



Arboricultural Impact Assessment

601 Pacific Highway, St
Leonards
MARCH 19, 2026

Leigh Brennan
Tree Management Strategies Pty Ltd

✉ leigh@treems.com.au

☎ 0447 356 059

Narrabeen, NSW

🌐 www.treems.com.au

Dip Horticulture
Dip Arboriculture AQF Level 5
Cert IV Business Management

ABN 46 651 710 593



Contents

SUMMARY	2
1. Introduction.....	3
1.1 Background Information	3
1.2 SEARS Requirement	4
1.3 Aim:	4
1.4 Site Location.....	5
2.0 Developmental Impacts and Observations	6
2.1 Trees 3, 4 and 5.....	6
2.2 Class B Hoarding Tree 2.....	6
2.3 Trees 12, 13, 14 and 15.....	6
2.4 Trees 1, 6, 7, 8, 9, 10 and 11.....	6
3.0 Tree Protection Specifications	8
4.0 Referenced Documents.....	11
5.0 Conclusions & Recommendations	12
6.0 References	13
7.0 Appendices.....	14
Appendix 1: Tree Data Schedule.....	14
Appendix 2: Tree Location Plan.....	15
Appendix 3: Tree Impact Plan.....	16
Appendix 4: Method	17
Site Assessment	17
Research	17
Tree Data Schedule Method	18
Tree Retention Value Method	21
Notional Root Zone and Structural Root Zone Method.....	24

Summary

Tree Management Strategies has been commissioned by Stockland Development Pty Limited to provide an Arboricultural Impact Assessment (AIA) for 15 trees located within and adjacent to 601 Pacific Highway, St Leonards. The AIA forms part of a State Significant development application (SSDA).

The health, condition and retention values of 15 trees are recorded in the Tree Data Schedule (Appendix 1). The Structural Root Zone, Notional Root Zone and retention values are shown on the Tree Location Plan (Appendix 2) and on the Tree Impact Plan (Appendix 3).

The developmental impacts are explored in Developmental Impact and Observations (Section 2) of this report.

The proposal requires the removal of 8 trees and the retention/protection of 7 trees.

Conclusion

Tree 2, located on the street reserve, has a total impact by the proposed development's envelope and scaffold location that requires its removal.

Trees 3, 4, 5, 12, 13, 14 and 15, located within the subject site's boundary, have total impacts by the proposed development that require their removal.

Trees 1, 6, 7, 8, 9, 10 and 11 are unaffected by the development and will remain healthy and viable with tree protection measures adhered to.

The Landscape Plan prepared by Aspect Studios recommends the planting of 19 trees to compensate for tree removals.

Recommendations

- Remove Trees 2, 3, 4, 5, 12, 13, 14 and 15. trees. Tree removal work to be undertaken in accordance with *AS 4373 Pruning of Amenity Trees*, using a qualified Arborist (minimum Australian Qualification Framework (AQF3) Level Arborist).
- Adhere to the Tree Protection Specifications (Section 3) of this report to ensure the ongoing health of Trees 1, 6, 7, 8, 9, 10 and 11.

1. Introduction

This Arboricultural Impact Assessment has been prepared by Tree Management Strategies and is submitted to the Department of Planning, Housing and Infrastructure (DPHI) in support of a State Significant Development Application (SSDA) (SSD-**85848713**) and concurrent rezoning proposal for a new mixed-use development at 601 Pacific Highway, St Leonards (the site).

The proposal seeks consent for the following:

- An amendment to the North Sydney Local Environmental Plan 2013 (NLEP 2013) to rezone the site from E2 Commercial Centre to MU1 Mixed Use and to amend the minimum non-residential floor space ratio development standard under Clause 4.4A from 20:1 to 1:1.
- Demolition of the existing 14 storey commercial office building that is currently on the site.
- Site excavation, remediation and other preparatory works.
- Construction and operation of a new 52 storey (RL264.50) mixed use shop top housing development, with a FSR of 20:1 (maximum GFA of 56,880m²), comprising:
 - 538 dwellings including 508 Build-to-Sell apartments and 30 Affordable Housing apartments across a mix of apartment typologies.
 - A contribution of 5% of the residential GFA toward Affordable Housing.
 - Retail and commercial land uses at the ground and podium levels.
 - Internal and external residential amenities provided throughout the building.
 - Six levels of basement carparking, comprising a total of 300 car spaces, bicycle parking, loading bays, waste areas, plant, and back of house.
- Vehicular access to the basement via Atchison Street.
- Landscaping and Public Domain works.
- Reticulation of site services and infrastructure (electricity, telecommunication, water, and sewer connections).

1.1 Background Information

Stockland Development (Stockland) submitted an EOI for an SSDA and concurrent rezoning proposal on 17th January 2025 through the Housing Delivery Authority Pathway (HDA). At its Briefing on 19th February 2025, the HDA recommended to the Minister that the applicant's project be declared SSD, for the reason that it sufficiently satisfied the objectives and criteria of the HDA. The project was declared as SSD in the State Significant Development Declaration Order 2025 (No 2) (26 February 2025). A request for SEARs was lodged on the 6th of June 2025 with SEARS received on the 4th of July 2025.

1.2 SEARS Requirement

This Arboricultural Impact Assessment has been prepared to address the following relevant Secretary's Environmental Assessment Requirements (SEARs), refer to (Table 1).

