Arboricultural Report

Construction Impact Assessment with Tree Management Protection Plan

46 Theodore Avenue
Noble Park VIC 3174

RIGONI TREE SOLUTIONS

Provide specialist arboriculture advice for vegetation management in the urban forest.

Commissioned By:

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Report No.

181-2024

Report Date:

17/09/2024

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Introduction

Rigoni Tree Solutions has been engaged by Jova Drafting Consultants to assess and survey all trees onsite and on adjoining trees within close proximity to property boundaries including street trees to 46 Theodore Avenue Noble Park (the 'Subject Property') and prepare a Construction Impact Assessment with regards to the proposed construction works within close proximity to these trees, with a Tree Management Protection Plan (TMPP) to protect retained trees.

This report supersedes report 131-2023 dated 29/8/2023. Since our previous report, all onsite trees have been removed and the site has been cleared.

The site is located within a General Residential Zone Schedule 1 (GRZ1) in the City of Greater Dandenong (the 'Responsible Authority') (*DTP, 2024*).

Whilst there are no planning scheme overlays affecting this site, there are local laws governing tree removals. Any tree with more than 40cm in diameter measured at 1.4m above ground level will require a permit. Trees declared as a Noxious Weed under the Catchment and Land Protection Act 1994 are exempt from this local law.

These local laws were introduced after our original report.

A project arborist must be appointed to certify works throughout all construction stages.

Tree Protection Zone (TPZ) and Structural Root Zones (SRZ) have been calculated for each tree, with measurements provided to assist with the design and development phases. As part of the arboricultural impact assessment completed for this site a tree management and protection plan has been provided which outlines how retained on and offsite trees are to be protected during the proposed development at this address in line with Australian Standard *AS4970-2009: Protection of Trees on Development Sites*.

Critical Issues

Demolition and construction works can negatively affect retained trees both directly through mechanical injury and indirectly in ways that are not evident immediately but affect the health of the tree in the long term. It is for this reason that tree protection measures should be implemented and adhered to throughout the entire development process.

Arboricultural techniques cannot repair construction damage to a tree or the degradation to its environment. Arborists only have a limited ability to 'cure' specific injuries or generalized stress caused by construction activities. Once a tree has been damaged, few remedial treatments available (*Matheny & Clark 1998)*.

Direct damage to roots through trenching and site cuts can remove absorbing roots and sever structural roots. Root activity can be compromised by various activities: soil compaction, sealing the soil surface by adding soil fill over roots. These activities limit the amount of oxygen and moisture that may reach the roots, and without which roots cannot function. Tree trunks and branches are easily damaged by machinery during works. It is important that trees are properly protected throughout all stages of the project starting at the design phase.

Determining Tree Protection Zones

The following information has been adapted from the Australian Standard for the Protection of trees on development sites (*AS4970-2009*):

The tree protection zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The radius of the TPZ is calculated for each tree by multiplying its diameter at breast height (DBH) by 12. DBH is measured 1.4m above ground level. The TPZ measurement Is applied by measuring the radius from the centre of the stem at ground level. The following also applies:

- The TPZ incorporates the structural root zone (SRZ).
- A TPZ should not be less than 2 m nor greater than 15 m (except where crown protection is required).
- The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 m outside the crown projection.

Tree Protection Zone (TPZ) radius is measured from the centre of the trunk giving a circular area to protect the canopy and roots above and below ground during construction. The Structural Root Zone (SRZ) is incorporated in the TPZ to protect the tree's longevity and stability. No encroachment is allowed inside the SRZ as stated in the Australian Standard *AS4970-2009 Protection of Trees on Development Sites*.

Variations to the TPZ

It may be possible to encroach into or make variations to the standard TPZ. Encroachment includes excavation, compacted fill and machine trenching.

Minor Encroachment

If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. Variations must be made by the project arborist considering relevant factors listed.

Major Encroachment

If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ, the project arborist must demonstrate that the tree(s) would remain viable. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods and consideration of relevant factors.

Methodology

On Friday 25th August 2023, a detailed inspection was undertaken from the ground by Shaun Rigoni. Observations, estimations, measurements and photographs were taken during the inspection. Samples from the trees, including fruit, buds, bark and leaves were gathered to help in identifying the genus/species.

Detailed individual tree data (measurements and assessments) can be found in the observations section, starting on the next page. The Tree Protection Plan showing the TPZ/SRZ of retained trees and tree protection measures as they relate to the proposed plans is in appendix 1. The existing site plan showing all trees numbers and locations is in appendix 2. Tree photos can be found in Appendix 3, with Tree descriptors located in appendix 5 of this report for reference in understanding the data collected for the tree assessed.

