trenching is required to facilitate installation of underground services within the TPZs of any site trees arborist supervision is required. Works should be undertaken using techniques that are sensitive to tree roots to avoid unnecessary damage. Such techniques include:
1. Excavation by hand
 2. Excavation using a high-pressure water jet and vacuum truck
 3. Excavation using an Air Spade with vacuum truck.



- 7.6.2 Machine excavation is prohibited within the TPZs of retained trees unless undertaken at the direct consent from the project arborist and/or the responsible authority.

7.7 Pier Hole Excavation and Placement

- 7.7.1 Pier hole construction is to be undertaken via hand digging only. Care is to be taken to minimise careless damage to roots greater than 50mm diameter. Pier holes are to be flexible in design and to be placed in such a fashion as to bridge significant roots. Pier holes are to be inspected for roots by the project arborist prior to installation of pier uprights and concrete.
- 7.7.2 Where a situation occurs that a structural root (root greater than >50 mm diameter) requires pruning or removal, the root is to be severed with a sharp saw implement. **If such works are to be undertaken within the Tree Protection Zone they are to be monitored and certified by the project arborist.**

7.8 Compliance and Certification Reporting

- 7.8.1 The following project milestones are recommended to be carried out by the project arborist.

Purpose	Timing and Notes
Certify tree protection measures	Following the installation of tree protection measures.
During excavation within TPZ of trees to be retained	Once pier holes have been hand-dug and prior to installation of upright piers and concrete. During any excavation required for below ground services.
Post practical completion certification	Following the completion of works. Arborist to provide written certification that works have been completed as prescribed.

8 References

eSpade - State Government of NSW and Department of Planning, Industry and Environment, 2015. *Soil Landscapes of the Sydney 1:100,000 Sheet*, Sydney: State Government of NSW and Department of Planning, Industry and Environment.

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SIX Maps, 2019. *SIX Maps*. [Online]

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[Accessed 16 July 2019].

Standards Australia, 2007. *AS 4373–2007: Pruning of Amenity Trees*, Sydney: Standards Australia.

Standards Australia, 2009. *AS 4970–2009: Protection of Trees on Development Sites*, Sydney: Standards Australia.

9 Appendix A - Report Assumptions and Limitations

1. Any description or information provided to the consultant by the client or third party is assumed to be correct.
2. All information has been sourced with care and verified to the best of the consultant's knowledge. Any opinions not duly researched is based upon the consultant's experience and observations.
3. The consultant shall not be required to give testimony or attend court by reason of this report unless under contractual agreement, including payment of additional fees and charges for such services.
4. Modification or extraction of key contextual components invalidates the entire report.
5. There is no warranty, explicit or implicit, that the problems and deficiencies associated with the site or vegetation may not arise in future.
6. Unless stated otherwise, information contained within the report will address the items outlined in the project brief or that were examined during any site assessment and reflect the condition of those items at the time of inspection.
7. Unless otherwise specified, the inspection is limited to ground-based inspection of accessible areas without dissection, excavation or probing.



10 Appendix B - IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010)©

Tree Significance - Assessment Criteria

1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other



vegetation or buildings,

- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

Hazardous/Irreversible Decline


- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

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

		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					
	2. Medium 15-40 Years					
	3. Short <1-15 Years					
	Dead					

Legend for Matrix Assessment



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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 *Protection of trees on development sites*. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.

Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.

Consider for Removal (Low) - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.

Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.



11 Appendix C - Tree Assessment Schedule

Tree no.	Botanical Name	Common Name	DBH 1 (cm)	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy N (m)	Canopy E (m)	Canopy S (m)	Canopy W (m)	Health	Structure	Age	TLE (Yrs.)	STARS Significance Rating	Retention Value	Comments
1	<i>Araucaria heterophylla</i>	Norfolk Island Pine	62	62	73	7.4	173.9	2.9	20-30	2	6	5	5	Good	Good	Mature	Long (>40)	1 (High)	High	Good example of species
2	<i>Araucaria heterophylla</i>	Norfolk Island Pine	76	76	92	9.1	261.3	3.2	20-30	7	7	5	6	Good	Good	Mature	Long (>40)	1 (High)	High	Good example of species

12 Appendix D – Impact Assessment Schedule

Tree no.	Botanical Name	Common Name	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Encroachment into TPZ/SRZ	Likely Impact	Recommendations
1	<i>Araucaria heterophylla</i>	Norfolk Island Pine	7.4	173.9	2.9	Pedestrian egress and excavation for pier holes and below ground services	Isolated incursions into TPZ. Excavation to be conducted by hand.	Mulch to be placed over TPZ area prior to site establishment. Tree protection to be completed as specified in Section 7 of report.
2	<i>Araucaria heterophylla</i>	Norfolk Island Pine	9.1	261.3	3.2	Pedestrian egress and excavation for pier holes and below ground services	Isolated incursions into TPZ. Excavation to be conducted by hand.	Mulch to be placed over TPZ area prior to site establishment. Tree protection to be completed as specified in Section 7 of report.



13 Appendix E – Tree Protection Plan