Table 1: Sears Requirement

14. Trees and Landscaping • Provide a landscape plan, that: ○ details the proposed site planting, including location, number and species of plantings, heights of trees at maturity and proposed canopy coverage (as a percentage of the site area). ○ provides evidence that opportunities to retain significant trees have been explored and/or inform the plan. • If the proposal involves impacts to trees, provide an Arboricultural Impact assessment that assesses the number, location, condition and significance of trees to be removed and retained including: ○ any existing canopy coverage to be retained on-site. ○ tree root mapping. if the proposal involves significant impacts to tree-protection zones of retained trees identified as being significant	Landscape Plan <u>If required:</u> Arboricultural Impact Assessment
--	--

1.3 Aim:

This report aims to:

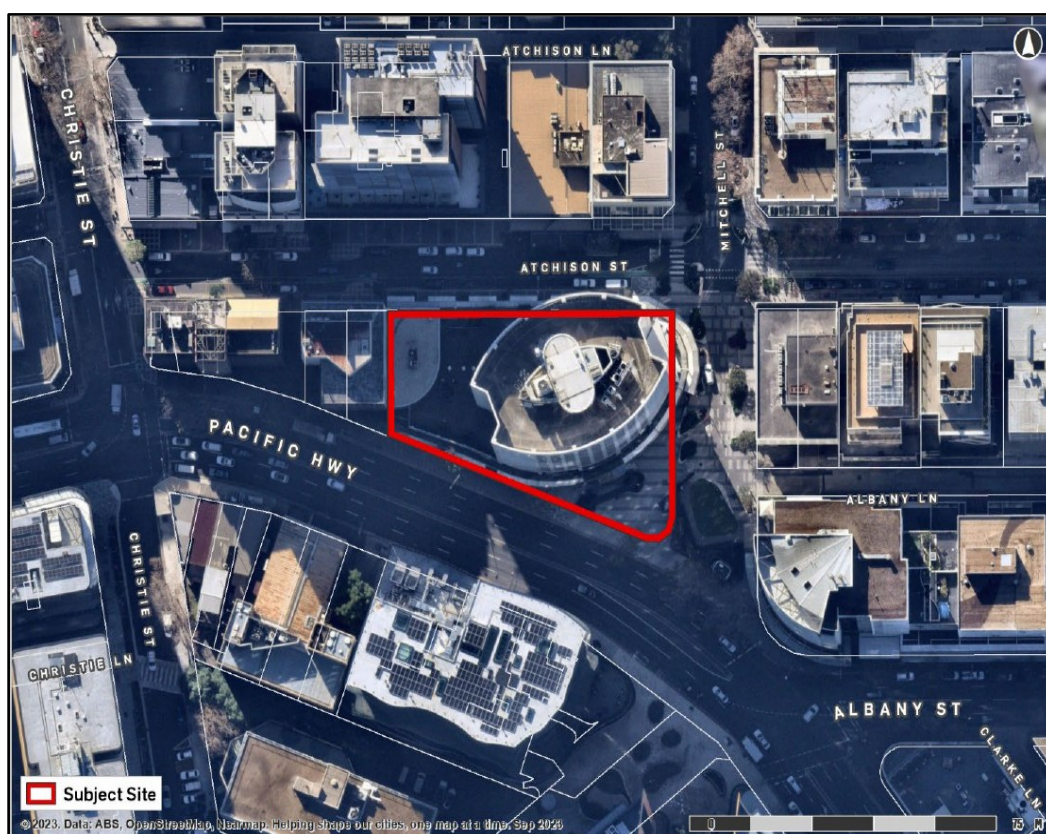
- Respond to the Secretary's Environmental Assessment Requirements (Sear's) Item 14, Trees and Landscaping.
- Assess the health and vitality of fifteen trees.
- Calculate the impact the proposed development will have on fifteen trees.
- Suggest sensitive construction or tree protection methods to retain high to medium-value trees on the subject site or neighbouring site.
- Recommend the retention or removal of the subject tree.

1.3 Site Location

The site is located on Cammeraygal country at 601 Pacific Highway, St Leonards within North Sydney (LGA). The site is legally described as Lot 71 in DP749690 and has a total area of 2,844m². The site is 4.5 km north of the Sydney CBD, 3 km from the North Sydney CBD, and within proximity to the centres of St Leonards, Chatswood, and Macquarie Park. The site is located 350 metres (walking distance) from St Leonards train station and approximately 400m (walking distance) from the Crows Nest Metro station.

A site aerial and location plan is provided at Figure 1 below.

Figure 1: Subject Site Highlighted in Red



2.0 Developmental Impacts and Observations

On the 9 of September 2025 a site inspection was conducted. The health, condition, retention values and photographs of 15 trees are recorded in the Tree Data Schedule (Appendix 1) and shown on the Tree Location Plan (Appendix 2).

The method for this report is outlined in (Appendix 4) Method.

All tree retention values are in accordance with IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©.

The tree impacts detailed below are based on the plans referenced in (Section 4) of this report.

The incursions to the theoretical Notional Root Zones (NRZ) potentially affecting trees assessed on the subject site are shown in the Tree Impact Plan (Appendix 3).

The development requires the removal of 8 trees. 2 x high retention, 1 x medium retention and 5 x low retention valued trees.

2.1 Trees 3, 4 and 5 located within the subject site have a total impact by the proposed ground floor level that requires their removal, refer to the Tree Impact Plan (Appendix 3). To compensate for tree removals, the Landscape Plan prepared by Aspect Studios recommends 7 replacement street trees be planted along the Pacific Highway frontage.

