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GeoLINK Consulting

Kingscliff Rural Ambulance Infrastructure Reconfiguration development
Cudgen Road, Kingscliff NSW
Arboricultural Impact Assessment

19 September 2022

Assessment and Report prepared by:

Andy Clark
Dip. Hort. (Arb.), AQF Level 5

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Simon Waterworth
Director/Town Planner
GeoLINK Consulting Pty Ltd
PO Box 1446
Coffs Harbour NSW 2450

Arboricultural Impact Assessment (AIA) Report – Kingscliff Rural Ambulance Infrastructure Reconfiguration (RAIR) development

Dear Simon,

We are pleased to provide you with the following Arboricultural Impact Assessment Report for twenty-seven (27) trees located within the Turnock Street verge adjacent the proposed Rural Ambulance Infrastructure Reconfiguration (RAIR) development at RAIR Kingscliff, Cudgen Road, Kingscliff.

Complete use of this report is authorised under the conditions limiting its use as stated in Appendix A Item 7 of "*Arboricultural Reporting Assumptions and Limiting Conditions*".

Should you have any queries relating to this report, its recommendations, or the options considered please do not hesitate to contact us on 1300 272 671.

Regards,

Andy Clark
Consulting Arborist
Dip. Hort. (Arb.), AQF Level 5

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1 Executive Summary

1.1.1 The following Arboricultural Impact Assessment (Report) is in regard to twenty-seven (27) trees located along the Turnock Street verge, adjacent the proposed development of a new Kingscliff ambulance station, completed under the auspices of the NSW Government Rural Ambulance Infrastructure Reconfiguration (RAIR) project The subject site was identified by GeoLINK Consulting Pty Ltd (the Client) as possessing trees that may be impacted upon by the proposed development.

1.1.2 The proposed development consists of the construction of a new ambulance building, parking areas, bio-retention basin and access roads, both from Turnock Street and into the adjacent Hospital area. The building platform, associated parking area and hospital access road are largely situated within cleared farmland, although the building platform is situated within a degraded orchard area. The access point from Turnock Street enters across the street verge and would require some expansion and re-contouring of the existing battered embankment to give space for a spill way on the southern side of the drive.

1.1.3 In part, the project scope was to nominate subject trees that can be retained, or require removal to facilitate the proposed development, as well as identify and reduce potential conflicts between subject trees and site development. Accurate information on the area required for tree retention and methods/techniques suitable for tree protection during construction have been provided.

1.1.4 Tree retention values have been determined based upon a modified version of the British Standard and which have been prescribed into one of the following four (4) categories, A, B, C and U. Refer to Appendix C for further detail. Generally, relevant consent authorities will consider:

- **A** retention value trees as a site constraint and may require alterations to the proposed development design and/or specific protection measures to allow retention, unless the proposed development outweighs the retention value of the tree
- **B** retention value trees as a site constraint consideration, lesser changes should be considered to retain such trees
- **C** retention value trees are not considered a site constraint
- **U** retention value trees are considered a site opportunity, as such trees are recommended for removal regardless of the proposed development.

1.1.5 Trees impacted by the proposed development:

Category	Description	Total	Removal		Retain	
			located within development footprint	irrespective of future development	with specific protection	with generic protection
A	High retention value trees	1				1
B	Moderate retention value trees	7	2, 3, 5, 6, 7, 10			17
C	Low retention value trees	15	13, 23, 24, 25, 26			11, 14, 15, 16, 18, 19, 20, 21, 22, 27
U	(Dead) Trees to be removed irrespective of proposed development	4		4, 8, 9, 12		

2 Introduction

2.1.1 Simon Waterworth engaged ArborSafe Australia Pty Ltd on behalf of the Client to complete an Arboricultural Impact Assessment Report on twenty-seven (27) trees located within or adjacent to the RAIR Kingscliff development site at Kingscliff.

2.1.2 The proposed development consists of the construction of a new ambulance building, parking areas, bio-retention basin and access roads, both from Turnock Street and into the adjacent Hospital grounds.

2.1.3 The building platform, associated parking area and hospital access road are largely situated within cleared farmland, although the building platform is situated within a degraded orchard area. The access point from Turnock Street enters across the street verge and would require some expansion and re-contouring of the existing battered embankment to give space for a spill way on the southern side of the drive.

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

2.1.5 Observations and recommendations provided within this report are based upon the client's information and an arborist site visit.

3 Scope

3.1.1 Carry out a visual examination of the nominated trees located within the vicinity of the proposed development, excluding the degraded orchard trees.

3.1.2 Provide an objective appraisal of the subject trees in relation to their species, estimated age, health, structural condition, useful life expectancy (ULE) and viability within the landscape.

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

3.1.4 Nominate subject trees that can be retained or require removal to facilitate the development.

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

3.1.6 Provide information on restricted activities within the area nominated for tree protection and suitable construction methods to be adopted during demolition and/or construction.

4 Methodology

4.1 Data Collection

4.1.1 Andy Clark of ArborSafe Australia Pty Ltd carried out a site inspection of the subject trees on 25 November 2021.

4.1.2 Trees that are the subject of this report (Figure 1) were identified during discussions with the Client, reviewing relevant supplied development documentation.

4.1.3 Smaller young/juvenile trees within the street verge have been omitted from the report and/or bundled into groups (Tags 23 and 23) based on their species, current size and/or potential future size and contribution to local amenity.

4.1.4 The subject trees were inspected from the ground using the initial component of Visual Tree Assessment (VTA) (Mattheck, 1994). No foliage or soil samples were taken and no aerial, underground or internal investigations were undertaken.

4.1.5 Tree height and canopy width were estimated and have been provided in ranges <5, 5-10, 10-15, 15-20 and 20-30m. Trunk diameter at breast height (DBH) and trunk diameter at the root crown (DRB) were measured with a diameter tape and provided to the nearest centimetre.

4.1.6 TPZ encroachment calculations are based on measurements obtained from PDF measuring tools and/or onsite measurements calculated within a dedicated TPZ calculator.

4.1.7 Environmental and Heritage information may be sourced from the NSW Central resource for Sharing and Enabling Environmental Data (SEED) mapping tool. The source of all information has been referenced accordingly.

4.1.8 Data collected on site was analysed against the supplied development documentation by Andy Clark, of ArborSafe Australia Pty Ltd, following which relevant findings and recommendations were formulated and collated into report format.

4.1.9 Tree protection zones (TPZ) and structural root zones (SRZ) were calculated in accordance with the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites* (refer to Section 7.6).

4.1.10 Retention values have been determined based upon a modified version of the British Standard BS 5837–2012: *Trees in Relation to Design, Demolition and Construction* (refer to Appendix C).

4.1.11 All photographs were taken at the time of the site inspections by the author and have not been altered for brightness or contrast, nor have they been cropped.

4.1.12 Plans of the existing site and of the proposed development were provided to ArborSafe on 14 July 2022.

4.1.13 No proposed underground civil infrastructure or service locations have been reviewed in the preparation of this report.

5 Observations

5.1 Location

5.1.1 The proposed development site was located within the extended grounds of the Kingscliff Hospital (Figure 1). Usage surrounding the site was a mixture of cleared farmland, wetlands, hospital car parking to the north and west. Turnock Street, Council swimming pool and residential properties were to the east.

5.1.2 The site possessed a sloping aspect characterised by a high point located to the south dropping down to the wetland in the north. Turnock Street is level with the land at the southern roundabout and has been kept raised, with the use of a rock retaining wall, above the sloping area as it progresses north (refer to Figure 3).

5.1.3 Site soils were not sampled or tested for the purpose of this report. Site soils are likely to be disturbed given the sites previous farming background and during the original construction of Turnock Street and assumed to be altered from their natural soil profiles. The general soil conditions were not foreseen to have relevance to the reporting and impact upon site trees.

5.1.4 The site was located within the Tweed Shire Council Local Government Area (LGA).

Figure 1. Whole site image (location). The red rectangle identifies the proposed development site and adjacent verge trees identified within this report. The yellow line shows the approximate location of the rock retaining wall. (Nearmap, June 2022).

Figure 2. Image looking north along the Turnock Street verge with Tree 27 in the bottom left and Tree 1 in the top centre. (ArborSafe, November 2021).

5.2 Site Trees

5.2.1 Trees can be identified on site using green tree tags, typically located at approximately 2.0m from ground level on the southern side of the trunk.

5.2.2 The trees are considered natural regrowth and endemic to the local region. The treescape is relatively young, with most assessed trees rated as semi-mature or juvenile specimens.

5.2.3 Smaller young regrowth, largely *Macaranga tanarius* (Bullocks Heart) under 5m in height and with a DBH <5cm, was observed growing throughout the verge area. This regrowth is acknowledged however has largely been excluded from the subject tree data, with the exception of tags 22 and 23 which identify denser groupings, due to small size and ease of replacement.

