Arboricultural Impact Assessment Report

Seniors Housing Development, NSW Land & Housing Corporation

17, 19 and 21 Wardell Road, Alstonville NSW

Prepared for: DTA Architects

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1. Introduction

1.1. Background

Arbor Ecological was engaged by DTA Architects to undertake an arboricultural/ tree impact assessment and prepare an associated report for a NSW Land & Housing Corporation seniors housing development project for three properties at 17, 19 and 21 Wardell Road, Alstonville NSW, in the Ballina Local Government Area, hereafter referred to as *the site*.

The assessment followed a preliminary arboricultural/ tree impact assessment and report, including Visual Tree Assessments (VTAs)[1] and Tree Retention Value (TRV) scores, to guide development design. Finalised development design plans were subsequently provided identifying trees and shrubs (hereafter referred to as the subject trees) plotted in relation to proposed buildings and infrastructure; and subject trees proposed to be retained and removed.

Subject tree impacts from the proposed development centre on potential impacts to health, condition and ongoing vitality associated with development and construction works.

1.2. Aim

This assessment report aims to gather, analyse and present information on the impact of the proposed development to inform recommendations including tree removal, tree retention, tree pruning, and protection of trees to be retained for ongoing tree vitality.

1.3. Objectives

- To identify subject trees on the site with high potential to be substantially impacted by the proposal.
- To assess the impacts of the proposed development on the subject trees based on Visual Tree Assessment findings and finalised design drawings (refer to **Figure 1**) showing the location of the subject trees in relation to the development footprint, and TPZ encroachment details.
- To prepare an arborist report in accordance with the Australian Standard *AS4970 2009 Protection of Trees on Development Sites*[2] as a primary reference and guide for tree protection and management, and with reference to the Ballina Shire Development Control Plan.
- To provide recommendations regarding tree removal, tree retention, tree pruning, tree protection measures and other vegetation management measures.

[1] **Visual Tree Assessment (VTA)** is a standard method for tree inspection from ground level of overall vitality, health, stability and defect symptoms. Inspection may be undertaken with the aid of binoculars, probes and sounding mallet, and includes inspection of the soil conditions around the tree; root flare and roots (where readily accessible); bark, trunk; scaffold limbs; branches; leaves; and tree form. More detailed tree part inspection may be recommended as a result of VTA (Mattheck, C & Breloer, H 1994, *The body language of trees, a handbook for failure analysis*, TSO Her Majesty's Stationary Office, London, England).

[2] **Standards Australia 2009**, *AS4970-2009 Protection of trees on development sites*, Standards Australia, Sydney.

1.4. Site Description

The site consists of residential dwellings and associated structures and infrastructure. Subject trees and shrubs are mostly landscape plantings with varying levels of maintenance and care.

The land is mostly gently sloping, and clay loam ferrosol (krasnozem) soil provides good growing conditions.

Ballina Shire Council online mapping shows the site is not attributed with any preferred or core Koala habitat, DCP *Wildlife Corridors* or *Natural Areas and Habitat*.

Similarly, the site is not mapped as *Biodiversity Values*, under the NSW Government *Biodiversity Values Map and Threshold Tool*. The *Biodiversity Values (BV) Map*[3] identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing including mapped core Koala habitat and Areas of Outstanding Biodiversity Value (AOBV) under the NSW *Biodiversity Conservation Regulation 2017*.

2. Assessment Methods

As part of the preliminary assessment, Visual Tree Assessments were undertaken on 11/01/23 by AQF level 5 arborist, Michael Hallinan and trainee Jordan Rockford. The subject trees were identified to species level where practicable and were numbered in line with tree numbering on the supplied survey plan.

Measurements were made of tree dimensions, i.e. Diameter at Breast Height (DBH)[4] and Diameter immediately Above the Root Buttress (DARB)[5] in case of a Tree Protection Zone encroachment. Visual estimates were made tree height and average crown spread.

[3] NSW Department of Planning and Environment (DPE) 2022, Biodiversity Values Map and Threshold Tool. Accessed 10/01//23, www.lmbc.nsw.gov.au/

[4] **Diameter at Breast Height (DBH)** refers to the diameter of the trunk at breast height (1.4m above the ground) measured with diameter tape (Matheny, NP & Clark, JR 1994, *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas*, 2nd edn., International Society of Arboriculture, Illinois, USA).

[5] **Diameter Above the Root Buttress (DARB)** is used to calculate the Structural Root Zone (SRZ) of a tree, rounded to the nearest centimetre.

Visual Tree Assessments (VTAs) focused on tree health[6], condition[7], structural defects[8], load[9] factors and age class[10]. Trees displaying low vigour[11], weakly formed codominant stems[12], substantial leans[13], over-extended branches or other structural defects were noted where they were detected.

Binoculars were used to view upper parts of trees; a fibreglass sounding hammer to assess tree hollowness; and a pointed metal probe to lift bark, examine the extent of any suspected points of decay, and to assess soil conditions. Diameter tape was used to measure DBH and DARB.

