25 May 2021

smart arbor professional CONSULTING

180 McCarrs Creek Rd, Church Point

Arbor Impact Assessment
Version 1.0
Client: Yu Choong Then
c/o Sydney Earth & Tree Works

Prepared By

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Contents

1. DISCLAIMER

The information provided within this report from Smart Arbor Professional Consulting is independently gathered by the author as an unbiased party and represents only the opinions and summations of the consulting arborist; compiled using the data gathered from the site inspection/s and any relevant information provided by the client or client representative.

It is assumed that any information provided by the client or client representative is accurate, unless later found conflicting with the consulting arborist's findings. In the event of this type of conflict all parts of this report are to be withheld until the matter is resolved.

All recommendations provided in this report relate to the time and date of the initial, and any following, site assessment/s. In the absence of historical records or information provided by the client or client representative, assumptions and findings of the consulting arborist are deemed the relevant data used in this report.

Measurements and locations noted in this report are an approximation and may be based on information found in surveys and further documentation not completed by the author. Exact locations and measurements of landscape require the assessment of a qualified surveyor. Soil profiles and/or samples, tissue samples, invasive testing or aerial/below ground analysis are not completed as part of this service but may be recommended within the report to assist with further investigation.

 If the author and/or consulting arborist is required to provide testimony in a court in relation to this report, this would be deemed as a variation on the scope and will incur additional fees.

No part of this report is to be provided or conveyed to any third party or authority until full payment of invoice is received, or an agreement of a later payment is granted by the author.

No guarantees are implied for any findings or recommendations made within this report. Deficiencies, defects, climatic impacts, environmental changes, vandalism, mechanical impacts, or any other variable that may change the current state of the tree/s assessed are not covered in this report and will not be relevant to the opinions and findings provided.

2. EXECUTIVE SUMMARY

The report has been commissioned by Yu Choong Then, c/o Sydney Earth & Tree Works to provide a qualified assessment for tree specimens on a proposed development site located at 180 McCarrs Creek Road, Church Point; a residential property located in the Northern Beaches Council LGA and subject to Local Government Tree Preservation policies.

The general vegetation on the site is noted to be a combination made up of endemic and native large canopy tree specimens. The vegetation assessed were 4 x trees on the property and 1 x tree in a neighbouring property.

The proposed development affecting vegetation on site consists of the construction of an inclinator with associated track, and the construction of a new boat shed with associated hard landscape works. This development will require adjustment of soil levels, excavation and construction works in proximity of trees on site and in a neighbouring property.

- 2 tree specimens (Tree No.'s 2 & 3) are unaffected by the proposed development.
- 1 tree specimen (Tree No. 1) is located within proximity to the proposed development, creating a low impact encroachment within the TPZ (<10%).
- 1 tree specimen (Tree No. 5) is located within proximity to the proposed development, creating a moderate impact encroachment within the TPZ (>10%; <20%).
- 1 tree specimen (Tree No. 4) is located within the building footprint.

A summary of the recommendations in reference to the vegetation assessed and information on the proposed development provided within this report is as follows:

TREES SUITABLE FOR RETENTION

- Tree No.'s 1 and 5 are suitable for retention due to a low/moderate encroachment from the proposed development. Tree protection fencing should be established prior to site establishment to encompass the measured TPZ (allowing access for the development and a maximum 500mm clearance for its construction) as well as an additional area equivalent to the encroachment posed by the development to offset against the impacts posed to the tree. This fenced area should be mulched with a 100mm layer of organic mulch.

- Tree No.'s 2 & 3 are unaffected by the proposed development and suitable for retention.

TREES UNSUITABLE FOR RETENTION

- Tree No. 4 is located within the development footprint and is unsuitable for retention. The tree should be removed prior to site establishment if the development is approved in its current design.

All recommended tree works must be approved by Council prior to completion. Tree pruning works should be completed by an experienced Arborist with a minimum AQF III qualification in Arboriculture who holds Public Liability and Workers Compensation insurance. All pruning works must be carried out in accordance with Australian Standard for Pruning of amenity trees (AS4373 - 2007)[(a)].

Schedule of Tree Management Processes

Stage	Task	Responsible Parties	Process Timing
1	Engagement of Project Arborist to oversee tree health and management	Principal Contractor	Prior to site establishment
2	Undertake removal of Tree 4	Principal Contractor	Prior to site establishment
3	Install Tree Protection measures around Trees 1 & 5	Principal Contractor	Prior to site establishment.
4	Certification of Pruning and Tree Protection Measures	Project Arborist	Prior to site establishment.
5	Supervise all excavation works proposed within the TPZ	Principal Contractor Project Arborist	As required prior to the works proceeding adjacent to tree
6	Final Inspection and certification of trees	Principal Contractor	Following the removal of tree protection measures from Stage 3

3. PURPOSE

3.1 - PROPOSAL

The report has been commissioned by Yu Choong Then, c/o Sydney Earth & Tree Works to provide a qualified assessment for tree specimens on a proposed development site located at 180 McCarrs Creek Road, Church Point; a residential property located in the Northern Beaches Council LGA and subject to Local Government Tree Preservation policies.

The objective of this report is to complete a Visual Tree Assessment (Mattheck and Breloer 1994 standard)[d] and take data to assess and provide advice on the impacts posed on vegetation protected by Local Government policies and provide recommendations to assist and guide management of tree species with the view of retaining and protecting suitable specimens.

Determinations and conclusions are drawn in this report by identifying key factors such as:

- Significant tree specimens
- Trees protected under the relevant Development Control Plan (Pittwater 21 Development Control Plan 2014; B4.22 – Preservation of Trees and Bushland Vegetation)[c].
- Trees protected under the Threatened Species Conservation Act (NSW 1995) and/or the Environment Protection and Biodiversity Conservation Act (Commonwealth 1999)
- Trees suitable for retention
- Trees unsuitable for retention
- The impacts by proposed structures to currently existing tree specimens

The data collected can be read in summarized table form in **TREE DATA COLLECTION FORM** (page 11).