Data collected for the trees included:

- **Genus** and **species** identification
- **Common name** of each tree
- An estimation of tree **height** and **canopy width**
- **Origin** of the species
- **Diameter at breast height (DBH)** measured at 1.4m above ground level and **Diameter at base (DAB)** measured at ground level above the root flare of each tree
- An estimation of tree **age**
- The **health** of each tree
- The **structure** of each tree
- The **hazard** that each tree presents to the site
- The **Useful Life Expectancy (ULE)** of each tree
- The **Arboricultural Significance** and **retention value** of each tree, as calculated on the STARS regimen.
- **Tree Protection Zone (TPZ)** in accordance with AS4970-2009
- **Structural Root Zone (SRZ)** in accordance with AS4970-2009

A visual assessment was done above ground on the root system with no evidence of problematic structural issues. Underground exploration was done only in the areas indicated in this report, otherwise no other underground exploration was undertaken, and no liability can be taken for any faults occurring underground. All the information given is in accordance with normal weather conditions and not in severe weather events. The assessment information relates to evidence taken on the day of inspection only and does not include changes thereafter. Rigoni Tree Solutions recommends reassessing the tree annually or directly after severe weather events.

Note: Tree descriptors are located in the appendix of this report for reference in understanding the data collected for the tree assessed.

Observations

Table 1 Detailed tree data tree survey at for 46 Theodore Ave, Noble Park. All measurements are in metres. Map: Appendix 1 Site Plan

Tree #	Genus/species (Common name)	Height (m)	Width (m)	Origin	Age	Health	Structure	Hazard	ULE	Significance	DBH (m)	DAB (m)	TPZ (m)	SRZ (m)	Permit Y/N	Comments
T1	*Leptospermum petersonii* (Lemon-scented Tea Tree)	6	4x4	Aust. Native	Semi-mature	Good	Good	Low	Long	Medium	0.26	0.35	3.12	2.13	NA	Council street tree
T2	*Cotoneaster glaucophyllus* (Cotoneaster)	4	5x5	Exotic	Semi-mature	Fair	Fair-poor	Low	Medium	Low	0.30	0.35	3.60	2.13	NA	Offsite tree located at 26 Theodore Ave. Multiple stems. Growing against boundary fences. Environmental weed

Discussion / Impact Assessment

Two trees have been assessed as part of this report with five onsite trees now removed. The two trees consist of one street tree and one tree on an adjoining property. All offsite and council trees must be protected through the proposal.

The proposal calls for the construction of three new dwellings, a common driveway & crossover and associated landscaping.

Of the two included within this report:

Tree #	Impacted	Minor (<10%)	Major (>10%)	Incursion %	Acceptable	Notes
T1	No	-	-	-	Yes	No direct impact. Tree is to be protected at all stages of the proposal
T2	No	-	-	-	Yes	No direct impact. Tree is to be protected at all stages of the proposal

A project arborist must be appointed to certify works throughout all construction stages.

Trunk measurements were taken to determine the tree protection zones (TPZ) and structural root zones (SRZ) of all trees in this report. These measurements are intended to guide the design process and protection during all stages of development. Australian Standard AS4970-2009 stipulates that an encroachment of less than 10% of the TPZ is acceptable as long as the percentage lost is compensated for elsewhere.

An encroachment of greater than 10% may be acceptable if the project arborist can demonstrate through further investigation with non-destructive methods that the tree will remain viable or when root sensitive construction methods are used.

Site address: 46 Theodore Ave, Noble Park VIC 3174
Prepared for: Jova Drafting Consultants
Prepared by: Rigoni Tree Solutions **17/09/2024**
Shaun Rigoni

A project arborist must be appointed which will form a key part of this Tree Management Plan and to certify works throughout all construction stages to ensure the tree remains viable post-construction.

The proposal calls for the construction of three new dwellings, a common driveway & crossover and associated landscaping.

Tree Protection Fencing is to be erected around the trees in the locations shown in the Tree Protection Plan's (TPP). This fencing must be erected during the Pre-Demolition phase, and must be in compliance with AS4970-2009, see image 1 for an example. The fencing is to remain in place until the Post-Construction phase, when all machinery has left the site.

This report has been created using Ground Floor Plan by Jova Drafting Consultants dated Dec 2022.

