

Arboricultural Impact Assessment

Proposed new boat shed

**22 Bona Crescent
Morning Bay**

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Figure 1. Tree survey / Site Plan

Figure 2 Site Photos

1.0 INTRODUCTION

This Arboricultural Impact Assessment & Tree Management Plan was commissioned by Stephen Crosby on behalf of client T & D Holland for the property known as Lot 72 22 Bona Crescent Morning Bay.

This report is to accompany a development application to Northern Beaches Council for a new boat shed & skid ramp.

The report includes:

- an assessment of the health and condition of existing trees within 5m of the proposed development;
- an assessment of the potential impact of the proposed development on existing trees within 5m;
- tree protection and management recommendations for existing trees to be retained in accordance with AS 4970 *Protection of Trees on Development Sites*. Standards (2009).
- details of exclusion fencing required prior to commencement of construction works;

The following documentation has been reviewed in preparation of this Arboricultural Impact Assessment & Tree Management Plan:

- Architectural drawings for 22 Bona Crescent Morning Bay prepared by Buck & Simple dated 29th January 2024
- Site Plan Trees 22 Bona Crescent Morning Bay prepared by Stephen Crosby and Associates dated February 2024; and
- AS 4970 *Protection of Trees on Development Sites* Standards Australia (2009)

2.0 PROPOSED DEVELOPMENT

The proposed development is for a new boatshed, at 22 Bona Crescent Morning Bay Refer to Figure 1 in Appendix Tree Survey / Site Plan for details.

The boat shed is proposed in an area of lawn on the northeast corner of the property adjacent to the Pittwater waterway and existing jetty.

Excavation is required to accommodate the proposed boat shed.

Two (2) existing trees are located within 5m of the proposed development (Trees notated 1 & 2). No indigenous understory vegetation is proposed for removal. The proposed new boatshed is to be located predominately in an area of existing lawn.

3.0 SITE DESCRIPTION

The site is a northeast waterfront property located at Lot 72 DP 558694, 22 Bona crescent Morning Bay.

The property includes an existing dwelling and jetty, existing retaining walls, sandstone stairs, lawn area, and remnant indigenous trees.

The original indigenous vegetation community northeast of the property between the existing dwelling and Pittwater Waterway has been highly modified by previous development activity. The existing vegetation predominately supports and area of lawn and retained garden areas. Two existing trees are located within 5m of the proposed boatshed.

4.0 METHODOLOGY

Tree assessment is based on Visual Tree Assessment (VTA) and similar tree assessment guidelines (Dunster, Smiley, Matheny & Lilly 2013, Mattheck, 1999 and Matheny and Clark, 2004 & 1999). Assessment of the impact of the proposed development on existing trees is included (Australian Standards (2009) AS 4970 *Protection of Trees on Development Sites*. Standards Australia).

Site inspection & tree assessment was conducted by Julia Stanton 6th of February 2024.

The assessment includes details of the health, condition, and impact of the proposed development.

The inspection and assessment was from ground level, no aerial or subterranean inspections were carried out. Tree heights, trunk diameter at breast height (DBH) and canopy spread were estimated.

Plans and documentation reviewed in preparation of this report include:

- Architectural drawings for 22 Bona Crescent Morning Bay prepared by Buck & Simple dated 29th January 2024
- Site Plan Trees 22 Bona Crescent Morning Bay prepared by Stephen Crosby and Associates dated February 2024; and
- AS 4970 *Protection of Trees on Development Sites* Standards Australia (2009)

The report includes the following information:

- botanical name, common name, diameter at breast height (DBH), height, canopy spread, tree health, form, tree defects, site conditions, hazard rating, Health & Condition rating* SULE rating**;
- an assessment of the potential impact of the proposed development on existing trees;
- identification of trees to be removed to accommodate the proposed development;
- recommendations of tree protection and management prior to, during and post construction; and
- a site plan and photographic record of existing trees and site conditions.

5.0 TREE ASSESSMENT

Two (2) existing trees, are located within 5m of the proposed development (Trees notated 1 & 2 as on the Tree Survey Figure 1 in Appendix).

Trees 1 & 2 are located on the foreshore area adjacent to the existing northeast boundary.

Refer to Figure 1 and 2, Tree Survey / Site Plan and Site Photos located in the appendix of this report.