3.2 - LOCAL GOVERNMENT TREE PROTECTION

The site is located within the Northern Beaches LGA, and is thus governed by their relevant adopted Development Control Plans and Local Environment Plans from former Councils; and their current Tree Management Policies.

The Pittwater Development Control Plan[c] requires a Vegetation Clearing Permit for:

a) Removal or cutting down of any tree over five (5) metres in height;
b) Pruning of more than ten percent (10%) of a tree canopy.
c) The removal or cutting down of vegetation in "Bushland".

The trees assessed in this report can be categorized as protected by this policy.

4. METHOD

4.1 – METHODOLOGY

A visual assessment of the trees (VTA[8] - Mattheck and Breloer 1994 standard)[(d)] was performed on 27th April, 2021. VTA[8] is an industry recognised and standard assessment of an individual tree from ground level to identify tree health and structural symptoms. VTA[8] is limited to view at ground level, and does not observe symptoms below ground level, or up in the canopy not viewable from ground.

In order to view tree conditions below ground level, excavation around the root base would be required. For viewing areas of the canopy not viewable from ground, an aerial inspection would be required. Neither of these methods were completed at the time of assessment.

4.2 - INSPECTION DATA

- Genus and species
- Height (Estimation),
- Canopy Spread (Estimation)
- DBH (Diameter at Breast Height) and DRB (Diameter at Root Base) with Diameter Tape
- Age
  (**J**uvenile, **S**emi-**M**ature, **M**ature, **O**ver-**M**ature, **S**enescent)
- Vigor
  (**G**ood, **AV**erage, **P**oor, **D**ead)
- Growth Habit
  (**U**pright, **S**preading, **L**eaning, **O**ver-**E**xtended, **D**ominant, **C**o-**D**ominant, **M**ulti-**S**temmed)
- Crown[1] Form
  (**S**ymmetrical, **AS**ymmetrical, **DE**nse, **SP**arse, **DO**rmant)
- IACA STARS© Significance value
  (**H**igh, **M**edium, **L**ow)
- Defects
- General Comments

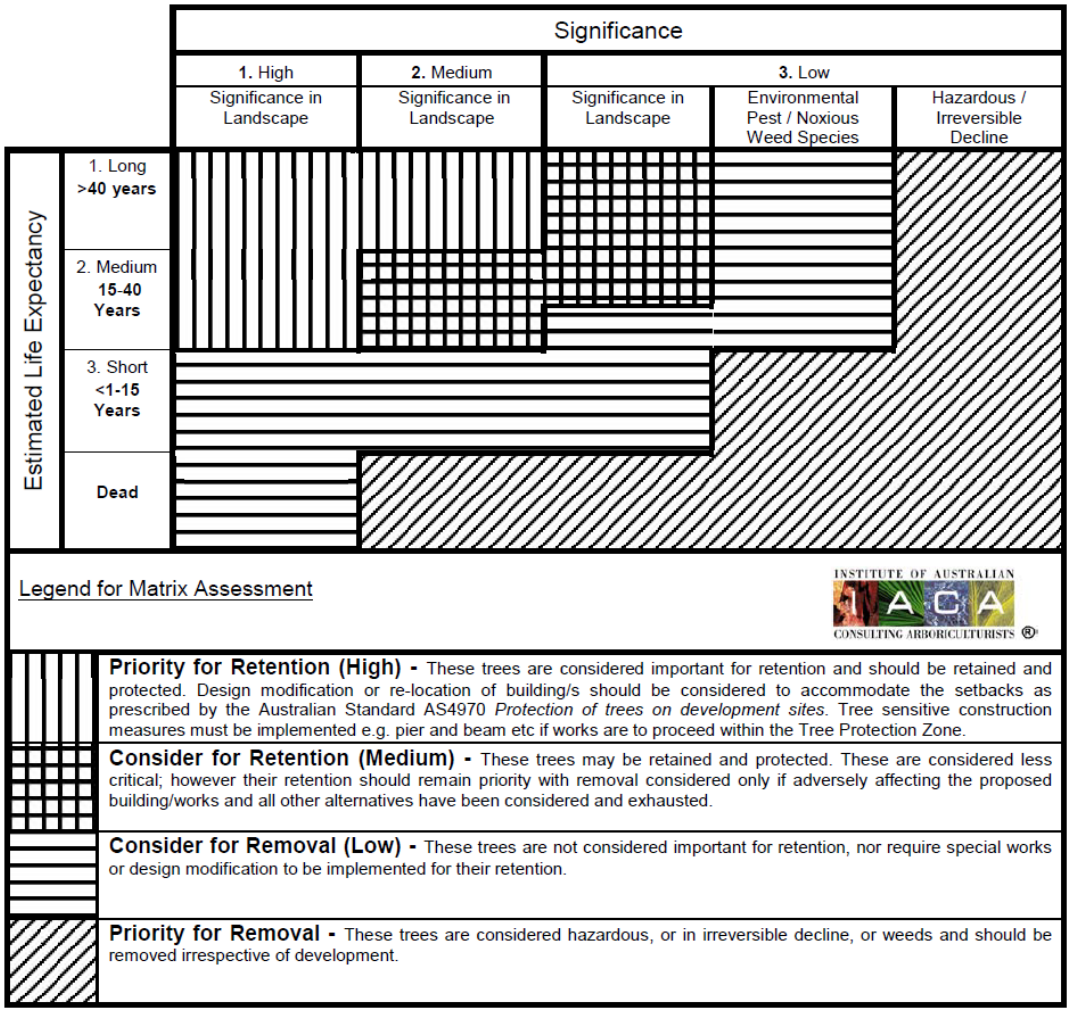
Data collected is then subject to the SULE (© Jeremey Barrell 2001)[(e)] methodology of assessment, which influences any conclusions drawn and recommendations made.