2.2 Class B Hoarding Tree 2 The construction of the proposed development will require a Class B (10kPa) 3m wide hoarding to be erected for periods in excess of 12 months along the Pacific Hwy, Atchinson St & Mitchell St interfaces for the purposes of protecting the public during the works overhead, refer to (Figure 2) for Class B Hoarding specifications. Tree 2 has a total impact by the proposed Hoarding that requires its removal, refer to the Tree Impact Plan (Appendix 3).

2.3 Trees 12, 13, 14 and 15 located within the subject site are given low retention values due to their age, health and position in the landscape. Trees 12, 13, 14 and 15 have total impacts by the proposed development envelope that requires their removal and replacement, refer to the Tree Impact Plan (Appendix 3).

2.4 Trees 1, 6, 7, 8, 9, 10 and 11 are not impacted by the proposed development, refer to the Tree Impact Plan (Appendix 3). Tree protection measures must be implemented during demolition and construction phases in accordance with the Tree Protection Specifications outlined in (Section 3) of this report.

The Landscape Plan prepared by Aspect Studios recommends the planting of 19 trees to compensate for tree removals.

Figure 2: Class B Hoarding Specification

Class B Hoarding

- **Purpose:** Overhead protection from falling objects.
- **Description:** A gantry-style structure that provides a covered walkway or protection for pedestrians and vehicles.
- **Materials:** Steel or engineered modular systems capable of supporting heavy loads.
- **Load Rating:** Often designed to withstand **10kPa** (equivalent to 1 tonne/m²). [alphasafe.com.au]
- **Applications:**
 - Urban areas with high foot traffic.
 - Sites with overhead construction activity.
 - Can span footpaths, roads, or entire building facades.



3.0 Tree Protection Specifications

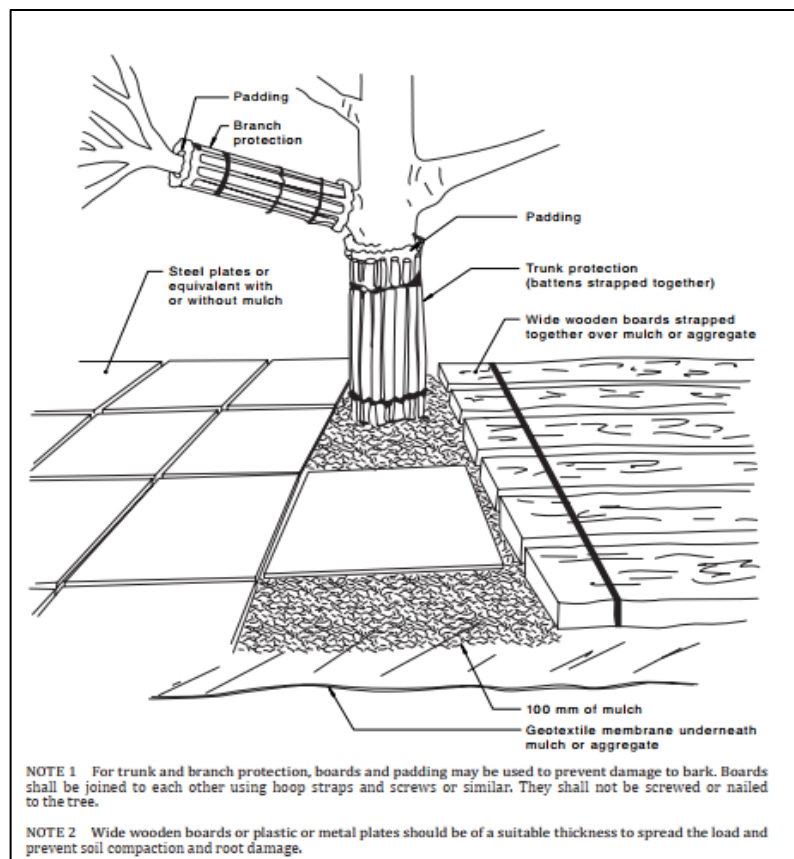
The Tree Protection Specifications is designed to offer detailed design modifications or sensitive construction methods and a step-by-step timeline for Tree Protection Measures.

Step 1: Trunk Battening

To ensure the protection of Trees 1, 6, 7, 8, 9, 10 and 11 potentially affected by the proposed development, Trunk Protection is required, as per the details outlined in (Figure 3).

The Project Arborist must certify that the protection measures are installed to the required specifications prior to commencement of construction. The trunk protection should remain in place for the duration of construction.

