



Arboricultural Impact Assessment Report

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1. INTRODUCTION

- 1.1 This report has been commissioned by the site owner Duncan Wallace to assess trees located on the site that may be impacted by a proposed development.
- 1.2 The following table contains all documents and information provided to me by the client.

Table 1: documents provided for the assessment

Title	Author	Date	Reference on document
Site Survey	DE Surveys	26/3/2020	
Proposed Site Plans	Action Plans	10/8/2020	See Below

SHEET NUMBER	SHEET NAME	DATE PUBLISHED
DA00	COVER	10/8/20
DA01	SITE ANALYSIS	10/8/20
DA02	SITE / ROOF / SEDIMENT EROSION / WASTE MANAGEMENT / STORMWATER CONCEPT PLAN	10/8/20
DA03	PROPOSED LOWER GROUND FLOOR PLAN	10/8/20
DA04	PROPOSED GROUND FLOOR PLAN	10/8/20
DA05	NORTH ELEVATION	10/8/20
DA06	SOUTH ELEVATION	10/8/20
DA07	EAST / WEST ELEVATION	10/8/20
DA08	LONG SECTION	10/8/20
DA09	CROSS SECTIONS	10/8/20
DA10	FRONT BOUNDARY ELEVATION / GARAGE SECTION	10/8/20
DA11	AREA CALCULATIONS	10/8/20
DA12	SAMPLE BOARD	10/8/20
DA13	WINTER SOLSTICE 9 AM	10/8/20
DA14	WINTER SOLSTICE 12 PM	10/8/20
DA15	WINTER SOLSTICE 3 PM	10/8/20
DA16	BASIX COMMITMENTS	10/8/20
DA17	BASIX COMMITMENTS: GRANNY FLAT	10/8/20

- 1.3 One site inspection was carried out on 24th March 2020. Access was available to the subject site and adjoining public areas only. All tree data contained in this report was collected during this site inspection. The weather during of the site inspection was clear with average visibility.
- 1.4 No additional inspection has been carried out for the purpose of the amendment.

2. SCOPE OF THE REPORT

- 2.1 **This report has been undertaken to meet the following objectives.**
 - 2.1.1 Conduct a visual assessment from ground level of four trees located on and adjoining the site.
 - 2.1.2 For the purpose of this assessment a 'tree' is greater than 5 metres in height and 5 metres canopy diameter have been included in this report only.
 - 2.1.3 Trees and vegetation less than 5 meters in height that feature on survey plans provided have not been included in this assessment.
 - 2.1.4 Determine the trees estimated contribution years and remaining, useful life expectancy and award the trees a retention value.
 - 2.1.5 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).
 - 2.1.6 Recommend methods to mitigate development impacts where appropriate.
 - 2.1.7 Recommend tree protection measures for any tree to be retained in accordance with AS4970 Protection of Trees on Development Sites - 2009.

3. LIMITATIONS

- 3.1 Tree 1 is growing over a large rock, the presence of tree roots beyond the rock is largely dictated by the location, orientation and distribution of surface and buttress roots extending from the tree. The calculations relied upon from AS4970-2009 regarding root projections and encroachments are indicative only.
- 3.2 Observations and recommendations are based on one site inspection. The findings of this report are based on the observations and site conditions at the time inspection.
- 3.3 Tree locations have not been identified across all site plans. Locations proposed on the plans have been overlaid based on the survey plan only.
- 3.4 All observations were carried out from ground level. No detailed additional testing was carried out on trees or soil on site and none of the surrounding surfaces were lifted for investigation.
- 3.5 Access was not available to several neighbouring trees, these trees dimensions have been estimated from within the property boundary.
- 3.6 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.
- 3.7 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.
- 3.8 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with a spp.
- 3.9 All diagrams, plans and photographs included in this report are visual aids only, and are not to scale unless otherwise indicated.
- 3.10 Hugh The Arborist neither guarantees, nor is responsible for, the accuracy of information provided by others that is contained within this report.
- 3.11 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.

- 3.12 Where trees are stated as retainable under the current proposal, this will only be possible if all recommendations and specifications are followed with consultation with the Project Arborist.
- 3.13 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.
- 3.14 Several trees assessed have not featured on the plans provided. Their locations have been estimated using available setbacks collected on site and plotted on a scaled site plan.
- 3.15 Alteration of this report invalidates the entire report.

4. METHODOLOGY

- 4.1 The following information was collected during the assessment of the subject tree(s).
- 4.2 Tree common name
- 4.3 Tree botanical name
- 4.4 Tree age class
- 4.5 DBH (Trunk/Stem diameter at breast height/1.4m above ground level) - millimetres.
- 4.6 Estimated height - metres
- 4.7 Estimated crown spread (Radius of crown) - metres
- 4.8 Health
- 4.9 Structural condition
- 4.10 Amenity value
- 4.11 Estimated remaining contribution years (SULE)¹
- 4.12 Retention value (Tree AZ)²
- 4.13 Notes/comments

¹ Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, <http://www.treeaz.com/>.

² Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, <http://www.treeaz.com/>.

- 4.14 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).³
- 4.15 Tree diameter was measured using a DBH tape or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools I used during the assessment were a digital camera and a Leica DistoD410 digital laser tape.
- 4.16 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009) ⁴ and in some cases estimated. See appendices for information.
- 4.17 Details of how the observations in this report have been assessed are listed in the appendices.

5. SITE LOCATION AND BRIEF DESCRIPTION OF PROPOSAL

- 5.1 The site is located in the Northern Beaches Council suburb of Elanora Heights.
- 5.2 All trees at the site are subject to management under the following policy and legislation;
 - 5.2.1 Pittwater Local Environmental Plan (LEP) 2014⁵
 - 5.2.2 Pittwater 21 Development Control Plan (DCP) 2014.⁶
 - 5.2.3 State Environmental Planning Policy (Vegetation in Non-Rural Areas 2017).

³ Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

⁴ Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

⁵ Pittwater Local Environmental Plan 2014 <https://legislation.nsw.gov.au/#/view/EPI/2014/320/historical2017-08-25/full>.

⁶ Pittwater 21 Development Control Plan, <https://eservices.northernbeaches.nsw.gov.au/ePlanning/live/pages/plan/book.aspx?exhibit=PDGP>, accessed 29 October 2018.

Tile 1: Site location and approximate boundary ⁷



⁷ <https://www.google.com/maps/place/128+Elanora+Rd,+Elanora+Heights+NSW+2101>

- 5.3 The site has not been identified as within a Heritage Conservation area or an area containing high levels of terrestrial Biodiversity, remnant native vegetation or wildlife corridors.⁸
- 5.4 The site is divided north east (front) to south west (rear). The site falls significantly in grade from front to rear and contains a large natural rock feature on the northern boundary. The site is considered to have been heavily disturbed during a separate development to subdivide the land.
- 5.5 Images on Sixmaps and Google Maps show there to be soil disturbance to the entire site where the subdivision appears to have graded all topsoil and moved it around the site. It is unknown as to whether the trees on site were protected during this activity.
- 5.6 The site contains three trees, one of which is growing on the large natural rock on the northern boundary.
- 5.7 The proposal consists of constructing a dwelling house over the existing grade.