Tree 1 mature specimen of *Allocasuarina torulosa* (Forest oak) a remnant indigenous tree located north east corner of the property

DBH: 500mm

DGL: 520mm

Height: 12m

Crown: 6m

Condition: Fair- Trunk cavity at 1.5m and cavity at branch junction @ 4m

Form: Fair - significant lean

Health: Fair moderately vigorous foliage in crown

SULE: 3a

Health & Condition rating: 2/3

Calculated SRZ: 2.5 m

Calculated TPZ: 6m

Excavation for proposed boatshed @ 0.5m which is a significant encroachment into the calculated structural root zone of 2.5m.

Tree 2 semi mature specimen of *Livistona australis* (Cabbage Tree Palm) a remnant indigenous palm located property boundary.

DBH: NA

DGL: NA

Height: 6m

Crown: 4m

Condition: Good

Form: Good

Health: Good

SULE: 1a

Health & Condition rating: 5

Calculated SRZ: NA - SRZ formula does not apply to palms & other monocots which have a compact fibrous root system

Calculated TPZ: Not less than 1m

Excavation for proposed boatshed @ 1.25

6.0 DISCUSSION DEVELOPMENT IMPACTS

Refer to Figure 1 and 2 Tree Survey and Site Photos in appendix

The most common impacts of development on existing trees include:

- significant changes to natural soil levels (excavation or fill);
- excavation and mechanical damage to existing root system;
- mechanical damage to trunk and branches;
- soil compaction or inversion of soil profile, resulting in reduced soil water and air movement;
- changes in natural hydrology, increased nutrient levels, changes to soil pH and soil contamination.

Published research in relation to species-specific growth and development patterns and responses to environmental change and the medium to long term impacts of development on many Australian Tree species is limited to date.

Estimating the extent of the root system of an existing tree is often used as the basis for assessing the potential adverse impact of a development on a tree. The area of significant root system (structural & feeder) that a tree relies on for survival is often calculated by the use of formulae related to the diameter of the trunk. Various terms and formulae exist to describe the area of root system that requires protection and in which development should be limited or excluded. These terms include Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) or Primary Root Zone (PRZ) and Critical Root Zone (CRZ).

Calculating the area of a root system that requires protection is often used to predict the potential adverse impact of a proposed development on the root system of existing trees (Australian Standards (2009) AS 4970 *Protection of Trees on Development Sites*. Standards Australia). It is noted that the definition and formulae for calculating the area of root system that requires protection is considered a guide in estimating the extent of the root system of a tree.

- the type and extent of development, including building envelope, services and landscaping.
- extent of excavation
- use of machinery or vehicles on site
- the area of a root system identified as requiring protection or management during development, and establishment of a (TPZ)
- an assessment of the subject tree including species, age, vigor, vitality, health condition;
- Calculated SRZ does not apply to palms & other monocots
- site and soil characteristics, and
- the potential of a tree to tolerate impacts of a development based on the above.

Development activity does not necessarily need to be excluded from within the identified TPZ. Some level of development activity within an identified (TPZ) such as minor excavation, minor fill and changes to hydrological patterns are often within acceptable limits when specific tree management and protection recommendations and construction techniques are adopted and implemented.

6.1 Potential impact of the proposed development on existing trees.

The proposed development is for a new boatshed at 22 Bona Crescent Refer to Figure 1 in Appendix Tree Survey / Site Plan for details.

Construction of the proposed boat shed involves excavation of an existing lawn area.

Two (2) existing trees are located within 5m of the proposed development (Trees notated 1 & 2 the Tree Survey Figure 1 in Appendix).

- Tree 1 – mature specimen of *Allocasuarina torulosa* (Forest Oak) in fair health & condition & of fair form located northeast corner of foreshore bank. Calculated SRZ is 2.5m. Excavation for the proposed boatshed is @ 0.5m. Excavation is proposed within a significant area of the calculate SRZ. In consideration of the mature size, age class & health & condition, this tree is unlikely to tolerate the impacts of development and cannot be safely retained. This tree is recommended for removal to accommodate the proposed development.
- Tree 2 – a semi-mature specimen of *Livistona australis* (Cabbage Tree Palm) in good health and condition and located on northeast property boundary. Excavation for boatshed is @ 1.25m. SRZ formula does not apply to palms & other monocots which have a compact fibrous root system. Palm species can generally tolerate excavation within 1m. **This Palm is to be retained and protected and TPZ established.**

Tree Protection recommendations in accordance with AS 4970 *Protection of Trees on Development Sites*. Australian Standards (2009), Refer to Figure 1 recommended Tree Protection Zones (TPZ).