4.3 - TREE DATA DEFINITIONS

- **Age:** The definitions for tree age refer to the stage of life and maturity the tree is currently in that is relevant to tree species. Juvenile (**J**) is where the tree is in a small or sapling form and has not yet reached a stage where it is producing fruit. This category can often refer to a tree specimen that is under Local Government minimum requirements for classification of a tree, but is not necessarily defined by this parameter. A juvenile specimen can grow at an accelerated rate in comparison to the other categories depending on competing species. Semi-Mature (**SM**) is an age of the tree where it may have reached fruiting ability, however the size and habit does not reflect what would be classified as a fully mature example of its species. This category is governed by tree species and their growth habits. Mature (**M**) is the category where the tree has reached fruiting ability and the size and habit reflect what is expected from a fully mature specimen. A mature tree will continue to have steady annual growth. Over-Mature (**OM**) is a mature tree that has considerably slowed its growth rate and has neared its useful life expectancy. Senescent (**S**) is a stage where the tree is still alive, but no longer capable of putting on new growth. This is the final live stage of a tree.
- **Vigor:** The definitions for vigor correlate with how well the tree is performing in its environment and inclusive of canopy growth, branch growth and habit, and expression of general shape from the species in question. Good (**G**) is signs of new growth both in leaf/canopy and branches. 'Flushing'[4] is a general good indicator. Average (**AV**) is little to no signs of 'Flushing'[4], however growth is stabilizing and there is no significant loss of canopy growth, nor is there excessive presence of deadwood. Poor (**P**) is when the tree shows signs of decline, usually with excessive amounts of deadwood or epicormic[3] growth, along with less canopy leaf presence and little to no progress in branch and trunk growth. Dead (**D**) means no signs of growth, and the tree is irreversible of its condition.
- **Growth Habit:** The definitions for growth habit apply to condition and habit of the tree and the form features that impact its shape and other factors. Upright (**U**) means the tree is generally growing straight up and reaching skyward with little deviation of direction from the point of the root base. Leaning (**L**) means the tree has deviated from the point of the root base and is favoring a direction that is leaning away. Over-extended (**OE**) means the tree has an excessive lean that could over-balance the tree, and extreme weather conditions may pose a threat of uprooting the tree. Co-Dominant (**CD**) means the main leader of the tree has split into two or more main leaders that have started growing their own primary and secondary laterals. Multi-Stemmed (**MS**) means the tree has begun growth of multiple leaders from the root base that have started their own scaffold of primary and secondary branches.
- **Crown Form:** The definitions for crown form describe the shape and habit of the canopy, or crown, and touch upon the vigor or leaf growth habit of the crown also. Symmetrical (**S**) describes the canopy as being generally even and balanced in all directions, without favoring a direction. Asymmetrical (**AS**) could refer to a lean or unbalanced canopy, generally seen in species inhibited by other species or unevenly pruned. Dense (**DE**)

describes the canopy as generally full for its species, with decent or 'Flushing'[4] growth. Sparse (**SP**) describes the canopy as having less decent growth, or open gaps in the canopy. Dormant (**DO**) describes the canopy as being non-existent, i.e. no leaves, however this is not necessarily a sign of death or poor vigor as the tree may be deciduous and just during its dormancy stage.

- **Significance Value:** The definitions for significance value are determined using the IACA Significance of a Tree, Assessment Rating System (STARS)©[1]. This rating system assists with tree management in the planning processes for a proposed development that impacts trees protected under Local Government Tree Management Policies. The system defines three categories of significance as **H**igh, **M**edium and **L**ow within the landscape. Once assessment criteria defines the significance of the tree in the landscape, a retention value can then be determined utilising the below Priority Matrix :



Other variations on values defined and attributed to the significance value of a tree is at the discretion of the author utilizing experience and professional opinion. All such results are discussed in a report's recommendations.

5. OBSERVATIONS

5.1 - SITE DESCRIPTION

The trees are located on a residential block that composes of a multi-storey residence, existing driveway, paved paths and footways, and landscaped tiered gardens supporting the steep slope of the block.

The proposed development affecting vegetation on site consists of the construction of an inclinator with associated track, and the construction of a new boat shed with associated hard landscape works. This development will require adjustment of soil levels, excavation and construction works in proximity of trees on site and in a neighbouring property.

The approximate location of each tree specimen can be identified on the **TREE LOCATION PLAN** (page 15)

5.2 - VEGETATION COMMUNITY

The original native vegetation of this area is characterised by the Narrabeen Slopes (Open Forest of *Angophora floribunda-Allocasuarina torulosa*) ecological community. Narrabeen Slopes Is found along the western foreshores of Pittwater from McCarrs Creek to West Head. This ecological community is generally found on strata of the Narrrabeen group Newport formation that outcrop on lower slopes below cliffs and ridges of Hawkesbury Sandstone.

The Narrabeen Slopes Forest is generally characterised by *Angophora floribunda*, *Euclayptus* punctata and *Allocasuarina torulosa* trees. The understorey is dry with an open shrub layer and groundcover is dominated by grasses and herbs. Shrubs include *Pultenaea flexilis*, *Acacia ulicifolia*, *Astrotricha floccosa, Cassinia denticulata, Platysace linearifolia, Prostanthera denticulata* and *Persoonia linearis*. Grasses include *Entolasia sp* and *Themeda australis*, there may also be *Syonum* glandulosum and *Calochaena dubia*.