Figure 3: Trunk Battening Detail

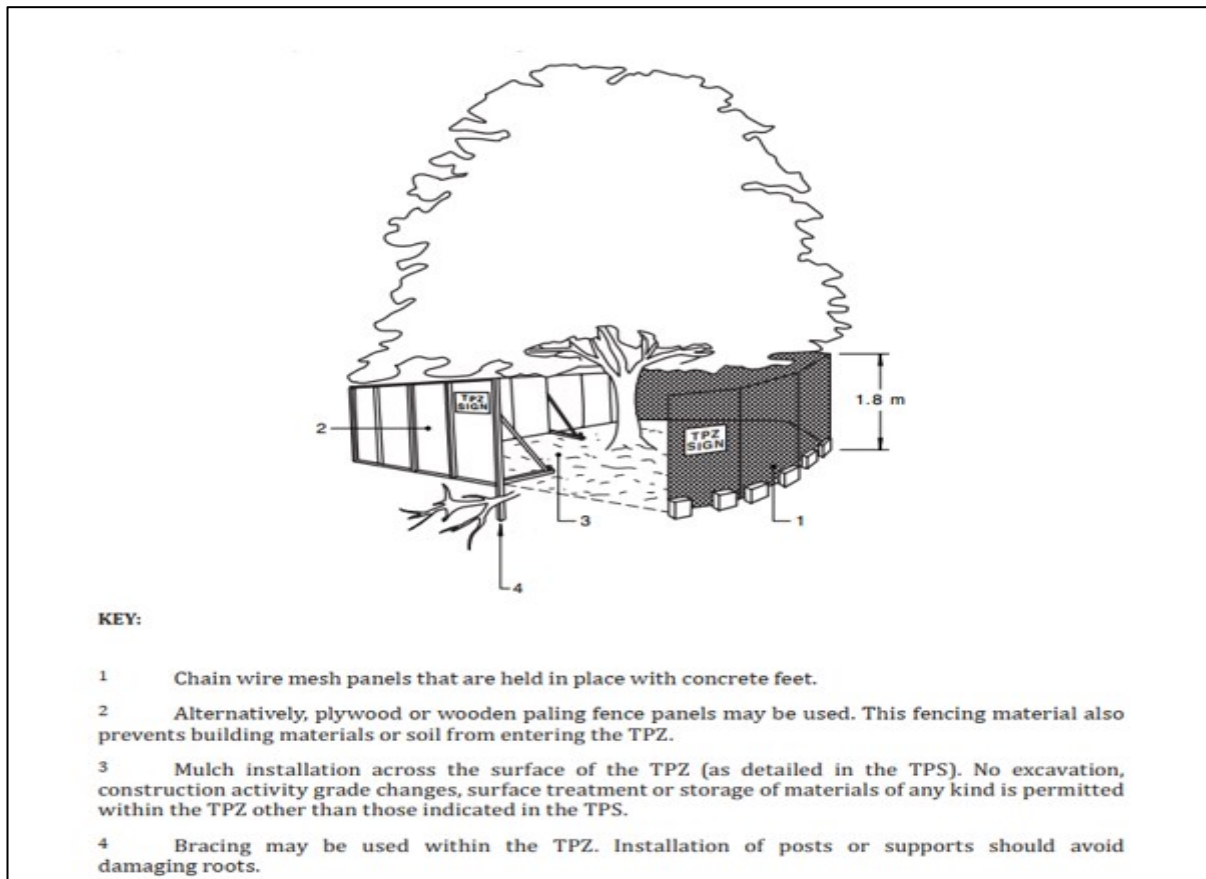


Step 2: Erect Tree Protection Fence Trees 1, 6, 7, 8, 9, 10 and 11

To ensure the protection of trees to be retained, a tree protection fence is recommended as per the details shown in (Figure 4).

The fence detailed in (Figure 4) needs to be erected throughout construction and may be dismantled when landscaping begins. The Project Arborist must certify the protection measures are in the correct location and to specifications prior to commencement of construction.

Figure 4: Tree Protection Fence



Step 3: Monitoring

The Project Arborist must inspect all trees to be retained on a monthly basis, unless otherwise specified by the project arborist, for the duration of the project to ensure tree protection measures are being adhered to and the health of all trees are not being adversely affected. Monitoring to cease following the final inspection and report.

Step 4: General Exclusions within the TPZ

The following activities shall be excluded within the TPZ's of trees to be retained, to (Figure 5).

Figure 5: TPZ exclusions

4.2 Activities generally excluded from the TPZ

These include but are not limited to the following:

- (a) Excavation, cultivation or disturbance of the soil, including scraping of the surface.
- (b) Equipment and material storage.
- (c) Preparation of chemicals, including preparation of cement products.
- (d) Movement or parking of vehicles and plant.
- (e) Dumping of waste.
- (f) Spreading or stockpiling of fill.
- (g) Refuelling.
- (h) Washing down and cleaning of equipment or hard surfaces.
- (i) Fires.
- (j) Physical damage to the tree.

The Project Arborist must be notified in the event any disturbance within the TPZ of trees to be retained is required.

Step 5: Final Certification

Upon completion of construction, the Project Arborist will certify that the health and condition of all trees to be retained have not been adversely affected by the development.

4.0 Referenced Documents

Plans that were referred to for this report include:

Plan Title	Drawing Number	Consultant	Revision
Tree Location Plan	TPD_TMS_601 Pacific_T01A	Tree Management Strategies	10-09-2025
Tree Impact Plan	TPD_TMS_601 Pacific_T01C	Tree Management Strategies	19-03-2026
Architectural Plans	DA03 - General Arrangements General Arrangement Plan Level L1	Batessmart	17-03-2026
Landscape Plan	LS-1001	Aspect Studios	Rev A 18-03-2026

5.0 Conclusions & Recommendations

Conclusion

Tree 2, located on the street reserve, has a total impact by the proposed developments envelope and scaffold location that requires its removal.

Trees 3, 4, 5, 12, 13, 14 and 15, located within the subject site's boundary, have total impacts by the proposed development that require their removal.

Trees 1, 6, 7, 8, 9, 10 and 11 are unaffected by the development and will remain healthy and viable with tree protection measures adhered to.

The Landscape Plan prepared by Aspect Studios recommends the planting of 19 trees to compensate for tree removals.

Recommendations

- Remove Trees 2, 3, 4, 5, 12, 13, 14 and 15. trees. Tree removal work to be undertaken in accordance with *AS 4373 Pruning of Amenity Trees*, using a qualified Arborist (minimum Australian Qualification Framework (AQF3) Level Arborist).
- Adhere to the Tree Protection Specifications (Section 3) of this report to ensure the ongoing health of Trees 1, 6, 7, 8, 9, 10 and 11.