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[6] **Tree Health** – Categorised as:
Good: A tree with good health exhibits one or more of the following: Crown full and dense; foliage of good colour and with minimal or no insect or disease damage; typical growth indicators slightly abnormal for species, e.g. extension growth, leaf size and crown foliage density; no or minimal crown die-back; good woundwood and/or response growth development. Associated with high tree vigour.
Fair: A tree with fair health exhibits one or more of the following: Has less than 12% dead wood; has minor crown dieback; foliage mostly with good colour and/or minor to moderate insect or disease damage, minor pathogen damage present; typical growth indicators slightly abnormal for species, e.g. extension growth, leaf size and crown foliage density.
Poor – Very Poor: A tree with poor health exhibits one or more of the following: Has greater than 12% dead wood; significant crown dieback present; foliage discoloured or distorted leaves; excessive epicormic growth; poor woundwood and/or response growth development; substantial wood decay affecting health; signs of strain leading to tree decline. Associated with low tree vigour.
Dead: A tree that is still standing but no longer shows signs of being alive.

[7] **Tree Condition** refers to a tree's structural form or habit and is expresses as:
Good: A tree with good structural form or habit and free from or with only negligible/minor structural defects, e.g. upright or with a slight lean; apparently stable; well tapered stems; full and balanced/symmetrical crown; free from or with only slight signs of pests and structural wood decay; nil or slight crown/branch dieback.
Fair: A tree with moderately good structural form or habit typical of the species and/or minor to moderate structural defects, e.g. slight to moderate lean, over-extended branches or signs of pests and structural wood decay; slight crown/branch dieback or stem cracks; semi-full crown; slightly unbalanced/asymmetrical crown; codominant stems.
Poor: A tree with moderately poor structural form or habit atypical of the species and/or substantial structural defects, e.g. moderate to high lean (uncorrected), crown/branch dieback, stem cracks, wounds, cavities, signs of pests and structural wood decay, epicormic shoot development, over-extended branches or unbalanced/asymmetrical crown; poorly tapered stems; weakly formed codominant stems; deformed stems; roots that are shallow, exposed, twisted or broken.
Very Poor: A tree with substantially poor structural form or habit atypical of the species and/or substantial structural defects and signs of failure of the tree or tree parts, refer to poor condition examples above.
Dead: A tree that is still standing but no longer shows signs of being alive.

[8] **Structural defects** are physiological weaknesses, faults or features that detract from tree condition or the uniform distribution of mechanical stress. They may be either naturally occurring e.g. from storm damage, pests, pathogens, wind and gravity forces; or from human activities, e.g. poor planting or pruning practices. Structural defects can include leans; unbalanced or poorly formed crowns; wounds; cavities; weakly formed codominant stems; included bark; poor structural branch attachments; over-extended branches; poorly tapered stems; crown or branch dieback; stem cracks; roots that are shallow, exposed, twisted or broken; excessive epicormic shoot development and the effects of pests, diseases and poor pruning practices.

[9] **Loads** include dynamic load from wind and static load from gravity acting on a tree. These two loads can interact and are affected by factors including wind exposure, crown size relative to trunk diameter; crown density, abundance of interior branches, vines or mistletoe; and recent of planned changes affecting load (Dunster, JA, Smiley, ET, Matheny, N & Lilly, S, 2013, *Tree Risk Assessment Manual*, International Society of Arboriculture, Illinois, USA).

[10] **Age class** categories: (J) Juvenile refers to a young or juvenile, established tree; (SM) Semi-mature refers to a tree between immaturity and full size; (M) Mature refers to a full size tree with capacity for some further growth; (OM) Over-mature refers to a tree in decline; (D) Dead refers to a tree that is still standing but no longer shows signs of being alive.

[11] **Vigour** refers to a tree's capacity to resist strain and continue to grow; overall health, condition and resilience on a qualitative scale from high to low (Wilson P, 2021, *A-Z of tree terms*: *A companion to British arboriculture, 3rd Ed.*).

[12] **Codominant stems** are stems that originate at about the same position on a stem and are approximately the same diameter. The structure is defective in various circumstances because the only way trunk xylem can grow around a branch, and form a strong attachment, is for the trunk to be larger in diameter than the branch attachment. Co-dominant stems typically lack overlapping tissue present in a collar and often have narrow angles between stems and included bark between stems which can lead to failure at the point of attachment. Additionally, the weight and leverage of the co-dominant stems increases with age, intensifying the stress on the attachment (Harris RW, Clark JR & Matheny NP, 1999 *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vine*s, Prentice Hall, NJ USA).

[13] **Lean** refers to the deviation in the vertical angle of the main stem/s categorised in this instance as: Slight: up to 5^0; Moderate: 6^0 to 12^0; High: 13^0 to 20^0; and Severe: >21^0. Leans can originate from different points along the stem/s and are caused by factors such as competition for light, slope, prevailing winds and genetics. Leans may be static, progressive or corrected. They may be hazardous, particularly when other defects are present (Smiley TE, Matheny N & Lilly S 2011, *Tree Risk Assessment, Best Management Practices*, International Society of Arboriculture (ISA), Illinois, USA; and Dunster et al 2013).

To guide project design and tree and shrub retention and removal considerations, Tree Retention Value (TRV) scores were assigned to subject trees based on categories (best fit) modified from Morton (2006)[14], refer to **Section 2.1.**

Subject trees with *Very Low* Tree Retention Value scores are recommended to be removed where they were identified as hazardous or environmental weed species. Otherwise, tree and shrub retention, removal, pruning and protection recommendations have been guided by development design.

