

ARBORICULTURAL IMPACT ASSESSMENT



Date: 10th April 2023

Site: 107 Iris Street, Beacon Hill 2100 (Lot 18 DP 19022)

Client: Maree Hayes

Commissioned By: Maree Hayes

Author: Antony Osborn

AQF5 Level Arborist

Sydney Arborist

1 Summary

- 1.1 The report was commissioned by Maree Hayes to assess the impacts of the proposed building development on one (1) tree covered by Northern Beaches Council's Tree Preservation Order at 107 Iris Street, Beacon Hill 2100.
- 1.2 The proposed development is a subdivision. The stages of development will be demolition, site preparation and building of new homes.
- 1.3 Recommendations have been made for the retention of the tree (a combination of tree health, encroachment values, landscape significance and retention values were considered when making the determination).
- 1.4 The tree is located in the middle of the property. There is a major encroachment to the tree from the proposed developments. Only one encroachment value was given for the purpose of this report
- 1.5 There is a large natural rock formation which is located in the building footprint of Lot 1 and 2. This area has not been included in the encroachment value as there will be no root growth present.
- 1.6 Due to the proximity of the proposed developments to the tree. Recommendations have been made for root investigation and tree sensitive building measures. The client has specified that tree sensitive building measures have already been incorporated into part of the design.
- 1.7 The TPZ (Tree Protection Zone) and the SRZ (Structural Root Zone) have been included in the report to give a better understanding of the impacts and encroachments of the proposed building works (see Appendix 2 for calculations and see Glossary of Terms for definitions).
- 1.8 Recommendations and suggestions are made in accordance with AS 4970-2009 Protection of Trees on Development Sites.

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2 Introduction

- 2.1 The purpose of this report is to gauge the health and vigour of the tree affected by the proposed subdivision/building works and to assess the impacts of the proposed development on the future health of the tree. The significance of the tree will be evaluated along with impacts of the proposed development. Tree retention and tree protection will be discussed.
- 2.2 This AIA (Arboricultural Impact Assessment) is a supporting document that will be presented to Northern Beaches Council as part of the DA. Northern Beaches Council are the determining authority that will make the final decision on the trees.
- 2.3 The property is located in the LGA (Local Government Area) of Northern Beaches Council.
- 2.4 The report was written by Antony Osborn, AQF5 level Arborist.
- 2.5 The following documentation was provided prior to writing this report:
- Site survey plan.
 - Proposed subdivision plan
- 2.6 A site diagram has been provided with the tree location, SRZ and TPZ. The original DA plans and site survey were used for this purpose. The tree location was taken from the site survey and transferred to the proposed sub division plan using CAD.

3 Method

- 3.1 On Thursday, 19th January 2023 a site inspection was carried out at 107 Iris Street, Beacon Hill 2100, for the purpose of gathering information to produce this report. During the inspection all trees were assessed from ground level. The application of VTA (Visual Tree Assessment), *methodology produced by Mattheck & Breloer 1994*, was used in this process.
- 3.2 The trees health & vigour and future potential were assessed. The impact of building works and the trees capabilities to tolerate disturbances along with species and suitability was taken into consideration.
- 3.3 Trees are identified from ground level only by a visual assessment of foliage, other characteristics and the tree as a whole.
- 3.4 Photographs were taken using an iPhone.
- 3.5 Height measurements were estimated.
- 3.6 Canopy spread was measured to the four cardinal points (N, S, E, and W).
- 3.7 Diameter at breast height (DBH) was measured at 1.4 meters above ground level as a multi stem calculation. The diameter at buttress (DAB) was measured just above the root buttress.
- 3.8 The TPZ (Tree Protection Zone) and the SRZ (Structural Root Zone) have been included in the report to give a better understanding of the impacts and encroachments of the proposed building works (see Appendix 2 for calculations and see Glossary of Terms for definitions).
- 3.9 No invasive testing, root mapping, soil analysis, tomograph testing or resistograph drilling was undertaken.
- 3.10 Refer to the appropriate appendix for further information:
- Appendix 1 – Tree Schedule
 - Appendix 2 – Incursion Calculations
 - Appendix 3 – Tree protection (excerpt from AS 4970-2009 Protection of Trees on Development Sites)
 - Appendix 4 – Photographs
 - Appendix 5 - Hazard Rating Information
 - Glossary of Terms
 - PDF Attachment – TPZ and SRZ site plan

4 Observations

- 4.1 The site is located at 107 Iris Street, Beacon Hill 2100 (Lot 18 DP 19022) and is located in the LGA (Local Government Area) of Northern Beaches Council.
- 4.2 The site slopes and faces north.
- 4.3 Map and tree locations (yellow circle):



- 4.4 See Appendix 1 for Tree schedule (data collected during site inspection).