5.2.4 Included within the internal landscape is a degraded orchard. Farming practices have resulted in a reduced individual tree structure and TLE. As future landscape trees, the vegetation offers transient value, due to the size and quality of the trees respectively. Due to their limited botanical significance and commercial potential, the trees have not been subject to individual assessment, however are recognised on the tree removal plan. Individual trees for removal should be considered during offset planting (refer Section 7.11), where replacement with a small tree producing a 5 meter canopy at maturity would provide equal environmental value.

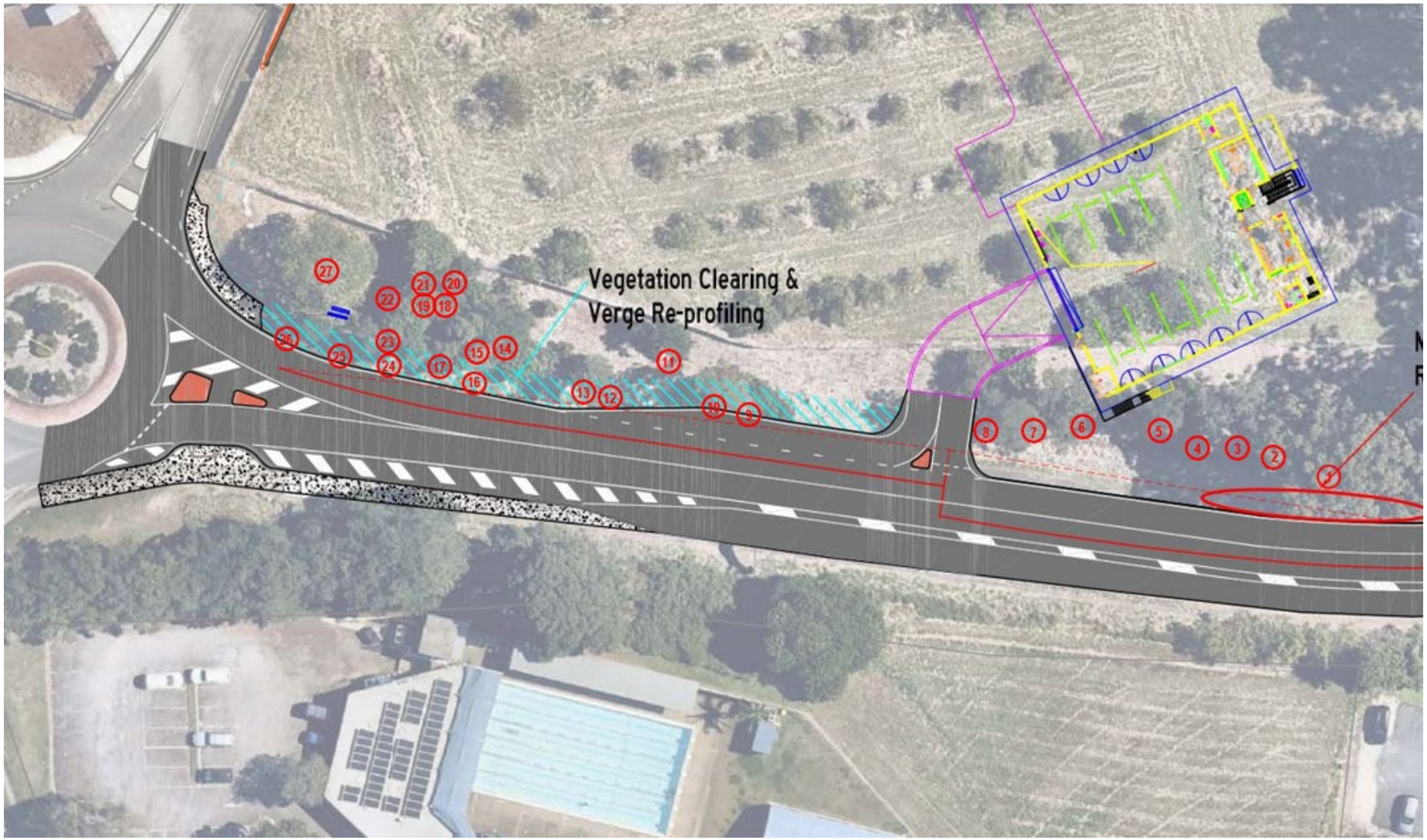

Figure 3. Site map showing subject trees. Tree attributes are to be obtained from Appendix DD – Tree Assessment Data. (ArborSafe, November 2021).

5.3 Tree Retention Values

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

Category	Tree numbers
A	1
B	2, 3, 5, 6, 7, 10, 17
C	11, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27
U	4, 8, 9, 12

5.4 Heritage Status

5.4.1 The proposed development site has no trees identified as being of national, state or local heritage significance. (SEED, n.d.).

5.5 Botanical and Environmental Status

5.5.1 The site trees were considered common species in the local area and as such hold limited botanical significance.

5.5.2 The site was not within any mapped area as Critically Endangered Ecological Community (CEEC) (SEED, n.d.).

5.5.3 The subject site was within a specific *Area of Regional Koala Significance* (ARCS) and had BioNet Koala sightings listed around the area, however not within any of the assessed trees (SEED, n.d.).

5.5.4 The site does not incorporate any area designated as a *Coastal Environment Area* under the Coastal Management SEPP 2018.

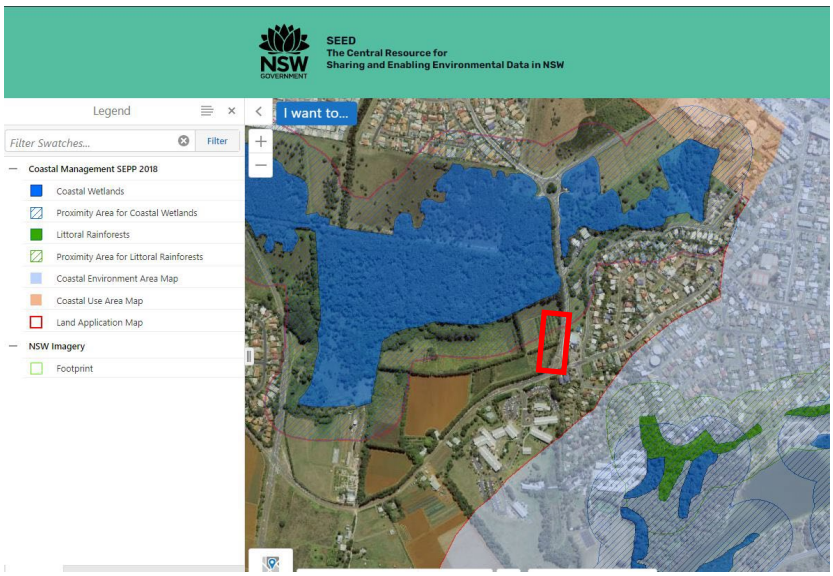

Figure 4. Image of surrounding areas mapped within SEPP 2018. The red rectangle defines the proposed development site. (Seed, 2022).

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6 Discussion

6.1 Determining TPZ Encroachment

6.1.1 **Major encroachment**. As per the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*, a major encroachment into the TPZ of any tree is considered to occur when it is beyond 10% of the total TPZ area. Trees with major encroachment may require removal or, in certain instances, be retained with specific protection requirements throughout the construction stage.

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

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

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

- Requiring removal due to a level of encroachment into their TPZ that would likely result in a detrimental impact upon their future health and/or stability
- Retainable and requiring specific protection requirements throughout construction (i.e. generic requirements plus arborist supervision and careful construction methods within their TPZ)
- Retainable and requiring generic tree protection measures only (i.e. protective fencing and restriction of activities within the TPZ).

6.2 Proposed Construction

6.2.1 The proposed development consists of the construction of a new ambulance building, parking areas, bio-retention basin and access roads, both from Turnock Street and into the adjacent Hospital grounds.

6.2.2 The building platform, associated parking area and hospital access road are largely situated within cleared farmland, although the building platform is situated within the degraded orchard area.

6.2.3 Cut and fill estimates (refer Figure 7) to facilitate finished building levels detail excavation of ranging between 0 and 10 meters increasing in southern portions, below the south-west corner and western boundary of the building footprint. The proposed addition of fill (soil) ranges from 0 and 10 metres increasing in as the site slope falls in western directions, below the proposed new link road affecting trees within the degraded orchard only.

6.2.4 The bioretention facility located away from site trees within pre-cleared farm land requires cutting/filling of +/- 10 metres across its defined footprint.

6.2.5 The access point from Turnock Street enters across the street verge and would require some expansion and re-contouring of the existing battered embankment to give space for a spill way on the southern side of the drive.