To detect any significant heritage values for the site, searches were made of the *Ballina Shire Local Environmental Plan*, the NSW *State Heritage Inventory*, and the *Australian Heritage Database*.

Tree impact assessment included preparation of a tree removal, tree retention and tree protection plan drawing with TPZ encroachment details, refer to **Table 1 and Figure 1**. Various recommendations, particularly in relation to tree protection, are outlined below in **Section 4**.

2.1. Tree and Shrub Retention Value Assessment Criteria

Tree Retention Value (TRV) scores for subject trees and shrubs based on categories modified from Morton (2006) are as follows, refer to **Table 1 and Figure 1**.

For consistency, commonly occurring ornamental shrubs have been assigned Tree Retention Value (TRV) scores in line with the criteria used for trees. It may be argued that ornamental shrubs have lower retention values since they are more easily replaced than established trees, with advanced nursery stock as part of a development landscaping plan.

1. Very High

- Local, State or Commonwealth listed threatened species, rare, uncommon, or having substantial botanical, heritage, or cultural values.
- Known fauna habitat tree, recognised as providing an important habitat resource for threatened species, e.g. food, shelter, or breeding resources.
- Remnant tree or representative of the original vegetation of an area prior to development.
- Very large live crown size for the species.
- Visually prominent in the landscape or having landmark values.
- Very good form and habit typical of the species and makes a significant contribution to the amenity and visual character of an area.
- Vigorous and in good health and condition.
- Structurally stable tree that may require remedial works to reduce hazards and enable the tree to be retained with vitality and safety.

[14] Morton A, 2006, *Determining the retention value of trees on development sites*. Treenet Journal.

2. High

- Likely fauna habitat tree, suspected as providing an important habitat resource for threatened species, e.g. food, shelter, or breeding resources.
- Naturally occurring, indigenous species endemic to an area.
- Large live crown size for the species.
- Good form and habit typical of the species; makes a significant contribution to the amenity and visual character of an area.
- Vigorous and in fair to good health and condition.
- Structurally stable tree with minor defects that may require remedial works to reduce hazards and enable the tree to be retained with vitality and safety.
- Not readily replaced with new tree planting from advanced nursery stock.

3. Moderate

- Generalist fauna habitat tree, providing habitat resources for native fauna.
- Moderately large live crown size for the species.
- Moderate form and habit for the species; may exhibit minor to moderate deviations from typical species form and habit.
- Makes a fair contribution to the visual character and amenity of an area.
- Moderately vigorous and in fair health and condition.
- Structurally stable tree with defects that may require remedial works to reduce hazards and enable the tree to be retained with vitality and safety.

4. Low

- Poor form and habit; not representative of the species or showing significant deviations from the typical form and habit.
- Small live crown size for the species.
- Not visibility prominent in the landscape.
- Makes a negligible contribution or has a negative impact on the amenity and visual character of an area.
- Low vigour and in poor to fair health and/ or condition.
- Structurally defective, unstable, and/or hazardous tree that may require substantial remedial works to reduce hazards and enable the tree to be retained with vitality and safety.
- Landscape or other planting readily replaced with a new planting from advanced nursery stock.

5. Very Low

- Environment weed species recognised as being invasive.
- Nuisance tree or species due to its position relative to buildings or infrastructure.
- Low vigour and in poor to very poor health and/ or condition.
- Structurally defective, unstable, and/or hazardous tree that cannot practicably be retained with vitality and safety through remedial works.

3. Impact Assessment Findings

Table 1 provides a tree schedule and findings in relation to Visual Tree Assessments, TPZ encroachment details, recommendations, observations, comments & plates.

Figure 1 illustrates subject trees; tree retention and tree removal; relevant TPZ encroachments for trees to be retained; and project TPZ fence locations in relation to demolition and construction works and trees to be retained.

Key assessment findings are as follows:

- A total of 37 trees, shrubs and clumps were assessed within the area of the site.
- One shrub (T5) only is recommended to be retained. It has a Minor[15] TPZ encroachments of less than 10%. Standards Australia (2009) note that TPZ locations may be varied for trees with Minor TPZ encroachments where the area lost to the encroachment is compensated for elsewhere and is contiguous with the TPZ, as is the case in this instance.
- Proposed works within the TPZ of T5 are considered to be tolerable and the shrub is expected to cope with construction activities, remain viable and maintain health, condition and vitality provided tree protection measures are effectively implemented as outlined below in **Section 4**.
- No trees to be retained have a Major[16] TPZ encroachment outside the Structural Root Zone (SRZ)[17], which is critical for tree stability.
- The remaining trees and shrubs are recommended to be removed for construction and or due to hazard and environmental weed status.
- Trees and shrubs to be removed are mostly landscape plantings with varying levels of maintenance and care and generally readily replaceable with new landscape plantings.
- It is understood that there are currently no cut or fill earthworks required within the TPZ of Tree 5 to be retained, including *Deep Soil* zones indicated on plan drawings provided.
- No significant heritage values were detected in relation to site vegetation from searches of the *Ballina Local Local Environmental Plan 2021 (Schedule 5, Environmental Heritage), the NSW State Heritage Inventory, and the Australian Heritage Database.*
- Site access for demolition and construction machinery is considered able to be routed around the Tree Protection Zone so as to not impact T5 to be retained.