5.3 - REFERENCE MATERIAL

- Development Application and associated site plans completed by **ActionPlans** 03/03/2021
- Stormwater Management Plan completed by **NB Consulting Engineers** April 2021
- NSW Government; **The SEED Initiative**; 2021
- Pittwater 21 Development Control Plan; **Pittwater Council (adopted by Northern Beaches Council);** 2014

ADDRESS: 180 McCarrs Creek Rd, Church Point

INSPECTION: 27/04/21

NO#	Genus	Species	Common Name	Age	Vigor	Growth Habit	Crown Form	Height (m)	Canopy Spread (m)	DBH	DRB	SRZ	TPZ	STARS Rating	DW %	Defects	General Comments	Encroachment
1	*Syncarpia*	*glomulifera*	Turpentine	M	Av	U	B, Sy	15	9	680	800	3013	8160	M	<5%	Included junctions with flaring @7m and 8m	Very slight lean to W	3.3m from proposed inclinator docking station - 4% encroachment within TPZ
2	*Glochidion*	*ferdinandii*	Cheese Tree	M	Av	CD	As	9	6	260	560	2594	3120	L	<5%	Tree has been significantly lopped on S side. Moderate caterpillar damage in upper crown	3 x leaders @ 1.8m	Not affected by current development
3	*Syncarpia*	*glomulifera*	Turpentine	M	G	U	As	16	6	550	710	2866	6600	H	<5%		Minor suppression from Eucalypt to SE	Not affected by current development
4	*Eucalyptus*	*resinifera*	Red Mahogany	M	Av	L	As	12	5	300	350	2129	3600	M	15%	Moderate lean to SW, full canopy skew to SW	Suppressed by T5	Within footprint of proposed boatshed
5	*Syncarpia*	*glomulifera*	Turpentine	M	G	U	Sy	15	8	420	560	2594	5040	H	5%		Tree on neighbouring property. Heavier canopy on NW side.	2.6m from proposed stormwater - 19% encroachment within TPZ

7. DISCUSSION

All tree species assessed on this site can be categorized native, but not endemic to the significant local vegetation community for the area. One of the trees surveyed is dead and does not require further assessment for impacts posed.

The extent of impacts to trees on development sites can be broadly rated using the following scale of impact to the tree's health and structure (Guy Parossien):

0% of encroachment into the Tree Protection Zone –	No Impact
0 to 10% of encroachment into the Tree Protection Zone –	Low Impact
10 to 15% of encroachment into the Tree Protection Zone –	Low to Moderate Impact
15 to 20% of encroachment into the Tree Protection Zone –	Moderate Impact
20 to 25% of encroachment into the Tree Protection Zone –	Moderate to High impact
25 to 35% of encroachment into the Tree Protection Zone –	High Impact
>35% of encroachment into the Tree Protection Zone –	Significant Impact

7.1 – Trees with a Low Impact (>10%)

- Tree 1 is a Turpentine(*Syncarpia glomulifera*), is considered to be of medium significance and is suitable for retention. The tree is located 3.3m from the proposed inclinator docking station, providing a potential 4% cut encroachment within the Tree Protection Zone.

  The Proposed Stormwater Plans identify a stormwater line and existing pit located adjacent to the tree. Advice from the engineer is that the line is existing and any repair works that may require excavation would necessitate a modification to the current plan.

  Tree sensitive construction measures must be implemented if works are to proceed within the TPZ (as prescribed by the Australian Standard AS4970-2009 Protection of trees on development sites[b]). Specifically, excavation for support piers of the docking station be supervised by a Project Arborist with a minimum AQF5 level qualification. Woody roots >40mm diameter affected by these works should be pruned cleanly under the supervision of the Project Arborist.

7.2 - Moderately Impacted Trees (>10%; <20%)

- Tree 5 is a Turpentine(*Syncarpia glomulifera*), is considered to be of high significance and is suitable for retention. The tree is located 2.6m from the stormwater system, providing a 19% cut encroachment within the Tree Protection Zone. While this is classified as a moderate impact encroachment, due the grade of the slope where excavation is potentially occurring and the existence of rocky outcrops surrounding the tree, the likelihood of impact to significant root matter is low.

The tree is located on the neighbouring property and should be retained. Tree sensitive construction measures must be implemented if works are to proceed within the TPZ (as prescribed by the Australian Standard AS4970-2009 Protection of trees on development sites[b]). Specifically, trenching for the installation of stormwater system should be completed using appropriate hand-controlled tools under the supervision of a Project Arborist with a minimum AQF5 level qualification. Woody roots >40mm diameter affected by these works should be pruned cleanly under the supervision of the Project Arborist.

7.3 - Trees within the development footprint

- Tree 4 is a Red Mahogany (*Eucalyptus resinifera*), is located within the proposed footprint of the boatshed and cannot be retained with the development in its current design. Extensive modifications and relocation of the boatshed would be required to retain this tree, however other more significant and healthy specimens are likely to be affected in this process. This tree is a more suitable candidate for removal.

7.4 - Other Trees Assessed and General Notes

- Tree 2 is a Cheese Tree (*Glochidion ferdinandii*), is located outside the development area and there is no measurable impact to the tree from construction. However, care should be taken when transporting equipment, machinery and goods in and around the tree.
- Tree 3 is a Turpentine (*Syncarpia glomulifera*), is located outside the development area and there is no measurable impact to the tree from construction. However, care should be taken when transporting equipment, machinery and goods in and around the tree.
- A dead tree was surveyed to the north-west of the residence. This tree should be removed prior to commencement of construction.

