HUGH
THE ARBORIST

# Arboricultural Impact Assessment


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## COPYRIGHT

# 1. INTRODUCTION

1.1 This report has been commissioned by the client Peter Kelly to assess trees located on and adjoining the site that may be impacted by a proposed development.

1.2 The site and tree inspections were carried out on 18th March 2025. Access was available to the subject site and adjoining public areas only. All tree data was collected during this time.

**Table 1:** Documents Reviewed For The Assessment.

| Title | Author | Date | Reference on document |
|---|---|---|---|
| Survey Plan | LS Surveyors Pty Ltd | 25/11/2024 | 10316.2 |
| Architectural Plans | Action Plans | 07/03/2025 | Refer To Schedule Below |

| NO. | DRAWING NAME |
|---|---|
| DA00 | COVER |
| DA01 | NOTATION |
| DA02 | SAFTEY NOTES |
| DA03 | SITE ANALYSIS |
| DA04 | SITE / ROOF / SEDIMENT EROSION / WASTE MANAGEMENT / STORMWATER CONCEPT PLAN |
| DA05 | EXISTING LOWER GROUND FLOOR PLAN |
| DA06 | EXISTING GROUND FLOOR PLAN |
| DA07 | EXISTING GARAGE FLOOR PLAN |
| DA08 | PROPOSED LOWER GROUND FLOOR PLAN |
| DA09 | PROPOSED GROUND FLOOR PLAN |
| DA10 | PROPOSED GARAGE FLOOR PLAN |
| DA11 | NORTH / EAST ELEVATION |
| DA12 | SOUTH / WEST ELEVATION |
| DA13 | LONG / CROSS SECTION |
| DA14 | EXISTING AREA CALCULATIONS |
| DA15 | PROPOSED AREA CALCULATIONS |
| DA16 | WINTER SOLSTICE 9 AM |
| DA17 | WINTER SOLSTICE 12 PM |
| DA18 | WINTER SOLSTICE 3 PM |
| DA19 | SAMPLE BOARD |
| DA20 | BASIX COMMITMENTS |

## 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 trees located on and adjoining the site within five metres of the proposed works.

2.1.2 For the purpose of this report, a tree is taken to have a height equal to or greater than 5 metres.

2.1.3 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.4 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).

2.1.5 Recommend methods to mitigate development impacts where possible.

2.1.6 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 Dense vegetation and a collapsed deck prohibited the access to the bases of trees 6 and 7 on site.

3.2 The 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 of the inspection.

3.3 All observations were carried out from ground level. No additional detailed testing was carried out on trees or soil on site and none of the surrounding surfaces were lifted for investigated.

3.4 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.

3.5 The report reflects the subject tree(s) as found on the day of the inspection. Any changes to the growing environment of the subject trees, 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.

3.6 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.

3.7 All diagrams, plans and photographs included in this report are visual aids only, and are not to scale unless otherwise indicated.

3.8 Hugh The Arborist neither guarantees, nor is responsible for, the accuracy of information provided by others that is contained within this report.

3.9 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 the trees at the site.

3.10 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.

3.11 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.

3.12 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).

4.1.1 Tree common name

4.1.2 Tree botanical name

4.1.3 Tree age class

4.1.4 DBH (Trunk/Stem diameter at breast height/1.4m) - millimetres.

4.1.5 DAB (Trunk diameter directly above the root buttress) – millimetres.

4.1.6 Estimated height - metres

4.1.7 Estimated crown spread (radius of crown) - metres

4.1.8 Health

4.1.9 Structural condition

4.1.10 Amenity value

4.1.11 Estimated remaining contribution years (SULE)[1]

4.1.12 Retention value (Tree AZ)[2]

4.1.13 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop*, Sydney, 2001. Barrell.

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

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

4.3 Trunk diameter was measured using a DBH tape or in some cases estimated. The trunk diameter of all trees in adjoining sites has been estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tool used during the assessment was a digital camera.

4.4 All information was imported into (GIS) PT-mapper pro software. This software was used to measure/calculate all encroachment estimates included in this report.

4.5 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) in a Microsoft Excel spreadsheet.[4]

4.6 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 suburb of Bilgola Plateau within the Northern Beaches Local Government Area (LGA), this assessment has been carried out in accordance with the following legislation and policy.

