

Arborist Report

Preliminary Assessment

Location: 106 Loongana Avenue, Glenroy

Reference number: WD24-07-23_106Loongana

Prepared by:

Liam Kennedy – Consulting Arborist

Qualifications:

Graduate Certificate in Arboriculture (University of Melbourne)
Advanced Diploma in Horticulture (Arboriculture) (University of Melbourne)
ISA Tree Risk Assessment Qualified | QTRA Certified

Report Commissioned By: Wardle Design

Report Date: 24 July 2024

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Executive Summary

Gum and Maple Consulting has assessed trees on and neighbouring 106 Loongana Avenue, Glenroy for the purposes of property development. The tables below list the assessed trees and provide each a retention value. This value is principally applied based on each tree's contribution to the property and broader landscape (significance and suitability) whilst considering relevant Council documents. These reference documents are listed in section 1.1 of this report. The below table lists the trees that are recommended to be removed to achieve a desired development outcome.

#	Common Name	Height & Spread	Origin	Ownership	Permit Status	Retention Value	Recommendation	Justification
2	Weeping Bottlebrush	3 x 4	N	Site Tree	NPR	Low	Remove	Low Landscape Values
3	Sweet Pittosporum	4 x 3	V	Site Tree	NPR	Low	Remove	Weed Status
4	Snow-in-Summer	6 x 8	N	Site Tree	NPR	Low	Remove	Low Landscape Values
5	Desert Ash	7 x 7	E	Site Tree	NPR	Low	Remove	Low Landscape Values
6	Box Elder	5 x 5	E	Site Tree	NPR	Low	Remove	Weed Status
7	Kohuhu	6 x 6	E	Site Tree	NPR	Low	Remove	Low Landscape Values
8	Cypress	4 x 3	E	Site Tree	NPR	Low	Remove	Low Landscape Values
9	Cherry-plum	4 x 3	E	Site Tree	NPR	Low	Remove	Weed Status
10	Cherry-plum	5 x 8	E	Site Tree	NPR	Low	Remove	Weed Status
11	Oleander	3 x 4	E	Site Tree	NPR	Low	Remove	Weed Status
12	Box Elder	6.5 x 8	E	Site Tree	NPR	Low	Remove	Weed Status
13	Cherry-plum	4 x 3	E	Site Tree	NPR	Low	Remove	Weed Status
14	Red Angel's Trumpet	4 x 5	E	Site Tree	NPR	Low	Remove	Low Landscape Values

The below table lists the trees that should be protected during any proposal to develop the property*.

#	Common Name	Height & Spread	Origin	Ownership	Permit Status	Retention Value	Recommendation	Justification
1	Willow Bottlebrush	5 x 5	N	Council	PARKS	High	Retain & Protect	Council Managed
15	Weeping Bottlebrush	3 x 2	N	Council	PARKS	High	Retain & Protect	Council Managed

#	Common Name	Height & Spread	Origin	Ownership	Permit Status	Retention Value	Recommendation	Justification
16	Weeping Bottlebrush	3 x 1	N	Council	PARKS	High	Retain & Protect	Council Managed
17	Willow Bottlebrush	5 x 6	N	Council	PARKS	High	Retain & Protect	Council Managed

* Council determinations to allow removal of Trees 15 and 16 at cost appears reasonable but ultimately subject to Council Policy

Some smaller woody vegetation/trees less than 3 metres in height were observed during the site inspection. AS4970-2009 – *Protection of Trees on Development Sites* defines a tree as a woody perennial plant exceeding 3 metres in height. Given their small size they have not been included in this reporting. Please note that the opinions expressed within this report are that of the author and ultimately the decision-making around vegetation removal and development outcomes sits with the responsible authority (Council).

1. Introduction

Gum and Maple Consulting was contacted by Wardle Design to assess trees on and directly neighbouring 106 Loongana Avenue, Glenroy (the Property). We are informed that the owner seeks to potentially subdivide and develop the property and want to best understand the site and neighbouring trees.

An inspection was undertaken on 18 July 2024. Prior to attending the property, I reviewed correspondence from the client, as well as aerial images (MetroMaps) to gather a general understanding of the Property, its size, as well as past and existing conditions and built structures.