6.0 References

Shigo, A., 1986, A New Tree Biology and Dictionary: facts, photos, and philosophies on trees and their problems and proper care, Snohomish, WA

Council of Standards Australia (July 2025)
The Australian Standard for the Protection of Trees on Development Sites (AS 4970 – 2025).

Harris, R., Clark, J. and Matheny, N., 2003, Integrated Management of Landscape Trees, Shrubs, and Vines, fourth edition, Prentice Hall, Australia

IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

Lonsdale, D. (1999). *Principles of Tree Hazard Assessment and Management*. Forestry Commission, London.

Mattheck, C. and Breloer, H (1994) *The Body Language of Trees*. Research for Amenity Trees No.4, The Stationery Office, London.

Disclaimer:

By the nature of their size, weight and miscellaneous structure, constant exposure to the weather and the elements, susceptibility to insects, pest and decay organisms, and trees always pose an inherent degree of hazard and risk from breakage or failure.

There is no guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future. No responsibility will be accepted for partial or full failure of any tree.

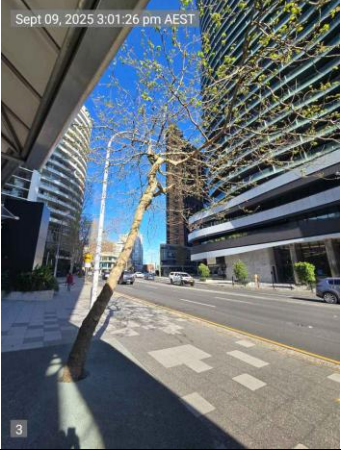
No responsibility will be accepted for any damage or injury caused by any tree or part thereof referred to in this report.

While great care is taken to accurately diagnose the condition of a tree, it is impossible to accurately determine the true structural condition of the entire tree and any diagnosis, opinions or recommendations expressed are based on several methods of determining tree health.

7.0 Appendices

Appendix 1: Tree Data Schedule

APPENDIX 1 – TREE DATA SCHEDULE

No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DSH metres (radius) Breast Ht	SRZ (radius) Metres	NRZ (radius) Metres	Height Metres	Canopy Spread (Metres) (radius)	Age Young, Semi- Mature, Mature Over Mature	Health Good Fair Fair/Poor Poor Dead	Condition Good Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
1	<i>Platanus acerifolius</i>	London Plane	0.70	0.60	2.85	7.20	16.00	4.00	Mature	Fair	Fair	Medium	High	High	Tree located within the street reserve. Retain tree	
2	<i>Platanus acerifolius</i>	London Plane	0.35	0.28	2.13	3.36	16.00	4.00	Mature	Fair	Fair	Medium	High	High	Tree located within the street reserve. Remove tree	
3	<i>Ulmus parvifolia</i>	Chinese Elm	0.22	0.17	1.75	2.04	8.00	2.00	Semi Mature	Fair/Poor	Fair/Poor	Medium	Low	Low	Trees located within the site boundary. Remove	

APPENDIX 1 – TREE DATA SCHEDULE

No	Genus-species	Common Name	DAB metres (radius) <i>Above Buttress</i>	DSH metres (radius) <i>Breast Ht</i>	SRZ (radius) <i>Metres</i>	NRZ (radius) <i>Metres</i>	Height <i>Metres</i>	Canopy Spread (Metres) (radius)	Age <i>Young, Semi- Mature, Mature Over Mature</i>	Health <i>Good Fair Fair/Poor Poor Dead</i>	Condition <i>Good Fair Fair/Poor Poor Failed</i>	Useful Life Expectancy <i>High Medium Low</i>	Landscape significance <i>High Medium Low</i>	Retention value <i>High Medium Low</i>	Notes	Photo
4	<i>Platanus acerifolius</i>	London Plane	0.45	0.36	2.37	4.32	14.00	3.00	Mature	Fair	Fair	Medium	High	High	Trees located within the site boundary. Remove	
5	<i>Platanus acerifolius</i>	London Plane	0.35	0.24	2.13	2.88	14.00	3.00	Mature	Fair	Fair	Medium	Medium	Medium	Tree located within the site boundary. Remove tree	
6	<i>Platanus acerifolius</i>	London Plane	0.30	0.23	2.00	2.76	7.00	2.00	Mature	Fair/Poor	Poor	Medium	Low	Low	Tree located within the street reserve. Retain tree	

APPENDIX 1 – TREE DATA SCHEDULE

No	Genus-species	Common Name	DAB metres (radius) <i>Above Buttress</i>	DSH metres (radius) <i>Breast Ht</i>	SRZ (radius) <i>Metres</i>	NRZ (radius) <i>Metres</i>	Height <i>Metres</i>	Canopy Spread (Metres) (radius)	Age <i>Young, Semi- Mature, Mature Over Mature</i>	Health <i>Good Fair Fair/Poor Poor Dead</i>	Condition <i>Good Fair Fair/Poor Poor Failed</i>	Useful Life Expectancy <i>High Medium Low</i>	Landscape significance <i>High Medium Low</i>	Retention value <i>High Medium Low</i>	Notes	Photo
7 and 8	<i>Corymbia maculata</i>	Spotted Gum	0.15	0.13	1.49	1.56	6.00	1.00	Young	Fair/Poor	Good	Medium	Low	Low	Tree located within the street reserve Retain Tree	
9 and 10	<i>Corymbia maculata</i>	Spotted Gum	15.00	0.13	10.32	1.56	8.00	1.00	Semi Mature	Poor	Poor	Medium	Low	Low	Tree located within the street reserve Retain Tree	
11	<i>Ulmus parvifolia</i>	Chinese Elm	0.22	0.18	1.75	2.16	6.00	3.00	Semi Mature	Fair	Fair	Medium	Medium	Medium	Tree located within the street reserve Retain Tree	

