Tree Impact Assessment

The Arbour – Stage 6
10 Victoria Street
Berry

Image sourced from Six Maps

11 April 2019

Prepared for:

Altre

Prepared by:

Bradley Hawthorne – Arborist
Dip. Arboriculture (AQF Level 5)
Dip. Local Government Management

Bradley Hawthorne
e: brad@targetcreekfarm.com.au
m: 0433668343

Introduction

At the request of Rachmat Djajadikarta, from Altre, visual tree assessments (VTA) were conducted at 10 Victoria Street, Berry on 8 January & 2 February 2019. The brief for this report was to assess the likely impact of the proposed development on trees located in the northeastern corner of the property and any neighbouring trees located in close proximity to adjacent boundaries.

This arboricultural report will accompany Development Application documentation for the proposed construction of eleven (11) dwellings with car parking, landscaped gardens and access roads.

This report shall make arboricultural recommendations that comply with the provisions of AS 4970 – 2009 Protection of trees on development sites and Chapter G4 of the Shoalhaven Development Control Plan.

The following documents were reviewed in the preparation of this report:

- Shoalhaven Local Environmental Plan (SLEP 2014)
- Shoalhaven Development Control Plan (SDCP 2014)
    - Chapter G4: Tree & Vegetation
- Draft Floor Plans. Pre DA Meeting Revision B. Mbark Pty Ltd. Dated 07/12/18 & 11/01/19
- Draft Floor Plan. Consultants Revision C. Saturday Studio Dated 01/04/19
- Detail & Level Plan of Lot 6 DP 1204186 – Johnson Procter Surveyors Pty Ltd. Dated 23 November 2018 & 24 January 2019
- AS 4970 – 2009 Protection of trees on development sites

Bradley Hawthorne
e: brad@targetcreekfarm.com.au
m: 0433668343

Methodology

Data for each tree and their surroundings were collected on Tree Audit Sheets (Attachment A). Furthermore, external signs of decay, defects, physical damage and adverse site conditions were recorded. Tree height has been estimated in metres and trunk diameter at breast height (DBH) and near ground level has been measured in metres.

A copy of the Detail & Level Plan has been copied and altered for the Tree Location Plan (Attachment B). Trees 17, 18, 20 & 27 have not been surveyed and their approximate locations have been depicted on the Tree Location Plan. Additionally, smaller trees were observed beneath the canopies of Tree 37 & 38. Narrow-leaved Paperbarks (*Melaleuca linariifolia*), growing in close proximity to each other, were grouped together as Trees 41, 42, 43, 45, 50, 51 & 52.

An area in the northeastern corner of Lot 6 DP 1204186, as depicted as the work area on the Floor Plan (Mbark Pty Ltd dated 11/01/19), has been adopted as the property/site in this report.

To measure the tree's growth and foliage volume at the time of the inspection, Tree Vigour was recorded as Dead, Poor, Fair or Good. Indicators are, but not limited to: live crown ratio, crown exposure to light, crown density, and crown dieback.

Condition of the tree was recorded as Poor, Fair or Good to provide a measure of the tree's general form, branch structure and trunk stability. Indicators are, but not limited to: branch attachment, branching pattern, crown position, external signs of decay, defects, mechanical damage, impact of insect/pathogen activities and adverse site conditions.

Tree vigour and condition are independent of each other. A tree displaying Poor vigour can have Good condition and vice versa.

A **Tree Retention Value** of High, Medium, Low and Very Low has been provided for each tree. A three (3) step process is used to determine the Tree Retention Value. This process has been adopted from City of Ryde's Urban Forest Technical Manual 2014:

Step1: Assess the sustainability of the tree in its location. This is determined by considering the vitality, structural condition, age/longevity of the tree and suitability of the tree to the site.

Step2: Assess the landscape significance of the tree. This is calculated by considering the amenity, heritage and environmental value of each tree.

Step3: Consider sustainability and landscape significance together to determine the tree retention value.

No aerial inspections or scientific testing were conducted. Site photographs were taken by the author at the time of the inspections and have not been altered in any way.