[15] A **Minor TPZ encroachment** occurs where an incursion less than 10% of the TPZ area outside the SRZ is encroached by proposed works (Standards Australia 2009).
[16] A **Major TPZ encroachment** occurs where an incursion greater than 10% of the TPZ area or within the SRZ is proposed (Standards Australia 2009).
[17] **Structural Root Zone (SRZ)** is the radius of the area required for tree stability. It only needs to be calculated (using the formula SRZ radius = $(D \times 50)^{0.42} \times 0.64$) when major encroachment into a TPZ is proposed. A larger area than the SRZ is required to maintain tree viability (Standards Australia 2009). The SRZ only needs to be calculated when a Major encroachment into a TPZ is proposed.

4. Recommendations

4.1. General Tree Protection Recommendations

Trees have been recommended to be retained where it is considered that they have conservation values; are not substantially defective or hazardous; and where development impacts can be sufficiently avoided and/ or minimised to maintain tree vitality into the future.

Establishment and maintenance of Project Tree Protection Zones (TPZs) throughout the construction process is important to protect tree roots and crowns; and maintain tree health and condition into the future.

Based on the proposed works, the following recommendations are made, refer to **Table 1** and **Figure 1**:

- In line with AS4970 and best practice, a Project Arborist[18] should be engaged to guide implementation of tree protection measures.
- Tree protection should comply with Section 4, Tree Protection Measures, of Australian Standard 4970 – 2009 *Protection of trees on development sites* unless otherwise noted in this report or recommended by the Project Arborist.
- The Project Arborist should assist with establishment of the project TPZ fence.
- The Project Arborist should be consulted to review any changes to design and construction plans in relation to tree protection and other recommendations.
- Project Arborist should review finalised stormwater plans and plans for underground services installation when available and advise on retained tree impact avoidance and minimisation measures.
- The Project Arborist should advise on tree protection for construction works within the TPZ of T5; and be onsite to monitor potential tree impacts for excavation works (as a minimum) within the TPZ; and cleanly cut (with a sharp handsaw or chainsaw) roots >3cm diameter that would be lost due to construction.
- Mulch up to 12cm depth and/ or lightweight load-sharing/ weight distribution mats, boards, planks or plates should be used in consultation with the Project Arborist if construction machinery are required to work within or pass through project TPZs.
- TPZ fences should be in place prior to the commencement of all works, including demolition and tree removal works, and before construction machinery and materials are brought onto the site.
- Tree protection fences are to be maintained in good condition during construction works and kept in place until after completion of construction works, including landscaping, or as otherwise advised by the Project Arborist.
- Any use of bobcat/ skid steer machinery for landscaping construction works are to be avoided where practicable within TPZ or otherwise monitored by the Project Arborist.
- The role and importance of tree protection measures should be addressed with all construction staff during site inductions and toolbox talks.

[18] The **Project Arborist** should have minimum AQF Level 5 (Diploma level) qualifications and suitable experience in tree protection (Standards Australia 2009).

- A copy of the TPZ Plan drawing (i.e. **Figure 1**) and this report should be retained on site with other construction drawings throughout the construction phases for reference as required.

The following activities should not be carried out within TPZs unless in consultation with the Project Arborist:

- Machinery access including excavators, bobcats, etc.
- Disposal of chemicals and liquids including concrete and mortar slurry, solvents, paint, fuel or oil.
- Stockpiling, storage or mixing of sand, gravel or other building materials.
- Refuelling, parking, storing or washing tools, equipment, machinery or vehicles.
- Soil excavation, trenching, placement of fill, or changes to soil levels.
- Installation of temporary offices, structures, or underground services.
- Erection of scaffolding.
- Tree removal or tree pruning.

4.2. Project Tree Protection Zone (TPZ) Fence Specifications

The project Tree Protection Zones (TPZs) are the areas dedicated to tree protection. **Figure 1** shows the recommended project TPZ fence locations in relation to retained T5 and the construction footprint.

Project TPZs are a variation to that of AS4970 (Standards Australia 2009), designed to ensure tree protection under the existing site conditions and construction requirements. The project TPZs may be only partially enclosed by tree protection fences and are considered to be appropriate in this instance to exclude construction impacts.

Recommended Project TPZ fence specifications are as follows:

- Minimum flexible plastic barrier mesh TPZ fencing, refer to **Figure 2**. The fencing should be secure and fastened to prevent unassisted movement. Steel mesh construction fencing, refer to **Figure 3**, may be used as an alternative or as required.
- A minimum of one TPZ sign every 10m of project TPZ fence should be installed indicating "*Tree Protection Zone, No Access*" or similar, refer to **Figures 4 and 5**. Each sign shall be weather resistant; a minimum size of 29.7mm x 420mm; and include the name and contact details of the Project Manager and/or the Project Arborist. The signs shall be visible from the main work areas of the site.