The Victorian State Government – Environment, Land, Water and Planning – VicPlan website and the Merri-bek Council website¹ were also reviewed to best understand the legislative controls and other requirements that affect vegetation within the municipality and on the Property.

1.1 Reviewed Documents

The following documents have also been reviewed in preparation of this Report:

- The Merri-bek Planning Scheme
- Clause 32.09 – Neighbourhood Residential Zone – Schedule 1 (NRZ1)
- Merri-bek City Council – Moreland General Local Law 2018
- Merri-bek Tree Planting Manual for Residential Zones 2014
- Merri-bek Arboricultural Report Writing Guide

From the Client

- Survey Plans (Existing Conditions) by Terrain Consulting Group dated 16 July 2024

1.2 Objectives

It is this report's primary purpose to inform the client and any other professionals engaged by the owner of the property for trees on and directly adjoining the property. Additionally, this report may assist in informing Council's Planning Department by addressing the arboricultural concerns relating to development of the property. This report will:

- Identify (nomenclature) and Number all relevant trees
- Provide for their location on a Site Map
- Provide their 'permit status'
- Provide their dimensions and tree protection areas
- Provide each tree a retention value
- Provide for analysis and constraints for building and works near trees requiring protection, and
- Comment and recommend any tree protection measures required (if applicable)

Proposed plans have not been supplied to Gum and Maple Consulting therefore our assessment does not analyse potential impacts to the assessed trees.

1.3 Procedure, Limitations & Assumptions

All trees were assessed from ground level utilising internationally accepted techniques and methods of non-invasive visual tree assessment (VTA)². No invasive tests were conducted, or samples taken, and any

¹ Merri-bek City Council, 2024, Trees on private property, <<https://www.merri-bek.vic.gov.au/living-in-merri-bek/environment/trees/trees-on-private-property/>> [viewed on 22 July 2024]

² Lonsdale, D (1999) The Principles of Tree Hazard Assessment and Management (Research for Amenity Trees). London: Her Majesty's Stationery Office Book.

assessments of decay are qualitative only unless otherwise stated. Data for neighbouring trees (height, canopy widths and stem measurements) has been estimated from within the subject property. The positioning of each assessed tree is taken from the Survey Plans provided by the client. It is noted that some smaller trees are not plotted on the provided drawings, their locations are therefore estimated based off site observation, laser measurements taken during the inspection, and aerial images.

The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) for each tree was measured in accordance with the Australian Standards AS 4970-2009 *Protection of Trees on Development Sites*. The assessment of these trees in terms of their overall condition has been made in accordance with the descriptors as set out in Appendix B. These must be referred to when reading this report. Vegetation less than 3 metres in height has not been assessed or commented on in this report. I confirm this report has been written from an impartial perspective and not as an advocate of the client. In addition, this report adopts the Harvard Referencing System as an accepted academic format when referencing resource materials.

2. Planning & Local Law Context

2.1 General

From the town planning perspective, the *Planning and Environment Act 1987* provides controls with respect to the use and development of land. To achieve this objective the Victorian state government requires that all municipalities develop, administer and enforce their own planning scheme.

Planning Schemes divides all land within the municipality into zones ranging from residential, commercial, industrial and other zones. Each zone will allow for a number of land uses and development to occur without consent from Council's planning branch (as-of-right). Other land uses or development may require Council consent by way of a planning permit (discretionary), whereas other land uses and development may be prohibited all together. In all instances it is the intent of the planning scheme to ensure that the underlying purpose of each zone is maintained by requiring that permitted land uses are compatible with neighbouring land uses.

In addition to the zone controls many properties are also affected by overlay controls. These overlay controls are associated with development requirements which can specifically affect vegetation removal and/or outcomes. Some Councils also utilise local laws to regulate vegetation protection. In these instances, it is the *Local Government Act 2020* (S70)(1) that provides the authority to Councils to make determinations. The integration of these tree protection mechanisms, however, is applied differently across each Council.