- Existing services that run within the TPZ that are to be decommissioned must be left in situ.
- New services must be routed outside the TPZ. Any further installation of utilities with a TPZ will require further review of service plans by the Project Arborist.

TREES TO BE PROTECTED

Tree number	Protection requirements
1, Leptospermum petersonii ***6, Cotoneaster glaucophyllus***	Erect protective fencing as shown on the Tree Protection Plan (TPP) prior to site demolition, this must remain in place until the Post-Construction phase.

General Tree Protection

GENERAL	Activities to be isolated from the TPZ: • machine excavation including trenching • excavation for silt fencing • cultivation • storage • preparation of chemicals, including preparation of cement products • parking of vehicles and plant • refuelling • dumping of waste • wash down and cleaning of equipment • placement of fill • lighting of fires • soil level changes • temporary or permanent installation of utilities and signs, and • physical damage to the tree. The above actions must be isolated from the Tree Protection Zone unless approved by Council or within the specific detail of the Tree Protection Management Plan. When tree protection fencing cannot be installed or requires temporary removal, other tree protection measures should be used, including those set out on page 11.
DEMOLITION AND CONSTRUCTION	• Tree protection fencing is to be erected along the perimeter of all TPZs or as shown in the Tree Protection Plan prior to the commencement of site-preparation works and maintained throughout the construction phase. TPZ fencing may only be moved if approved, supervised and documented by the project arborist, to the satisfaction of the responsible authority. • If TPZ fencing is required to be moved temporarily at any point additional protection measures must be in place before it is moved. • If vehicle access will be required over the TPZ additional ground protection measures are required. Measures may include crushed rock below rumble boards (see page 11).
SERVICES	• Services should not be routed through the TPZ. • If encroachment is unavoidable and new services must be routed through the TPZ further review of service plans by the project arborist will be required. • If approved by the project arborist underground services may only be installed by directional drilling or manual excavation (including the use of pneumatic or hydraulic tools).
LANDSCAPING	• Landscaping within the TPZ is to be completed in the final stage of construction once machinery has left the site. • All soft landscaping to be completed at existing ground level, without cultivation or changes to soil levels. • Plants should be selected in small size (max 14cm) nursery pots or tube stock to minimise size of planting holes.