Bradley Hawthorne
e: brad@targetcreekfarm.com.au
m: 0433668343

The **Safe Useful Life Expectancy (SULE)** for each tree has been assessed, as per assessment guidelines by Jeremy Barrell (2001), and placed into one of the following categories:

SULE category	Description
Long	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk
1a	Structurally sound trees located in positions that can accommodate for future growth
1b	Trees that could be made suitable for retention in the long term by remedial tree care.
1c	Trees of special significance that would warrant extraordinary efforts to secure their long term retention.
Medium	Trees that appeared to be retainable at the time of assessment for 15-40 years with an acceptable level of risk.
2a	Trees that may only live for 15-40 years
2b	Trees that could live for more than 40 years but may be removed for safety or nuisance reasons
2c	Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide for new planting.
2d	Trees that could be made suitable for retention in the medium term by remedial tree care.
Short	Trees that appeared to be retainable at the time of assessment for 5-15 years with an acceptable level of risk.
3a	Trees that may only live for another 5-15 years
3b	Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
3c	Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
3d	Trees that require substantial remedial tree care and are only suitable for retention in the short term.
Remove	Trees that should be removed within the next five years.
4a	Dead, dying, suppressed or declining trees.
4b	Dangerous trees because of instability or loss of adjacent trees
4c	Dangerous trees because of structural defects
4d	Damaged trees not safe to retain.
4e	Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide for a new planting.
4f	Trees that are damaging or may cause damage to existing structures within 5 years.
Small	Small, or young trees that can be reliably moved or replaced.
5a	Small trees less than 5m in height.
5b	Young trees less than 15 years old but over 5m in height.

Australian Standard 4970 – 2009 Protection of trees on development sites has been referred to for determining and calculating Tree Protection Zones and Structural Root Zones.

The **Tree Protection Zone (TPZ)** is a hypothetical estimation of the area required to protect a tree from adverse construction activities. It is calculated for each tree by multiplying diameter at breast height (DBH) by 12 and is a radius measured in metres from the centre of trunk.

The **Structural Root Zone (SRZ)** is the area required for tree stability and is generally only calculated when encroachments into the TPZ are greater than 10%. AS4970-2009 Protection of trees on development sites provides the following formula of an indicative SRZ radius:

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

where D equals the trunk diameter in metres, measured above the root buttress.

Limitations

This report has been prepared for the exclusive use of Altre and key stakeholders. The findings of this report are based upon, and limited to, visual examination of trees from ground level and review of Draft Floor Plans (Dated 07/12/18 & 11/01/19).

This report reflects the health and structure of trees at the time of inspection. The author cannot guarantee that a tree will be healthy and safe under all circumstances or for a specified period of time. There is no guarantee that problems or defects with assessed trees will not arise in the future.

Liability will not be accepted for damage to person or property as a result of failure of assessed trees.

Bradley Hawthorne
e: brad@targetcreekfarm.com.au
m: 0433668343

Observations

In addition to information contained in Tree Audit Sheets (Attachment A), the following was observed:

Trees 1, 2 & 3 were Narrow-leafed Ashes (*Fraxinus angustifolia*) and formed part of an avenue planting along Pepper Farm Drive. These three (3) trees were classified Semi mature and displayed Good Vigour. Trees 4 to 7 were located adjacent to the northwestern boundary and footpath on Pepper Farm Drive.

Fourteen (14) Council owned trees (Trees 8 to 21), located on the southern verge of Victoria Street, were included given their close proximity to the northern boundary. Trees 9, 10, 12, 13, 15 & 16 were Sweet Gums (*Liquidambar styraciflua*) planted between the concrete footpath and southern kerb. These six (6) trees, in addition to Tree 22, a large Blackbutt (*Eucalyptus pilularis*), contributed to streetscape amenity given their size and location.