Figure 2. Example project Tree Protection Zone plastic barrier mesh fence

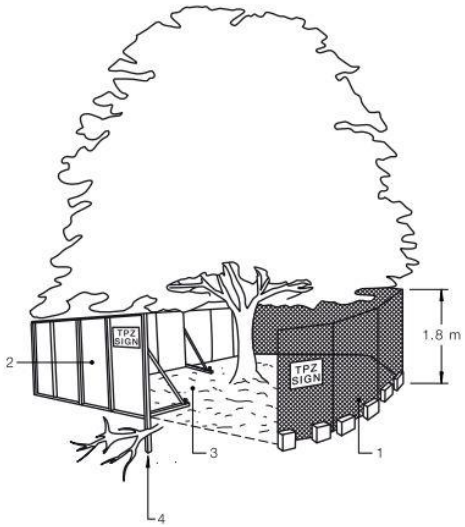

Figure 3. Example Tree Protection Zone steel/ wire mesh fence, Standards Australia (2009)

Figure 4. Example Tree Protection Zone sign, Standards Australia (2009)

Figure 5. Example Tree Protection Zone sign

4.3. Other Recommendations

- Any new landscape plantings for the site should consist of non-invasive species selections and endemic native species should be considered.
- To promote tree health, consider application (where practical) of forest mulch or tea tree mulch around drip zones of T5 to a depth of up to 100mm and up to 0.5m from the shrub base.

5. General Assumptions and Limitations

- Information in this report relates only to the subject trees examined and reflects their condition at the time of inspection.
- Information presented in this report relies on information supplied by the client.
- It is understood that there are currently no cut or fill earthworks required within TPZs of T5 to be retained, including *Deep Soil* zones indicated on plan drawings provided.
- No risk assessments were included as part of this assessment and no recommendations are made in regard to risk management.
- This assessment was limited to visual examination of accessible items without climbing, coring, dissecting or excavating. No responsibility is assumed for any tree defects that could only reasonably have been discovered by performing climbing, coring, dissecting or excavating.
- Michael Hallinan and Arbor Ecological bear no responsibility for the actions and consequences of any party that performs works associated with recommendations outlined in this report.

Table 1. Visual Tree Assessment findings, TPZ encroachment details, recommendations, observations, comments & plates, refer to Figure 1.

Tree Number & Identification Species Status and Values Tree Retention Values (TRVs)	DBH (cm) DARB (cm) Height & Spread (m)	Age Class Health Condition	AS4070 TPZ (m) SRZ (m)	Recommendations[19] Nature of any AS4970 TPZ encroachment[20] Health & Condition Observations and Comments	Plates
T1 Yesterday Today and Tomorrow *Brunfelsia pauciflora* Planted; Exotic ornamental shrub species TCV Low	16 20 3 3	Mature Good Fair	N/A N/A	REMOVE shrub for construction Shrub base is entirely within the construction footprint for dwelling construction Spreading; Multi-stemmed, overly close shrub spacing, Low volume deadwood	
T2 An Acalypha *Acalypha sp. or var.* Planted; Exotic ornamental shrub species TCV Low	N/A N/A 2 1	Mature Good Fair	N/A N/A	REMOVE shrub for construction Shrub base is entirely within the construction footprint for dwelling construction Upright; Multi-stemmed, overly close shrub spacing, Light reaching, Low volume deadwood	

[19] **Recommendations.** Refer to Section 4 of this report for detailed recommendations.

[20] **Nature of any AS4970 TPZ encroachment** noted where relevant and may include the TPZ percentage encroachment and/ or SRZ encroachment distance from the most substantial incursion/ encroachment as per design drawings.

Tree Number & Identification Species Status and Values Tree Retention Values (TRVs)	DBH (cm) DARB (cm) Height & Spread (m)	Age Class Health Condition	AS4070 TPZ (m) SRZ (m)	Recommendations[19] Nature of any AS4970 TPZ encroachment[20] Health & Condition Observations and Comments	Plates
T3 Tree philodendron Philodendron *selloum* Planted; Exotic ornamental shrub species **TCV Low**	N/A N/A 2 4	Mature Good Fair	N/A N/A	**REMOVE** shrub for construction Shrub base is entirely within the construction footprint for dwelling construction Spreading; Multi-stemmed, overly close shrub spacing, Low volume deadwood	
T4 Paw Paw Tree *Carica papaya* Planted; Exotic fruit tree species **TCV Low**	9 10 3 0.5	Mature Fair Fair	2.0 1.5	**REMOVE** tree for construction Tree base is entirely within the construction footprint for dwelling construction Upright; Low vigour, Low volume deadwood	
T5 A Callistemon *Callistemon sp. or var.* Planted; Native ornamental shrub species **TCV Low**	9 10 1 1	Semi-Mature Fair Fair	2.0 1.5	**RETAIN** shrub, install TPZ fence Minor 2% TPZ encroachment outside the SRZ for pavement construction Spreading; Multi-stemmed, Poor past pruning, Lopping/ topping, Low volume deadwood	