The Trees

- 4.5 There was one (1) tree covered by Council's Tree preservation order that was assessed during the site inspection. The tree is located in the middle of the property (see Appendix 4 for photograph).
- 4.6 The tree is a mature *Quercus robur* (English Oak). The tree was exhibiting good health and good vigour at the time of inspection (see Appendix 4, figures 1 and 2).
- 4.7 The subject species is not listed under the Threatened Species Conservation Act (1995).
- 4.8 The site is not located in a heritage conservation area. There are no heritage items on these trees.

Site - 107 Iris Street, Beacon Hill 2100 (Lot 18 DP 19022)

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5 Discussion

- 5.1 The tree was identified as a mature *Quercus robur* (English Oak). At the time inspection the tree was displaying signs good health and vigour. The tree had good form and no obvious signs of defects. The tree was classified as high landscape significance and retention value (see Appendix 4, Figure 1 photograph).
- 5.2 The tree will be affected by the proposed subdivision and development. There is a major encroachment from entire development on the tree (see Appendix 2 for encroachment value). There is exposed natural sandstone rock in the encroachment area. This area has not been included to the encroachment value as there will be no root growth in this area (see Appendix 4, Figure 3 for photograph).
- 5.3 There is an encroachment from the proposed parking area in Lot 1.
- 5.4 There is a major encroachment from Lot 2 on the tree. The exposed natural sandstone rock is present in the TPZ of Lot 2. This area has not been included to the encroachment value as there will be no root growth in this area. The client has specified that tree sensitive building measures have been incorporated into the design of the proposed parking area for Lot 2.
- 5.5 There is a major encroachment from the driveway of Lot 3 and 4. The client has specified that tree sensitive building measures have been incorporated into the design of the driveway.

6 Conclusion and Recommendations

- 6.1 It is recommended that the tree *Quercus robur* (English Oak) is to be retained. Therefore further investigation and tree protection will be necessary.
- 6.2 There is an encroachment to the TPZ of the tree in Lot 1 by the proposed parking area. Root investigation should be carried out along the edge of the proposed parking area within the TPZ to the edge of the exposed natural rock. Root investigation through non-destructive measures will help locate roots and determine if the building can be located with minimal impacts to the tree (see Appendix 3, 3 for further information on root investigation and mapping).
- 6.3 There is a major encroachment to the TPZ of the tree in Lot 2 by the proposed driveway and parking area. The client has specified that the driveway and parking area will be built using tree sensitive building measures. Tree sensitive building measures such as pier and beam and suspended slab will allow building to take place with minimal impacts to the tree. Pier holes for the driveway and parking area should be hand dug in the presence of the project arborist with AQF5 accreditation or higher. Care should be taken not to cause damage to roots if they are exposed. If significant woody roots are found the pier holes should be relocated. This will be left to the discretion of the project arborist. There is natural sandstone rock located in the proposed building envelope of Lot 2.
- 6.4 Where the proposed driveway runs through Lot 3 and 4 and is not supported by pier and beam or suspended slab, root investigation should be carried out on the northern edge within the TPZ. Root investigation through non-destructive measures will help locate roots and determine if the driveway can be built with minimal impacts to the tree.
- 6.5 Tree protection measures need to be put in place to protect the tree during the construction stage. These measures include tree protection fencing and restricted activities within the TPZ (see Appendix 3). Tree protection fencing should be erected where possible as it won't be feasible to fence the entire TPZ. This will be left to the discretion of the project arborist.
- 6.6 A project arborist, with AQF5 accreditation or higher, should be assigned to monitor the work throughout the entire development process in order to ensure tree protection measures are adhered to. There should be a predetermined number of site inspections (see Appendix 3, 2 for more information).

10th April 2023

Antony Osborn



Sydney Arborist

(AQF5 Diploma of Arboriculture) In accordance with AS 4970-2009

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7 Limitations on the use of this report

This report is to be utilised in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report, may only be used where the whole of the original report (or a copy) is referenced in & directly attached to that submission, report or presentation.