The Merri-bek Council website states that

"An applicant of a planning permit need not apply for permits under both the Planning Scheme and the Local Law. In the hierarchy of controls, the Planning Scheme application takes precedence. If a tree is approved for removal as part of a planning permit that has been issued, it can be removed without a Local Law Mature Tree Permit."

Decisions regarding private vegetation are primarily made based on the Council's Planning Scheme – decision guidelines and policy documents – and ultimately by the delegated Council Officer (town planner) and their review of all planning application documents. There are times where the Council Officer may also consider specialist internal referral advice when needed.

Matheny, N. P & Clark, J. R (1994) A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas. 2nd Edition. International Society of Arboriculture

2.2 The Property

The Property is located at the corner of Loongana and Palana Street with an area of approximately 596 square metres. It is in a Neighbourhood Residential Zone (NRZ1).

No specific vegetation related Planning Scheme Overlays apply to the property. The Local Law status of each private tree is provided in this report in the event the owner of the land chooses to remove vegetation irrespective of any town planning application.

There are specific landscaping requirements associated with the NRZ (B13 – Landscaping). This states that

“The development should provide at least one canopy tree located within the front setback that meets the following requirements:

For front setbacks of 4.5 metres or more:

- *Located within a permeable area within the site of at least 4.5 metres x 4.5 metres.*
- *Reach a height of 8 metres -15 metres at maturity.*
- *Achieve a canopy width of at least 7 metres at maturity.*

At least one canopy tree located within the secluded private open space of each dwelling that meets the following requirements:

- *Located within a permeable area within the site of at least 4.5 metres x 4.5 metres*
- *Reach a height of 6 metres - 8 metres at maturity*

3. Site Map



PALANA

STREET

● Hazardous
● Low Values
● Moderate Values
● High Values

4. Tree Data

#	Species	Common Name	Height & Spread	DBH	TPZ	SRZ	Health	Structure	Form	Origin	Ownership	Permit Status	Retention Value
1	<i>Callistemon salignus</i>	Willow Bottlebrush	5 x 5	28	3.4	2.1	Fair	Good	Good	N	Council	PARKS	High
2	<i>Callistemon viminalis</i>	Weeping Bottlebrush	3 x 4	14	2	1.5	Fair	Fair	Poor	N	Site Tree	NPR	Low
3	<i>Pittosporum undulatum</i>	Sweet Pittosporum	4 x 3	12	2	1.5	Fair	Fair	Poor	V	Site Tree	NPR	Low
4	<i>Melaleuca linariifolia</i>	Snow-in-Summer	6 x 8	79	9.5	3	Poor	Fair	Poor	N	Site Tree	NPR	Low
5	<i>Fraxinus angustifolia</i> ssp. <i>angustifolia</i>	Desert Ash	7 x 7	23	2.8	1.8	Fair	Fair	Poor	E	Site Tree	NPR	Low
6	<i>Acer negundo</i>	Box Elder	5 x 5	25	3	1.8	Fair	Fair	Fair	E	Site Tree	NPR	Low
7	<i>Pittosporum tenuifolium</i>	Kohuhu	6 x 6	25	3	1.8	Poor	Poor	Poor	E	Site Tree	NPR	Low
8	<i>Cupressus sp.</i>	Cypress	4 x 3	14	2	1.5	Fair	Fair	Poor	E	Site Tree	NPR	Low
9	<i>Prunus cerasifera</i>	Cherry-plum	4 x 3	11	2	1.5	Good	Good	Good	E	Site Tree	NPR	Low
10	<i>Prunus cerasifera</i>	Cherry-plum	5 x 8	37	4.4	2.2	Fair	Poor	Poor	E	Site Tree	NPR	Low
11	<i>Nerium oleander</i>	Oleander	3 x 4	9	2	1.5	Fair	Fair	Fair	E	Site Tree	NPR	Low
12	<i>Acer negundo</i>	Box Elder	6.5 x 8	34	4.1	2.1	Good	Poor	Poor	E	Site Tree	NPR	Low
13	<i>Prunus cerasifera</i>	Cherry-plum	4 x 3	35	4.2	2.1	Poor	Poor	Poor	E	Site Tree	NPR	Low
14	<i>Brugmansia sanguinea</i>	Red Angel's Trumpet	4 x 5	129	15	0	Good	Fair	Fair	E	Site Tree	NPR	Low
15	<i>Callistemon viminalis</i>	Weeping Bottlebrush	3 x 2	6	2	1.5	Fair	Good	Good	N	Council	PARKS	High
16	<i>Callistemon viminalis</i>	Weeping Bottlebrush	3 x 1	8	2	1.5	Fair	Good	Good	N	Council	PARKS	High
17	<i>Callistemon salignus</i>	Willow Bottlebrush	5 x 6	21	2.5	1.7	Fair	Fair	Poor	N	Council	PARKS	High