6. OBSERVATIONS AND GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

- 6.1 **Tree information:** Details of each individual tree I have assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in appendix 2, where I have calculated the indicative tree protection zone (TPZ) for the subject trees. The TPZ and SRZ should be measured in radius from the centre of the trunk. I awarded the subject trees a retention value based on my observations. The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. I have included the Tree AZ categories sheet (Barrell Tree Consultancy) to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline.
- 6.2 **Site plans:** Appendix 1 contains information on the existing site and tree locations. Appendix 1a contains the proposed development floorplan and the existing trees on site. Appendix 1B shows trees proposed for retention and recommended protection methods. All site plans identify tree locations have overlaid the indicative TPZ and SRZ of each tree. Appendix 1a offers site management and tree protection advice.

⁸ <https://services.northernbeaches.nsw.gov.au/icongis/index.html>

- 6.3 **Tree protection zone (TPZ):** The TPZ is principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be the extent where root loss or disturbance will generally impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. In appendix 4 I have included additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.
- 6.4 **Structural Root Zone (SRZ):** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always needs to be maintained to preserve a viable tree. There are several factors that can vary the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ. See appendix 5 for more information about the SRZ.
- 6.5 **Minor encroachment into TPZ:** Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
- 6.6 **Major encroachment into TPZ:** Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.

7. ASSESSEMENT OF CONSTRUCTION IMPACTS

7.1 **Table 2:** In the table below I have summarised the impact of proposed development impact to all trees included in the report.

Tree ID	Common name	Retention value	TPZ radius (m)	SRZ Radius (m)	TPZ encroachment	Discussion	Conclusion
1	Ficus macrophylla (Moreton Bay Fig)	A1	11.5	3.4	Major	<p>Tree 1 is situated on top of a large natural rock exposed on the northern boundary of the site. The tree is likely to have self-seeded and has become well established in its location.</p> <p>The Ficus genus is well known to have advantageous roots that are capable of growing in the open air and often colonizing bare rock.</p> <p>The standard Calculations (AS4970_2009) when assessing Tree Protection Zone radius are only partially applicable here for the reason we can see the location and spread of the roots extending over the rock.</p> <p>Immediately to the south west the rock edge drops by approximately 1.5 metres. There are no tree roots extending toward the edge indicating that the south eastern section of the TPZ area (calculated) is largely non-applicable in terms of root loss and development impact.</p> <p>Tree roots have extended down the surface of the rock to the soil to the west of the tree and are largely directed into the neighboring property.</p> <p>One large tree root is extending along the surface to the south east of the tree and appears to be the dominant root structure within the site boundaries for tree number 1. During the site assessment it was observed that the root has been subject to significant mechanical damage, likely from civil machinery, during the subdivision carried out prior to this application.</p> <p>It is noted that the subdivision was carried out under a separate application to the proposed development.</p>	



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Tree ID	Common name	Retention value	TPZ radius (m)	SRZ Radius (m)	TPZ encroachment	Discussion	Conclusion
						<p>The proposed garage occupies up to 39m² of the TPZ area and is the only area that encroaches into the SRZ. A 1.5 meter cantilever section has been implemented to avoid any excavation within the SRZ area and the entire structure will be raised above grade. Four piers are required to be installed within the TPZ area to support the suspended slab that extends a further two metres of slab that is raised above grade with no footing. Cut will be required for the initial 2.7 metres joining the existing access road to the garage. This will require excavation for the slab to meet the required level of around 200 millimeters. The garage will occupy up to 10% of the TPZ area however only 5% of the TPZ will be disturbed by excavations.</p> <p>The proposed dwelling to the south east of the tree will occupy up to 8% of the TPZ area with no encroachment into the structural roots proposed. The house has been designed above grade with a subfloor sufficient to give a minimum 100 millimeters clearance from the large diameter surface root. Some loss of fibrous roots is anticipated within this area for the installation of the footings however this has been minimized by the above grade design. It is also noted that the previous development is likely to have removed the feeder roots when the topsoil was disturbed reducing their abundance. Proposed structures to the west and the south west of the tree are not considered to be contributing to the encroachment as there are no tree roots emanating from the tree across the rock into the soil below that will be affected by the dwelling.</p> <p>Up to 3% landscaping has been proposed on the southern fringe of the TPZ area. This can be managed to minimize the impact by installing a pre fabricated pond and timber deck requiring</p>	



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Tree ID	Common name	Retention value	TPZ radius (m)	SRZ Radius (m)	TPZ encroachment	Discussion	Conclusion
						<p>minimal excavation.</p> <p>The total coverage of structures within the TPZ area of tree 1 is up to 21% from a combination of the dwelling, garage and landscaping. Taking the tree sensitive design into consideration the proposed fibrous root loss will not exceed 16% with no structural roots proposed to be impacted.</p> <p>The subject tree was of good health at the time of the assessment indicating it has recovered from any previous disturbance. The tree is considered to be in a condition that will tolerate the proposed development with minimal effect on its health and long-term viability.</p> <p>In conclusion, the TPZ area that contains tree roots and subject to the development impact has been assessed as the southern and south eastern section of the calculated TPZ area only. The area has already been subject to significant disturbance and is possible that previous works have already removed the fine feeder roots in this location. Notwithstanding, the development has been designed using methods that allow the retention of tree roots below the structure and the tree is considered to be retainable providing the recommendations section in this report is implemented.</p>	
2	Eucalyptus microcorys (Tallow Wood)	Z4	6	2.6	Major	<p>Tree located on neighboring property and is dead.</p> <p>The proposed development will encroach into the Tree Protection Zone by up to 16%. The tree is proposed to be removed by the neighbor and will not be of material constraint to the development.</p>	Remove



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Tree ID	Common name	Retention value	TPZ radius (m)	SRZ Radius (m)	TPZ encroachment	Discussion	Conclusion
3	Eucalyptus microcorys (Tallow Wood)	A1	5.5	2.8	Footprint	Tree located within the footprint of the proposed dwelling and is not retainable.	Remove
4	Pinus Radiata (Monterey Pine)	Z3	7	2.8	Footprint	Tree located within the footprint of the proposed dwelling and is not retainable. Tree 4 was assessed as in fair condition at the time of the assessment with a thinning canopy. The species is not protected in NBLGA and as a result is not a material constraint to the development.	Remove

8. CONCLUSIONS

8.1 **Table 3:** Summary of the impact to trees during the development;

Impact	Reason			
		AA1	A	Z
Trees to be removed	Building construction, new surfacing and/or proximity, or trees in poor condition.	None	3 (One Tree)	2,4 (Two Trees)
Retained trees that will be subject to TPZ encroachment	Removal of existing surfacing/structures and/or installation of new surfacing/structures	None	1 (One Tree)	None
Trees to be retained that will not be subject to TPZ encroachment	Space for development	None	None	None
Trees requiring further investigation (Root Mapping)	Soil characteristics, topography and level changes within the TPZ	None	None	None

9. PHOTOGRAPHS



Photo a: Tree 1 with its orientation of roots clearly visible.