8 Assumptions

Care has been taken to obtain information from reliable sources. All data has been verified insofar as possible, however, Sydney Arborist or Antony Osborn can neither guarantee nor be responsible for the accuracy of information provided by others.

Unless stated otherwise:

Information contained in this report covers only the tree/trees that were examined and reflects the condition of trees at the time of inspection.

The inspection was limited to visual examination of the subject trees without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

9 Bibliography

- [Google Maps](#)
- NSW Government Office of Environment & Heritage, Threatened Species Conservation Act (1995) Online Threatened Species Search
<http://www.environment.nsw.gov.au/threatenedSpeciesApp>
- NSW Government Office of Environment & Heritage, State Heritage Inventory
<http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=20601>
- [10](#)
- Barrell, J. (1996), Useful Life Expectancy of Trees (ULE.) Barrell Tree Care. UK
- Arboriculture Integrated Management of Landscape Trees, Shrubs and Vines Fourth edition. Richard W. Harris, James R. Clark and Nelda P. Matheny.
- The Body language of Trees, C. Mattheck
- Field Guide for Visual Tree Assessment, C. Mattheck
- Northern Beaches Council Tree Preservation Order & Local Environment Plan 2012
- Northern Beaches Council Development Control Plan
- Warringah Local Environmental Plan 2011 (pub. 14-2-2014)
- AS4970-2009 Protection of Trees on Development Sites SAI Global Sydney Australia

Appendix 1

Tree Schedule:

Tree No	Scientific Name (Common name)	Health	Vigour	Age	Height (m)	Canopy spread				DBH (cm)	DAB (cm)	TPZ Radius (m)	SRZ Radius (m)	Hazard Rating	ULE (Years)	Landscape Significance	Retention Value	Comments	Retain/ Remove
						N (m)	S (m)	E (m)	W (m)										
1	<i>Quercus robur</i> English Oak	G	G	M	14	11	8	8	12	111.9	129.9	13.4	3.7	3	Long 40 years +	High	High	Good health and vigour, good form, No signs of defects, minimal deadwood.	Retain

*Canopy: measured as (N) North, (S) South, (E) East, (W) West (4 Cardinal Points).

*See Appendix 5 for Hazard Rating calculations.

Appendix 2

Encroachment Calculations:

Tree No	SRZ (m)	SRZ Encroachment	Area of TPZ (m ²)	TPZ Encroachment (m ²)	TPZ Encroachment %	TPZ Encroachment Rating
1	3.7	Yes	566.5	219	37	Major

* A minor incursion/encroachment is <10% of the area of the TPZ (Tree Protection Zone). This is classified as an acceptable encroachment by the Australian Standards and should not require detailed root investigation.

* A major incursion/encroachment is >10% of the area of the TPZ. This is classified as an unacceptable encroachment by the Australian Standards unless a qualified Arborist can prove that the tree is viable to withstand this encroachment. Root investigation is usually required.