Heading Definitions

~Height x Spread – metres

DBH (Diameter at Breast Height) – centimetres

TPZ & SRZ – radius, metres

Origin

I – Indigenous | V – Victorian

N – Native | E – Exotic

LLP – Local Law permit required to Remove

NPR – No Permit Required – Tree can be removed 'as-of-right'

TPO – Third-Party Owned

5. Discussion

5.1 Tree Retention

Trees have an essential role in the built environment. A healthy well-positioned tree, along with being aesthetically pleasing, can provide tangible positive benefits from an environmental, social and financial perspective. In contrast, trees that are inappropriately positioned or that are in poor condition can pose significantly higher risks to built environments, people and can cause varying levels of nuisance and financial burden.

Property owners can unknowingly plant inappropriate trees without fully understanding their growth characteristics or maintenance requirements. Often in these instances, trees are neglected after planting and outgrow their position impacting upon or displacing built structures. There are also times where trees are not planted but readily germinate from seed carried by various methods. This uninformed or haphazard approach often provides for undesirable outcomes.

From a development perspective due to competing pressures for above and below ground space, it is not suitable or reasonable to retain all trees. It is better to identify the more significant trees that have a greater contribution to the site and surrounding area and focus on protecting these well³. Whether it be the tree's position, overall condition or its landscape contribution, a retention value is placed on all trees that may be impacted by a proposal to develop land.

As identified in section 3, this report categorises all trees on the Property into 4 main groups. They are:

- Hazardous
- Low retention
- Moderate retention
- High retention

As indicated in the first dot point above, trees that pose a high or extreme risk are considered hazardous. Please note, none of the trees assessed in this Report are deemed hazardous. However, risk and more crucially its level, is the most important determining factor when considering a tree's overall retention value.

Trees of low retention value contribute little to the site and surrounding area and are unsuitable for retention, they should not restrict development of a property.

Trees holding moderate retention value should be retained pending a thorough analysis of any potential constraints (i.e. can the tree be incorporated with minor design changes). In these instances, the determination to retain a tree and incorporate it into the development should be based on a combination of the tree's position and the proposed essential or desirable spaces. An example of this is; a kitchen, living room or master bedroom is essential to a dwelling whereas, a gym, shed or swimming pool is not.

Trees of high retention value contribute greatly to the site and surrounding area. Such trees should be adequately accommodated for in the design stages. When trees are removed consideration should be given to suitable replacement planting. In most instances legislation either through a Planning Scheme or a Local Law requires that provisions be placed on issued permits to offset the loss of trees.

Neighbouring trees are categorised as High retention value as there are common law rights and obligations that are afforded to the owner/s of these assets. Any proposal to develop the land should give regard to their healthy safe retention. In saying this there may be instances where their removal can be negotiated with the owner/s whilst also satisfying any legislative requirements with the Responsible Authority (Council).

³ Matheny, N and Clark, J. 1998. *Trees and Development*. ISA, Champaign, Ill, USA

5.2 Development Considerations

Trees have above ground parts (stem/s, branches and leaves) and below ground parts (woody and non-woody roots) both are essential for a tree's health and structure. It is a common misconception that a tree's canopy and roots mirror each other and that tree roots only extend to a tree's 'drip-line'. In actuality they differ greatly in their function and distribution.

When developing a site, tree roots are often forgotten or insufficiently considered, nonetheless they can be adversely impacted in various ways. To reduce these impacts, Arborists use the Australian Standard AS 4970-2009 - *Protection of Trees on Development Sites* (AS 4970-2009) to guide the integration between existing retained trees and proposed development construction.