Photo b: Overview of the proposed development area and trees 1,2,3 and 4.



Photo c: Trees 3 and 4



Photo d: Tree 1 and previously damaged surface root.



Photo e: looking to the north at tree 1, rock outcrop and surface roots.



Photo f: Existing site disturbance and tree 4 trunk.

10. RECOMMENDATIONS

- 10.1 This report assesses the impact of a proposed development at the site to four individual trees in accordance with AS4970 Protection of trees on development sites (2009).
- 10.2 **Refer to the table in section 8 for individual tree identification.**
- 10.3 Trees 3 and 4 are required to be removed to facilitate the development.
- 10.4 Tree number 2 is a dead tree located on neighbouring property.
- 10.5 Tree number 1 is recommended to be retained and protected for the life of the development.
- 10.6 The rear of the garage is to be cantilevered so there is no footing or excavation within 3.4 metres radius of the tree trunk, measured from the centre of the trunk.
- 10.7 Four piers are to be installed no closer than the 3.4 metres and a slab suspended providing a void between the natural soil line and the underside of the slab.
- 10.8 Manual excavation under the supervision of the project Arborist is required for the piers and where the slab meets the natural soil line. Piers should be relocated to retain tree roots greater than 40 millimetres in diameter. Small roots may be pruned clear of the footings by the project Arborist using a clean sharp blade.
- 10.9 The proposed entry to the dwelling is recommended to be constructed to allow a sub-floor space capable of retaining the large diameter surface root below and provide a minimum 100 millimetres clearance. All works are to be carried out in consultation with the project Arborist.
- 10.10 To minimise the landscaping impact component it is recommended that the proposed pond be constructed on the existing grade using a pre-fabricated pond shell and the decking above grade on a pier and beam footing.
- 10.11 One month prior to the commencement to works, tree 1 is to be provided with soil conditioner (Seasol or GoGo) and a balanced NPK fertiliser suitable for native species (Nitrosol). This is to be carried out by the project Arborist and repeated midway through the development phase. Additional remedial measures are to be implemented by the project Arborist during the development depending on site and climatic conditions.
- 10.12 All tree protective measures are to be installed prior to the commencement of works inclusive of demolition.
- 10.13 All trees removed through the development process are recommended to be replaced at a ratio of 1:1. It is recommended the trees be installed at a 100 litre stock size.
- 10.14 **Major roots** are considered to be 40 millimetres in diameter or greater are recommended to be assessed by the project Arborist prior to pruning.

- 10.15 **Replacement trees** are recommended to comply with Australian Standard 2303 Tree Stock for Landscape use (2015). All transplants are to be carried out by an Arborist or Horticulturalist experienced in major tree transplants.
- 10.16 **New footpaths and hard surfaces**, where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ, manually excavated and retrain roots greater than 40 millimetres in diameter.
- 10.17 All construction activity is to comply with Australian Standard AS4970 Protection of Trees on Development Sites (2009), sections 7, 10 and 11 of this report.
- 10.18 No canopy pruning has been recommended for any retained tree to accommodate the development.
- 10.19 No service or landscaping plan has been assessed as part of this report. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention. Section 4.5.5 of AS4970-2009 says that 'The directional drilling bore should be at least 600 mm deep. The project Arborist should assess the likely impacts of boring and bore pits on retained trees. For manual excavation of trenches the project Arborist should advise on roots to be retained and should monitor the works'.⁹
- 10.20 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners. This report should be submitted as supporting evidence with any tree removal/pruning or development application.

11. ARBORICULTURAL WORK METHOD STATEMENT (AMS) AND TREE PROTECTION REQUIREMENTS

- 11.1 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site and be provided a copy of this report.
- 11.2 **Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.

⁹ Council of Standards Australia, *AS 4970 Protection of trees on development sites* (2009) page 18.

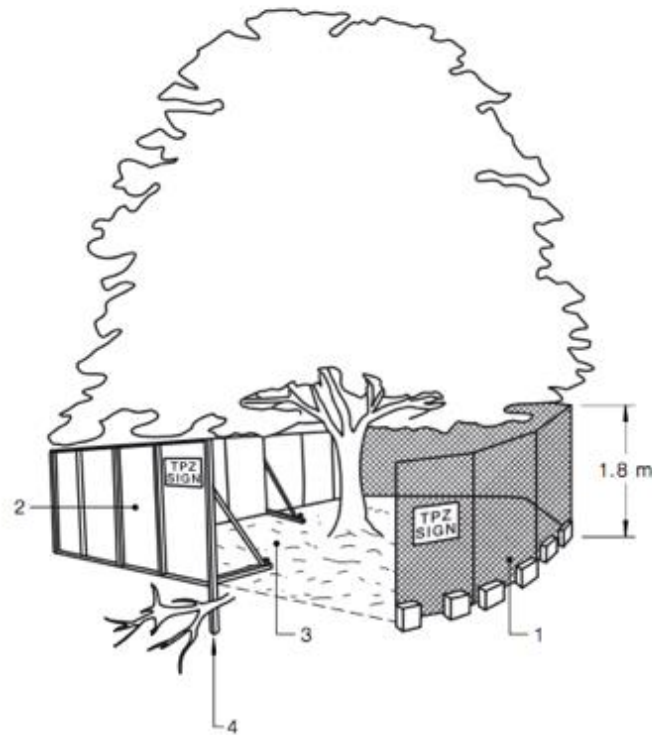
- 11.3 Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 3 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).
- 11.4 Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principle contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. I recommend regular site inspections on a frequency based on the longevity of the project, this is to be agreed in the initial meeting.

11.5 Table 4: Site Specific Tree Protection Recommendations

Tree Number	Protection specification
1	<ul style="list-style-type: none"> - Trunk protection - Either isolate with fencing or apply mulch and carpet underlay over the large diameter structural roots. - Isolate surface roots on the rock with fencing.
1	<ul style="list-style-type: none"> - One month prior to the commencement to works, trees 7 and 4 are to be provided with soil conditioner (Seasol or GoGo) and a balanced NPK fertiliser suitable for native species (Nitrosol).

- 11.6 Tree protection Specifications:** It is the responsibility of the principle contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

- 11.7 Protective fencing:** Where it is not feasible to install fencing at the specified location due to factors such as restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing is unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.
- 11.8 TPZ signage:** Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:
- Tree protection zone/No access.
 - This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
 - The name, address, and telephone number of the developer/builder and project Arborist
- 11.9 Trunk and Branch Protection:** The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.
- 11.10 Mulch:** Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.
- 11.11 Ground Protection:** Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.