Recommendations to minimise the potential adverse impact of the proposed development on existing trees to be retained include:

- Establishing adequate Tree Protection including exclusion fencing & trunk protection prior to the commencement of construction works. Tree protective fencing must be maintained for the duration of construction works;

7.0 RECOMENDATIONS

- Tree / trunk / soil protective fencing is to be in place prior to commencement of site works (Trees, 2) and is to be maintained for the duration of construction works. Refer to Figure 1 for tree protective / exclusion fencing.
- Tree 1 is recommended for removal to accommodate the proposed development.
- To compensate for tree loss and enhance the ecological values of the site three (3) replacement indigenous trees are to be planted in a suitable location on the property. Suitable replacement species include *Allocasarina torulosa* (Forest oak)
- There **must be no additional changes to** existing soil levels other than excavation / fill detailed as a part of this proposed development. **Specifically there must be no further encroachment** / excavation or changes to soil levels within Tree 2.
- Materials and stock piled subsoil and topsoil are not to be stored within 5m of all existing trees to be retained including all trees on neighbouring properties.
- No building waste such as excavated soil, concrete, mortar, paint etc. is to be disposed of within, 5m of any tree to be retained.

8.0 CONCLUSIONS

The proposed development is for a new boatshed, at 22 Bona Crescent Morning Bay. Refer to Figure 1 in Appendix Tree Survey / Site Plan for details.

The boat shed is proposed in an area of lawn on the northeast corner of the property adjacent to the Pittwater waterway and existing jetty.

Excavation is required to accommodate the proposed boat shed.

Two (2) existing trees are located within 5m of the proposed development (Trees notated 1 & 2). No indigenous understory vegetation is proposed for removal. The proposed new boatshed is located in an area of existing lawn.

- Tree 1 – mature specimen of *Allocasuarina torulosa* (Forest Oak) in fair health & condition & of fair form located northeast corner of foreshore bank. Calculated SRZ is 2.5m. Excavation for the proposed boatshed is @ 0.5m. Excavation is proposed within a significant area of the calculate SRZ. **In consideration of the mature size, age class & health & condition, this tree is unlikely to tolerate the impacts of development and cannot be safely retained. This tree is recommended for removal to accommodate the proposed development.**
- Tree 2 – a semi-mature specimen of *Livistona australis* (Cabbage Tree Palm) in good health and condition and located on northeast property boundary. Excavation for boatshed is @ 1.25m. SRZ formula does not apply to palms & other monocots which have a compact fibrous root system. Palm species can generally tolerate excavation within 1m. **This Palm is to be retained and protected and TPZ established.**

There is no significant indigenous understorey vegetation proposed for removal.

To compensate for tree loss and enhance the ecological values of the site three (3) replacement indigenous trees are to be planted in a suitable location on the property. Suitable replacement species include *Allocasuarina torulosa* (Forest oak)



Julia Stanton B.Sc. (Environmental and Urban Horticulture) 12th February 2024
Arborist/Environmental Horticulturalist

9.0 BIBLIOGRAPHY

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NOTES

Hgt = Height in metres, Age = Age Class, Av Can = Average Canopy Spread in metres
DBH = Diameter @ breast height (1.5m) in millimetres

Age classes (I) *immature* refers to a well established but juvenile tree. (S) *Semi-mature* refers to a tree at growth stages between immaturity and full size. (M) *Mature* refers to a full sized tree with some capacity for further growth. (O) *Overmature* refers to a tree about to enter decline or already declining.

Health refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion and the degree of dieback.

Condition refers to the tree's form & growth habit, as modified by its environment. And includes the state of the scaffold (ie trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions (inclusions) and condition of the root system. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

Adapted from Matheny and Clark (1999) Conducting a Resource Evaluation, from *Care and Management of Trees on Development Sites Proceedings of the 2nd NAAA Tree Management Seminar and Workshop*.

* **H & C (Health & Condition) rating** - summary of the health and structure of the tree on a scale of 0 - 5

5 A healthy vigorous tree, little if any signs / symptoms of disease or stress with good structure and form typical of the species

4 Trees with some evidence of decline in vigour, minor twig die back, small amount of dead wood, good form and structure.

3 A tree with only moderate vigour, presence of moderate amounts of twig die back and dead wood, crown may be thinning, moderate form, or a tree with some branch or trunk damage but canopy/ foliage cover good, or a tree with good overall condition, but poor form.