8. RECOMMENDATIONS

8.1 - TREES SUITABLE FOR RETENTION

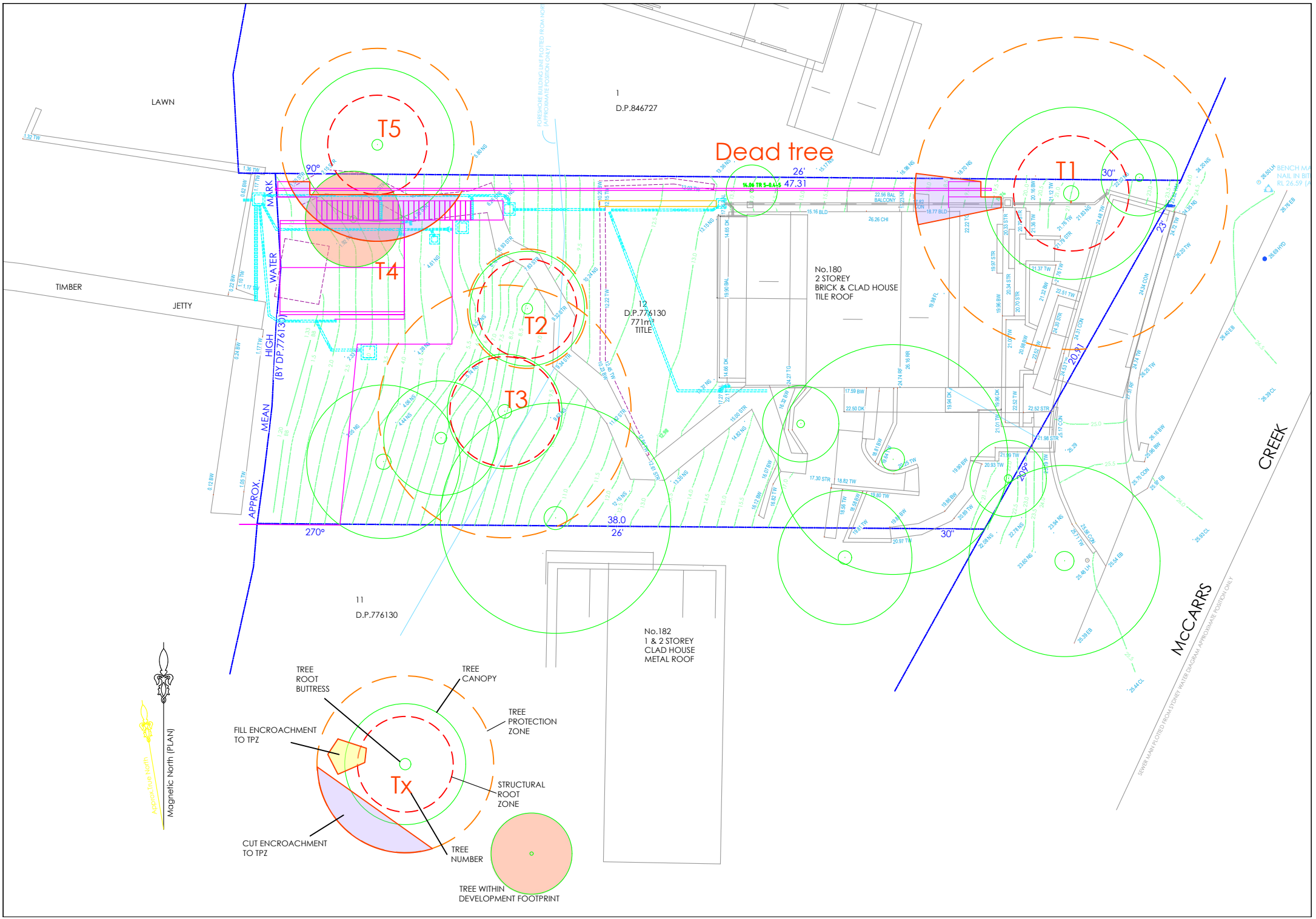
- Tree No.'s 1 and 5 are suitable for retention due to a low/moderate encroachment from the proposed development. Tree protection fencing should be established prior to site establishment to encompass the measured TPZ (allowing access for the development and a maximum 500mm clearance for its construction) as well as an additional area equivalent to the encroachment posed by the development to offset against the impacts posed to the tree. This fenced area should be mulched with a 100mm layer of organic mulch.

- Tree No.'s 2 & 3 are unaffected by the proposed development and suitable for retention.

8.2 - TREES UNSUITABLE FOR RETENTION

- Tree No. 4 is located within the development footprint and is unsuitable for retention. The tree should be removed prior to site establishment if the development is approved in its current design.

All recommended tree works must be approved by Council prior to completion. Works should be completed by an experienced Arborist with a minimum AQF III qualification in Arboriculture who holds Public Liability and Workers Compensation insurance. All pruning works must be carried out in accordance with Australian Standard for Pruning of amenity trees (AS4373 - 2007)[a].


LAWN
TIMBER
JETTY
MEAN HIGH WATER MARK (BY DP.776130)
APPROX.
1
D.P.846727
Dead tree
T1
T2
T3
T4
T5
90°
26'
47.31
30"
23'
20.9'
270°
38.0
26'
30"
20.9°
12
D.P.776130
771m²
TITLE
No.180
2 STOREY
BRICK & CLAD HOUSE
TILE ROOF
11
D.P.776130
No.182
1 & 2 STOREY
CLAD HOUSE
METAL ROOF
CREEK
McCARRS
BENCH MA
NAIL IN BIT
RL 26.59 (A
FORESHORE BUILDING LINE PLOTTED FROM NOR
(APPROXIMATE POSITION ONLY)
SEWER MAIN PLOTTED FROM SYDNEY WATER DIAGRAM APPROXIMATE POSITION ONLY
Magnetic North (PLAN)
Approximate North
TREE ROOT BUTTRESS
TREE CANOPY
TREE PROTECTION ZONE
FILL ENCROACHMENT TO TPZ
Tx
STRUCTURAL ROOT ZONE
CUT ENCROACHMENT TO TPZ
TREE NUMBER
TREE WITHIN DEVELOPMENT FOOTPRINT

10. TREE PROTECTION PLANNING

10.1 - Tree Protection Fencing

When required as part of an approved Development Application, tree protection fencing shall be installed prior to site establishment to establish the TPZ for trees to be retained. Tree protection fencing shall be maintained for the duration of the development schedule. The Tree Protection Fencing should enclose as much of the TPZ as can reasonably be fenced off, allowing for pedestrian access and a minimum 1m offset around construction footprint and scaffolding. The fencing should be made up of steel and lockable. All Tree Protection Fencing should be sign posted with a 'no access' instruction and contact details for the Project Manager and Project Arborist. This should all be certified by the Project Arborist.

10.2 - Other Tree Protection Measures

Other measures that can assist with the protection of the canopy, trunk, branches or roots from the risk of damage can include:

- A 100mm layer of approved mulch to be installed to the TPZ.
- A temporary drip irrigation system to be installed to the TPZ.
- Ground protection matting for staff, equipment and machinery access over tree roots.
- Trunk and branch battens and/or wrapping.