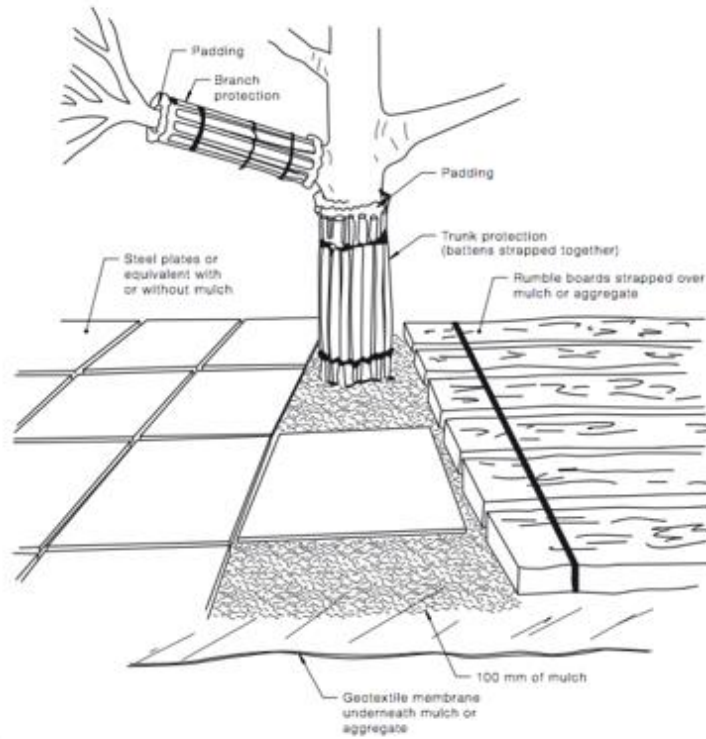


LEGEND:

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

An image from AS4970-2009,¹⁰ with example tree protection.

¹⁰ Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.



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.

An image from AS4970-2009,¹¹ with example tree protection.

¹¹ Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

11.12 Root investigations: Where major TPZ encroachments require demonstrating the viability of trees the following method for root investigations is to be used. Non-destructive excavations are to be carried out along the outer edge of proposed or existing structures within the TPZ (excavation methods include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device). Excavations generally consist of a trench to a depth dictated by the location of significant roots, bedrock, unfavourable conditions for root growth, or the required depth for footings up to 1 metre. The investigation is to be carried out by AQF5 consulting Arborist who is to record all roots greater than 30 millimetres in diameter and produce a report discussing the significance of the findings. No roots 30 millimetres in diameter are to be frayed or damaged during excavation and the trench is to be backfilled as soon as possible to reduce the risk of roots drying out. In the event roots must be left exposed they are to be wrapped in hessian sack and regularly irrigated for the duration of exposure.

11.13 Restricted activities inside TPZ: The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

- A) Machine excavation.
- B) Ripping or cultivation of soil.
- C) Storage of spoil, soil or any such materials
- D) Preparation of chemicals, including preparation of cement products.
- E) Refueling.
- F) Dumping of waste.
- G) Wash down and cleaning of equipment.
- H) Placement of fill.
- I) Lighting of fires.
- J) Soil level changes.
- K) Any physical damage to the crown, trunk, or root system.
- L) Parking of vehicles.

11.14 Demolition: The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.

- 11.15 **Excavations and root pruning:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 10mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).¹² The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.
- 11.16 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.
- 11.17 **Level changes should be minimised.** The existing ground levels within the landscape areas should not be lowered by more than 50mm or increased by more 100mm without assessment by a consulting Arborist.
- 11.18 **New retaining walls** should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, consider pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.
- 11.19 **New footpaths** and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpath should be located outside the SRZ.

¹² Council Of Standards Australia, AS 4373 *Pruning of amenity trees* (2007) page 18

- 11.20 **The location of new plantings** inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.
- 11.21 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.
- 11.22 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.
- 11.23 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

12. HOLD POINTS

12.1 Hold Points: Below is a sequence of hold points requiring project Arborist certification throughout the development process. It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development.

12.2 Hold points applicable to the development have been shaded in grey.

Hold Point	Stage	Responsibility	Certification	Complete Y/N and date
Project Arborist to hold pre construction site meeting with principle contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise.	Prior to work commencing.	Principle contractor	Project Arborist	
Project Arborist To supervise all pruning works to retained trees.	Prior to works commencing	Principal Contractor	Project Arborist	
Project Arborist to assess and certify that tree protection has been installed in accordance with section 11 and AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	Principle contractor	Project Arborist	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. I recommend site inspections on a bi-monthly frequency.	Ongoing throughout the development	Principle contractor	Project Arborist	
Project Arborist to oversee all initial pier excavations and demolition inside the TPZ of any tree to be retained.	Construction	Principle contractor	Project Arborist	
Project Arborist to certify that all pruning of roots greater than 40mm in diameter has been carried out in accordance with AS4373-2007. All root pruning must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	Principle contractor	Project Arborist	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	Principle contractor	Project Arborist	
All landscaping works/boundary walls within the TPZ of trees to be retained are to be undertaken in consultation with the project	Landscape	Principle contractor	Project Arborist	

Arborist to minimize the impact to trees.				
After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigor and authorize the removal of protective fencing. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of construction	Principle contractor	Project Arborist	
Any wounding or injury that occurs to a tree during the demolition/construction process will require the project arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. All remediation work is to be carried out by the project arborist, at the contractor's expense.	Ongoing throughout the development	Principle contractor	Project Arborist	

13. BIBLIOGRAPHY/REFERENCES

- Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009).
- Council of Standards Australia, *AS4373 Pruning of amenity trees* (2007).
- Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).
- Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, <http://www.treeaz.com/>.
- Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, <http://www.treeaz.com/>.
- *Pittwater Local Environmental Plan 2014*
<https://legislation.nsw.gov.au/#/view/EPL/2014/320/historical2017-08-25/full>.
- *Pittwater 21 Development Control Plan*,
<https://eservices.northernbeaches.nsw.gov.au/ePlanning/live/pages/plan/book.aspx?exhibit=PDCP>.
- *Northern Beaches Council - Removing and Pruning Trees on Private Land*,
<https://www.northernbeaches.nsw.gov.au/planning-development/tree-management/private-land>
- State Environmental Planning Policy (Vegetation in non-rural areas 2017)
- <https://maps.six.nsw.gov.au/>
- <https://www.google.com/maps/place/128+Elanora+Rd,+Elanora+Heights+NSW+2101>

14. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 1 – Existing site plan
- Appendix 1A – Proposed Floor Plan
- Appendix 1B – Proposed Site Plan, Tree retention and Protection Plan
- Appendix 2 - Tree inspection schedule
- Appendix 3 - Health
- Appendix 4 – Tree Protection Zone
- Appendix 5 – Structural Root Zone
- Appendix 6 – Amenity Value
- Appendix 7 – Age Class
- Appendix 8 – Structural Condition
- Appendix 9 – SULE Categories
- Appendix 10 – Retention Values
- Appendix 11 – Trees AZ