AS 4970-2009 uses the tree's trunk or stem dimensions to equate a Structural Root Zone (SRZ) and a Tree Protection Zone (TPZ) for each assessed tree. These measurements are provided in section 4 of this Report. Both zones are a radial measurement from the tree trunk's centre and encompass the entire tree. These zones should appear as circles on scaled site plans and should not be confused with each tree's estimated canopy dimensions.

Development encroachment is all proposed construction within a tree's calculated TPZ. This includes but is not limited to; site cuts or excavation, built form (buildings), decking or hard landscaping, and surfaces (including permeable surfaces).

Development encroachment is assessed as either 'minor' encroachment (less than 10%) or 'major' encroachment (greater than 10%) into a tree's TPZ. Any encroachment into a tree's SRZ is discouraged and is always assessed as a 'major' encroachment.

In instances of minor encroachment outside the SRZ, such construction is generally considered acceptable on the basis that it can be compensated for elsewhere and is contiguous with the TPZ. If a proposed encroachment is greater than 10% of the TPZ, or inside the SRZ, a consulting Arborist must demonstrate that the tree will remain viable. Determining this may require further investigation by non-destructive methods.

The severity of proposed development encroachment is assessed on a sliding scale. The removing of soil to install basement levels, ramps and retaining walls is considered most detrimental to trees as it can remove tree roots and the soil environment conducive for root growth entirely. Surfaces, hard landscaping or decking is generally viewed at the opposing end of the scale and more tolerable. In saying this there are many factors that influence this determination. Some of these are listed below:

- i. The subject tree, its species, tolerances and condition
- ii. Pre-existing site conditions that may have limited the extent and distribution of root growth
- iii. The type of proposed encroachment (as above)
- iv. The level of proposed construction works represented as a percentage
- v. The design and methods of construction works

Such an assessment must be undertaken by a fully qualified consulting or project Arborist, with a minimum Australian Qualification Framework (AQF) – Level 5 Diploma in Arboriculture.

6. Conclusions

The property mostly contains exotic trees many of which are weed species such as oleander, pittosporums, and cherry-plums. There are a few Australian native trees from New South Wales near the boundaries, particularly in the front setback of the property. The most notable of these is a Snow-in-Summer tree in poor condition located close to the western boundary. None of the assessed trees exceed 7 meters in height.

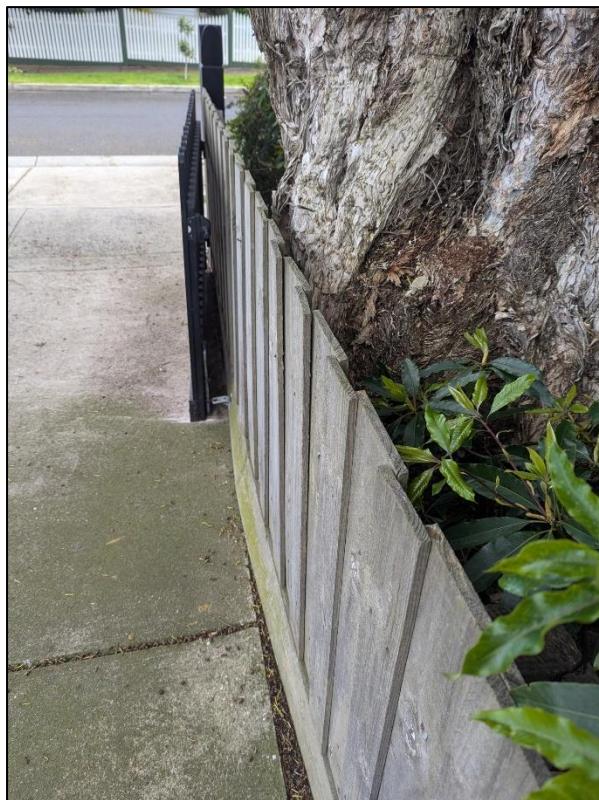
Arboricultural concerns that relate to potential buildings and works and development of the property are:

1. Assessment of the condition of each tree and their respective worthiness of retention in a proposed development (tables provided in Executive Summary best provide this information).
2. Identify the size and protection areas of any Council managed trees.
3. Provide analysis of potential impact to Council managed trees by construction of potential additional vehicle crossing at Loongana Avenue frontage
4. Recommend any canopy trees that could be selected to be planted in open space areas of any future development and provide for their mature dimensions.