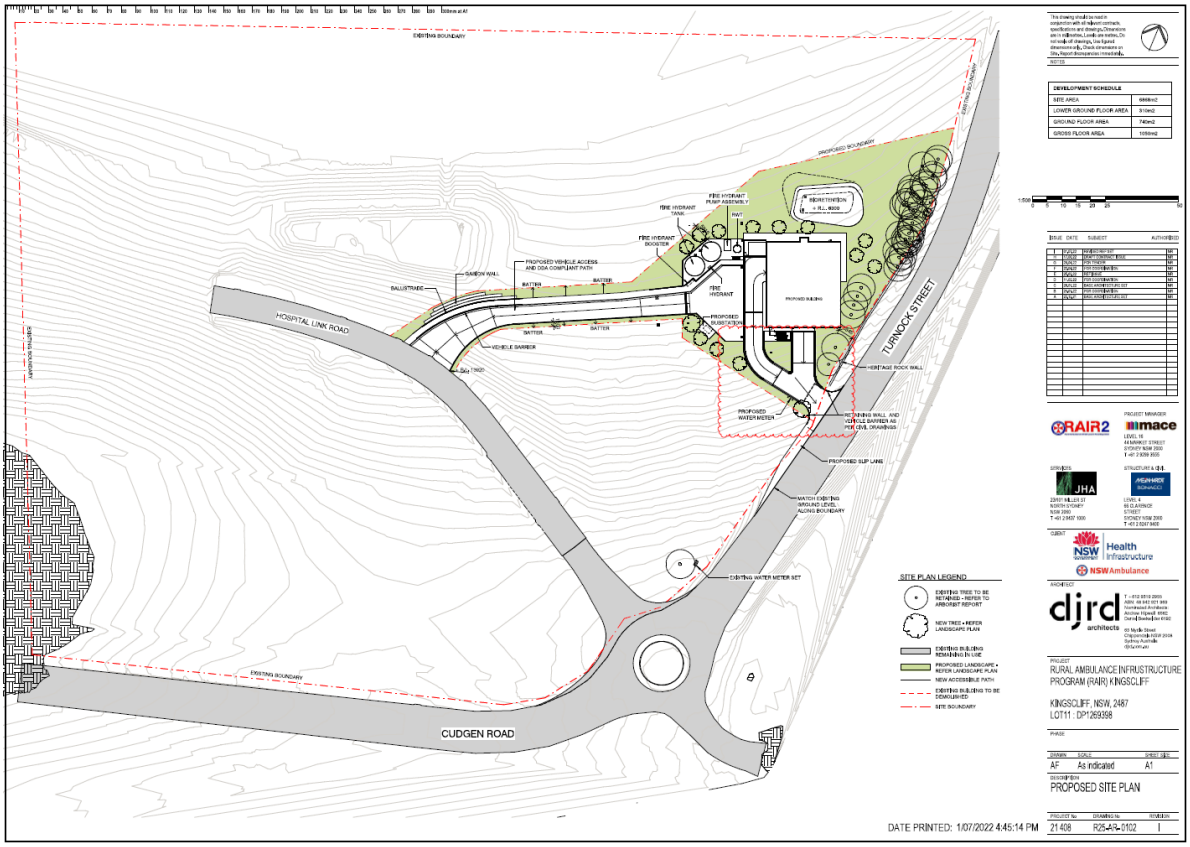


Figure 5. Excerpt from Proposed Site Plan (Drawing R25-AR-0102, Rev. I). (djrd Architects, 1 July 2022).

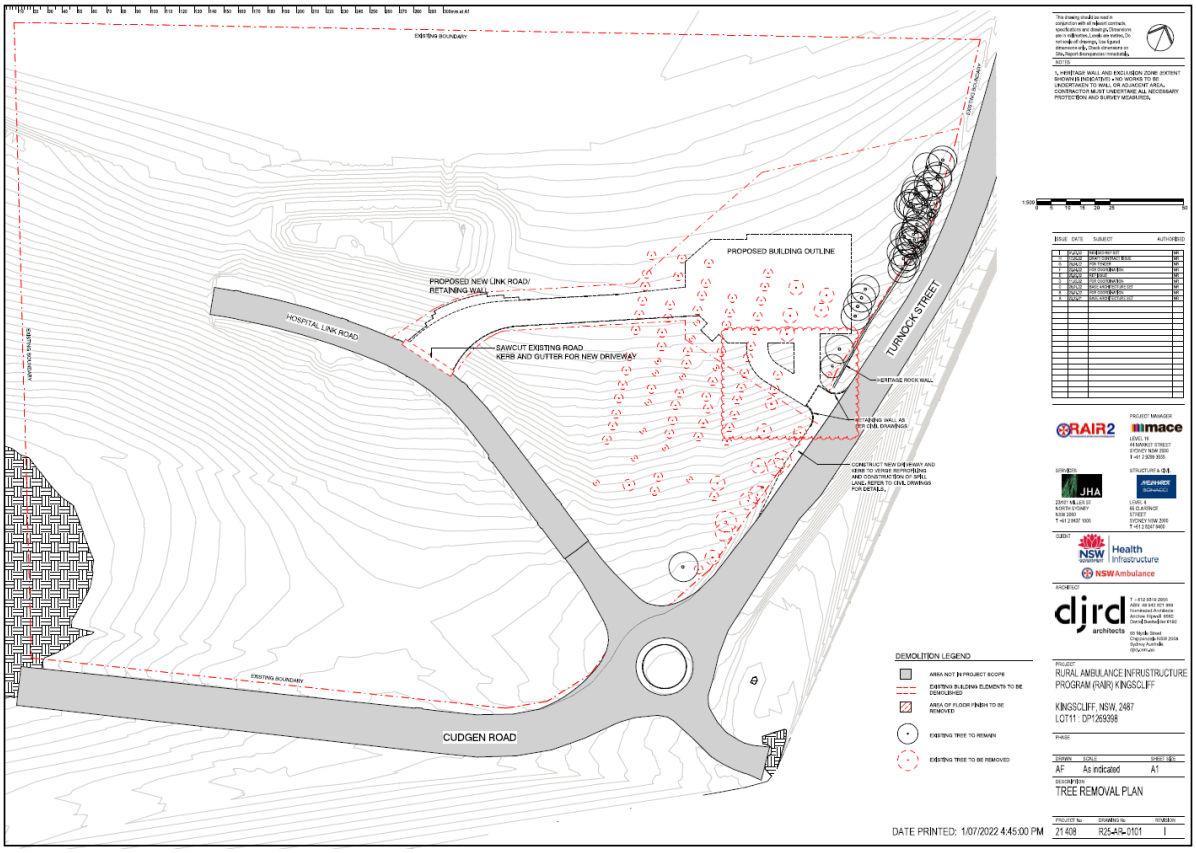


Figure 6. Excerpt from Tree Removal Plan (Drawing R25-AR-0101, Rev. I). (djrd Architects, 1 July 2022).

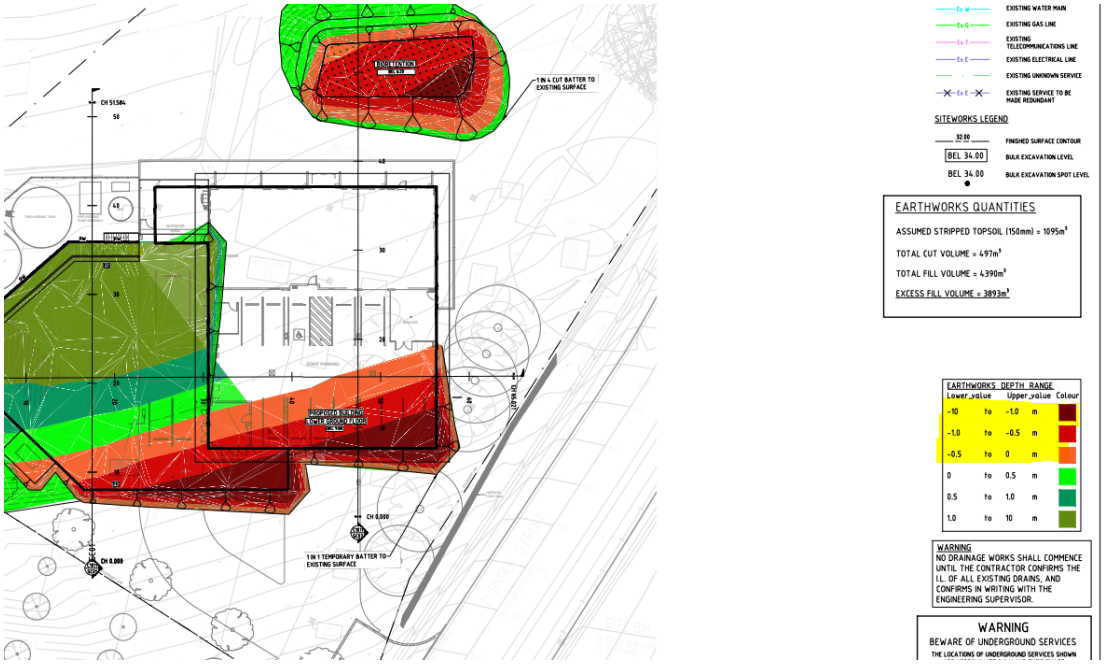


Figure 7. Cut and Fill estimates provided by email. (Client, 12 September 2022).