5.1.1 Pittwater Local Environmental Plan (LEP) 2014

5.1.2 Pittwater 21 Development Control Plan (DCP) 2014

5.1.3 State Environmental Planning Policy (Biodiversity and Conservation) 2021

5.1 The proposed works assessed in this report is the reconstruction of an existing collapsed deck with an extended section of deck off the rear of the existing dwelling.

5.2 The site has not been identified as within a heritage conservation area or within an area containing biodiversity according to the NSW Planning Portal Spatial Viewer.[5] Accessed *20/03/2025*

5.3 For the purpose of this report ‘the site’ is referred to as the rear of the existing dwelling. The site falls significantly from the rear of the dwelling with a series of stone stairs and planters containing trees and Palms.

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

[5] https://www.planningportal.nsw.gov.au/spatialviewerhistoric/#/find-a-property/address

## Site Location [6]

[6] https://maps.six.nsw.gov.au/

## 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 plan:** In appendix 1 the tree information including canopy spread, TPZ and SRZ have been overlaid onto the received site plan.

- Appendix 1: Existing Site Plan
- Appendix 1A: Proposed Site Plan and Tree Protection Plan

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.

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.

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. ASSESSMENT OF CONSTRUCTION IMPACTS

7.1 **Table 2:** In the table below, the impact of the proposed development has been assessed for all trees included in the report.

| Tree ID | Botanical Name | Retention value | TPZ radius (m) | SRZ radius (m) | TPZ encroachment | Discussion/ Conclusion | Recommendation |
|---|---|---|---|---|---|---|---|
| 1 | *Archontophoenix cunninghamiana* | Z3 | 3.0 | NA | None | No encroachment proposed. | Retain and protect |
| 2 | *Archontophoenix cunninghamiana* | Z3 | 3.0 | NA | None | No encroachment proposed. | Retain and protect |
| 3 | *Angophora floribunda* | A1 | 4.8 | 2.4 | Minor | The proposed reconstruction of the deck encroaches into the TPZ but not the SRZ by up to 10% which is a minor encroachment. The tree is contained within an existing stone planter indicating it will not be impacted by the proposed works. | Retain and protect |
| 4 | *Livistona australis* | A1 | 2.5 | NA | None | No encroachment proposed. | Retain and protect |
| 5 | *Corymbia maculata* | A1 | 7.8 | 3.0 | Minor | The proposed reconstruction of the deck will encroach into the TPZ but not the SRZ by less than 10% which is a minor encroachment. The tree is situated up to 600mm lower than the proposed works and is separated by a series of stone stairs and a stone planter indicating it is unlikely any tree roots will be affected and the tree will be subject to negligible impacts. | Retain and protect |
| 6 | *Livistona australis* | A1 | 2.5 | NA | None | No encroachment proposed. | Retain and protect |
| 7 | *Magnolia grandiflora* | A1 | 2.0 | 1.6 | None | No encroachment proposed. | Retain and protect |

## 8. CONCLUSIONS

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

| Impact | Reason | Category A | Category Z | Total |
|---|---|---|---|---|
| | | A | Z | |
| Trees recommended to be removed | Building construction, new surfacing and/or proximity, or trees in poor condition. | - | - | **0** |
| Trees recommended to be retained requiring tree sensitive construction methods and/or design modifications | Removal of existing surfacing/structures and/or installation of new surfacing/structures may impact the viability of the trees | - | - | **0** |
| Trees recommended to be retained | Removal of existing surfacing/structures and/or installation of new surfacing/structures will not impact the viability of the trees | 3,4,5,6,7 | 1,2 | **7** |

## 9. PHOTOGRAPHS

**Photo A:** The Looking from the lower ground floor at Tree 3 which is contained within a stone planter and will not be impacted by the associated encroachment of the deck.

## 10. RECOMMENDATIONS

10.1 This report assesses the impact of a proposed development at the subject site to seven trees located on and adjoining the site in accordance with AS4970 Protection of Trees on Development Sites (2009).

10.2 No trees are proposed to be removed as part of this development.

10.3 All trees can be retained in a viable condition under the proposed development with no tree sensitive specifications for the construction. The reason is that the existing level changes and planter beds have modified the calculated Tree Protection Zone areas and the encroachments assessed are unlikely to encounter any significant tree roots while installing the deck.

10.4 All trees to be retained must be protected in accordance with AS4970-2009, details of which are included in section 11.

10.5 No services or landscape plan has been assessed as part of this report. See section 10 for general guidance when landscaping within the TPZ of trees to be retained.

10.6 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 with 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.

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 principal 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 **Tree protection Specifications:** It is the responsibility of the principal 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.