10.3 - Excavation within the TPZ

Excavation within the TPZ should be avoided, however this is not always realistically the case during a development. All efforts to preserve tree root systems should be taken including:

- Supervision from the Project Arborist during excavation.
- Excavation to be completed by hand when reasonable to avoid damage to roots.
- Root mapping may be required prior to excavation and should be completed with the use of either ground penetrating radar, air spade, water laser or by hand excavation; and should be certified by the Project Arborist.
- Where roots >50mm diameter are encountered, alternative construction methods should be considered to ensure roots are not damaged. Allowance should also be made for future root growth.
- Underboring for services proposed below the root ball of the tree should be considered and certified by the Project Arborist.

10.4 - Fill

All fill material to be placed within the TPZ should be approved prior by the Project Arborist, and be interfaced with a large diameter gravel or pebble to provide aeration and percolation to the root zone.

10.5 - Paving

Proposed paved areas within the TPZ should be placed on or above grade to minimise excavation, and avoid root severance and/or damage. Pavements should be permeable or porous.

10.6 - Pruning

All recommended pruning works (including root pruning) should be in accordance with Australian Standard for Pruning of amenity trees (AS4373 - 2007)[a]. If required, roots should be severed with clean sharp implement flush with the face of the excavation and maintained in a moist condition. Root pruning shall be performed under the supervision of the Project Arborist.

10.7 - Tree Removal

Tree removal work shall be carried out by an experienced Arborist in accordance with the NSW Work Cover Code of Practice for the Amenity Tree Industry (1998), and holds Public Liability and Workers Compensation insurance. Care shall be taken to avoid damage to trees during the felling operation. Stumps shall be grinded using a mechanical stump grinder to a minimum depth of 300mm without damage to other retained root systems.

10.8 - Tree Damage

In the event of damage to a tree or the TPZ of a tree to be retained, the Project Arborist should be advised in order to provide advice on remedial action. This should be implemented as soon as practicable and certified by the Project Arborist.

10.9 - Post Construction Tree Management

Tree protection fencing with additional trunk and root protection shall be removed following completion of the development schedule. Any mulch layer installed for root protection should be reduced to a 75mm layer and retained on site. In the event of any tree deteriorating in health after the development schedule is complete, the Project Arborist should be engaged to provide advice on any remedial action.

11. APPENDIX

1. Crown: The canopy of the tree from the starting point of the tree's first primary lateral.

2. Deadwood: Leaves and branches that have died back and are of an irreversible condition.

3. Epicormic: The growth that occurs at the point of the epicormic bud that become active shoots when reacting to damage or stress in the tree.

4. Flushing: Fast green leaf growth occurring in reaction to ideal or high nutrient conditions for the tree.

5. Tree Protection Zone (TPZ): The area calculated (DBH x 12) as a protective buffer to isolate a tree from construction and excavation disturbance so the tree may remain viable.

6. Structural Root Zone (SRZ): The area calculated ($(DRB \times 50)^{0.42} \times 0.64$) that estimates root growth requiring to be retained for stability of the tree.

7. Encroachment: An activity or disturbance that takes place within proximity to the tree and inside the Tree Protection Zone.

8. Visual Tree Assessment (VTA): a non-invasive biomechanically based system of Tree Assessment developed by Claus Mattheck and Helge Breloer, examining the health and structural condition of individual trees.

9. Canker: A symptom of an infectious fungal pathogen that has entered between the bark cambium and heartwood that can display as a discolouration, a depression in the bark, or a wound that continues to attempt to heal but is continuously expanding.

12. REFERENCES

a) Standards Australia; **AS 4373 Pruning of amenity trees;** 2007

b) Standards Australia; **AS 4970 Protection of trees on development sites;** 2009

c) Pittwater 21 Development Control Plan; **Pittwater Council (adopted by Northern Beaches Council);** 2014

d) Claus Mattheck; Helge Breloer; **The body language of trees : a handbook for failure analysis;** 1994

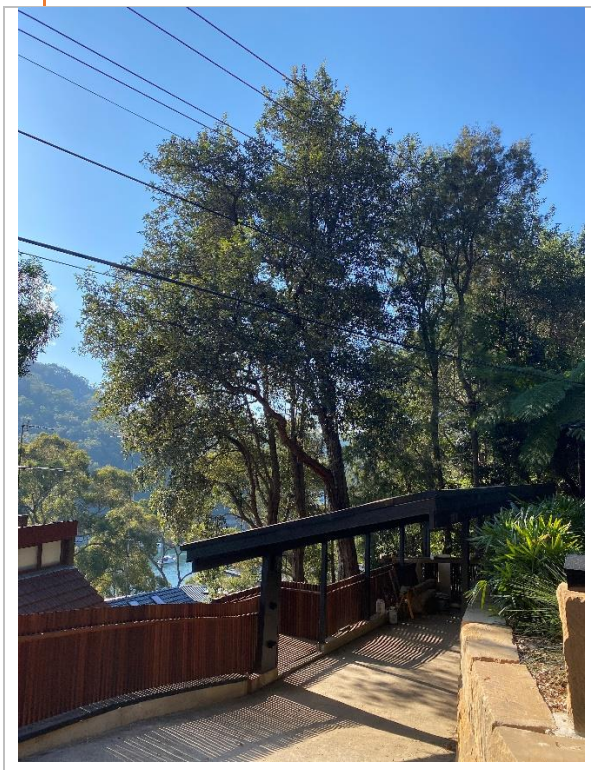
e) Jeremy Barrell; **SULE: Its use and status into the New Millennium;** modified paper, 2001

f) Institute of Australian Consulting Arboriculturalists; **IACA Significance of a Tree, Assessment Rating System (STARS)©;** 2010