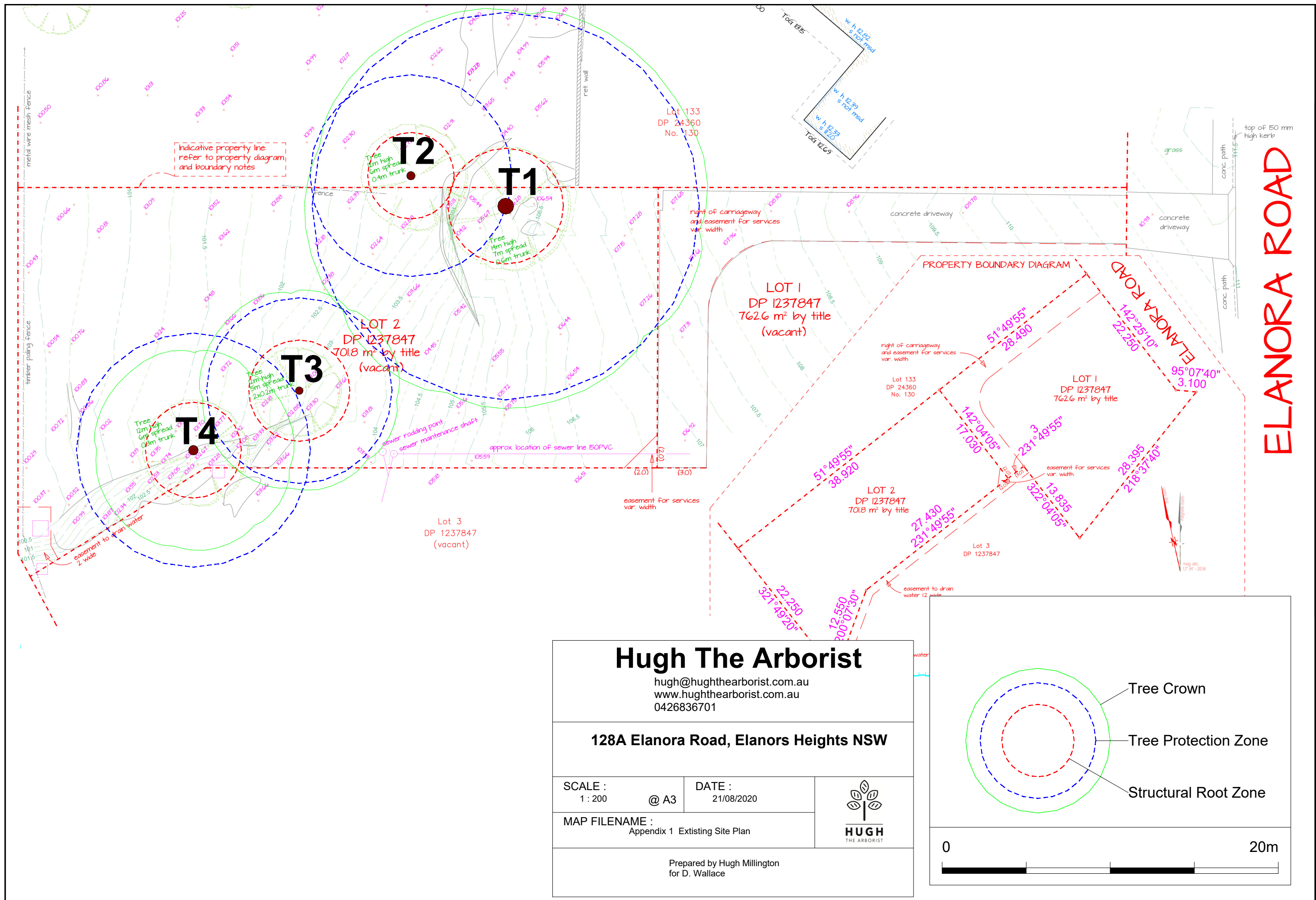
Hugh Millington



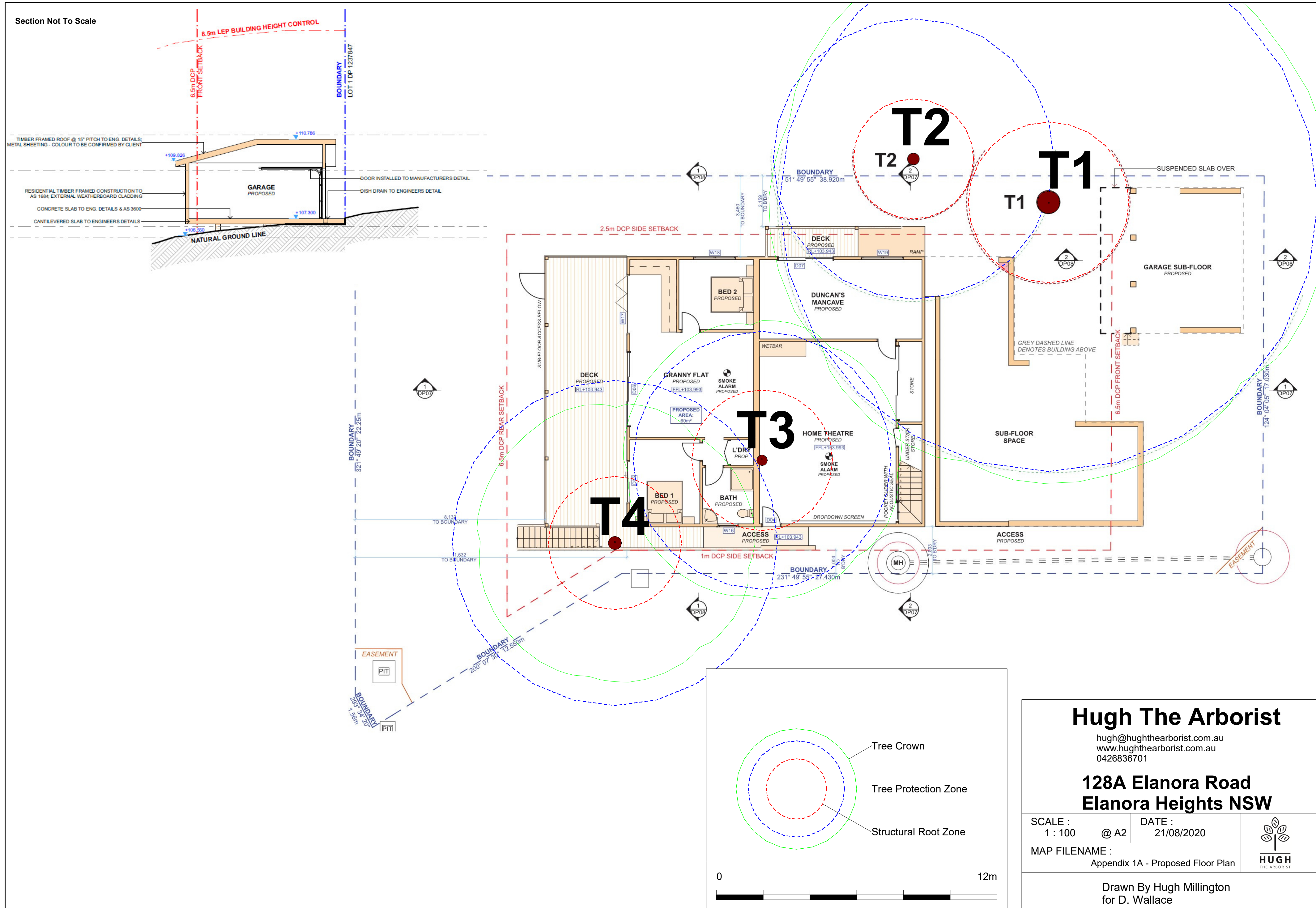
Diploma of Arboriculture (AQF5)
NC Forestry and Arboriculture III (UK)
RFS Tech. Cert. II (UK)
QTRA Registered User
ISA Tree Risk Assessment Qualification
MAA
MISA