Tree 1 is a willow bottlebrush, native to New South Wales, and is in fair overall condition. The client requested specific analysis to understand any potential impacts on the tree from the construction of an additional vehicle crossing at the westernmost end of the Loongana Avenue frontage. To achieve this, measurements and a Non-Destructive Root Investigation (NDRI) were conducted during the site inspection. This involved measuring 3 meters from the westernmost corner of the property along the boundary to allow for the standard vehicle crossing width and driveway. Additionally, a 1-meter measurement was taken to account for the width of a splay extending from the pedestrian footpath to the roadside curb edge. These measurements, best illustrated on proposed and scaled architectural drawings, were taken on-site. The infographic below shows the approximate location where the NDRI took place.



Trees in the front yard are predominantly weeds aside from one paperbark or Snow-in-Summer (Tree 4) that is hard against the western boundary. Most of the western canopy has been lopped to the property boundary fenceline. Moderate displacement of the fence plinth board was observed at the time of inspection. Due to the tree's large and multiple stems it has a large TPZ radius of 9.5 metres though the tree is of low landscape values given its poor condition and relatively small canopy dimensions.



Displacement of plinth board



Sparse canopy above fenceline

The trees toward the northeastern corner of the property (Trees 6-8) are broadly in poor condition, sparse with moderate level of deadwood and branches in their respective canopies. They are in a prominent location facing two street frontages though provide little to the landscape and would be better replaced with more contributory species that have larger and more broad-spreading canopies. They should not be retained in any proposed development of the property.

This is similarly the case for the trees in the rear setback which apart from Tree 14 are weeds. They are:

#	Common Name	Height & Spread	Origin	Ownership	Retention Value
10	Cherry-plum	5 x 8	E	Site Tree	Low
11	Oleander	3 x 4	E	Site Tree	Low
12	Box Elder	6.5 x 8	E	Site Tree	Low
13	Cherry-plum	4 x 3	E	Site Tree	Low
14	Red Angel's Trumpet	4 x 5	E	Site Tree	Low

The Red Angel's Trumpet although in good overall condition is located against the existing garage structure and can only be seen when standing in its immediate area (the rear yard). To demolish the garage, it will require removal.

There are two (2) recently planted weeping bottlebrush in the Palana Street frontage. Any future proposal to develop the land should allow for their retention. However, if on the basis they require removal, Council's Vehicle Crossing Policy states under section 5.9 Street Trees (emphasis provided on underlined).

"If a property owner requests a tree be removed for a vehicle crossing, the tree will be assessed by Council's arborist. If the tree is mature and healthy, and the crossing permit is closer than the required Tree Protection Zone of the Australian Standard AS4970, then the vehicle crossing permit will not be

supported. If the tree is deemed not significant, the fee charged to the applicant will include the calculated value of the tree, plus the cost of removal of the tree and the stump and the cost of planting and establishing an advanced new tree for two years. If a replacement tree is not warranted in that location, then one will be planted nearby."

Given both are juvenile, any determination to allow their removal at cost to the applicant appears reasonable. This should only be pursued by an applicant if a desired development design requires it, otherwise these trees should be retained and protected.

7. Recommendations

7.1 Tree Removal & Retention

- A. Any future development design should reflect the site trees (Trees 2-14) as removed. These tree warrant removal in a development context for the following reasons:
 - Low Landscape Values
 - Weed Status, OR
 - Poorly Located (hard against boundary fences)
- B. The TPZ and SRZ of all proposed removed trees should be shown in faint dotted lines on plans.

7.2 Design Considerations

The street trees (Trees 1, 15-17) should be reflected as retained within a future development proposal* with adequate setbacks and encroachments not exceeding 10% (subject to further analysis is necessary).