TREE PROTECTION FENCING SPECIFICATIONS

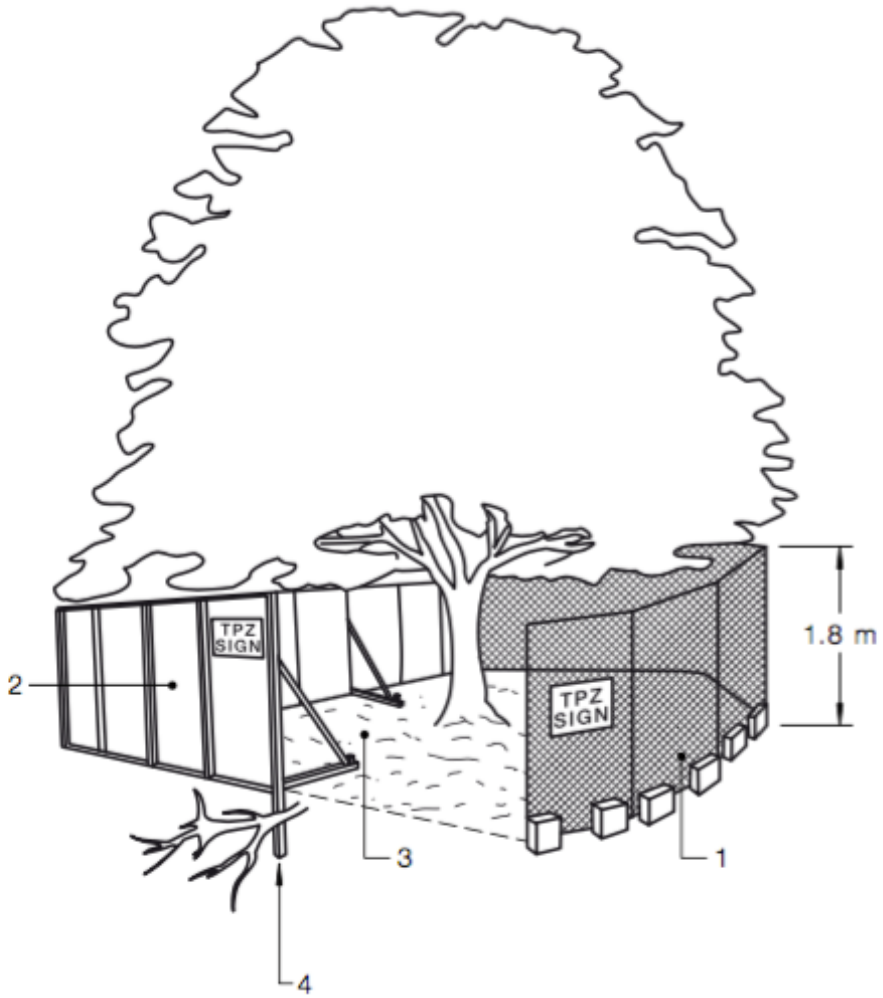


Image 1: Example tree protection zone with fencing, signage, mulch and bracing (AS4970-2009).

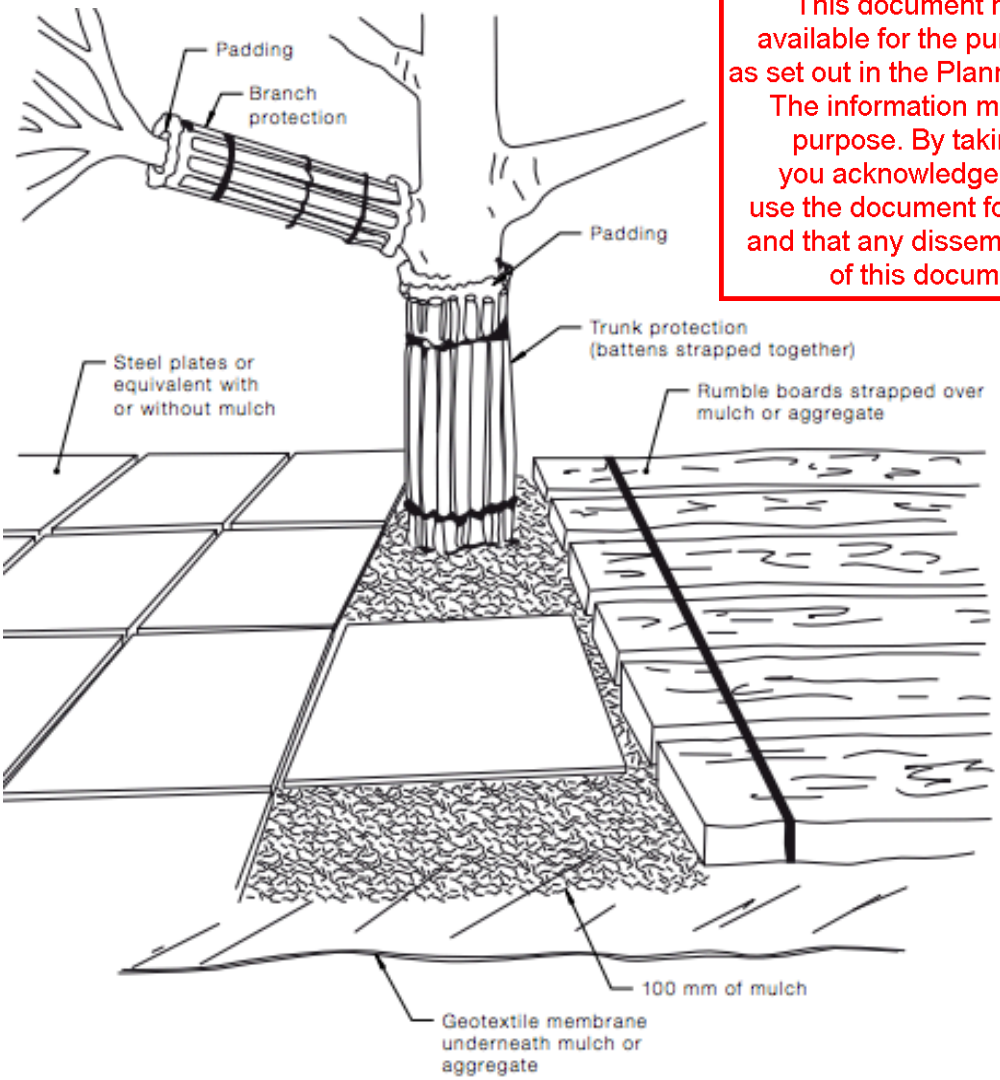
Legend:

1	Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2	Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3	Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4	Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots

OTHER TREE PROTECTION MEASURES

When tree protection fencing cannot be installed or requires temporary removal, other tree protection measures should be used, including those set out below.