Trees 8, 11, 14, 17 to 21 were located between the concrete footpath and northern boundary. The majority of these trees had Poor Condition and Fair Vigour. Major lopping and/or topping had occurred to the Camphor Laurels (*Cinnamomum camphora*) with regrowth evident from old stumps and large pruning cuts. The Camphor Laurels had Very Low Tree Retention Values and 4e Removal SULE ratings.

The assessment of thirteen (13) trees (Trees 23 to 35), located at 22 Victoria Street, were included given their close proximity to the eastern boundary. A concrete driveway accessing The Grange was located to the east of these trees. A trimmed Leyland hedge (*Cupressus X leylandii*) was aligned north south between the driveway and metal fence.

Photo A: The steel fence on the eastern boundary juts out around the trunk of Tree 35. It would appear the survey does not accurately depict fence alignment.

Bradley Hawthorne
e: brad@targetcreekfarm.com.au
m: 0433668343

It has been advised that alignment of the metal fence and the Leyland hedge is not on the property boundary. The Detail & Level Plan does not accurately depict observations made on site.

Trees 22, 24, 25 & 29 contributed to the surrounding amenity given their size and prominence in the landscape.

Photo B: Looking northeast across the vacant site at Trees 22 to 29.

Single stands of Narrow-leaved Paperbarks (*Melaleuca linariifolia*) growing in close proximity to each other were grouped together as Trees 41, 42, 43, 45, 50, 51 & 52. Recent changes had occurred to ground level beneath the canopies of Trees 38 & 39.

Photo C: Looking south at a single stand of Narrow-leaved Paperbarks grouped together as Tree 41. Trees 40 & 43 were located either side of the group.

The vacant site slopes gently down from the northeastern corner to the southwestern corner. Lower levels of the southern and southwestern boundary were marked as flood plane areas on the floor plan.

The site, 10 Victoria Street (Lot 6 DP 1204186), was zoned RU1 Primary Production (Sheet LZN_019E) and was not depicted as an Environmental Heritage item on the Heritage Maps (Sheet HER_019A & 019E).

The majority of assessed trees had a mature age class. Only three (3) trees (Trees 11, 18 & 19) had an over-mature age class, with irreversible decline in vigour and decreasing biomass. A further six (6) trees (Trees 1, 2, 3, 20, 36 & 39) were classified as semi-mature.

Nearly fifty percent (50%) of assessed trees had a Medium (No.2) SULE rating. Thirty percent (30%) had Short (No.3) SULE ratings and a further seventeen percent (17%) had a Remove (No.4) SULE rating. Only two (2) trees (Trees 22 & 24) were classified with a Long (No.1) SULE rating.

Location of proposed services, below and above ground, has not been reviewed.

Discussion

Prior to undertaking tree assessment, a request was made to survey neighbouring trees at 22 Victoria Street, in close proximity to the eastern boundary. Following the initial site inspection and review of a draft floor plan (dated 07/12/18) discussions were had with Altre on the proposed layout of dwellings and Streets B & C. As a result of these discussions, minor amendments were made to the footprint of Streets B & C and perimeter work area (Floor plan dated 11/01/19).

The Tree Protection Zone (TPZ) is a hypothetical estimation of the area required to protect a tree from adverse construction activities. In general, major excavation (cut & fill), site storage and open trenching cannot be permitted within the TPZ of retained trees.

Trees 1, 2 & 3 are located outside the proposed work area. Installation of adequate site fencing at alignment of the work area will ensure the retention and protection of these three (3) Narrow-leafed Ashes.

Proposed construction for Street A, running west from Pepper Farm Drive, will require the removal of Trees 4 & 5 and adoption of tree protection measures for Trees 6 & 7.

Eight (8) Council owned trees located between the Victoria Street footpath and the northern boundary (Trees 8, 11, 14 & 17 to 21) had Low to Very low Tree Retention Values and a Remove SULE classification of 4e. These trees are not worthy of retention throughout the development phase and approval should be sought from Council for their removal. Their timely removal will allow for installation of perimeter site fencing along the northern boundary and beneficial landscaping.