6.3 Impact of Proposed Development

6.3.1 Review of the proposed design has been undertaken in the context of tree retention and removal across the site.

6.3.2 The development will impact six (6) site trees through direct conflict with the expansion and reprofiling of the Turnock Street verge (Category B RV Tree 10 & Category C RV Trees 13, 23, 24, 25 and 26) to accommodate the proposed slipway. To retain any of these trees a redesign or relocation of the slipway would be required, although this would not be considered reasonable due to the low RV values and ease of replacement. A further four (4) dead trees were also recommended for removal. Refer to Appendix D for full detail.

6.3.3 The other main development impact which affects trees, but not necessarily to the point of requiring immediate removal, is through significant root damage due to major TPZ encroachment. These can largely be placed into three (3) categories – soil compaction, level changes or direct root severance.

6.3.4 Negative tree impacts can manifest as either a reduction in health and/or vigour due to root loss (absorption and/or transport roots) resulting in a reduction in water and nutrient absorption capability or on tree stability if larger roots are impacted. Ultimately, the outcome for the trees depends on a number of variable factors including species, age, current health, TPZ encroachment percentage, soil type, topography, previous site use and the proposed design and construction methodology.

6.3.5 Compacted soils, especially artificially compacted soils such as those found under driveways or building platforms, have a higher bulk density down to a deeper level of subsoil. Bulk density is the term used for describing the weight of soil per unit volume. The broad engineering thinking is that the higher the density the more stable the road surface due to less soil movement in expansion, contraction, or compression. A higher bulk density is produced by compacting the soil to reduce available pore space between the soil particles.

6.3.6 The effect of compacted soils on plants is somewhat influenced by the soil type but generally a reduction in available pore space reduces the available area for oxygen and water within the soil. A reduction in available soil water and oxygen inhibits root activity within the soil, as they are essential for root elongation and growth, and the lack of these properties is considered a major limiting factor.

6.3.7 A similar reduction in root activity, due to a reduction in pore space, can occur following significant soil level changes across the TPZ, although this generally occurs over a longer time frame than if the roots were directly severed. Root severance has the same effect, reduction in root function and capability, but on an instantaneous time scale where there is no time for the tree to adjust.

6.3.8 The assumption of allowable encroachment and minimal long-term health or structural impacts to the trees rely on a combination of the following being used - root sensitive construction methods being adhered to within the TPZ, minimal excavation within the TPZ to limit root severance (i.e. construction placed outside the TPZ where possible), fill rather than excavation utilised to affect level changes where possible (i.e. to minimise root severance and allow the trees root system time to adjust), no construction occurring within the SRZ, compensatory area being available around the unimpacted aspects of the trees and the enhancement of the existing TPZ area (i.e. mulched, soil conditioning and irrigation when required).

6.3.9 Significant excavation ranging 1 to 10 metres in depth to facilitate finished levels propose major encroachments to Trees 3, 5 and 6. 1:1 battering proposes further encroachments to Trees 2 and 7 where excavation up to 1 metre is required. Impacts to the trees are likely to be in the form of major root severance.

6.3.10 Trees 2, 3 and 5 would require crown pruning to allow for the building plus reasonable access for construction. Structure would be limited in potential, from ongoing pruning/maintenance requirements and crown suppression resulting from the proposed two-storey building. Due to the compounding impacts being proposed, it is unlikely these trees will remain viable post construction. These trees may also be included for removal to establish the Asset Protection Zone (APZ) separation distance proposed in the Bushfire Hazard Assessment (Silver, 2022).

6.3.11 Tree 7 is likely to obscure line-of-sight views to Turnock Street from exiting vehicle traffic during emergencies, requiring ongoing pruning and maintenance. Due to the compounding impacts the tree is expected to sustain, TLE will be significantly reduced. Due to the circumstances related to use of the site, removing the tree is considered the most practical management option.

6.3.12 **Tree 1 – *Eucalyptus microcorys* (Tallowwood)**

6.3.13 A large mature tree (Category A RV) located at the end of the rock retaining wall which has no TPZ encroachment and is therefore recommended for retention.

Figure 8. View to north of Tree 1 *Eucalyptus microcorys* (Tallowwood) in its growing environment. (Andy Clark, November 2021).

6.3.14 **Trees 4, 5, 6, 7 and 8 – Dead trees and *Casuarina* sp.**

6.3.15 An image (below) of trees situated at the northern end of the verge and numbered 8, 7, 6, 5 and 4. Trees 8 and 4 are dead trees (Category U RV) which have been recommended for removal, while the remaining trees are *Casuarina* sp. which have only minor TPZ encroachment and are therefore recommended for retention.

Figure 9. View to west of Tree 8, 7, 6, 5, 4 in their growing environment. (ArborSafe, November 2021).

6.3.16 **Tree 27 – *Macaranga tanarius* (Bullocks Heart)**

6.3.17 A mature tree (Category C RV) located at the southern end of the Turnock Street verge adjacent the roundabout. This species is a pioneer plant which is easily spread and self-sown, as seen by the many juvenile saplings coming up along the verge area.

Figure 10. View to north of Tree 27 *Macaranga tanarius* (Bullocks Heart) in its growing environment. (Andy Clark, November 2021).

7 Tree Protection and Management Recommendations

7.1 Tree Removal

7.1.1 Eleven (11) trees would require removal, based on the supplied design proposal, to facilitate the development.

7.1.2 A further four (4) dead trees should be removed in the context of development (Cat U).

7.1.3 A breakdown of tree numbers and RV is displayed below:

Recommendation	Category A High retention value		Category B Moderate retention value		Category C Low Retention value		Category U No retention value	
	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers
Remove for development	0		6	2, 3, 5, 6, 7, 10	5	13, 23, 24, 25, 26	0	
Remove in context of development	0		0		0		4	4, 8, 9, 12

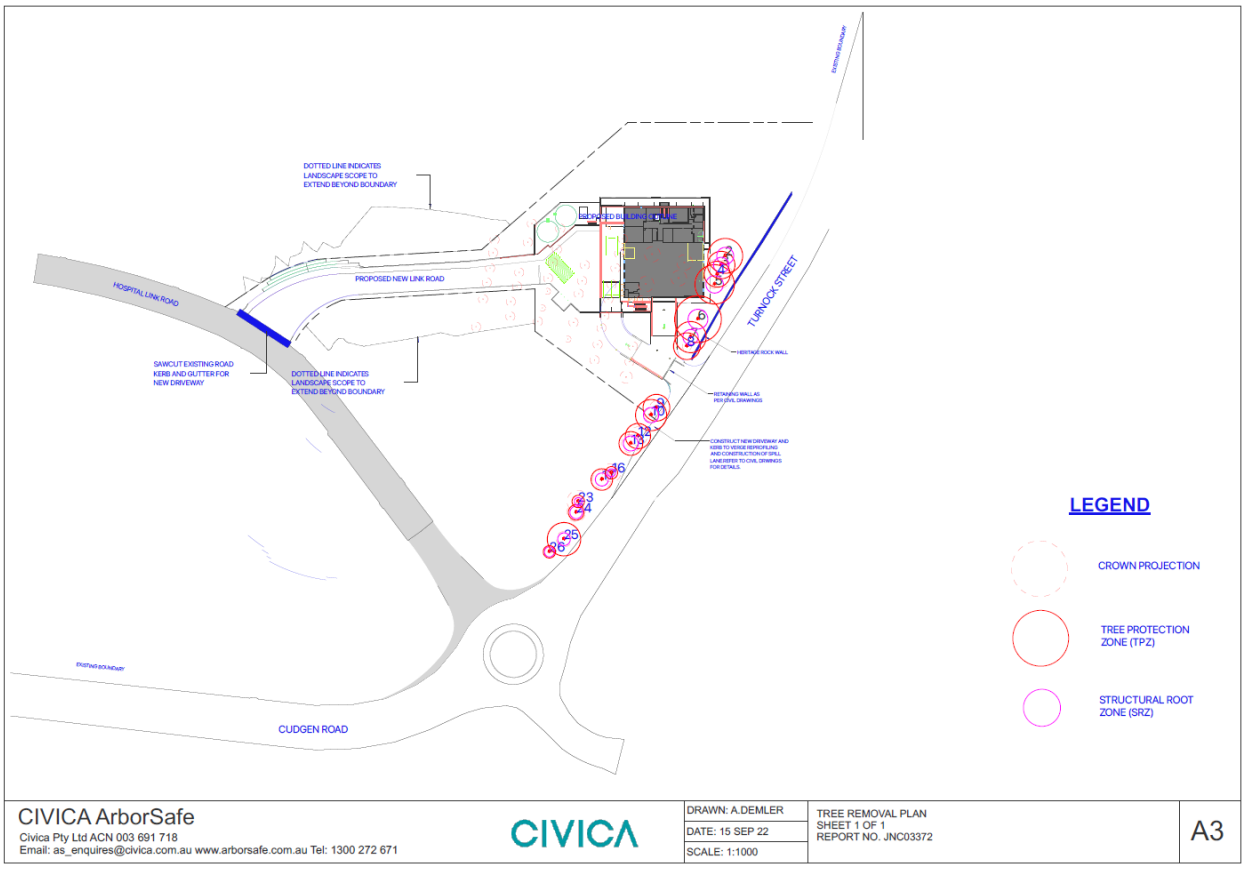


Figure 11. Site map showing trees recommended for removal. (ArborSafe, September 2022).