2 A tree in a state of decline, large amount of twig die back or epicormic growth, dieback of medium to large branches, cause of decline cannot be rectified or alleviated. Or a tree with significant structural defects (inclusions, root girdling, and cavities) which cannot be rectified or satisfactorily remediated.

1 A tree in serve decline, die back of dominant branches or trunk, large amounts of twig die back or the majority of foliage epicormic. Cause of decline cannot be rectified or alleviated. Or a tree with significant structural defects (inclusions, root girdling, and cavities) which cannot be rectified or remediated.

0 Dead tree

****SULE categories (Barrell.**

Safe Useful Life Expectancy Categories (Updated 01/04/01) Barrell (2001)

1: Long SULE: Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.

- (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 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 SULE: Trees that appeared to be retainable at the time of assessment for 15-40 years with an acceptable level of risk.

- (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 SULE: Trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable level of risk.

- (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: Trees that should be removed within the next 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 or regularly pruned: Trees that can be reliably moved or replaced.

- (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.

DEFINITIONS (From Tree Risk Assessment Manual ISA (2013), Australian Standard *Protection of Trees on Development Sites* 2009 Australian Standards AS 4373 – 2007 Pruning of Amenity Trees, Matheny and Clark, 1994 and 2004)

Co-dominant stems – stems or trunks of about the same size originating from the same position from the main stem. When the stem bark ridge is turned upwards the union is strong, when the ridge turns inwards the union is weak.

Critical Root Zone (CRZ) – an offset 5 x the trunk diameter of a tree. Within this area significant structural roots are usually encountered. Elevated construction may be possible within this area, subject to an assessment of the subject tree including age, vigor, health and condition and root zone assessment. Specific tree management and protection recommendations and construction techniques required.

C & PRZ – Critical and Primary root zone - The definition and formulae for calculating the C & PRZ of a tree is to be considered only a guide to determine the extent of a tree's root system. The C & PRZ calculation should be used in conjunction with an assessment of the subject tree including age, vigor, health and condition, site and soil characteristics and root zone assessment, when assessing the potential adverse impact of a proposed development on a tree.

Crown lifting – the removal of the lowest branches.

Crown Thinning – General pruning with the additional removal of secondary branches whilst retaining the main structural branches of the tree.

Crown Maintenance General – pruning which consists of removal of dead, diseased, dying, defective and conflicting branches.

Deadwooding – removal of deadwood

DGL- Trunk diameter at ground level

Endemic – having a natural distribution confined to a particular geographic region.

Hazard- situation or condition that is likely to lead to a loss, personal injury property damage, a likely source of harm.

Hazard abatement- Reduction in the likelihood that failure of a tree or a part will result in injury to people or damage to property.

Indigenous – native to the area not introduced

Locally native flora and fauna – plants and animals that are native in Pittwater at any stage of life cycle

Lopping- random cutting of branches or stems between branch union or internodes. This is an unacceptable practice.

Primary Root Zone (PRZ) – an offset 10 x the trunk diameter of a tree. Within this area significant feeder roots area usually encountered. Excavation and fill may possible within this area, subject to an assessment of the subject tree including age, vigor, health and condition and root zone assessment. Specific tree management and protection recommendations and construction techniques required.

Risk – The combination of the likelihood of tree failure and severity of the potential consequences. The likelihood of tree failure occurring and affecting a target and severity of the consequences.

Selective pruning – The removal of identified branches that are causing a specific problem. These branches shall be specified.