*Council determinations to allow removal of Trees 15 and 16 at cost appears reasonable but ultimately subject to Council Policy

7.3 Tree Protection

To allow protection for the street trees (Trees 1, 15, 16, and 17) it is recommended that prior to demolition and construction works, a Project Arborist be appointed by the site manager or property owner to implement tree protection measures.

Standard Tree Protection Measures

Tree Protection Zones and associated fencing shall be established for Tree 1, 15, 16, and 17. Once installed to the satisfaction below, the Tree Protection Zones shall be maintained until the conclusion of works (or otherwise stated) to the satisfaction of the Responsible Authority and Project Arborist, and shall meet the following requirements:

(a) Extent

Trees 1, 15, 16, and 17: Tree Protection Zone is to be provided to the extent of the calculated Tree Protection Zone (TPZ) where it occurs in the nature strip outside the subject property.

(b) Fencing

Protective fencing must consist of chain wire mesh panels, held in place with concrete feet. Fencing must comply with Australian Standard AS 4687-2007 *Temporary fencing and hoardings*. Shifting of fences can only occur to allow grass cutting or maintenance.

(c) Signage

Fixed signs are to be provided on all visible sides of the Tree Protection Fencing, stating "Tree Protection Zone – No entry without permission from Council".

(d) Access to Tree Protection Zone

- (i) No persons, vehicles or machinery are to enter the Tree Protection Zone except with the consent of the Council;
- (ii) No fuel, oil dumps or chemicals are allowed to be used or stored within the Tree Protection Zone and the servicing and re-fuelling of equipment and vehicles must be carried out away from the root zones;
- (iii) No storage of material, equipment or temporary building is to take place within the Tree Protection Zone;
- (iv) Nothing whatsoever, including temporary services wires, nails, screws, or any other fixing device, is to be attached to any tree.

7.4 Tree Planting and Landscaping

To provide a contribution to neighbourhood character is satisfy B13 Landscaping requirements, tree planting is required. Below provides a list of species that may be suitable. Large trees should be centrally in open space areas offset from structures and underground services.

Tree List

Small Trees (less than 8 metres in height)

- *Tristaniopsis laurina* – kanooka
- *Callistemon viminalis* – bottlebrush
- *Koelreuteria paniculata* – golden rain tree
- *Hymenosporum flavum* - native frangipani

Large Trees (8+ metres in height)

- *Acacia implexa* - lightwood
- *Eucalyptus polyanthemos* – red box
- *Quercus palustris* – pin oak
- *Corymbia eximia* - yellow bloodwood

References

Dunster, J. 2017. *Tree Risk Assessment Manual 2nd Edition*, Champaign, Illinois, USA.

Lonsdale, D (1999) The Principles of Tree Hazard Assessment and Management (Research for Amenity Trees). London: Her Majesty's Stationery Office Book.

Matheny, N. P & Clark, J. R (1994) A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas. 2nd Edition. International Society of Arboriculture.

Matheny, N and Clark, J. 1998. Trees and Development. ISA, Champaign, Illinois, USA.

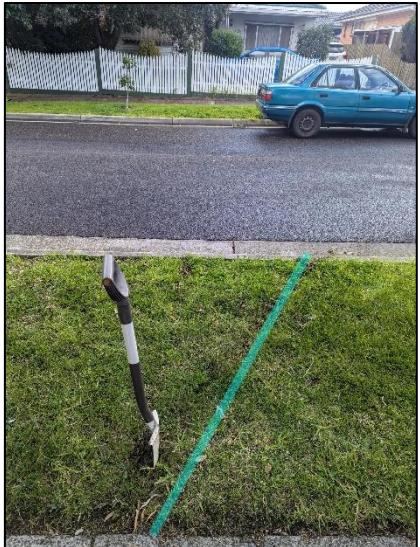
Standards Australia, 2009. *Protection of Trees on Development Sites*. AS 4970-2009. Sydney, Australia.

Standards Australia, 2007. *Pruning of Amenity Trees*. AS 4373-2007. Sydney, Australia.