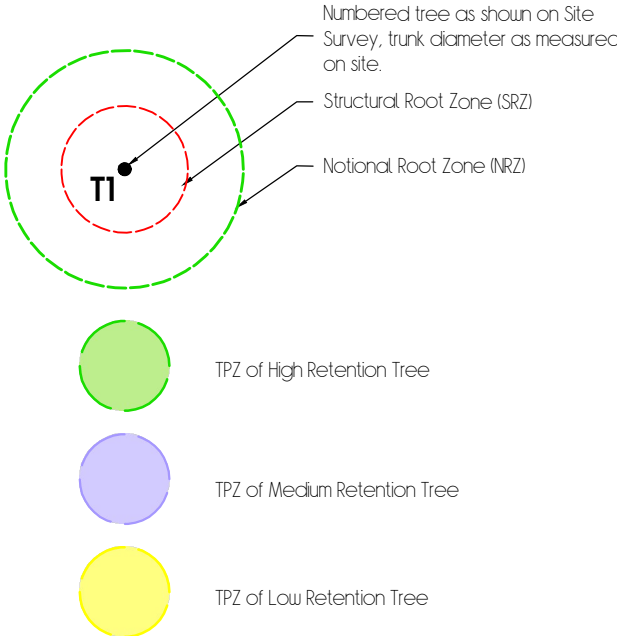


APPENDIX 1 – TREE DATA SCHEDULE

No	Genus-species	Common Name	DAB metres (radius) Above Buttress	DSH metres (radius) Breast Ht	SRZ (radius) Metres	NRZ (radius) Metres	Height Metres	Canopy Spread (Metres) (radius)	Age Young, Semi- Mature, Mature Over Mature	Health Good Fair Fair/Poor Poor Dead	Condition Good Fair Fair/Poor Poor Failed	Useful Life Expectancy High Medium Low	Landscape significance High Medium Low	Retention value High Medium Low	Notes	Photo
12, 13, 14 and 15	Cupaniopsis anacardioides	Tuckeroo	0.20	0.25	1.68	3.00	5.00	2.00	Semi Mature	Fair/Poor	Fair/Poor	Medium	Low	Low	Trees located within the site boundary. Remove Trees	