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Section Not To Scale



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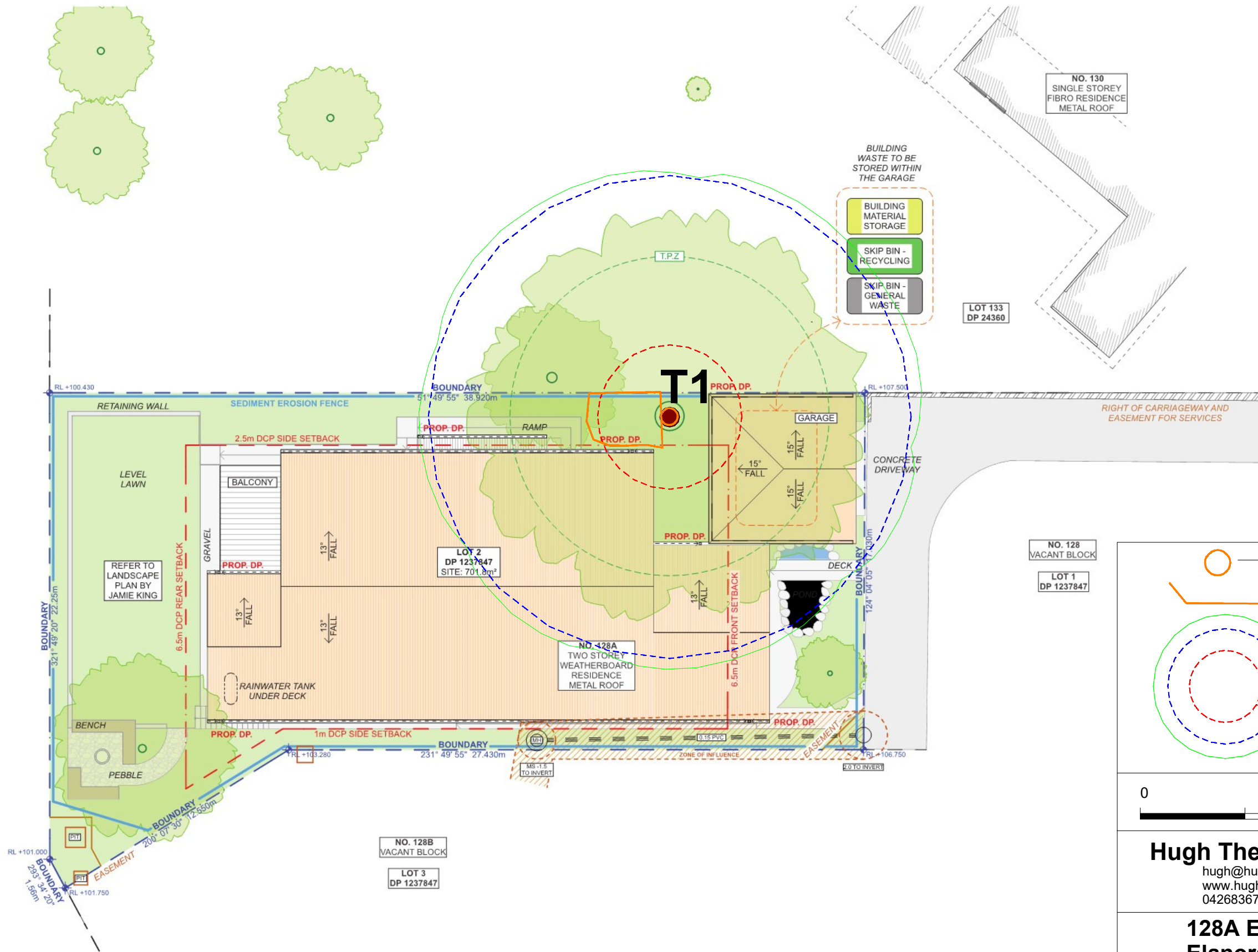
**128A Elanora Road
Elanora Heights NSW**

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MAP FILENAME : Appendix 1A - Proposed Floor Plan



Drawn By Hugh Millington
for D. Wallace



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DATE :
21/08/2020

MAP FILENAME :
Appendix 1B - Tree Retention and Protection Plan



Prepared by Hugh Millington for D. Wallace

Appendix 2 - Tree Inspection Schedule

Tree ID	Tree Species	Age Class	DBH (MM)	DAB (MM)	Height (M)	Spread (M)	TPZ radius (M)	SRZ radius (M)	Health	Structure	Amenity Value	SULE	Retention Value	Notes/comments
1	Ficus macrophylla (Moreton Bay Fig)	M	960	1100	16	12	11.5	3.4	Good	Good	High	1,Long	A1	Included stems are showing signs of occlusion. Major root development over natural rock. Root damage from civil machinery during subdivision.
2	Eucalyptus microcorys (Tallow Wood)	D	500	550	10	6	6	2.6	Dead	Poor	Low	4.Remove	Z4	Neighbours tree is dead.
3	Eucalyptus microcorys (Tallow Wood)	E M	380/260	800	15	5	5.5	2.8	Good	Good	High	1.Long	A1	Twin stem, appears to have had root damage from civil machinery likely during the subdivision phase.
4	Pinus Radiata (Monterey Pine)	M	580	700	15	6	7	2.8	Fair	Good	Medium	2.Medium	Z3	Tree showing signs of sparse canopy.



Appendix 2 - Tree Inspection Schedule

Explanatory Notes

Tree Species - Botanical name followed by common name in brackets. Where species is unknown it is indicated with an '*spp*'.

Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y), Dead (D).

Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level. Where DBH has been estimated it is indicated with an 'est'. The (1) indicates the stem number and the (t) indicates the total DBH when calculated in accordance with AS4970-2009 definition.

Diameter Above root Buttresses (DAB): Measured with a DBH tape or estimated above root buttresses (DAB) for calculating the SRZ.

Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.

Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.

Tree Protection Zone (TPZ) - $DBH \times 12$. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the TPZ is set at 1 metre outside the crown projection.

Structural Root Zone (SRZ) - $(DAB \times 50)^{0.42} \times 0.64$. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.

Health - Good/Fair/Poor/Dead

Structure - Good/Fair/Poor

Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.

Amenity Value - Very High/High/Medium/Low/Very Low.

Appendix 3 – Condition/Overall health

<u>Category</u>	<u>Example condition</u>	<u>Summary</u>
Good	<ul style="list-style-type: none"> • Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development. • Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form. 	<ul style="list-style-type: none"> • The tree is in above average health and condition and no remedial works are required. • The tree is considered structurally good with well developed form.
Fair	<ul style="list-style-type: none"> • The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree. • The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may have a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing. 	<ul style="list-style-type: none"> • The tree is in below average health and condition and may require remedial works to improve the trees health. • The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	<ul style="list-style-type: none"> • The tree may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health. • The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. 	<ul style="list-style-type: none"> • The tree is displaying low levels of health and removal or remedial works may be required. • The identified defects are likely to cause either partial or whole failure of the tree.