11.6 **Site Specific Tree Protection Recommendations:**

**Table 4: Protection Requirements:** See appendix 1A for indicative fencing location. See section 10 for general specifications of tree protection.

| Tree Number | Protection Specification |
|---|---|
| 1,2,3,4 | - Trunk Protection |
| 5,6,7 | - No specific tree protection required |

11.7 **Protective fencing:** Where it is not feasible to install fencing at the specified location due to factors such 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 in 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:

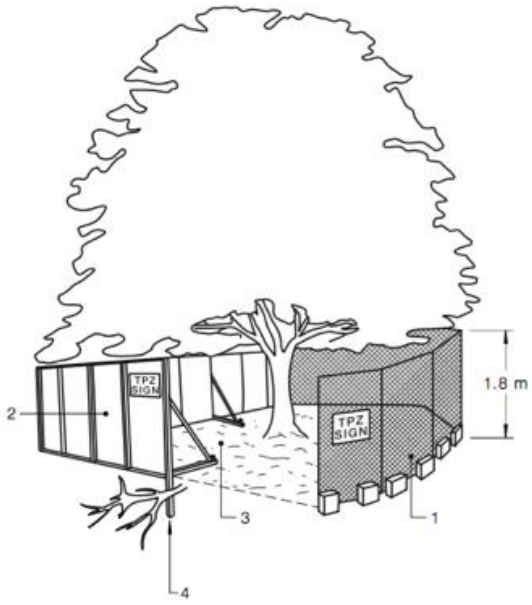
- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.

- 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.

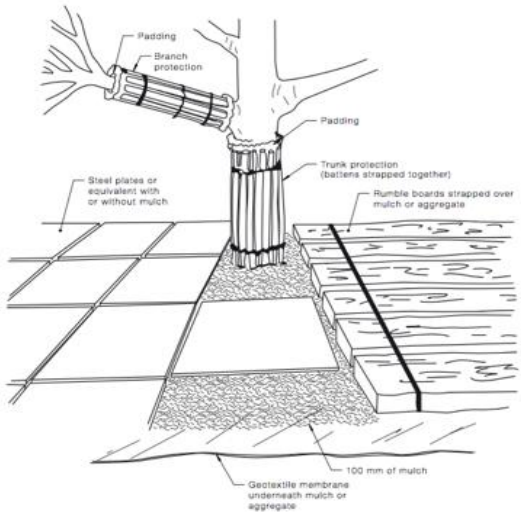
11.10 **Mulch:** Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.

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,[7] with example tree protection.

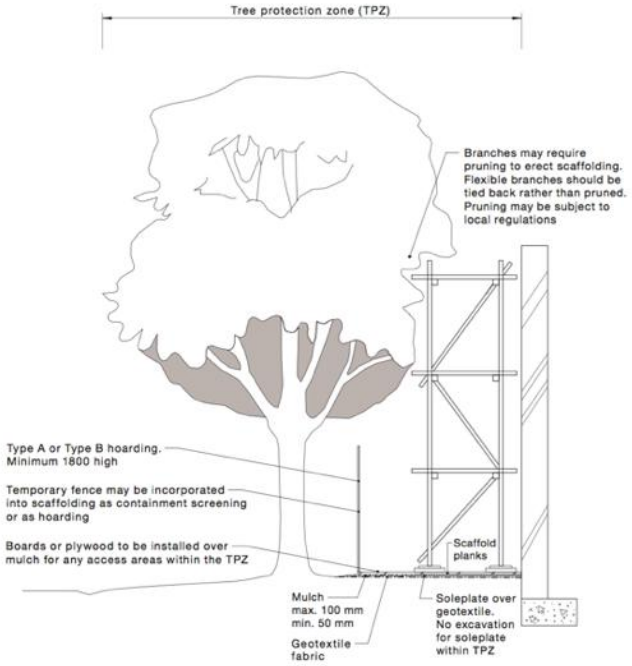



NOTES:
1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

An image from AS4970-2009,[8] with example tree protection.

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

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




An image from AS4970-2009,[9] with example tree protection involving scaffold.

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.

[9] Council of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 19.

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).[10] 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.

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

11.16 **Underground Services:** Where possible underground services should be located outside the TPZ of trees to be retained. AS4970 Protection of trees on development sites (2009) recommends that all underground services located inside the TPZ of any tree to be retained should 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.