The location of six (6) Sweet Gums (*Liquidambar styraciflua*), on the southern verge of Victoria Street, is outside the proposed work area. The retention of these six (6) Council street trees will benefit streetscape amenity and retain screening to the site from dwellings to the north. Construction activities should be contained within the work area, including the parking of trucks and site storage. Proactive pruning of their eastern canopies prior to undertaking construction activities would be prudent.

The proposed building footprints of two (2) of the four (4) dwellings adjacent to the northern boundary are within the TPZ of Tree 22, a Blackbutt (*Eucalyptus pilularis*). These proposed incursions coupled with the impracticality of retaining a large canopy tree above two (2) courtyards with outdoor living areas will require the removal of Tree 22.

The surveyed locations of thirteen (13) neighbouring trees (Trees 23 to 35) have not been overlaid on the Floor Plan. Their locations, with an accurate depiction of TPZs, should be shown on all detailed drawings. The proposed footprint of Street B with associated footpaths, as shown on Floor plan dated 11/01/19, will make major incursions into the western TPZs of all neigbouring trees and incursions into the SRZ of most larger trees.

Of the thirteen (13) neighbouring trees, that could potentially be impacted by proposed construction of Street B, four (4) trees (Trees 23, 27, 32 & 33) had Low Retention Values and Short (No.3) SULE ratings. Furthermore, the canopies of these four (4) trees were skewed to the west, overhanging the boundary. In consultation with Council, it could prove advantageous to seek approval from the neighbour for their removal, prior to commencing construction activities.

The extent of detail shown on Floor Plan (dated 11/01/19) is inadequate for conclusive Arboriculture impact assessment of proposed construction activities for Street B. Within the TPZs and SRZs of neighbouring trees, consideration for sympathetic road design should avoid continuous strip footing and trenching for storm water pipes/pits along the eastern alignment. In addition to existing soil levels within the TPZs remaining unaltered, finished road surface will need to allow gaseous exchange to soil and ensure filtration of rainwater across the TPZs.

Should excavation or incursions greater than 10% of TPZs be proposed, root investigation prior to construction would be required. This can, in part, involve the Project Arborist supervising non-destructive hand excavation at proposed eastern alignment of Street B to undertake a root-mapping investigation prior to approving the proposed design.

The proposed building footprints of two (2) dwellings and the turning circle of Street B will require the removal of Trees 36 to 39. Three (3) of these four (4) trees had Low Retention Values.

Amendment to the draft Floor Plan has removed the proposed footprint of Street C to outside the indicative TPZs of Trees 41, 43, 44 & 47 to 52. Installation of adequate site fencing at alignment of the work area will ensure the retention and protection of these groups of Narrow-leaved Paperbarks. Furthermore, existing soil levels will need to remain unaltered around these trees and all underground services excluded within their TPZs.

Provision for offset planting within the property and within Council's road reserve will ensure that there is no net environmental loss as a result of the development. Proactive, infill planting will increase streetscape amenity and benefit perpetuity of endemic Eucalypts in the area.

Conclusion

Amendments made to the draft Floor Plan have allowed for the retention of all Narrow-leafed Paperbarks located to the southwest of the work area.

The proposed removal of Trees 8, 11, 14 & 17 to 21, located between Victoria Street footpath and the northern boundary, will not impact on streetscape or surrounding amenity, given their Low to Very low Tree Retention Values and a Remove SULE classification.

Proposed street and building footprints will require the removal of seven (7) trees (Trees 4, 5, 22, 36 to 39). Adequate offset planting with a maintenance period should be stipulated.

Details provided thus far for Street B are inadequate for conclusive Arboricultural impact assessment. Adoption of tree sensitive construction measures, adjacent to neighbouring trees (Trees 23 to 35), are required to ensure that the proposed development does not impact the neighbour's tree asset.