Appendix 3

1. Tree Protection:

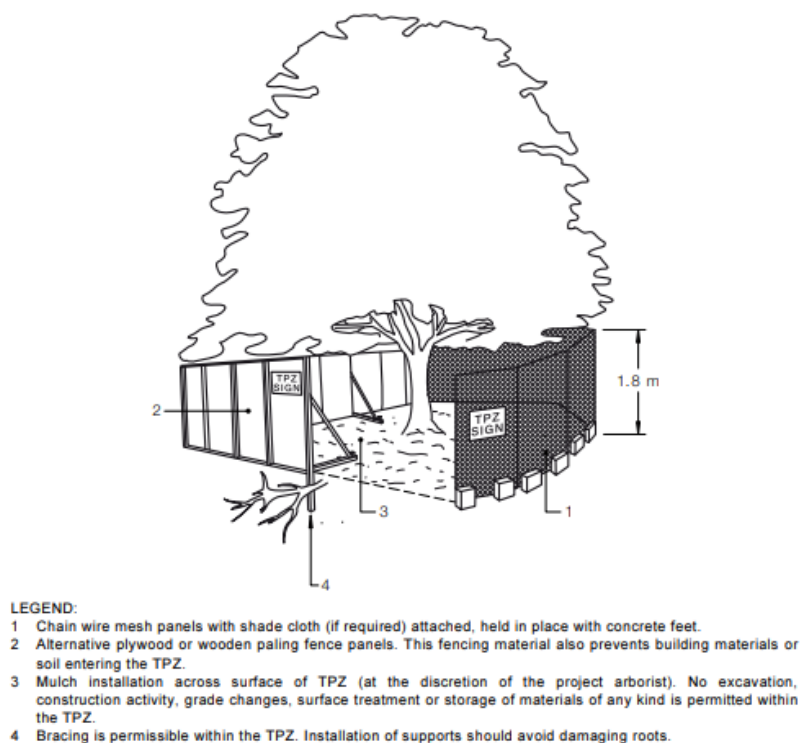


FIGURE 3 PROTECTIVE FENCING

Figure 1: This diagram is an excerpt from AS 4970-2009 Protection of Trees on Development Sites.

Fencing should be put in place around protected trees before any construction work commences. Protective fencing must not be tampered with during the entire development process, unless approved by the project arborist.

Activities generally excluded from TPZ's include but are not limited to:

- Mechanical excavation.
- Unsupervised manual trenching/ excavating.
- Cultivation.
- Storage.
- Mixing/ preparation of chemicals and cement.
- Parking of vehicles and plant.
- Refuelling.
- Waste/ rubbish disposal.

- Washing/ cleaning equipment.
- Dumping/ storing fill or soil.
- Fires/ welding.
- Changes in soil level.
- Installation of utilities & signs.
- Mechanical/ physical damage to tree.



Figure 2: An example of signage that should be displayed and clearly visible around the tree protection zone (in accordance with AS 4970-2009 Protection of Trees on Development Sites).

Signs should be attached to the protective fencing clearly identifying the Tree Protection Zone (TPZ)

A Project Arborist, with AQF5 accreditation or higher, should be assigned to monitor the work throughout all stages of the construction process in order to ensure tree protection measures are adhered to.

2. Monitoring Construction Work:

The Project Arborist will monitor the impacts of general construction works on retained trees. Monitoring should be done regularly. Monitoring is to be recorded for inclusion in certification at practical completion. Critical stages typically include installation of services, footings and slabs, scaffolding, works within the TPZ and at completion of building works.

Level changes are not allowed within the SRZ/TPZ of retained tree assets unless detailed within this report. The Project Arborist must supervise any works within TPZ's. The Project Arborist should specify any remedial works above and below ground. Monitoring is to be recorded for inclusion in certification at practical completion.

Installation of underground services should be installed outside the Tree Protection Zone (TPZ). If this is not possible and underground services need to pass through the TPZ then they should be installed using directional drilling at minimum depth of 600mm or with manually excavated trenches. This is to be supervised by the Project Arborist.

3. Root mapping:

Care should be taken not to cause damage when exposing roots. Methods such as; pneumatic, hydraulic, hand digging and ground penetrating radar are acceptable.

A map of the root system should be compiled and photographic evidence taken. Under no circumstances are roots to be cut, damaged, bruised, or frayed during this process.

If roots are exposed when root mapping is carried out they should be kept moist. This may include hessian material over roots and keeping it moist.

Root pruning:

Root pruning should be supervised by the Project Arborist. Roots identified to be pruned by the Project Arborist should be pruned back with a final cut of undamaged wood.

Pruning cuts should be undertaken with sharp tool. For example; secateurs, pruners, handsaws and chainsaws are suitable. Roots should never be cut or damaged with machinery such as excavators or backhoes.

Appendix 4



Figure 1: The tree *Quercus robur* (English Oak) displaying signs of good health & vigour, good form and high landscape significance.



Figure 2 The tree showing good branch structure.



Figure 3 Showing the location of the natural sandstone rock which would not accommodate root growth.

Appendix 5

Hazard Rating:

Consists of three categories:

- Potential failure
- Size of defective part
- Target

Each individual category has a 1-4 rating, totalling 12 (1 being a low risk and 12 being an extremely high risk)

Potential failure:

1. Low – Unlikely to fail
2. Medium – Defects are present (i.e. small cavity)
3. High – Significant defect (serious bark inclusion)
4. Severe – Possibly already failed (severe *Phellinus*/rot)

Size of defective part:

1. < 150mm in diameter
2. 150mm – 300mm in diameter
3. 300mm - 450mm in diameter
4. > 450mm in diameter

Target (Occupancy):

1. Occasional use
2. Intermittent use
3. Frequent use
4. Constant use

Potential failure + Size of defective part + Target = HAZARD RATING

Glossary of Terms

Age class - (SM) Semi Mature, (M) Mature, (OM) Over Mature.