If directional drilling is proposed, 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'.[11]
If manual excavations are proposed, all excavations for the services should be carried out manually under the supervision of the project Arborist (minimum qualification AQF 5). 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. All roots greater than 40mm in diameter should be retained in the service trench. The service pipe should then be threaded below the retained roots where practical. Roots greater than 40mm within the alignment of the service pipe should only be severed/pruned under the approval of the project Arborist. All root pruning should be in accordance with AS4373 Pruning of amenity trees (2007).
Open trenching in the SRZ of trees can be impractical without impacting significant roots, as often dense root growth is present in the SRZ. Open trenching should therefore be avoided in the SRZ. It is recommended that any section of pipe that is located in the SRZ of trees to be retained is installed via sub-surface boring/directional drilling methods only. The feasibility of sub-surface boring/directional drilling will need to be investigated by a sub-surface boring/directional drilling specialist. The project Arborist should provide advice and supervise excavations for bore pits, which must be carried out manually if located within the TPZ. The top of the pipe must be at least 600mm below the existing soil grade. The location of bore pits should be flexible in the TPZ to avoid significant roots, the project Arborist should assess and advise in writing the impact of any significant root severance to the condition of the tree.

11.17 **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.

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

11.19 **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, considerer 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.

11.20 **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.

11.21 **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.

11.22 **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.

11.23 **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.

11.24 **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**.** The hold points 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.

| Hold Point | Stage | Responsibility | Certification | Complete Y/N and date |
|---|---|---|---|---|
| Project Arborist to hold pre construction site meeting with principal 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 carry out 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 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 30mm 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 Arborist to minimize the impact to trees. | Landscape | Principle contractor | Project Arborist | |
| 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


- Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop, Sydney*, 2001. Barrell
- Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.
- Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).
- Council Of Standards Australia, *AS4373 Pruning of amenity trees* (2007).
- Hirons, A. D., & Thomas, P. A., *Applied Tree Biology*, John Wiley & Sons Limited (2018).
- Lonsdale, D., *Principles of tree hazard assessment and management*, The Stationary Office, London, England (1999).
- Matheny, N. & Clark, J. R, *A technical guide to preservation of trees during land development*, International Society of Arboriculture, P.O Box 3029, Champaign, IL, USA (1998).
- Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).
- Pittwater Local Environmental Plan (LEP) 2014
- Pittwater 21 Development Control Plan (DCP)
- State Environmental Planning Policy (Biodiversity and Conservation 2021)


## 14. LIST OF APPENDICES

The following are included in the appendices:

Appendix 1: Existing Site Plan
Appendix 1A: Proposed Site Plan and Tree Protection Plan
Appendix 2 – Tree inspection schedule
Appendix 3 – Health
Appendix 4 – Amenity Value
Appendix 5 – Age Class
Appendix 6 – Structural Condition
Appendix 7 – SULE Categories
Appendix 8 – Retention Values
Appendix 9 – Trees AZ
Appendix 10 – TPZ Encroachment