Appendix A: Photographs



Panorama view of Loongana Avenue property frontage with NDRI shown on amended photo



NDRI alignment



Open trench to ~400mm depth



Root <10mm



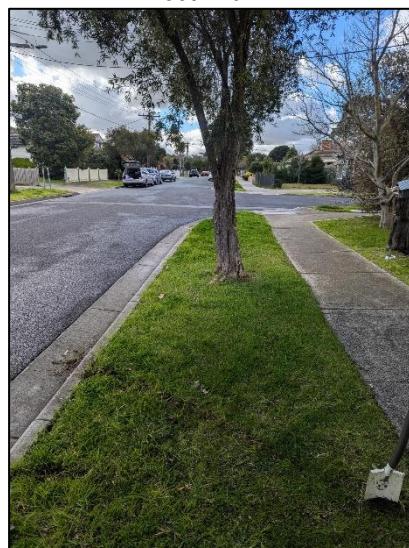
Root <10mm



Root <10mm



Open trench



NDRI backfilled



Tree 1



Tree 2



Tree 3



Tree 4



Tree 5



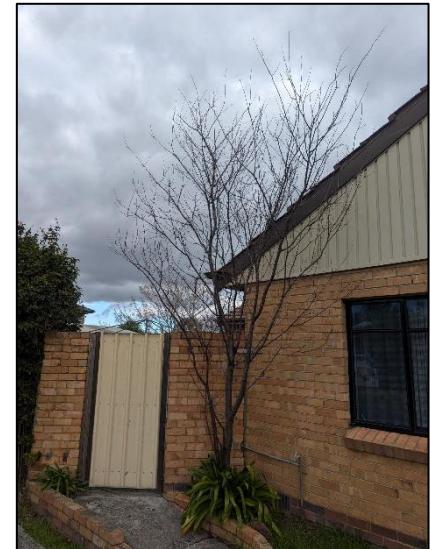
Tree 6



Tree 7



Tree 8



Tree 9



Tree 10



Tree 11



Tree 12



Tree 13



Tree 14



Tree 15



Tree 16

Appendix B: Definition of Terms

Maturity	
Juvenile	Tree is deemed to be less than 5 years old
Semi-mature	Tree yet to achieve 70% of typical mature height and canopy spread for its species
Mature	Tree has achieved greater than 70% of its expected size
Over-mature	Tree has achieved its mature expected size for species, and displays signs of natural decline in health and structure
Dead	Tree has completely defoliated and has no living sections

Health	
Good	A tree with leaf size, colour, density and intermodal growth typical for its species; minor deadwood and dieback caused by natural attrition may be present; no visible pathogen infestation.
Fair	A tree with reduced canopy density including foliage size and colour; uncharacteristic deadwood may present; infestation of pests or epicormic growth may be present at minor levels.
Poor	A tree with significantly reduced canopy and foliage density; significant amounts of deadwood; extensive infestation of pests; and is likely to decline further.
Dead	Foliage may have turned completely brown. No live foliage in the canopy.

Structure	
Good	Structurally sound scaffold limbs and branch unions; no major decay observed on trunk and scaffold limbs. Scaffold limbs and branches display positive taper.
Fair	Structurally sound scaffold limbs and branch unions that may display; structurally stable bifurcated or co-dominant stems; prevalence of tight branch unions but with structurally sound attachments; previous limb failures caused by inclement weather though structural issues have not destabilised remaining sections; trunk or limb decay present but currently not excessively affecting structural integrity.
Poor	Structurally unstable bifurcated or co-dominant stem structure with excessive included bark characteristics; prevalence of structurally unstable scaffold or branch unions and attachments; prevalence of limb failures caused by inclement weather and structural issues that have likely destabilised other sections; excessive trunk or limb decay affecting structural integrity.

Form	
Good	Canopy form typical for species; symmetrical or minor asymmetrical canopy spread; missing canopy less than 25%
Fair	Canopy form atypical for species; asymmetrical canopy spread with minor directional bias; minor phototrophic lean; missing canopy 25%-50%
Poor	Canopy form atypical for species; asymmetrical canopy spread with major directional bias; excessive trunk lean; missing canopy greater than 50%

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