Aerial Inspection - Refers to climbing a tree to obtain more accurate information.

AS4970 (2009) Protection of Trees on Development Sites – These are guidelines/ industry standards to minimise negative impacts on trees on building sites.

AS4373 (2007) Pruning of Amenity Trees – These are guidelines/ industry standards to minimise negative impacts on trees.

Classes - (G) Good, (F) Fair, (D) Declining, (P) Poor.

Critical Root Zone (CRZ) - Refers to a radial offset of five (5) times the trunk DBH measured from the centre of the trunk. This zone is often the location of the tree's structural support roots.

Crown lifting – The removal of lower branches.

DBH (Diameter at Breast Height) – This is the diameter of the trunk at breast height (1.4 Metres above ground level).

Dead wood – Refers to any branches that have no living tissue left in them. Some dead wood can be beneficial for the tree.

Decay – Is when healthy wood/tissue breaks down.

Defect – An imperfection or flaw in the trees structure.

Die back – Refers to the dying of the tips or ends of branches. This can mean the tree is stressed and is a factor in assessing tree health.

Electrical service –

- **OHP** Overhead electricity wiring.
- **LVOHP** Low Voltage Overhead Power lines
- **HVOHP** High Voltage Overhead Power lines
- **ABC** Aerial Bundled Cable

Endemic – Restricted to a certain place.

Epicormic growth – Also known as sucker growth, is usually a result of bad pruning/lopping or signs of a stressed tree. They sprout from axillary buds in the bark. They are usually weakly attached.

Form – The visible shape or configuration of a tree.

Health – Refers to the trees ability to grow, modified by aspects of its environment. Signs of good health are; tree vigour, green foliage, crown density and amount of dead wood.

Classes are: Good (G), Fair (F), Declining (D) & Poor (P)

Included bark/Inclusion – Refers to weak branch attachment. This is where bark grows between the join of the branch and stem instead of healthy tissue. Usually a very acute angled branch.

Indigenous – Native to Australia but not to one particular place.

Landscape significance rating – Refers to Species, Landscape Significance, Ecological Significance and Historical Significance.

Classes: Very high, High, Moderate, Low

Lopped – Incorrect pruning method not to AS4373 (2009) Pruning of Amenity Trees.

Point of attachment – Is the part of tree joins another i.e. a branch joins the trunk.

Retention value - The trees contribution to the amenity, landscape quality and visual character of an area that is important from a planning perspective.

Root mapping – Removing/excavating soil from around the roots with hand tools.

SRZ (Structural Root Zone) – Refers to the part of the root zone necessary for the structural integrity of a tree as set out in AS4970-2009 Protection of Trees on Development Sites. The calculation for this measurement is $((D \times 50)^{0.42} \times 0.64)$, D = Diameter at the trunk buttress measured in metres. The SRZ for trees with DAB under 0.15 metres is 1.5 metres.

Taper – Reduce or increase in thickness.

Transverse Crack – A crack that extends crossways against the fibres of a tree part. Usually caused by bending of the trunk or branch.

Tree Protection Zone (TPZ) - Is the combination of root and canopy area required to maintain tree stability, health & vitality as set out in AS4970-2009 Protection of Trees on Development Sites. TPZ calculation is twelve (12) times the trunk DBH (Diameter at breast height) measured as a radial offset from the centre of the tree trunk. The TPZ indicates the location where protective fencing should be installed to create an exclusion zone around a protected tree.

Vigour – Refers to the growth rate of the tree. This includes; new growth, reaction wood, ability to compartmentalise at a rapid rate and the ability to fight off pest & disease infection.

Classes are: Good (G), Fair (F), Declining (D), and Poor (P)

Useful Life Expectancy (ULE) – Is a guide to assessing trees longevity. ULE takes into consideration the trees environment, health, vigour, structural integrity and suitability. Adapted from Barrell 1996, (Updated April 2001).

Classes: (Long) 40 years +, (Medium) 15-40 years, (Short) 5-15 years, (Removal) Less than 5 years.

VTA (Visual Tree Assessment) – This refers to techniques developed to evaluate trees by Mattheck & Breloer "The Body Language of Trees".

Attachments

SRZ and TPZ site plan: see separate PDF