7.2 Tree Retention

7.2.1 Twelve (12) trees were recommended for retention and require generic protection measures, largely centred on exclusion from the development site, during construction to ensure they remain viable following the completion of works.

Recommendation	Category A High retention value		Category B Moderate retention value		Category C Low Retention value	
	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers
Retain with generic protection requirements	1	1	1	17	10	11 14 15 16 18 19 20 21 22 27

7.3 Generic Protection and Reporting Measures

7.3.1 All retained trees require generic protection measure (Figure 12). Refer to Section 7.4–7.7 for further detail.

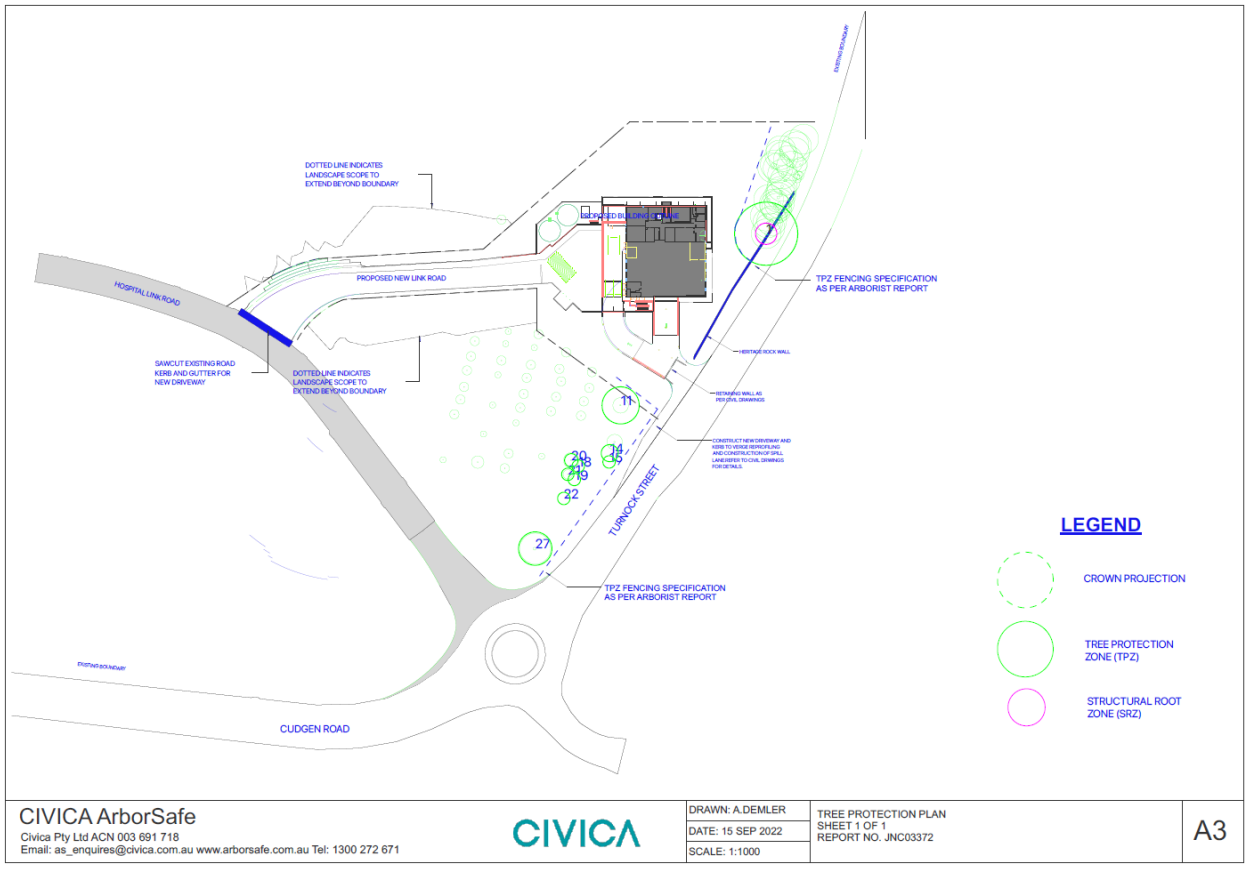


Figure 12. Site map showing tree requiring generic protection measures. (ArborSafe, September 2022).

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

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

7.3.3 Activities Prohibited within the TPZ

- Machine excavation including trenching
- Storage
- Preparation of chemicals, including cement products
- Parking of vehicles and plant
- Refuelling
- Dumping of waste
- Wash down and cleaning of equipment
- Placement of fill
- Lighting of fires
- Soil level changes
- Temporary or permanent installation of utilities and signs
- Physical damage to the tree

7.4 Protective Fencing Specification

7.4.1 Protective fencing (Figure 13) is to be installed as far as practicable from the trunk of any retained trees. Fencing should be erected as per the image below before any machinery or materials are brought to site and before commencement of works (including demolition).

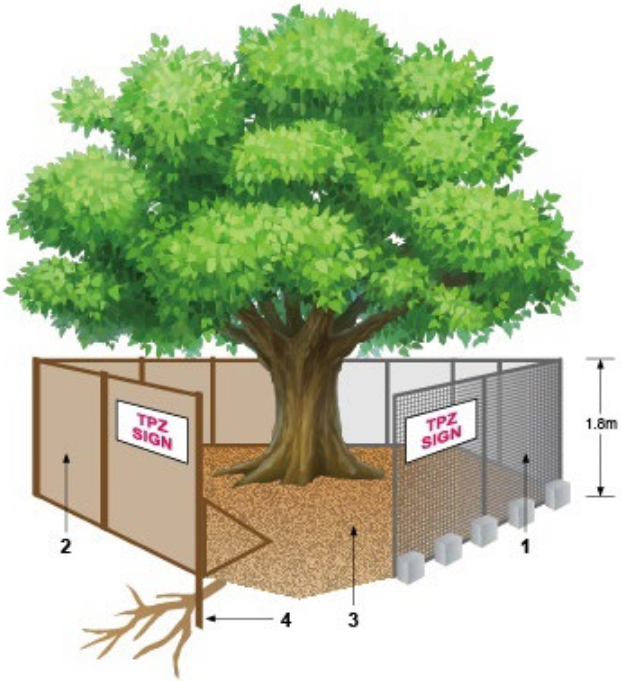
7.4.2 The site perimeter fence may be used to exclude the trees as an alternative to individualised protective fencing within the site. Individual tree TPZ must be considered , especially in the case of trees 5,6 & 7 during installation.

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

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

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

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



Legend:

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

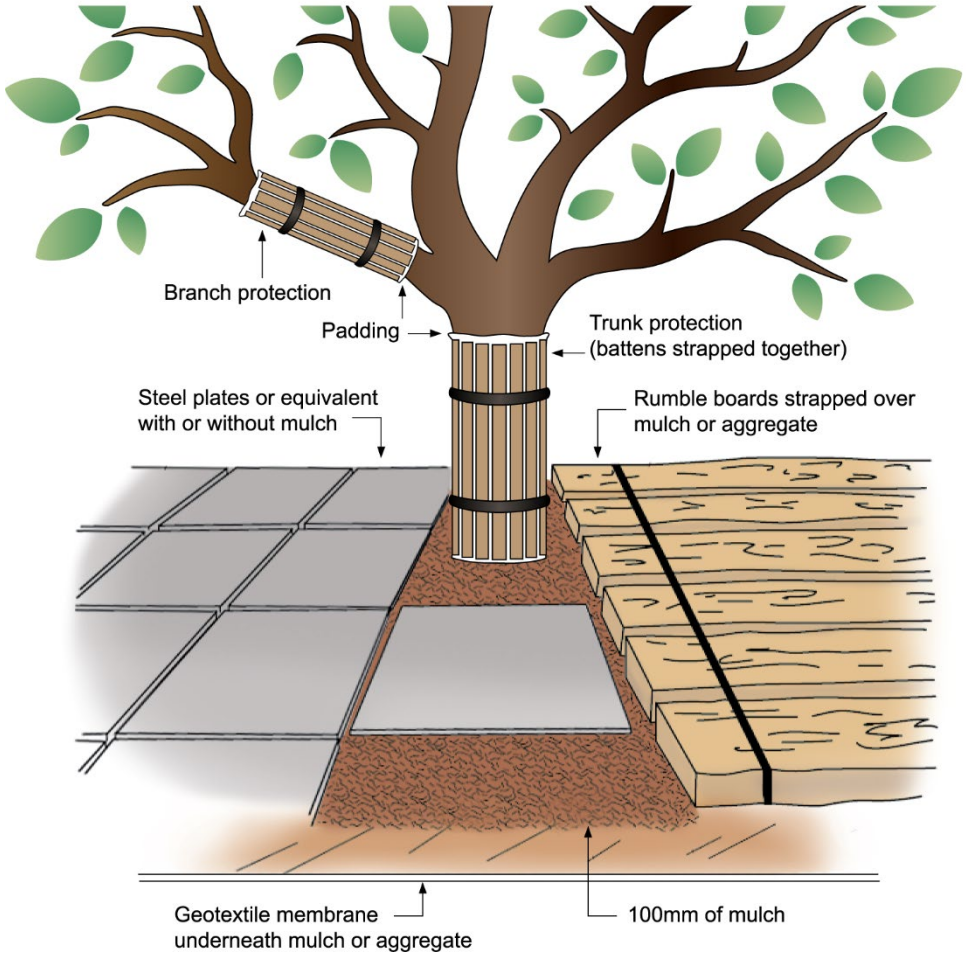
Figure 13. Depicts standard fencing techniques. (AS 4970–2009).