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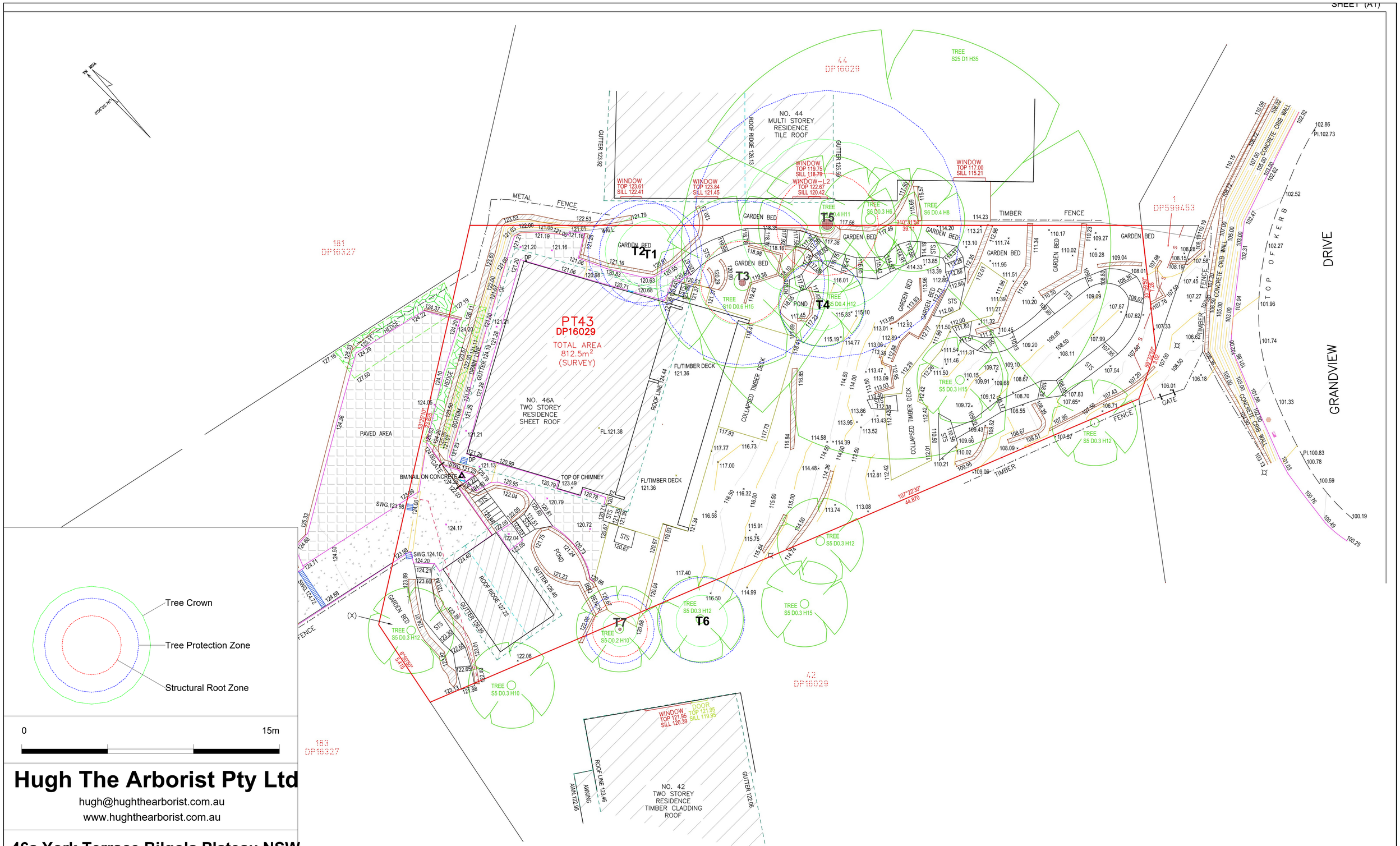
SHEET (A1)