Trunk and branch protection	Where necessary, install protection to the trunk and branches of trees as shown below. The materials and positioning of protection are to be specified by the project arborist. A minimum height of 2m is recommended. Do not attach temporary powerlines, stays, guys and the like to the tree. Do not drive nails into the trunks or branches.
Ground protection	If temporary access for machinery is required within the TPZ ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Measures may include a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards. These measures may be applied to root zones beyond the TPZ.



Notes:

- For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
- Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

Image 2: Trunk, branch & ground protection examples (AS4970-2009).

Scaffolding	Where scaffolding is required, it should be erected outside the TPZ. If it is essential for scaffolding to be erected within the TPZ the ground below the scaffolding must be protected by boarding as shown below. A board walk or other surface material should be installed to minimise soil compaction. Boarding should be placed over mulch and impervious sheeting to prevent soil contamination. The boarding can be removed after the scaffolding is removed and the TPZ fencing reinstated.

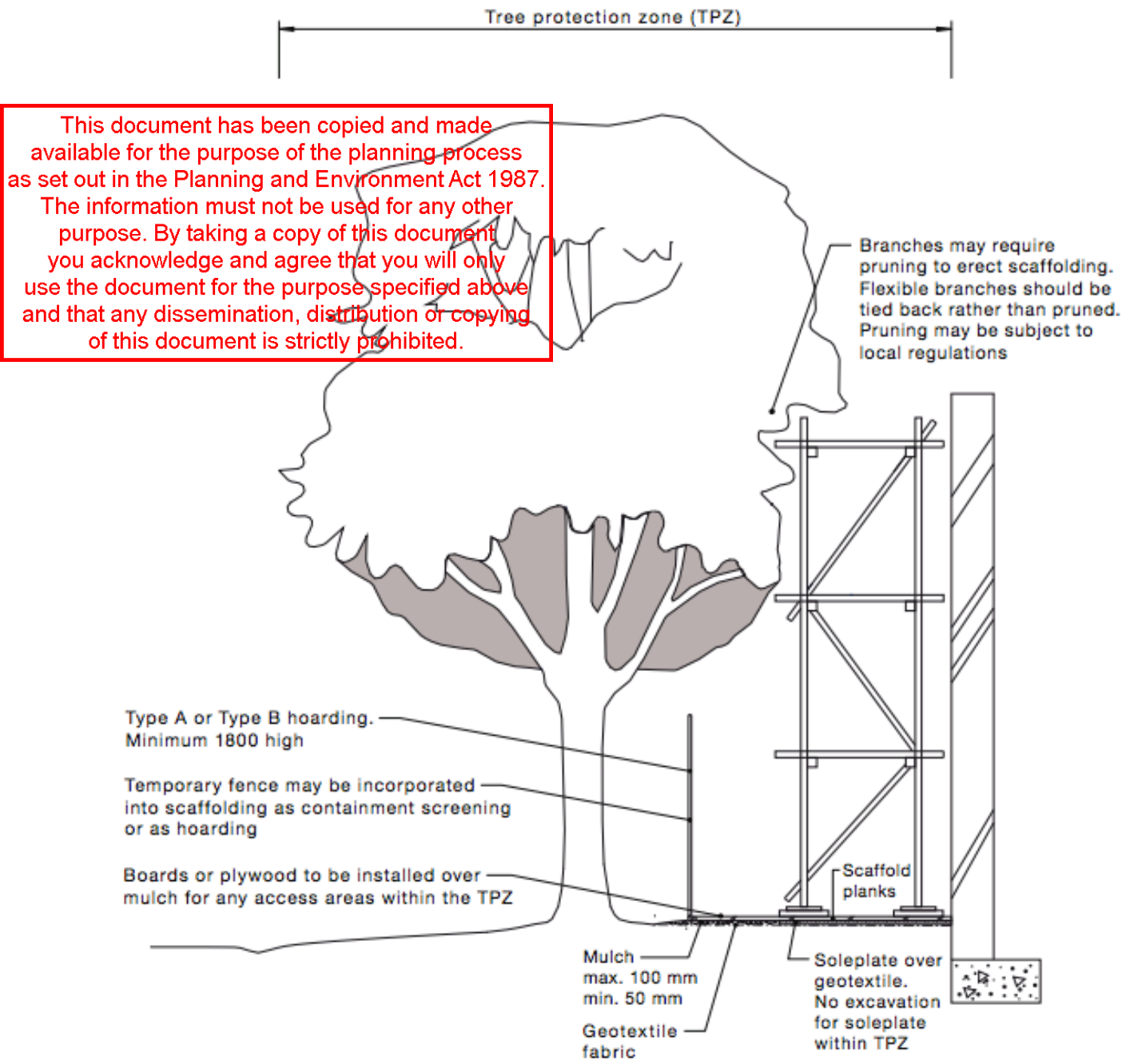


Image 2: Example of scaffolding within a TPZ (AS4970-2009).