Bradley Hawthorne
e: brad@targetcreekfarm.com.au
m: 0433668343

Recommendations

As a result of the inspections and assessment of Trees 1 to 52 and review of Floor plan (dated 11/01/19), the following recommendations are made:

Design stage

1. Undertake in-depth Arboricultural impact assessment for the proposed construction of Street B within the Tree Protection Zones of neighbouring trees (Trees 23 to 35). Project Arborist and Engineer to detail design layout and sympathetic construction methods to limit the potential impact on neighbouring trees.
2. Accurately depict alignment of existing infrastructure (steel fence and Leyland hedge) adjacent to eastern boundary. Assess implications of realigning existing infrastructure to property boundary.
3. Ensure underground services do not create incursions into the TPZs of retained trees.

Pre-construction

4. Provide detailed drawings and Arboricultural comment for revised layout and construction methods for Street B, adjacent to neighbouring trees.
5. This report should accompany Development Application documentation and be submitted to Shoalhaven City Council for their deliberation.
6. No tree work should commence until written approval has been received from Council.
7. Seek written permission from Council to remove Trees 8, 11, 14 & 17 to 21, located adjacent to the northern boundary.
8. Seek written permission from the owner(s) of 22 Victoria Street for the timely removal Trees 23, 27, 29 & 30, that overhang the eastern boundary.
9. Trees 4, 5, 22 & 36 to 39 located within the work area are to be removed, as per recommendations below:
    - 9.1. Prior to undertaking tree work, a copy of Council's approval and this Report, including the Tree Location Plan (Attachment B), shall be reviewed by the successfully appointed Arboricultural company and site manager, to ensure no discrepancies exist between approved plans and scheduled works.
    - 9.2. All works shall be in accordance with Safe Work Australia 'Guide to Managing Risks of Tree Trimming and Removal Work' July 2016.
    - 9.3. Tree work shall only be undertaken by a suitably qualified and insured Arboriculutral company with staff trained to AQF Level 3 in Arboriculture, or above, or equivalent.
    - 9.4. All vegetative waste is to be mulched through a commercial mulcher/chipper and either be directed to a waste facility that is licensed to accept the waste, reused for landscaping purposes on site, or used as per the NSW Environmental Protection Authority's Mulch Exemption 2016.

10. Install tree protection fencing, at a five (5) metre radius around Trees 6 & 7, in compliance with specifications below:
    - 10.1. Tree protection measures must comply with AS 4970 – 2009 Protection of trees on development sites.
    - 10.2. Install 1.8m high, 2.5m long chain-mesh/steel panels on supporting blocks, fastened and secured to prevent movement at a five (5) metre radius from centre of trunks.
    - 10.3. Attach an outward facing sign on each side of the tree protection zone. Signs to include the words "*Tree Protection Zone – Keep Out*"
    - 10.4. Ensure each tree protection zone is free of weeds and, unless the existing surface is grass, install wood chip mulch to a maximum depth of 75mm.
11. Install fastened and secured site perimeter fence to eliminate access from the work area to the TPZs of Trees 40 to 52.
    - 11.1. Attach inward facing signs that include the words "*Tree Protection Zone – Keep Out*".
    - 11.2. Ensure each tree protection zone is free of weeds and install wood chip mulch to a maximum depth of 75mm.
    - 11.3. Ensure existing levels outside the work area remain unaltered

Construction

12. Project Arborist and site manager to:
    - 12.1. Ensure site perimeter fencing and Tree Protection Fencing eliminates access to the TPZs of retained trees.
    - 12.2. Ensure existing soil level within the TPZs of retained trees remains unaltered.
    - 12.3. Ensure machinery and construction activities are restricted to within the work area. No site storage or parking of trucks on Victoria Street.

Post construction

13. In consultation with stakeholders, undertake offset planting with twelve (12) month maintenance period.
14. In consultation with the property owner(s) of 22 Victoria Street, undertake replacement planting, adjacent to the eastern boundary.
15. Replacement planting should conform to NATSPEC guidelines and Ross Clark's 'Guide for assessing the quality of and purchasing of landscape trees' 2003

Bradley Hawthorne – Arborist
Dip. Arboriculture (AQF Level 5)
Dip. Local Government Management

Attachments: **A** – Tree Audit Sheets
B – Tree Location Plan