Tree Crown

Tree Protection Zone

Structural Root Zone

0 15m

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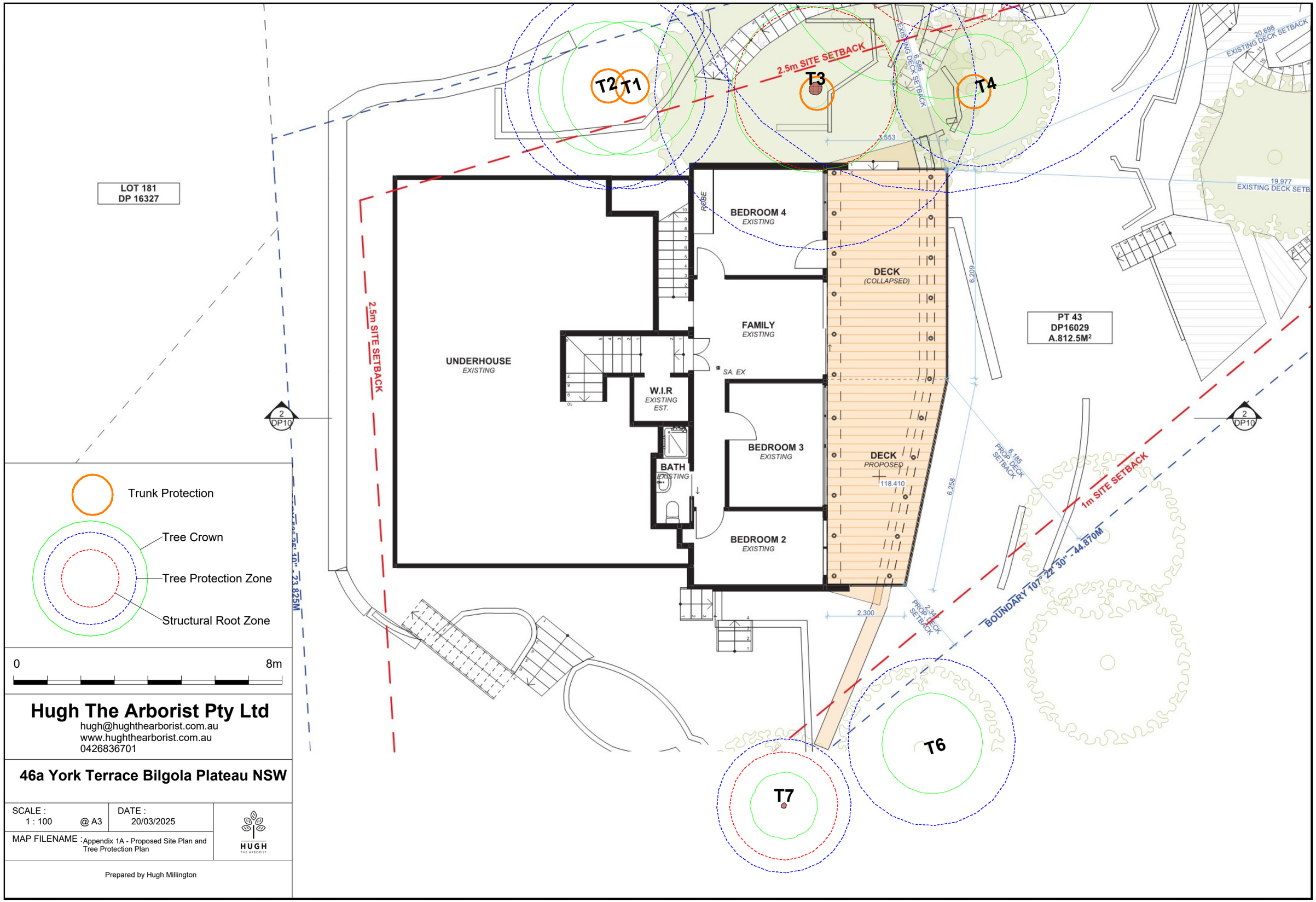
## 46a York Terrace Bilgola Plateau NSW

| SCALE : | DATE : |
|---|---|
| 1 : 100 @ A1 | 20/03/2025 |

MAP FILENAME : Appendix 1 - Existing Site Plan

HUGH THE ARBORIST

**Prepared by Hugh Millington**

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## 46a York Terrace Bilgola Plateau NSW

| SCALE : | DATE : |
|---|---|
| 1 : 100 @ A3 | 20/03/2025 |

MAP FILENAME : Appendix 1A - Proposed Site Plan and Tree Protection Plan

HUGH
THE ARBORIST

Prepared by Hugh Millington

## Appendix 2 - Tree Inspection Schedule

| Tree ID | Common Name | Botanical Name | Age Class | Height (m) | Canopy Spread Radius (m) | Stem 1 (mm) | Stem 2 (mm) | Stem 3 | Stem 4 | Stem 5 | Stem 6 | DBH (mm) | DAB (mm) | Health | Structure | Amenity Value | SULE | Retention Value | TPZ Radius (m) | SRZ Radius (m) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Bangalow Palm | *Archontophoenix cunninghamiana* | Mature | 8 | 2 | 200 | | | | | | 200 | NA | Good | Good | Low | 1. Long | Z3 | 3.0 | NA | |
| 2 | Bangalow Palm | *Archontophoenix cunninghamiana* | Mature | 8 | 2 | 200 | | | | | | 200 | NA | Good | Good | Low | 1. Long | Z3 | 3.0 | NA | |
| 3 | Rough Barked Apple | *Angophora floribunda* | Semi-mature | 8 | 2.5 | 400 | | | | | | 400 | 480 | Good | Good | High | 1. Long | A1 | 4.8 | 2.4 | Isolated in retaining wall |
| 4 | Cabbage Palm | *Livistona australis* | Mature | 10 | 1.5 | 380 | | | | | | 380 | NA | Good | Good | High | 1. Long | A1 | 2.5 | NA | |
| 5 | Spotted Gum | *Corymbia maculata* | Mature | 13 | 5 | 650 | | | | | | 650 | 780 | Good | Good | High | 1. Long | A1 | 7.8 | 3.0 | On lower rl and stone stairs |
| 6 | Cabbage Palm | *Livistona australis* | Mature | 10 | 1.5 | 200 | | | | | | 200 | NA | Good | Good | High | 1. Long | A1 | 2.5 | NA | |
| 7 | Southern Magnolia | *Magnolia grandiflora* | Semi-mature | 6 | 1 | 160 | | | | | | 160 | 180 | Good | Good | Medium | 1. Long | A1 | 2.0 | 1.6 | |

**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'.

**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 x 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.
**(x)** Indicates the measurement taken for the diameter at tree base above the buttress roots.
**(E)** Indicates estimated measurements.