g) NSW Government; **The SEED Initiative;** 2021

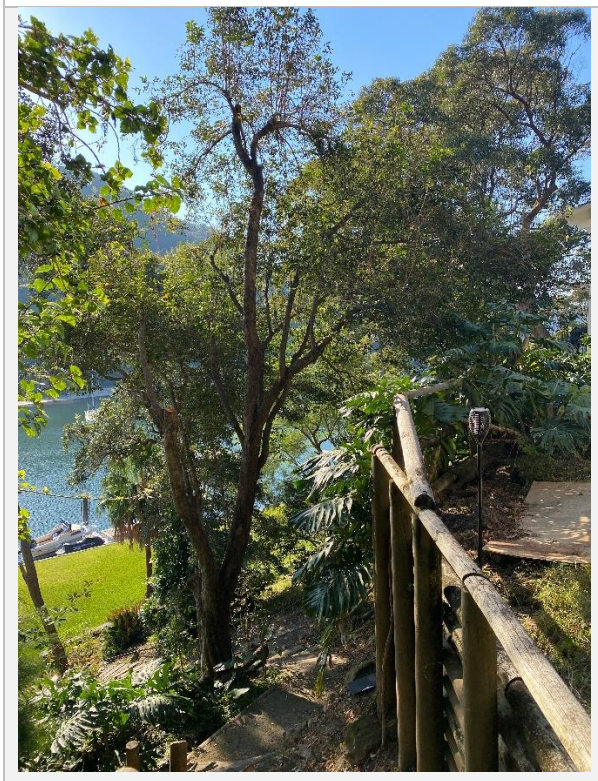
h) Richard W. Harris; James R. Clark; Nelda P. Matheny; **Arboriculture: Integrated Management of Landscape Trees, Shrubs , and Vines**; 4th Edition 2004