7.5 Trunk and Ground Protection

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

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

7.5.3 Trunk and ground protection (Figure 14) should be undertaken in line with the Australian Standard AS 4790–2009: *Protection of Trees on Development Sites* as per the image below:



Notes:

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

Figure 14. Depicts trunk and ground protection techniques. (AS 4970–2009).

7.6 Tree Protection Signs

7.6.1 Signs identifying the TPZ (Figure 15) should be placed at 10m intervals around the edge of the TPZ and should be visible from within the development site.

Figure 15. Depicts standard fencing techniques. (AS 4970–2009).

7.7 Project Arborist

7.7.1 An official "Project Arborist" must be commissioned to oversee the tree protection, any works within the TPZ's and complete regular monitoring compliance certification.

7.7.2 The project arborist must have minimum five (5) years industry experience in the field of arboriculture, horticulture with relevant demonstrated experience in tree management on construction sites, and Diploma level qualifications in arboriculture – AQF Level 5.

7.7.3 Inspections are to be conducted by the project arborist at several key points during the construction in order to ensure that protection measures are being adhered to during construction stages and decline in tree health or additional remediation measures can be identified.

7.8 Project Milestones

7.8.1 The following visits and milestones were recommended as to when on-site tree inspection by the project arborist is required:

Item	Purpose of Visit	Timing of Visit(s)	Prerequisites
1	Pre-start induction	Following sign off from Item 1. Contractor to provide a minimum of five days advance notice for this visit.	Prior to commencement of works. All parties involved in the project to attend.
2	Supervision of works during batter reprofiling	Contractor to provide a minimum of five days advance notice for such visits.	
3	Regular site inspections	Minimum frequency monthly for the duration of the project.	The checklist must be completed by the Project Arborist at each site inspection and signed by both parties.
4	Final sign off	Following completion of works.	Practical completion of works and prior to tree protection removal.

7.9 Compliance Reporting

7.9.1 Following each inspection, the project arborist shall prepare a report detailing the condition of the trees. These reports should certify whether or not the works have been completed in compliance with the consent relating to tree protection.

7.9.2 These reports should contain photographic evidence where required to demonstrate that the work has been carried out as specified.

7.9.3 Matters to be monitored and included in these reports should include tree condition, tree protection measures and impact of site works which may arise from changes to the approved plans.

7.9.4 The reports and Compliance Statements shall be submitted to the Project Manager (as well as the Clients' nominated representative) following each inspection.

7.9.5 The reports and any Non-Compliance Statements shall be submitted to the Project Manager (as well as the Clients' nominated representative) if tree protection conditions have been breached. Reports should contain clear remedial action specifications to minimise any adverse impact on any subject tree.

7.10 Proposed Pruning

7.10.1 It is anticipated that minor pruning only will be required, largely centred on reduction or crown lifting to facilitate site access during construction, of no greater than 10% of any one trees total crown area. Such pruning is considered to have minimal long term health impact to the tree.

7.10.2 All pruning is recommended to be completed in accordance with the Australian Standard AS 4373–2007: *Pruning of Amenity Trees* (Standards Australia, 2007) and undertaken by a suitably qualified arborist (minimum AQF 3 arborist).

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

7.11 Offset Tree Planting

7.11.1 Offset planting should reflect the number of trees removed and the initial loss of amenity and biomass. New trees should be of long-term potential and sourced from a reputable supplier.

7.11.2 Replacement tree species must suit their location on the site in terms of their potential physical size and their tolerance(s) to the surrounding environmental conditions. To avoid unethical or unprofessional tree selection and/or their placement within the landscape, replacement tree species must be selected in consultation with a consulting arborist, who can also assist in implementing successful tree establishment techniques.

7.11.3 Replacement tree species must have the genetic potential to reach a mature size potential of those trees removed to facilitate the development. As a guide, potential height will be a minimum of 10m (or more) and produce a spreading canopy so as they may provide amenity value to the property and contribute to the tree canopy of the surrounding area in the future.

7.12 Additional Excavation/Trenching within TPZs

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

7.12.2 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 a smaller (<5 tonne) machine with an additional spotter

7.12.3 Machine excavation should be prohibited within the TPZs of retained trees unless undertaken at the direct consent from the project arborist and/or the responsible authority.

8 References

- Mattheck, C. a. B. H., 1994. *The Body Language of Trees: A Handbook for Failure Analysis.* H. M. Stationery Office: University of Michigan.
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- Standards Australia, 2007. *AS 4373–2007 Pruning of Amenity Trees,* GPO Box 476 Sydney NSW 2001: Standards Australia.
- Standards Australia, 2009. *AS4970–2009: Protection of Trees on Development Sites,* Sydney: Standards Australia.
- The British Standards Institution, 2012. *BS5837–2012: Trees in relation to design, demolition and construction,* London: BSI Standards Limited.
- Urban, J., 2008. *Up By Roots - Healthy Soils and Trees in the Built Environment.* Champaign (Illinois): International Society of Arboriculture.

Plans of the existing site and of the proposed development were provided to ArborSafe on 14 July 2022 and include:

- Proposed Site Plan (Drawing R25-AR-0102, Rev. I). (djrd Architects, 1 July 2022).
- Tree Removal Plan (Drawing R25-AR-0101, Rev. I). (djrd Architects, 1 July 2022).

Appendix A. Arboricultural Reporting Assumptions and Limiting Conditions

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

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Appendix B. Explanation of Tree Assessment Terms

Tree number: Refers to the individual identification number assigned within the ArborSafe software to each assessed tree on the site and the number which appears of the tree's tag.

Tree location: Refers to the easting and northing coordinates assigned to the location of the tree as obtained from the geo-referenced aerial image within the ArborSafe software.

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

Trees in group: The number of trees encompassing a collective assessment of more than one tree. Typically grouped trees have similar attributes that can be encompassed within one data record.

Height: The estimated range in metres attributed to the tree from its base to the highest point of the canopy. Where required height will be estimated to the nearest metre.

Diameter at Breast Height (DBH): Refers to the tree's estimated trunk diameter measured 1.4m from ground level for a single trunked tree. These estimates increase in 50mm increments. Where required DBH will be measured to give an accurate measurement for single trunked trees, trees with multiple trunks, significant root buttressing, bifurcating close to ground level or trunk defects and will be measured as per the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*.

Tree Protection Zone (TPZ): A specified area above and below ground and at a given distance measured radially away from the centre of the tree's trunk and which is set aside for the protection of its roots and crown. It is the area required to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development. The radius of the TPZ is calculated by multiplying its DBH by 12. TPZ radius = DBH × 12. (Note "Breast Height" is nominally measured as 1.4m from ground level).TPZ is a theoretical calculation and can be influenced by existing physical constraints such as buildings, drainage channels, retaining walls, etc. (Standards Australia, 2009).

Structural Root Zone (SRZ): The area close to the base of a tree required for the tree's anchorage and stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. SRZ radius = $(D \times 50)^{0.42 \times 0.64}$ (Standards Australia, 2009).

Canopy spread: The estimated range in metres attributed to the spread of the tree's canopy on its widest axis. Where required crown spread will be estimated to the nearest metre.

Origin: Refers to the origin of the species and its type.

Category	Description
Indigenous	Occurs naturally in the local area and is native to a given region or ecosystem.
State Native	Occurs naturally within State but is not indigenous.
Australian Native	Occurs naturally within Australia and its territories but is not a State native or indigenous.
Exotic Evergreen	Occurs naturally outside of Australia and its territories and typically retains its leaves throughout the year.
Exotic Deciduous	Occurs naturally outside of Australia and its territories and typically loses its leaves at least once a year.

Health: Refers to the health and vigour of the tree.