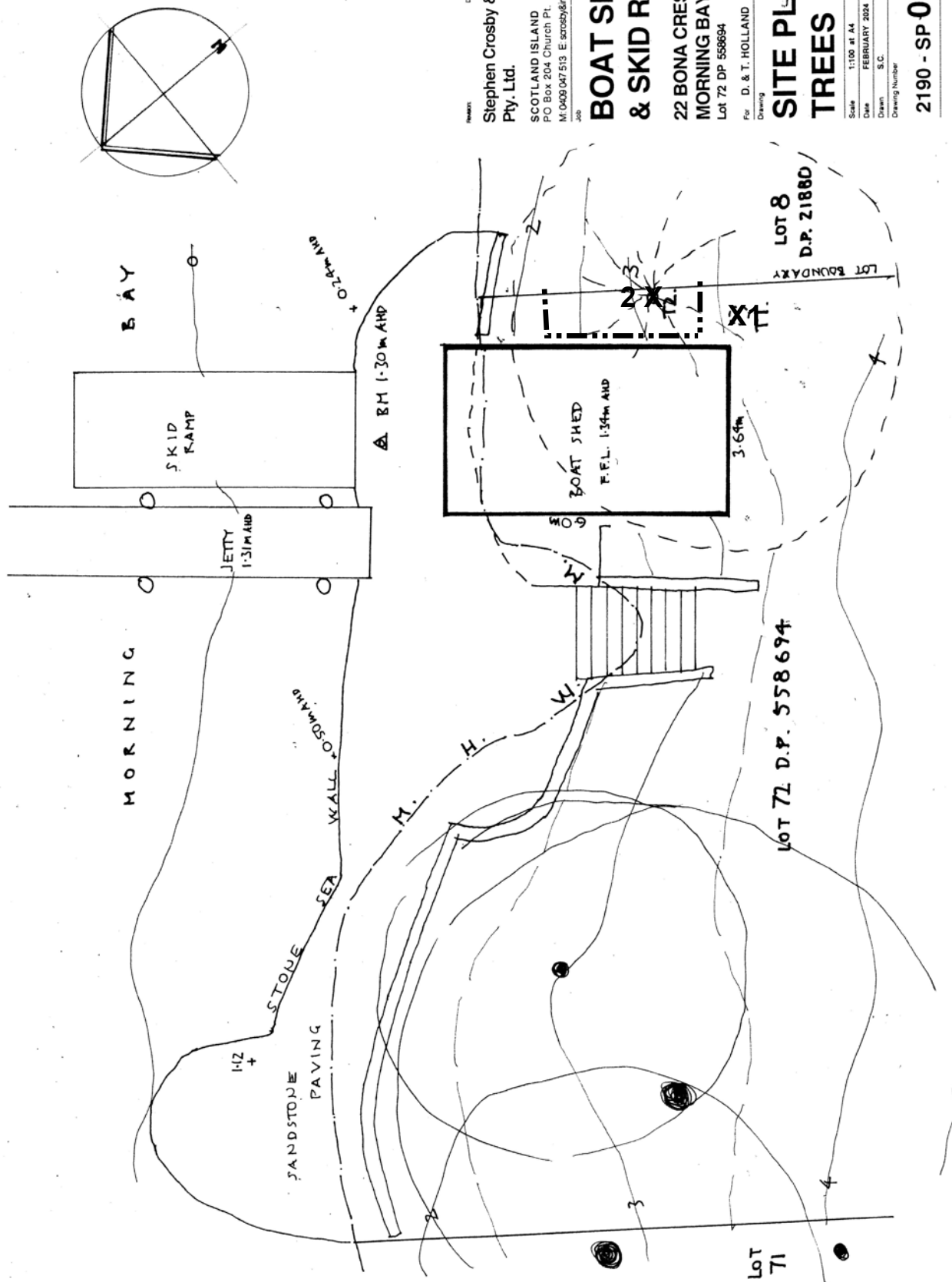
Senescence – The process of aging and death.

Significant Trees - trees that contribute substantially, either individually or as a component of a tree group to the landscape character, amenity, cultural values or biodiversity of their locality.

Structural Root Zone (SRZ) The portion of the root plate comprised primarily of structural woody roots (integral with the soil profile) providing the main mechanical support and anchorage of a tree, calculated in accordance with AS 4970:2009, expressed as a radial dimension in metres from the centre of the trunk.

Target – People or property potentially affected by tree failure

Tree Protection Zone (TPZ) - A specified area at a given distance from the trunk set aside for the protection of a trees root system and canopy during land development works to ensure the long term viability and stability of a tree, calculated in accordance with AS 4970:2009.



.....Tree Protection Zone fencing

Tree Survey / Site Plan
22 Bona Crescent
Morning Bay
Boat Shed

Figure 1

Prepared By: Stephen Crosby & Assoc.
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**BOAT SHED
 & SKID RAMP**

22 BONA CRESCENT,
 MORNING BAY
 Lot 72 DP 558694

For: D. & T. HOLLAND

Drawing

**SITE PLAN
 TREES**

Scale: 1:100 at A4
 Date: FEBRUARY 2024
 Drawn: S.C.
 Drawing Number:

2190 - SP01



Photo 1 location of proposed boat shed
Trees 1 & 2



Photo 3 Tree 1 *Allocasuarina torulosa*
cavities on trunk & at branch junction



Photo 2 Location of proposed boat shed
Trees 1 & 2



Photo 4 Tree 1 cavity @ branch junction

Site Photos
22 Bona Crescent
Morning Bay
February 2024

Figure 2