	<ul style="list-style-type: none"> • The tree crown may have poor weight distribution which could cause failure. 	
Dangerous	<ul style="list-style-type: none"> • The tree is dead or almost dead. • The tree is an imminent danger to people or property. 	<ul style="list-style-type: none"> • The tree should generally be removed.

Appendix 4 - Tree Protection Zone (TPZ)

The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The TPZ incorporates the structural root zone (SRZ).

Determining the TPZ

The radius of the TPZ is calculated for each tree by multiplying its DBH × 12.

$$\text{TPZ} = \text{DBH} \times 12$$

Where

DBH = trunk diameter measured at 1.4 m above ground

Radius is measured from the centre of the stem at ground level.

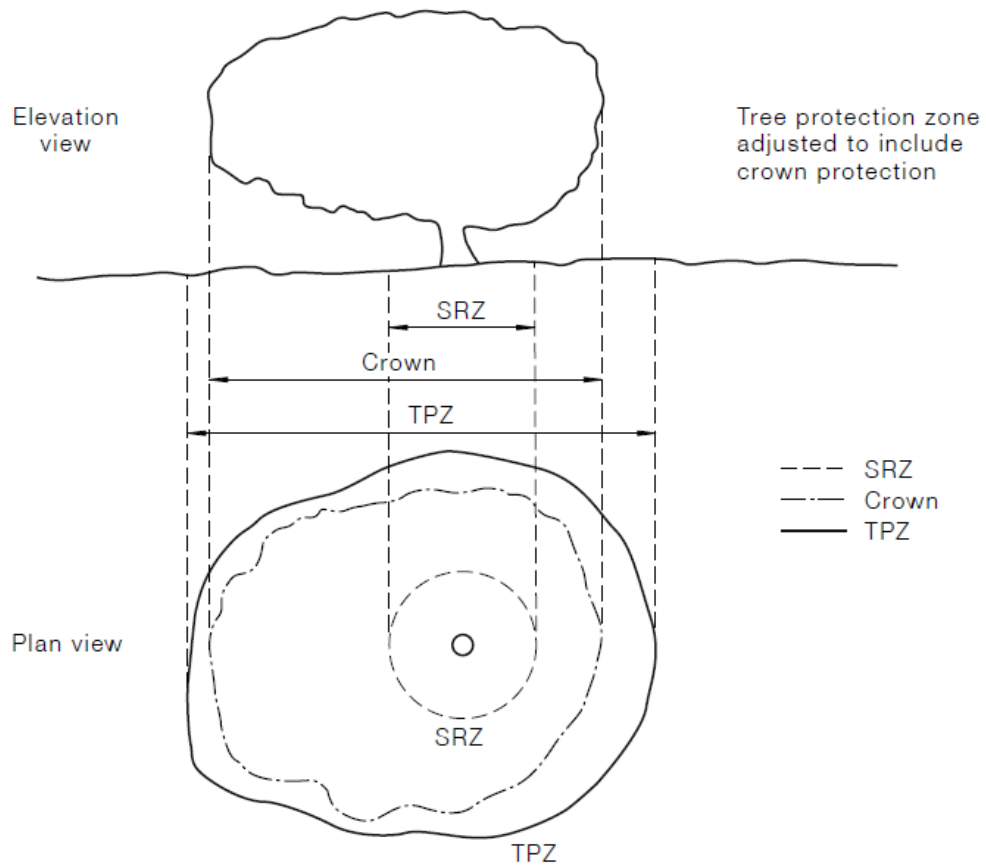
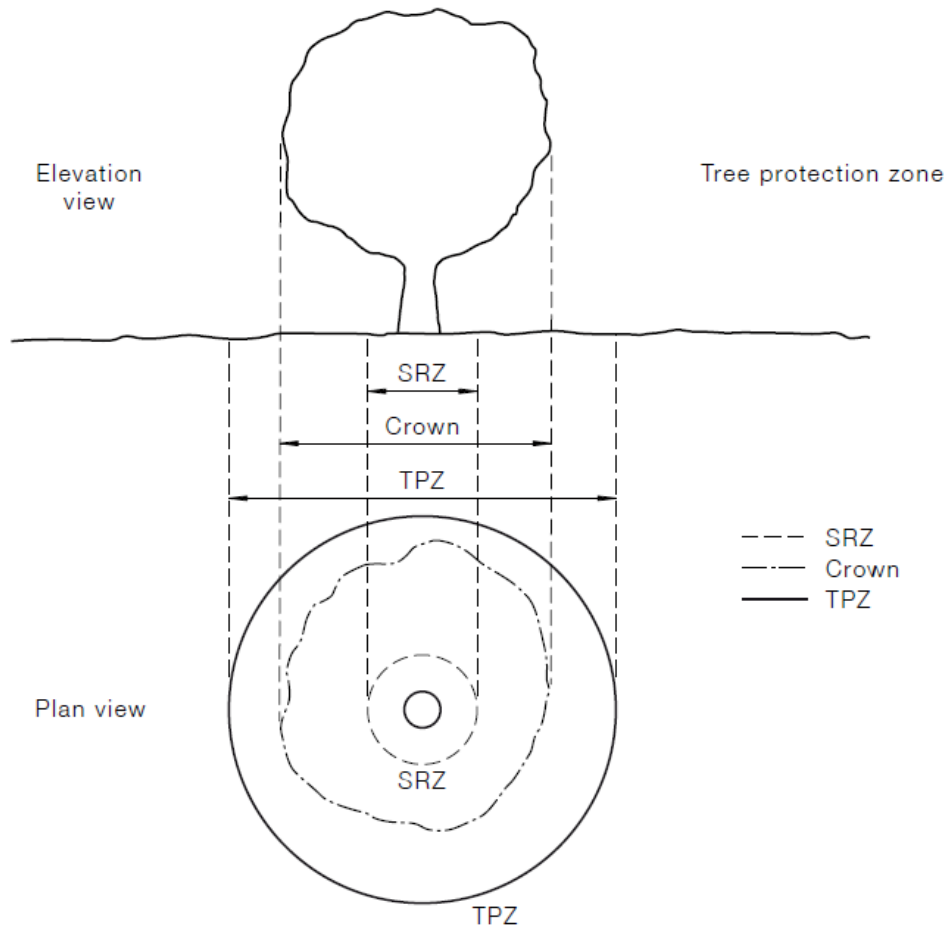
A TPZ should not be less than 2 m nor greater than 15 m (except where crown protection is required).