Appendix 2: Tree Location Plan

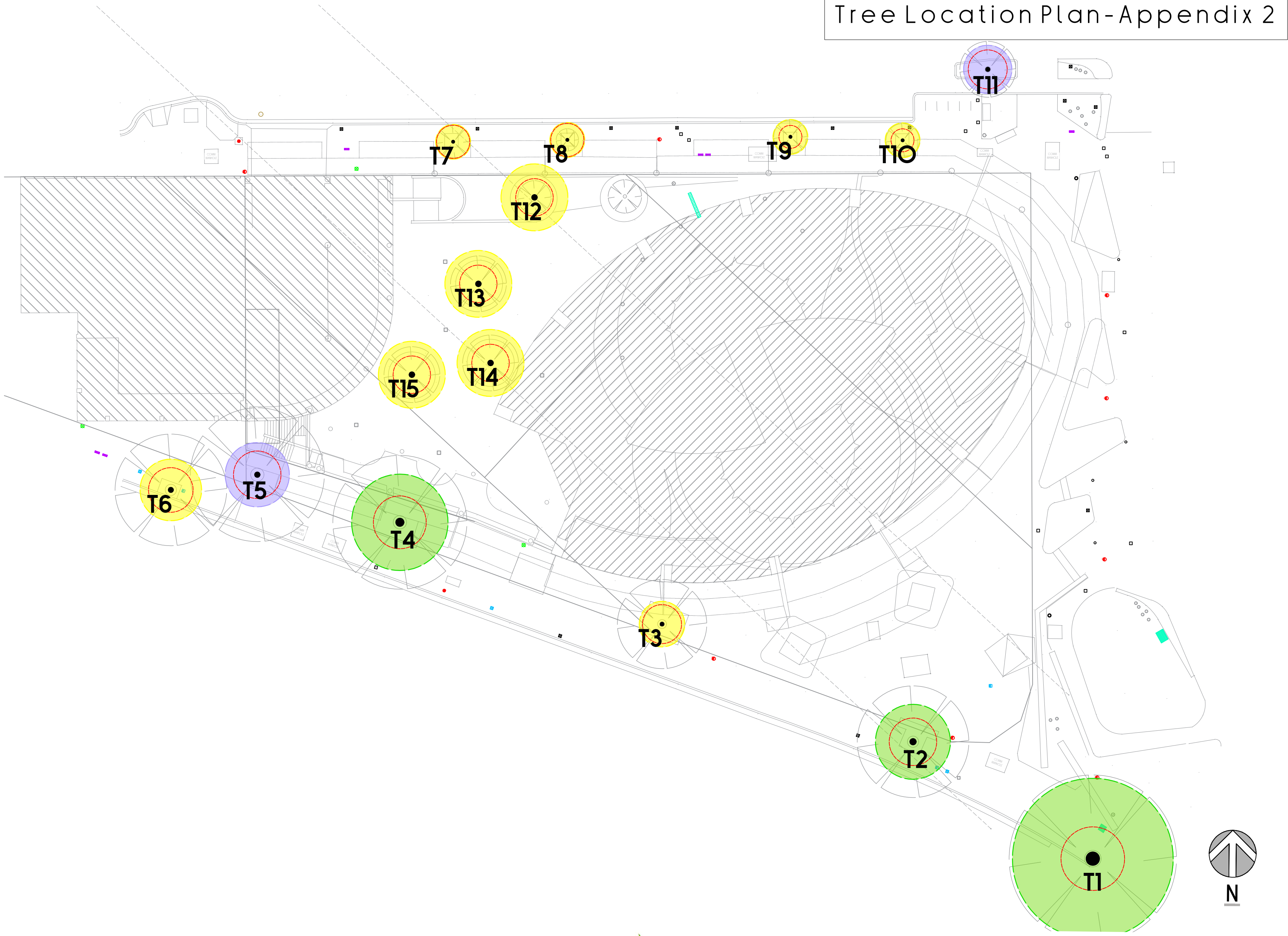
Legend



Trees Total Retention Value



Tree Location Plan-Appendix 2



BASED ON SURVEY PLAN BY LTS DATED 12/08/25



Plan prepared for Assessing Arborist:
LEIGH BRENNAN
AGF level 5 Consulting Arborist



DATE	10/09/2025	DWG	TPD-TMS_601Pacific_TOA	REVISION	01	SCALE	1:300m	DRAWN	Hannah Marata	SHEET	1 of 1
ADDRESS	601 Pacific Highway, St. Leonards										
PLAN TITLE	Tree Location Plan										
Tree Management Strategies				Sydney & Regional NSW							
W: www.treems.com.au				T: 0447 356059				E: leigh@treems.com.au			

Appendix 3: Tree Impact Plan

Legend



 High = 1
 Medium = 1
 Low = 5

 High = 2
 Medium = 1
 Low = 5



DATE	19/03/2026	DWG#	TPD_TMS_60I Pacific_TOID	REVISION	04	SCALE	a2	T300m	DRAWN	Hannah Morata	SHEET	TOI of 1
ADDRESS	60I Pacific Highway, St. Leonards											
PLAN TITLE	Tree Impact Plan											
Tree Management Strategies								Sydney & Regional NSW				
W: www.treems.com.au								T: 0447 356059				
								E: Leigh@treems.com.au				

Appendix 4: Method

Site Assessment

From the ground, the following information was recorded and displayed in the Tree Data Schedule (Appendix 1).

- Tree genus and species.
- Approximate height spread if deemed applicable.
- Trunk diameter at breast height and above the buttress.
- Age class: young, semi mature, mature, over mature.
- Health.
- Condition.

Observations were recorded and photographed.

Research

The following legislation, documents or websites were reviewed:

- The Australian Standard for the Protection of Trees on Development Sites (AS 4970 – 2025).
- North Sydney Council Development Control Plan 2025.
- North Sydney Council Environmental Plan 2013.

Tree Data Schedule Method

The health and condition of trees assessed are shown in the Tree Data Schedule (**Appendix 1**) with the methods explained below:

Tree Health

Overall Health (Vigour/Vitality)	Tree vigour is exhibited by crown density, crown cover, leaf colour, leaf size, leaf texture, presence of epicormic growth, ability to withstand predation by pest and disease, resistance and degree of dieback.
Good (Excellent)	Good tree vigour exhibited by no decline in overall health and vigour, height and shape. The specimen is observed to be of excellent condition displaying characteristics that is known for that particular species (what would be the expected condition for that particular species of that age in that location), 0% dieback, full crown density, leaf health, no pest or disease present.
Fair	Fair tree vigour exhibited by moderate decline in overall health and vigour, height and shape. The specimen is observed to be of moderate condition by not displaying characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), less than 10% dieback, 90% of crown foliage density, more than 90% leaf health, acceptable level of pest or disease is evident for the assessing arborist (where it is considered the tree's overall health or condition will not be affected or lead to irreversible decline from pest or disease).
Fair/Poor	Fair to poor tree vigour exhibited by considerable decline in overall health and vigour, height and shape. The specimen is observed to be of less than acceptable condition by not displaying characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), 10-20% dieback, considerable foliage deficiencies, 70-90% foliage density, 70-90% leaf health, pest or disease infestation at acceptable thresholds for the assessing arborist (where it is considered the tree's overall health or condition will not be affected or lead to irreversible decline from pest or disease).

Poor	Poor vigour exhibited by substantial decline in overall health and vigour, height and shape. The specimen is observed to be of poor condition by not displaying characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), 20-30% dieback, considerable foliage deficiencies, 50-70% leaf health, pest or disease infestation at unacceptable infestation level that exceeds thresholds for the assessing arborist (where it is considered the tree's overall health or condition will be affected or lead to irreversible decline from pest or disease).
Very Poor	Very poor vigour exhibited by irreversible decline in overall health and vigour, height and shape. The specimen is observed to be of less than acceptable condition by not displaying characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), 15-50% dieback; severe foliage deficiencies; 30-50% density; 30-50% leaf health; pest or disease infestation at severe infestation level that exceeds thresholds for the assessing arborist (where it is considered the tree's overall health or condition will be affected or lead to irreversible decline from pest or disease).
Dead	Dead tree vigour exhibited by complete decline in overall health and vigour, height and shape. The specimen is observed to be dead by not displaying any characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), tree holds less than 15% foliage; branching is dead throughout canopy, pest or disease infestation at severe infestation level that exceeds thresholds for the assessing arborist (where it is considered the tree's overall health or condition will be affected or lead to irreversible decline from pest or disease).