## Appendix 3 – Assessment of Health

| Category | Example condition | Summary |
|---|---|---|
| Good | • Crown has good foliage density for species.<br>• Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree.<br>• Tree is displaying good vigour and reactive growth development. | • The tree is in above average health and condition and no remedial works are required. |
| Fair | • The tree may be starting to dieback or have over 25% deadwood.<br>• Tree may have slightly reduced crown density or thinning.<br>• There may be some discolouration of foliage.<br>• Average reactive growth development.<br>• There may be early signs of pathogens which may further deteriorate the health of the tree.<br>• There may be epicormic growth indicating increased levels of stress within the tree. | • The tree is in below average health and condition and may require remedial works to improve the trees health. |
| Poor | • The may be in decline, have extensive dieback or have over 30% deadwood.<br>• The canopy may be sparse or the leaves may be unusually small for species.<br>• Pathogens or pests are having a significant detrimental effect on the tree health. | • The tree is displaying low levels of health and removal or remedial works may be required. |
| Dead | • The tree is dead or almost dead. | • The tree should generally be removed. |

# Appendix 4 Landscape Value

| RATING | HERITAGE VALUE | ECOLOGICAL VALUE | AMENITY VALUE |
|---|---|---|---|
| 1. SIGNIFICANT | The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register | The subject tree is scheduled as a Threatened Species as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999 | The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species |
| | The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item | The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species | The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity |
| | The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to Commemorate an important historical event | The subject tree is a Remnant Tree, being a tree in existence prior to development of the area | The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance |
| 2. VERY HIGH | The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site. | The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site. | The subject tree has a very large live crown size exceeding 200m²; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area |
| 3. HIGH | The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence | The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value | The subject tree has a large live crown size exceeding 100m²; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% normal);<br>The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area |
| 4. MODERATE | The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting. | The subject tree is a non-local native or exotic species that is protected under the provisions of this DCP. | The subject tree has a medium live crown size exceeding 40m²;The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crowndensity of more than 50% (thinning to normal); and<br>The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area. |
| 5. LOW | The subject tree detracts from heritage values or diminishes the value of a heritage item | The subject tree is scheduled as exempt (not protected) under the provisions of this DCP due to its species, nuisance or position relative to buildings or other structures. | The subject tree has a small live crown size of less than 40m² and can be replaced within the short term (5-10 years) with new tree planting |
| 6. VERY LOW | The subject tree is causing significant damage to a heritage Item. | The subject tree is listed as an Environment Weed Species in the Local Government Area, being invasive, or is a known nuisance species. | The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse). |
| 7. INSIGNIFICANT | The tree is completely dead and has no visible habitat value | The tree is a declared Noxious Weed under the Noxious Weeds Act (NSW) 1993 within the relevant Local Government Area. | The tree is completely dead and represents a potential hazard. |

Ref: *Determining the retention value of trees of development sites,* presentation handouts at TAFE NSW Ryde College, March 2012

## Appendix 5 - Age class

Determining the exact age of a tree is difficult without carrying out potentially invasive testing. The age class of the subject tree has been estimated using the definitions below.

| Category | Description |
|---|---|
| Young/Newly planted | • Young or recently planted tree. |
| Semi Mature | • Up to 20% of the usual life expectancy for the species. |
| Early mature/Mature | • Between 20% - 80% of the usual life expectancy for the species. |
| Over mature | • Over 80% of the usual life expectancy for the species. |
| Dead | • Tree is dead or almost dead. |

## Appendix 6 - Structural condition

| Category | Example condition | Summary |
|---|---|---|
| Good | • Branch unions appear to be strong with no sign of defects.<br>• There are no significant cavities.<br>• The tree is unlikely to fail in usual conditions.<br>• The tree has a balanced crown shape and form. | • The tree is considered structurally good with well developed form. |
| Fair | • The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects.<br>• The tree may a cavity that is currently unlikely to fail but may deteriorate in the future.<br>• The tree is an unbalanced shape or leans significantly.<br>• The tree may have minor damage to its roots.<br>• The root plate may have moved in the past but the tree has now compensated for this.<br>• Branches may be rubbing or crossing. | • The identified defects are unlikely cause major failure.<br>• Some branch failure may occur in usual conditions.<br>• Remedial works can be undertaken to alleviate potential defects. |
| Poor | • The tree has significant structural defects.<br>• Branch unions may be poor or weak.<br>• The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure.<br>• The tree may have root damage or is displaying signs of recent movement.<br>• The tree crown may have poor weight distribution which could cause failure. | • The identified defects are likely to cause either partial or whole failure of the tree. |