13. PHOTO REFERENCE

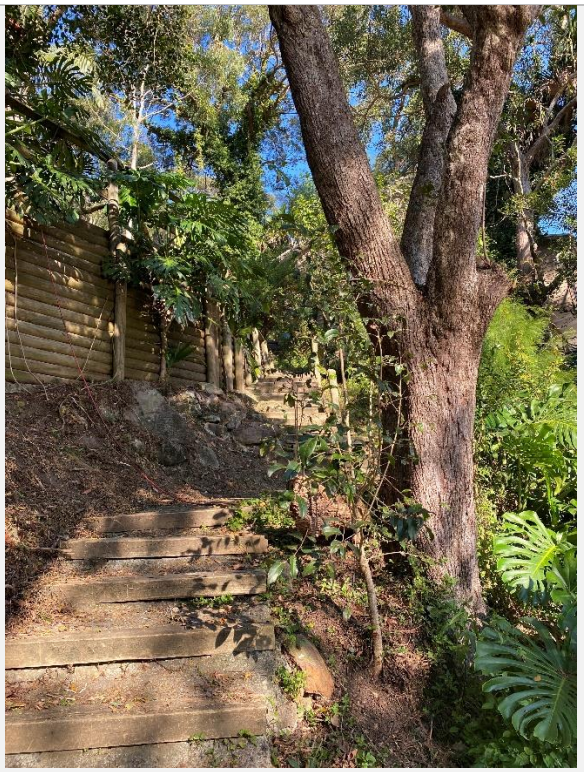


Tree 1

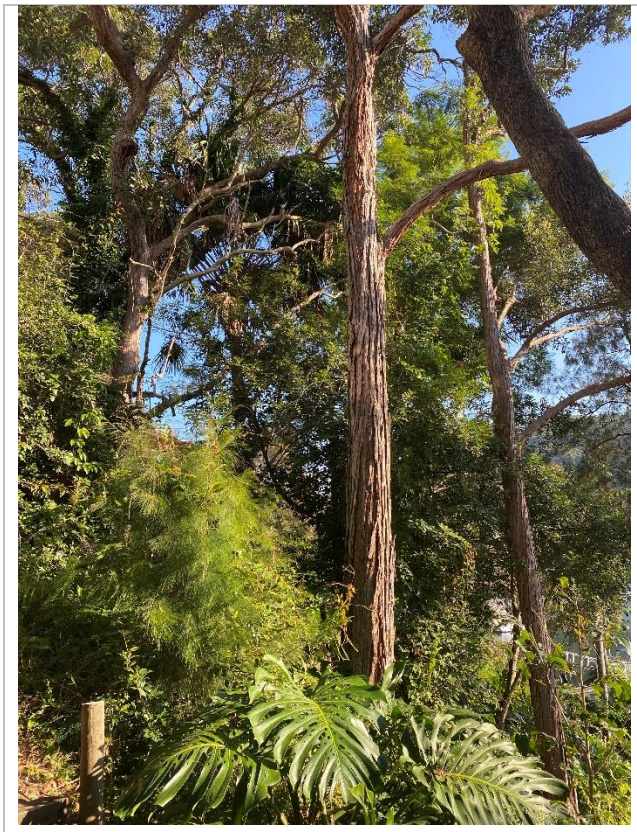
Base of Tree 1



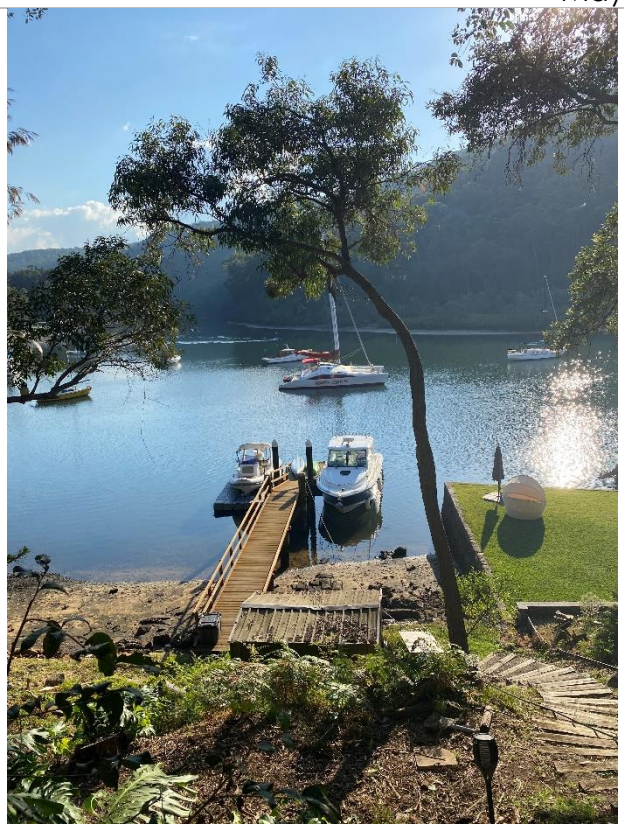
Tree 2



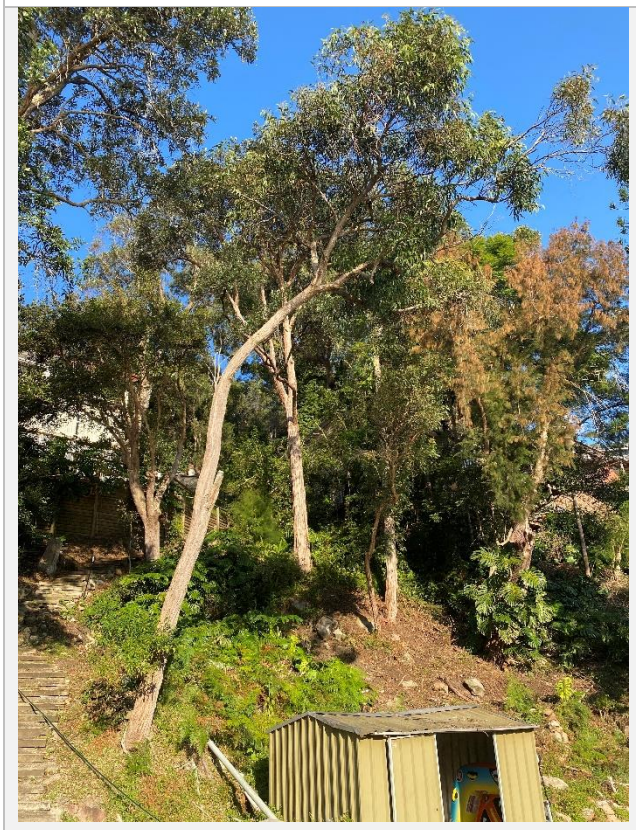
Base of Tree 2



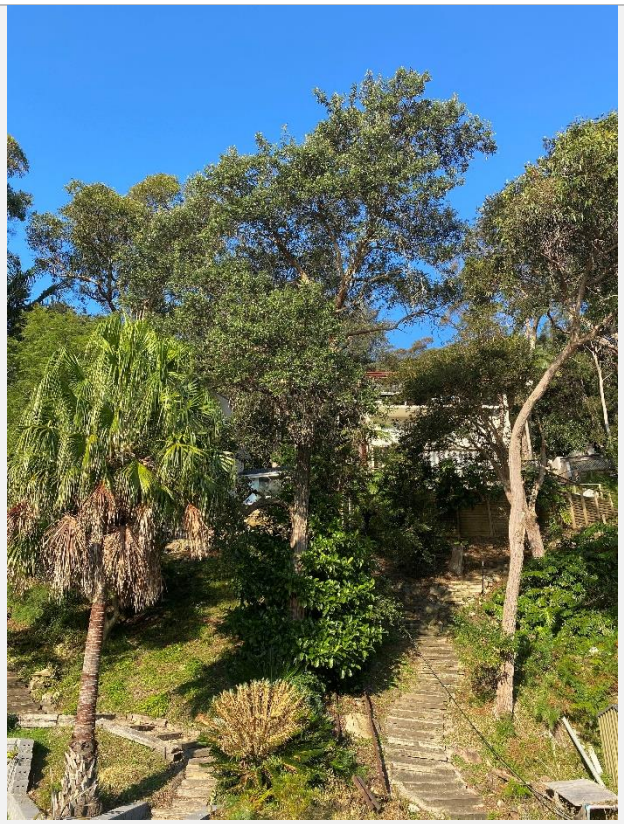
Tree 3



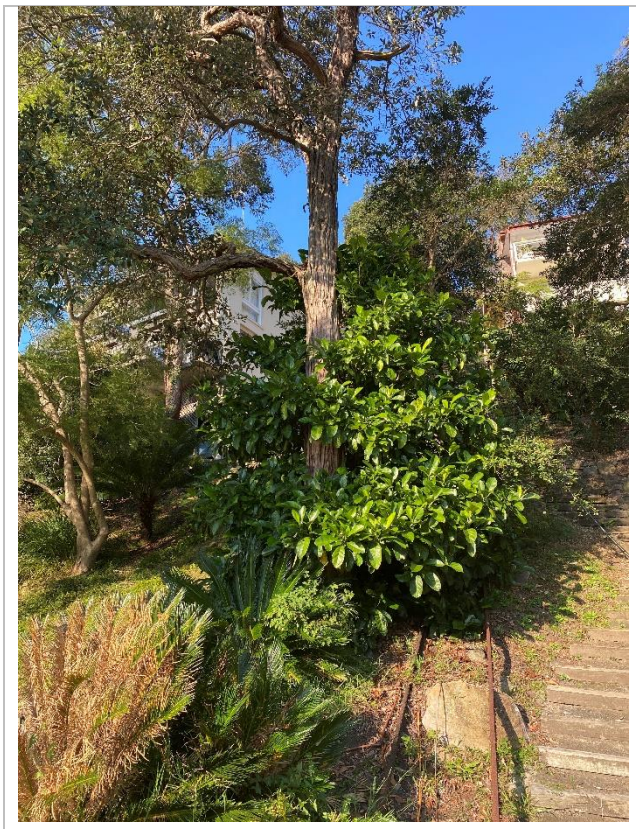
Tree 4



Tree 4 overhang



Tree 5



Base of Tree 5