Tree Condition

Overall Condition (Structure/Stability)	The tree condition as identified by the arborist in regard to defects in structure and stability.
Good (Exceptional specimen)	No damage or decay observed to the root plate, visible basal and /or root flare, stable in ground, well tapered branches with sound open unions. All characteristics within thresholds for the assessing arborist.
Fair (Standard tree – no observable major defects to suggest that there is an increased likelihood of tree or part of tree failure)	Minor damage or decay observed to root plate, trunk or primary branches or branch unions (1 st or 2 nd branch order or scaffolding branch), well-formed branch unions, minor branch end weight or over-extensions within thresholds for the assessing arborist.
Fair/Poor	Moderate damage or decay observed to root plate, trunk or primary branches or branch unions (1 st or 2 nd branch order or scaffolding branch); minimal basal/root flare; acute branch; past branch failure(s); moderate branch end-weight or over-extension approaching thresholds for the assessing arborist.
Poor	Major damage or decay observed to root plate, trunk or primary branches or branch unions (1 st or 2 nd branch order or scaffolding branch) no observable basal and /or root flare; acute branch unions starting to include bark; major branch end-weight or over-extension at or exceeds thresholds for the assessing arborist.
Very Poor	Excessive damage or decay observed to root plate, trunk, primary branch or branch unions (1 st or 2 nd branch order or scaffolding branch), excessive decay or hollows compromising the structural integrity, unstable in ground, excessive branch end-weight, included-bark unions, exceeding thresholds for assessing arborist. Failure probable.
Failed	Failure of root plate or trunk or primary branch or branch unions (1 st or 2 nd branch order or scaffolding branch) or active split between branch unions or severe damage to primary tree structure.

Tree Retention Value Method

IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the Tree Significance - Assessment Criteria and Tree Retention Value - Priority Matrix, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of High, Medium and Low significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

Tree Significance - Assessment Criteria



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 a council's Significant Tree Register.
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity.
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values.
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ - tree is appropriate to the site conditions.

Medium Significance in landscape

- The tree is in fair to 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.

Low Significance in landscape

- The tree is in fair to 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 and or 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 mono-cultural stand in entirety.

Useful Life Expectancy (ULE)

Useful life expectancy (ULE) is a measure of a trees remaining lifespan regarding its health, condition and locality ULE categories were measured as:

- Long (greater than 40 years)
- Medium (between 15 and 40 years)
- Short (between 1 and 15 years)
- Dead

Tree Retention Value - Priority Matrix

		Significance				
		1. High Significance in Landscape	2. Medium Significance in Landscape	Significance in Landscape	3. Low 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 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.						

REFERENCES

- Australia ICOMOS Inc. 1999, *The Burra Charter – The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, www.icomos.org/australia
- Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturist (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.
- Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

Notional Root Zone and Structural Root Zone Method

Following the VTA, The Notional Root Zones and Structural Root zones were calculated and added to the Tree Data Schedule (Appendix 1) and the Tree Impact Plan (Appendix 2) with the methods explained below:

The Structural Root Zone (SRZ) is the area around the base of a tree required for its stability. The woody root growth and soil cohesion in this area are necessary to hold the tree upright; therefore, there are no variations to its size. The SRZ is normally circular with the trunk at its centre and is expressed by its radius in metres (AS – 4970). Due to the potential of causing instability of a tree, it is highly recommended that no roots within its SRZ are pruned or removed. SRZ, which is the area required for tree stability, was calculated as follows: $SRZ \text{ radius} = (D \times 50) 0.42 \times 0.64$.

The Notional Root Zones (NRZ) is the principle means of protecting trees on development sites. The NRZ is a combination of the root area and crown area that requires protection. It is an area isolated from construction disturbance, so that the tree remains viable (AS – 4970). The radius of the NRZ is calculated for each tree by multiplying its DSH x 12. $NRZ = DSH \times 12$ (DSH = trunk diameter measured at 1.4m above ground level). The radius of the NRZ is measured from COT (Centre of the trunk).

Variations to the Notional Root Zones (NRZ)

General

It may be possible to encroach into or make variations to the standard NRZ. Encroachment Includes excavation, compacted fill and machine trenching.

Minor encroachment

If the proposed encroachment is less than or equal to 10% of the area of the NRZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and be contiguous with the NRZ. Variations must be made by the project arborist, considering relevant factors. (Figure 6) demonstrates some examples of possible encroachment into the NRZ up to 10% of the area.

Moderate encroachment

The proposed encroachment is considered moderate if it is greater than 10 % and less than or equal to 20 % of the area of the NRZ and is outside of the SRZ. A project arborist shall be engaged to review the proposed impact and undertake any other necessary investigation to address the factors. This may be through the implementation of suitable design measures and construction controls to mitigate impacts during the development process as part of a TPS and TPP. To avoid a net loss of soil area and volume, an area equivalent to the encroachment shall be incorporated into the NRZ, unless the project arborist otherwise demonstrates that the tree will remain viable.

Major encroachment

The proposed encroachment is considered major if it is greater than 20 % of the area of the NRZ or inside the SRZ. The project arborist shall be engaged to explore alternative designs with the design team and/or demonstrate that the tree will remain viable.

For the assessment of major encroachment, a more detailed investigation is necessary. This can include research such as root investigation, soil analysis, historical records of the tree or site, relevant literature and examples of similar encroachments. A TPS and TPP should be prepared to support the retention of the tree. To avoid a net loss of soil area and volume, an area equivalent to the encroachment shall be incorporated into the NRZ, unless the project arborist otherwise demonstrates that the tree will remain viable.

Figure 6: Examples of possible encroachment