Tree Number & Identification Species Status and Values Tree Retention Values (TRVs)	DBH (cm) DARB (cm) Height & Spread (m)	Age Class Health Condition	AS4070 TPZ (m) SRZ (m)	Recommendations[19] Nature of any AS4970 TPZ encroachment[20] Health & Condition Observations and Comments	Plates
T6-11 A Callistemon *Callistemon sp. or var.* Planted; Native ornamental shrub species **TCV Low**	N/A N/A 2 1	Mature Fair Fair	N/A N/A	**REMOVE** shrubs for landscape construction and due to Low TCV - Hedge; Multi-stemmed, Low volume deadwood	
T12 A Tibouchina *Tibouchina Alstonville var.* Planted; Exotic ornamental tree species **TCV Low**	25 27 5 8	Mature Fair Poor	3.0 1.9	**REMOVE** tree for construction, due to Poor condition and Low TCV Major TPZ encroachment 0.1m within the SRZ for dwelling construction Spreading; Multi-stemmed, Poor past pruning, Historic lopping/ topping, Moderate volume deadwood to ~5cmØ, climbing exotic Philodendron sp, juvenile Cocos Palm and cultivated *Macadamia sp*. near base	 
T13 Weeping Bottlebrush *Callistemon viminalis* Planted; Native ornamental tree species **TCV Very Low**	53 57 4 5	Over-Mature Poor Very Poor	6.4 2.6	**REMOVE** tree for construction and due to Poor health, Very Poor condition, Very Low TRV and since it is hazardous NA Spreading; Codominant stems with narrow V-shaped union @.5m, Severe lean, Dead N stem, Majority of crown dead, Fungal fruiting body present, Very high volume deadwood to ~10cmØ including large dead sections, hazardous	 

Tree Number & Identification Species Status and Values Tree Retention Values (TRVs)	DBH (cm) DARB (cm) Height & Spread (m)	Age Class Health Condition	AS4070 TPZ (m) SRZ (m)	Recommendations[19] Nature of any AS4970 TPZ encroachment[20] Health & Condition Observations and Comments	Plates
T14 China Doll *Radermachera sinica* Planted; Exotic ornamental tree species **TCV Low**	48 44 7 5	Mature Good Poor	5.8 2.3	**REMOVE** tree for construction Tree base is entirely within the construction footprint for dwelling construction Spreading; Irregular form, Multi-stemmed, Slight lean to S, Crown concentrated to S as a light response, Epicormic regrowth the from base, Low volume deadwood	
T15 A Eucalypt *Eucalyptus sp.* Planted; Native tree species **TCV Low**	35 42 11 10	Mature Fair Fair	4.2 2.3	**REMOVE** tree for construction Tree base is entirely within the construction footprint for dwelling construction Upright; Codominant stems with u-shaped union @ ~1.2m, No evidence of Koala use, unbalanced crown, Over-extended branch to the S, Backyard poses target, Low volume deadwood	
T16 Tallowwood *Eucalyptus* microcorys Planted; Native forest tree and primary Koala food tree species **TCV Moderate**	52 58 12 11	Mature Fair Fair	6.2 2.6	**REMOVE** tree for construction Tree base is entirely within the construction footprint for dwelling construction Upright; No evidence of Koala use, historic branch failure, Moderate volume deadwood to ~10cmØ	

Tree Number & Identification Species Status and Values Tree Retention Values (TRVs)	DBH (cm) DARB (cm) Height & Spread (m)	Age Class Health Condition	AS4070 TPZ (m) SRZ (m)	Recommendations[19] Nature of any AS4970 TPZ encroachment[20] Health & Condition Observations and Comments	Plates
T17 Swamp Mahogany *Eucalyptus robusta* Planted; Native forest tree and primary Koala food tree species **TCV Moderate**	39 46 11 4	Semi-Mature Fair Fair	4.7 2.4	**REMOVE** tree for construction Tree base is entirely within the construction footprint for dwelling construction Upright; Pseudo co-dominant from near base, Slight lean due to light response, partial correction in crown, No evidence of Koala use, Nest present in crown with no signs of activity, Low volume deadwood to ~10cmØ	
T18 Umbrella Tree *Schefflera actinophylla* Planted or naturally occurring; Exotic ornamental, environmental weed tree species **TCV Very Low**	49 58 9 4	Mature Fair Fair	5.9 2.6	**REMOVE** tree for construction and for environmental weed status Tree base is entirely within the construction footprint for dwelling construction Upright; Low volume deadwood; climbing exotic Philodendron sp. infestation	 

Tree Number & Identification Species Status and Values Tree Retention Values (TRVs)	DBH (cm) DARB (cm) Height & Spread (m)	Age Class Health Condition	AS4070 TPZ (m) SRZ (m)	Recommendations[19] Nature of any AS4970 TPZ encroachment[20] Health & Condition Observations and Comments	Plates
T19 Small-leaved Fig *Ficus obliqua* Planted; Native rainforest tree species **TCV Very Low**	52 63 8 4	Mature Poor Very Poor	6.2 2.7	**REMOVE** tree for construction and due to Poor health, Very Poor condition, Very Low TRV and since it is hazardous NA Spreading, Near dead, Multi-stemmed, Fungal fruiting bodies present indicating extensive decay, Significant branch failure to west and south, Very High volume deadwood including large dead sections, hazardous	  
T20 Weeping Bottlebrush *Callistemon viminalis* Planted; Native ornamental tree species **TCV Very Low**	19 22 6 3	Mature Poor Poor	2.3 1.8	**REMOVE** tree due to Poor health and condition and Very Low TRV NA Upright; Multi-stemmed, Low foliage density, Low Live Crown Ratio[21], Slight lean to S, Crown concentrated to S as light response, Epicormic regrowth the from base, High volume deadwood to ~8cmØ	 

[21] **Live Crown Ratio (LCR)** refers to the ratio of the size of a tree's live crown to tree height, or the ratio of tree height with foliage (Dunster et al. 2013).