Category	Description
Excellent	Canopy full with even foliage density throughout, leaves are entire and are of an excellent size and colour for the species with no visible pathogen damage. Excellent growth indicators, e.g. seasonal extension growth. Exceptional specimen.
Good	Canopy full with minor variations in foliage density throughout, leaves are entire and are of good size and colour for the species with minimal or no visible pathogen damage. Good growth indicators, none or minimal deadwood.
Fair	Canopy with moderate variations in foliage density throughout, leaves not entire with reduced size and/or atypical in colour, moderate pathogen damage. Reduced growth indicators, visible amounts of deadwood, may contain epicormic growth.
Poor	Canopy density significantly reduced throughout, leaves are not entire, are significantly reduced in size and/or are discoloured, significant pathogen damage. Significant amounts of deadwood and/or epicormic growth, noticeable dieback of branch tips, possibly extensive.
Dead	No live plant material observed throughout the canopy, bark may be visibly delaminating from the trunk and/or branches.

Age: Refers to the life cycle of the tree.

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

Structure: Refers to the structure of the tree from roots to crown.

Category	Description
Good	Sound branch attachments with no visible structural defects, e.g. included bark or acute angled unions. No visible wounds to the trunk and/or root plate. No fungal pathogens present.
Fair	Minor structural defects present, e.g. apical leaders sharing common union(s). Minor damage to structural roots. Small wounds present where decay could begin. No fungal pathogens present.
Poor	Moderate structural defects present, including bifurcations with included bark with union failure likely within 0–5 years. Wounding evident with cavities and/or decay present. Damage to structural roots.
Hazardous	Significant structural defects with failure imminent (3–6 months). Defects may include active splits and/or partial branch or root plate failures. Tree requires immediate arboricultural works to alleviate the associated risk.

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

Category
0 Years
<5 Years
5–10 Years
10–15 Years
15–25 Years
25–50 Years
>50 Years

Defects: Visual observations made of the presenting defects of the tree and its growing environment that are, or have the capacity to impact upon, the health, structural condition and/or the useful life expectancy of the tree. Defects may include adverse physical traits or conditions, signs of structural weaknesses, plant disease and/or pest damage, tree impacts to assets or soil related issues.

Tree Significance: Includes environmental, social or historical reasons why the tree is significant to the site. The tree may also be rare under cultivation or have a rare or localised natural distribution.

Arborist Actions: A list of arboricultural and/or plant health care works that are aimed at maintaining or improving the tree's health, structural condition or form. Actions may also directly or indirectly reduce the risk potential of the tree such as via the removal of a particular branch or the moving of infrastructure from under its canopy.

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Appendix C. Tree Retention Values

Based upon a modified version of the British Standard BS 5837–2012: *Trees in relation to design, demolition and construction* – recommendations.

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

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

Tree Quality

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

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

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

Category A	Typically trees in this category are of high quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years. The tree may make significant amenity contributions to the landscape and may make high environmental contributions. In some cases, trees within this category may not meet the above criteria, however possess significant heritage or ecological value. Trees of this retention value warrant design consideration and amendment to ensure their viable retention.
Category B	Typically trees in this category are of moderate quality with an estimated remaining life expectancy of 15–25 years and prominence of size dimensions that cannot be readily replaced within 10 years. They may make moderate amenity contributions to the landscape and make low/moderate environmental contributions. Trees with this retention value warrant lesser design consideration in an attempt to allow for their retention.
Category C	Trees in this category are of low quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable, may have poor health and/or structure, are easily replaceable, or are of undesirable species and do not warrant design consideration.
Category U	Trees in this category are found to be in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than five years. These trees may be dead and/or of a species recognised as a weed that resulted in them being unretainable.

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Appendix D. Tree Assessment Data

Tree no.	*Botanical Name*	Common Name	Origin	Trees in group	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	TLE (Yrs.)	Defects	Significance	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
1	*Eucalyptus microcorys*	Tallowwood	Endemic	1	85	110	10.2	326.85	3.4	20-30	15-20	Good	Fair	Mature	25-50	Cavity(s); Co-dominant stems; Wound(s);	Significant habitat - nests/hollows; Amenity value/shade; Within group; Significant due to age/size;	25-11-2021 : Andy Clark : End tree in the roadside avenue of larger trees. Good response growth observed around trunk cavity, eastern aspect at 3m, with no sap exudation, fungal fruiting bodies, significant decay or cambial dieback observed. Remove lowest southern lateral branch, back to trunk union at 5m, to improve site lines.	A	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
2	*Casuarina cunninghamiana*	River She-oak	Endemic	1	47	64	5.7	100.79	2.7	15-20	5-10	Fair	Fair	Semi-Mature	15-25	Co-dominant stems; Deadwood/stubs < 30mm; Dieback; Epicormic growth;	Amenity value/shade; Within group;	25-11-2021 : Andy Clark : The tree is in a reduced state of health with foliage density at 70%, consisting largely of epicormic growth. Good growth response observed. 7m from base of existing roadside rock retaining wall. 6m from existing chainmesh perimeter fence.	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
3	*Casuarina cunninghamiana*	River She-oak	Endemic	1	37	51	4.4	61.93	2.5	15-20	5-10	Fair	Fair	Semi-Mature	15-25	Deadwood/stubs < 30mm; Dieback; Epicormic growth;	Amenity value/shade; Within group;	25-11-2021 : Andy Clark : The tree is in a reduced state of health with foliage density at 70%, consisting largely of epicormic growth. Good growth response observed. 6m from base of existing roadside rock retaining wall. 7m from existing chainmesh perimeter fence. Minor crown suppression from adjacent trees. 4.5m from edge of new building platform (10% TPZ incursion)	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
4	*Dead Tree*	Dead tree		1	35	0	4.2	55.42		5-10	<5	Dead	Poor	Semi-Mature	<5	Decay; Dieback; Previous failure(s); Weak union(s); Wound(s);	Within group;		U		Remove tree irrespective of future development.
5	*Casuarina cunninghamiana*	River She-oak	Endemic	1	53	68	6.4	127.08	2.8	15-20	5-10	Good	Fair	Semi-Mature	25-50	Deadwood/stubs < 30mm; Dieback; Epicormic growth;	Amenity value/shade; Screen value;	25-11-2021 : Andy Clark : 5m from base of existing roadside rock retaining wall. 4.5m from existing chainmesh perimeter fence. 7m from existing chainmesh perimeter fence. 4.5m from edge of new building platform (10% TPZ incursion)	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
6	*Casuarina cunninghamiana*	River She-oak	Endemic	1	63	92	7.6	179.55	3.2	10-15	10-15	Fair	Fair	Mature	15-25	Deadwood/stubs > 30mm; Dieback; Epicormic growth;	Amenity value/shade; Within group; Screen value;	25-11-2021 : Andy Clark : The tree is in a reduced state of health with foliage density at 70%, consisting largely of epicormic growth. Good growth response observed. 4m from base of existing roadside rock retaining wall. 7m from existing chainmesh perimeter fence. 7m from edge of new driveway and building platform (4% TPZ incursion)	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
7	*Casuarina glauca*	Swamp she-oak	Endemic	1	42	50	5.0	79.80	2.5	15-20	5-10	Good	Good	Semi-Mature	15-25		Within group;	2m from base of existing roadside rock retaining wall. 6m from existing chainmesh perimeter fence. 4.5m from edge of new driveway (2% TPZ incursion).	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
8	*Dead Tree*	Dead tree		1	36	0	4.3	58.63		5-10	<5	Dead	Poor	Semi-Mature	<5	Decay; Dieback; Fungal fruiting body(s); Previous failure(s); Weak union(s); Wound(s);	Within group;		U		Remove tree irrespective of future development.
9	*Dead Tree*	Dead tree		1	36	0	4.3	58.63		5-10	<5	Dead	Poor	Semi-Mature	<5	Decay; Dieback; Fungal fruiting body(s); Previous failure(s); Weak union(s); Wound(s);	Within group;		U		Remove tree irrespective of future development.
10	*Casuarina glauca*	Swamp she-oak	Endemic	1	42	50	5.0	79.80	2.5	15-20	10-15	Good	Fair	Semi-Mature	15-25	Epicormic growth; Previous failure(s);	Amenity value/shade;	25-11-2021 : Andy Clark : 1m from top of existing roadside batter. Impacted by road batter reprofiling.	B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
11	*Cupaniopsis anacardioides*	Tuckaroo	Endemic	1	25	32	3.0	28.27	2.1	5-10	5-10	Good	Fair	Semi-Mature	25-50	Co-dominant stems; Included bark;	Amenity value/shade;	25-11-2021 : Andy Clark : 7m from top of existing roadside batter. 2m from existing chainmesh perimeter fence. Impacted by road batter reprofiling.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
12	*Dead Tree*	Dead tree		1	34	0	4.1	52.30		5-10	<5	Dead	Poor	Semi-Mature	<5	Decay; Dieback; Previous failure(s); Weak union(s); Wound(s);	Within group;		U		Remove tree irrespective of future development.
13	*Casuarina cunninghamiana*	River She-oak	Endemic	1	32	48	3.8	46.32	2.4	5-10	5-10	Fair	Fair	Semi-Mature	10-15	Deadwood/stubs < 30mm; Dieback; Epicormic growth; Previous failure(s);	Screen value;	25-11-2021 : Andy Clark : The tree is in a reduced state of health with foliage density at 60%, consisting largely of epicormic growth, and branch tip dieback observed throughout the canopy. 1m from top of existing roadside batter.	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
14	*Cupaniopsis anacardioides*	Tuckaroo	Endemic	1	23	30	2.8	23.93	2.0	5-10	<5	Good	Fair	Semi-Mature	25-50	Suppressed;	Within group; Screen value;	25-11-2021 : Andy Clark : 4m from top of existing roadside batter. Moderate crown suppression from neighbouring tree. Growing in co-dependent canopy situation.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
15	*Cupaniopsis anacardioides*	Tuckaroo	Endemic	1	15	18	2.0	12.57	1.6	5-10	<5	Good	Fair	Semi-Mature	25-50	Suppressed;	Within group; Screen value;	25-11-2021 : Andy Clark : 4m from top of existing roadside batter. Moderate crown suppression from neighbouring tree. Growing in co-dependent canopy situation.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
16	*Cupaniopsis anacardioides*	Tuckaroo	Endemic	1	7	10	2.0	12.57	1.5	<5	<5	Good	Fair	Juvenile	15-25	Suppressed;	Within group; Screen value;	25-11-2021 : Andy Clark : 3m from top of existing roadside batter. Significant crown suppression from neighbouring tree. Growing in co-dependent canopy situation.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
17	*Cryptocarya triplinervis*	Brown Laurel	Endemic	1	29	34	3.5	38.05	2.1	5-10	5-10	Good	Fair	Semi-Mature	25-50	Co-dominant stems;	Within group; Screen value;	25-11-2021 : Andy Clark : 3.5m from top of existing roadside batter.	B	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
18	*Cupaniopsis anacardioides*	Tuckaroo	Endemic	1	12	14	2.0	12.57	1.5	<5	<5	Fair	Poor	Juvenile	5-10	Epicormic growth; Previous failure(s); Suppressed;	Within group;	25-11-2021 : Andy Clark : Significant crown suppression from adjacent trees.	C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
19	*Cryptocarya triplinervis*	Brown Laurel	Endemic	1	12	14	2.0	12.57	1.5	5-10	<5	Good	Good	Juvenile	25-50		Within group; Screen value;	25-11-2021 : Andy Clark : 7m from top of existing roadside batter. Moderate crown suppression from neighbouring tree.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
20	*Cupaniopsis anacardioides*	Tuckaroo	Endemic	1	18	21	2.2	14.66	1.7	<5	<5	Fair	Poor	Juvenile	5-10	Epicormic growth; Suppressed;	Within group; Screen value;	25-11-2021 : Andy Clark : 9m from top of existing roadside batter. Moderate crown suppression from neighbouring tree. Growing in co-dependent canopy situation.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
21	*Cupaniopsis anacardioides*	Tuckaroo	Endemic	1	11	12	2.0	12.57	1.5	<5	<5	Fair	Poor	Juvenile	10-15	Epicormic growth; Suppressed;	Within group; Screen value;		C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
22	*Macaranga tanarius*	Bullocks Heart	Endemic	8	8	10	2.0	12.57	1.5	<5	<5	Good	Poor	Juvenile	10-15	Suppressed;	Within group; Screen value;	25-11-2021 : Andy Clark : A group of trees growing >6m from top of existing roadside batter.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
23	*Macaranga tanarius*	Bullocks Heart	Endemic	6	8	10	2.0	12.57	1.5	<5	<5	Good	Poor	Juvenile	10-15	Suppressed;	Within group; Screen value;	25-11-2021 : Andy Clark : A group of trees growing 6m from top of existing roadside batter.	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
24	*Casuarina cunninghamiana*	River She-oak	Endemic	1	21	31	2.5	19.95	2.0	5-10	<5	Fair	Poor	Juvenile	5-10	Decay; Epicormic growth; Previous failure(s); Weak union(s); Wound(s);	Screen value; Within group;	25-11-2021 : Andy Clark : 1m from top of existing roadside batter. Basal decay has resulted in limited ULE.	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
25	*Casuarina cunninghamiana*	River She-oak	Endemic	1	32	45	3.8	46.32	2.4	5-10	<5	Fair	Fair	Semi-Mature	10-15	Deadwood/stubs > 30mm; Dieback; Epicormic growth;	Screen value;	25-11-2021 : Andy Clark : 1m from top of existing roadside batter. Terminal leader has died.	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
26	*Cupaniopsis anacardioides*	Tuckaroo	Endemic	1	15	19	2.0	12.57	1.6	5-10	<5	Good	Fair	Juvenile	25-50	Suppressed;	Screen value;	25-11-2021 : Andy Clark : 1.5m from top of existing roadside batter. Minor crown suppression from adjacent trees.	C	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
27	*Macaranga tanarius*	Bullocks Heart	Endemic	1	45	50	5.5	93.60	2.5	5-10	10-15	Good	Fair	Mature	10-15	Co-dominant stems;	Screen value; Amenity value/shade;	25-11-2021 : Andy Clark : 5m from top of existing roadside batter.	C	2	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).