Minor encroachment into the TPZ

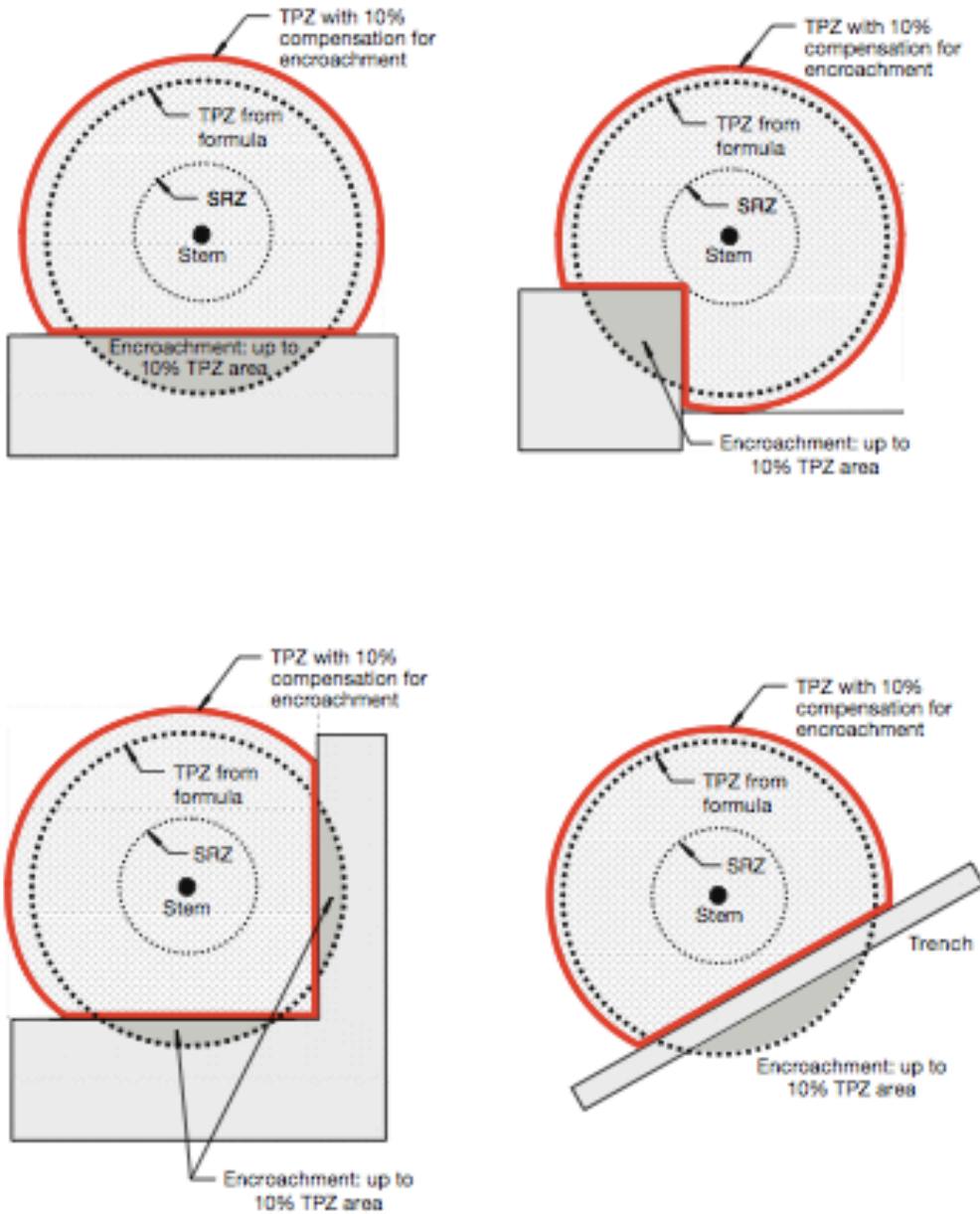
Where encroachment into the TPZ is unavoidable it is generally accepted that encroachment of under 10% of the total TPZ is possible without carrying out detailed root investigations. This minor loss of root area is normally compensated by the roots developing elsewhere.

Major encroachment into the TPZ

If an encroachment of more than 10% is proposed into the TPZ it would be necessary to demonstrate that the tree would remain viable. Non destructive root investigations may be required to determine any potential impact the encroachment may have on the tree.



Encroachment into the tree protection zone (TPZ) is sometimes unavoidable. Figure D1 provides examples of TPZ encroachment by area, to assist in reducing the impact of such incursions.



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.

Appendix 5 - Structural root zone (SRZ)

This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.

Determining the SRZ

An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.

$$\text{SRZ radius} = (D \times 50)^{0.42} \times 0.64$$

where

D = trunk diameter in m, measured above the root buttress.

Note - The SRZ for trees with trunk diameters less than 0.15 will be 1.5m.

Appendix 6 - Amenity value

To determine the amenity value of a tree we assess a number of different factors which include but are not limited to the information below.

- The visibility of the tree to adjacent sites.
- The relationship between the tree and the site.
- Whether the tree is protected by any statutory conditions.
- The habitat value of the tree.
- Whether the tree is considered a noxious weed species.

Appendix 7 - Age class

If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below.

<u>Category</u>	<u>Description</u>
Young/Newly planted	<ul style="list-style-type: none">• Young or recently planted tree.
Semi Mature	<ul style="list-style-type: none">• Up to 20% of the usual life expectancy for the species.
Early mature/Mature	<ul style="list-style-type: none">• Between 20% - 80% of the usual life expectancy for the species.
Over mature	<ul style="list-style-type: none">• Over 80% of the usual life expectancy for the species.
Dead	<ul style="list-style-type: none">• Tree is dead or almost dead.

Appendix 8 - Structural condition

<u>Category</u>	<u>Example condition</u>	<u>Summary</u>
Good	<ul style="list-style-type: none">• Branch unions appear to be strong with no sign of defects.• There are no significant cavities.• The tree is unlikely to fail in usual conditions.• The tree has a balanced crown shape and form.	<ul style="list-style-type: none">• The tree is considered structurally good with well developed form.
Fair	<ul style="list-style-type: none">• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects.• The tree may have a cavity that is currently unlikely to fail but may deteriorate in the future.• The tree is an unbalanced shape or leans significantly.• The tree may have minor damage to its roots.• The root plate may have moved in the past but the tree has now compensated for this.• Branches may be rubbing or crossing.	<ul style="list-style-type: none">• The identified defects are unlikely cause major failure.• Some branch failure may occur in usual conditions.• Remedial works can be undertaken to alleviate potential defects.
Poor	<ul style="list-style-type: none">• The tree has significant structural defects.• Branch unions may be poor or weak.• The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure.• The tree may have root damage or is displaying signs of recent movement.• The tree crown may have poor weight distribution which could cause failure.	<ul style="list-style-type: none">• The identified defects are likely to cause either partial or whole failure of the tree.

Appendix 9 - Safe Useful Life Expectancy (SULE), (Barrel, 2001)

A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.

5. Small/Young	<ul style="list-style-type: none"> (a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.
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TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species

Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc

High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure

Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure <u>cannot</u> be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc

Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people

Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc

Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population

Z9	Severe damage and/or structural defects where a high risk of failure can be <u>temporarily</u> reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

A1	No significant defects and could be retained with minimal remedial care
A2	Minor defects that could be addressed by remedial care and/or work to adjacent trees
A3	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
A4	Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

NOTE: Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.