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T21-26 Banana Tree *Musa acuminata* Planted; Exotic fruit tree species **TCV Low**	*Average* 14 18 2.5 1.5	*Average* Mature Fair Fair	*Average* 2.0 1.5	**REMOVE** trees for construction and due to Low TCV Varying levels of TPZ encroachment Upright, Low volume deadwood	
T27 A Dracaena *Dracaena sp. or var.* Planted; Exotic ornamental shrub species **TCV Low**	N/A N/A 3 3	Mature Good Fair	N/A N/A	**REMOVE** shrub for construction Shrub base is entirely within the construction footprint for dwelling construction Spreading; Multi-stemmed, Low volume deadwood	
T28 Tuckeroo *Cupaniopsis anacardioides* Likely planted; Native rainforest tree species **TCV Very Low**	65 72 10 7	Over-Mature Poor Poor	7.8 2.9	**REMOVE** tree for construction and due to Poor health and condition, Very Low TRV and since it is hazardous Tree base is entirely within the construction footprint for dwelling construction Upright; Highly defective and poor form, Codominant stems with narrow V-shaped union, NE leader severely leaning, Low foliage density, Tip dieback, clothes line present as failure target, High volume deadwood to ~10cmØ, hazardous	

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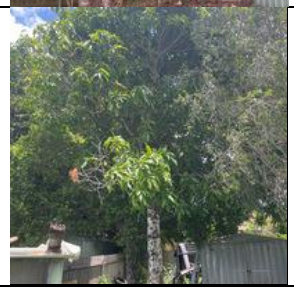
T29 Silky Oak *Grevillea robusta* Likely planted; Native forest tree species **TCV Moderate**	58 62 15 5	Mature Good Fair	7.0 2.7	**REMOVE** tree for construction Tree base is entirely within the construction footprint for dwelling construction Upright; Codominant stems with narrow v-shaped union at 1.8m, Included bark present, Low Live Crown Ratio, Low volume deadwood	 
T30 Sweet Pittosporum *Pittosporum undulatum* Likely planted; Native forest tree species **TCV Very Low**	60 65 11 10	Over-Mature Fair Poor	7.2 2.8	**REMOVE** tree for construction Tree base is entirely within the construction footprint for dwelling construction Upright; Multi-stemmed, Crown concentrated to NE, Moderate defoliation, Moderately low crown foliage density, Moderate volume deadwood to ~10cmØ	
T31 Mango Tree Mangifera indica Planted; Exotic fruit tree species **TCV Low**	28 37 6 5	Semi-Mature Fair Fair	3.4 2.2	**REMOVE** tree for construction Tree base is entirely within the construction footprint for driveway construction Upright; Codominant stems with U-shaped union at ~3m, Crown concentrated to N, Moderate tip dieback, Axe wounds on truck, Low volume deadwood	 

Tree Number & Identification Species Status and Values Tree Retention Values (TRVs)	DBH (cm) DARB (cm) Height & Spread (m)	Age Class Health Condition	AS4070 TPZ (m) SRZ (m)	Recommendations[19] Nature of any AS4970 TPZ encroachment[20] Health & Condition Observations and Comments	Plates
T32 Brush Cherry *Syzgium australe* Planted; Native ornamental tree species **TCV Moderate**	22 27 7 4	Semi-Mature Fair Fair	2.6 1.9	**REMOVE** tree for construction Tree base is entirely within the construction footprint for driveway construction Spreading; Slight lean, SW light response, High Psyllid infestation, Axe wounds on trunk, Fresh/ new wound, Wound wood well developed, Epicormic growth at base, Low volume deadwood	
T33 A Callistemom *Callistemom sp.* Planted; Native ornamental tree species **TCV Very Low**	25 29 6 5	Mature Poor Poor	3.0 2.0	**REMOVE** tree for construction and due to Poor health and condition and Very Low TRV Tree base is entirely within the construction footprint for driveway construction Upright; Pseudo Codominant stems with narrow V-shaped union at 1.8m, Moderate included bark, Moderate lean to E, Light response to E, Low foliage density, Moderate volume deadwood to ~8cmØ	

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T34 Mango Tree *Mangifera indica* Planted; Exotic fruit tree species **TCV Low**	33 37 6 7	Semi-Mature Fair Fair	4.0 2.2	**REMOVE** tree for construction Tree base is entirely within the construction footprint for driveway construction Spreading; Codominant stems with u-shaped union at ~1.9m, Poor past pruning, Low volume deadwood	  
T35 A Citrus *Citrus sp.* Planted; Exotic fruit tree species **TCV Very Low**	10 14 3 1	Semi-Mature Poor Poor	2.0 1.5	**REMOVE** tree for construction Tree base is entirely within the construction footprint for driveway construction Upright; Multi-stemmed, Signs of past borer damage, Advanced decay, Poor past pruning, Low volume deadwood	 