Appendix E. Tree Protection Plan

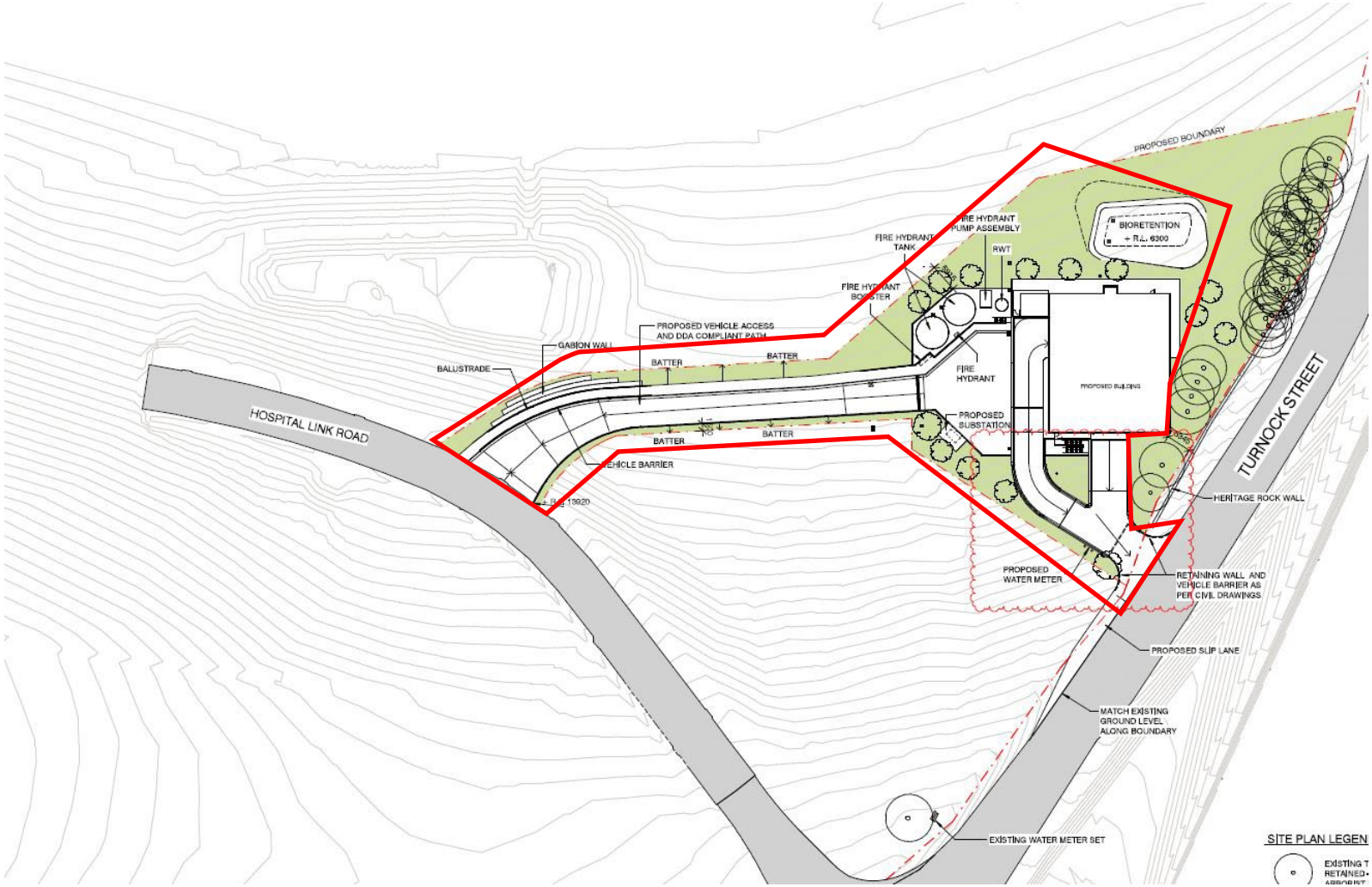

Figure 16. Site map showing retained trees with suggested Tree Protection Fence locations. (ArborPlan, July 2022).

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

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