## Appendix 7 - 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 | Useful life expectancy over 40 years |
| 2. Medium | Useful life expectancy 15 to 40 years |
| 3. Short | Useful life expectancy 5 to 15 years |
| 4. Remove | Useful life expectancy under 5 years |
| 5. Small/Young | Trees that could be transplanted or replaced with similar specimen. |
| 6. Unstable | Tree has become hazardous or structurally unstable. |

# 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 cannot 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 temporarily 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.

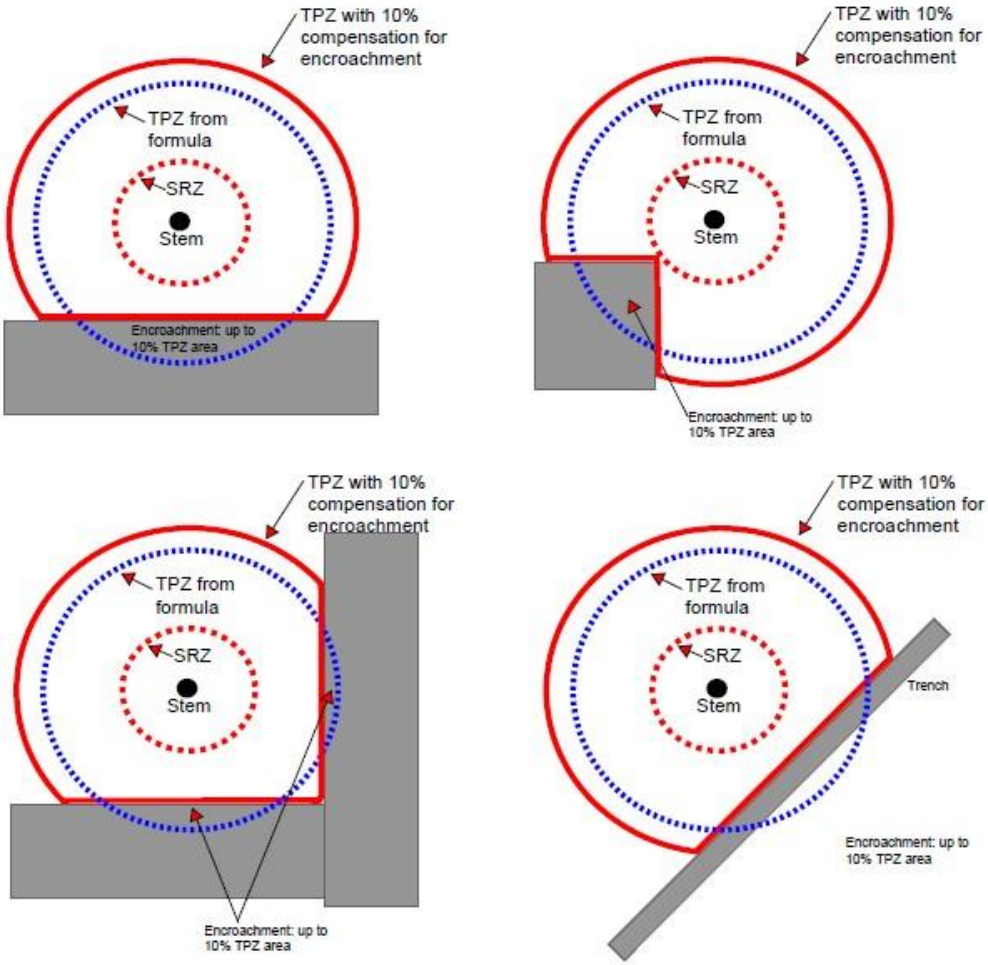
## Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

| | |
|---|---|
| **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.

## Appendix 9 – Examples of TPZ Encroachment

Encroachment into the Tree Protection Zone is sometimes unavoidable. The following diagram shows examples of acceptable levels of encroachment and how they may be compensated for by providing additional space contiguous to the TPZ area.




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