Tree Number & Identification Species Status and Values Tree Retention Values (TRVs)	DBH (cm) DARB (cm) Height & Spread (m)	Age Class Health Condition	AS4070 TPZ (m) SRZ (m)	Recommendations[19] Nature of any AS4970 TPZ encroachment[20] Health & Condition Observations and Comments	Plates
T36 A Citrus *Citrus sp.* Planted; Exotic fruit tree species TCV Low	12 13 3 1	Semi-Mature Fair Poor	2.0 1.5	REMOVE tree for construction Tree base is entirely within the construction footprint for driveway construction Spreading; Codominant stems with narrow V-shaped union at base, Branch dieback, Historic sap sucking insect attack, Moderate sooty mould, High volume deadwood to ~8cmØ	
T37 A Spurge *Euphorbia sp.* Planted; Exotic ornamental shrub species TCV Low	12 13 3 1	Over Mature Poor Poor	2.0 1.5	REMOVE shrub for construction Shrub base is entirely within the construction footprint for driveway construction Spreading, Multi-stemmed, Stress induced epicormic growth, Poor past pruning, Low volume deadwood	 

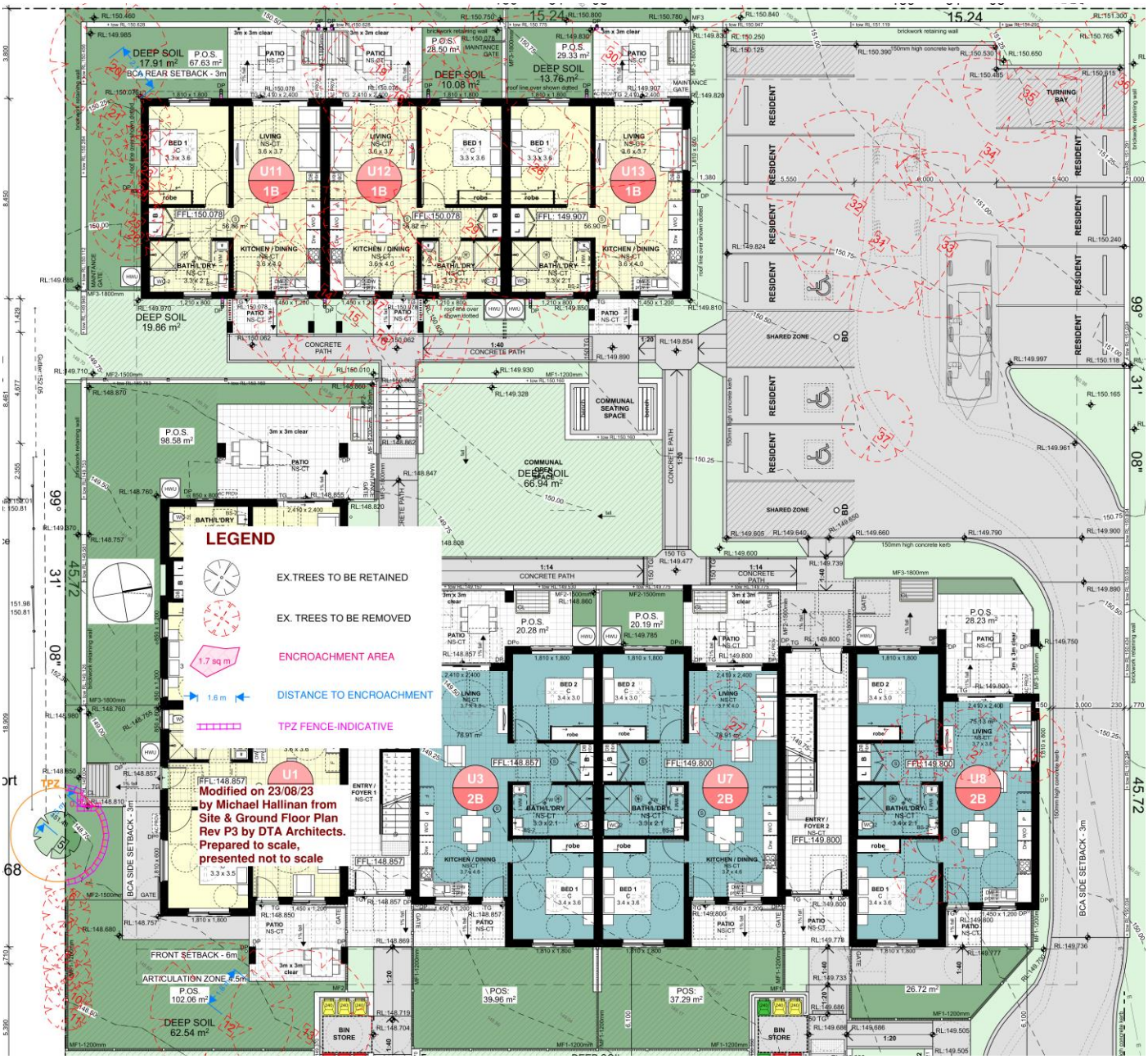

Figure 1. Tree retention, tree removal and tree protection plan drawing