PRE-DEMOLITION

Site induction:

- Project/Construction manager, project arborist and demolition contractors to meet on-site prior to demolition to introduce the requirements of the Tree Protection and Management Plan (TMPP).
- The TMPP induction must be attended by all demolition contractors.
- Project/Construction manager must ensure all contractors abide by the requirement of the TMPP and no modifications may occur without approval from the project arborist.
- Project arborist to ensure site access and storage locations are acceptable.

Tree removal:

- No further trees require removal or are recommended for removal. If further removal is required, this must be approved by the Project Arborist and/or the Responsible Authority prior to any works occurring.

Tree pruning:

- No pruning is required. If pruning is required, this must be approved by the Project Arborist prior to any pruning works occurring.

Tree protection:

- Erect tree protection fencing as indicated in the Tree Management Plan and Tree Protection Plan and according to *AS4970-2007 Protection of Trees on Development Sites*. To be organised by construction manager and erected before any machinery or materials are brought onto the site.
- Where fencing cannot be used due to requirements for contractor access additional ground protection must be installed, this alteration must be approved by the project arborist.
- Once all tree protection measures are in place, the project arborist and construction manager are to inspect and sign off.

Protective fencing:

- Once erected, protective fencing must not be removed or altered without approval by the project arborist and the TPZ should be secured to restrict access.
- AS-4687 specifies applicable fencing requirements.
- Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter and liquids into the protected area.
- Fence posts and supports should have a diameter greater than 20 mm and located clear of roots.
- Signs identifying the TPZ should be placed around the edge of the TPZ and be visible from within the development site. The lettering on the sign should comply with AS-1319.

PRE-CONSTRUCTION

Site induction to be conducted by project arborist for all builders and construction trades if unable to attend pre-demolition site induction.

Utility services:

- Existing services that run within the TPZ that are to be decommissioned must be left in situ.
- New services must be routed outside the TPZ. Any further installation of utilities with a TPZ will require further review of service plans by the project arborist.
- If approved by the project arborist, any further underground services may only be installed by directional drilling or manual excavation (including the use of pneumatic or hydraulic tools). Project arborist to supervise.

Tree protection:

- Project arborist to ensure maintenance of Tree Protection Zones as per certification document and sign off.

CONSTRUCTION

Construction manager and project arborist to meet on-site prior to construction to determine number of site inspections to be completed by the project arborist over the construction phase. Typical stages for inspection are installation of footings and slabs, scaffoldings, works within the TPZ and at completion of building works.

Construction:

- During extended dry periods, the construction manager and project arborist to schedule regular watering intervals directed by the project arborist.
- During excavation works any significant roots encountered to be cut must be supervised by the project arborist. Cuts to be made at right angles and with sharp tools.
- If any tree in this report sustains damage the project arborist must be contacted immediately to carry out remedial actions.
- If Tree Protection Fencing or other tree protection measures are to be moved or altered, the project arborist and construction manager must approve followed by supervision by project arborist.

Post Construction and Landscape Construction Stage

Site induction to be conducted by project arborist for all post construction and landscape construction trades if unable to attend a previous site induction. **Once all construction works are complete and machinery has left the site TPZ fencing can be removed.**

Landscaping:

- Once TPZ fencing is removed, the existing fences can be removed and replaced (if required). Any postholes which are to be installed within the trees' TPZ must be excavated by hand and must be relocated if any roots greater than 40mm dimeter are discovered.
- Landscaping within the TPZ is to be completed in the final stage of construction once machinery has left the site.
- All soft landscaping to be completed at existing ground level, without cultivation or changes to soil levels.
- Plants should be selected in small size (max 14cm) nursery pots or tube stock to minimise size of planting holes. Planting holes within the TPZ of any retained tree are to be excavated by hand and relocated if roots greater than 40mm in diameter are discovered.
- During extended dry periods, the construction manager and project arborist to schedule regular watering intervals directed by the project arborist.
- Project arborist to ensure maintenance of Tree Protection Zones as per certification document and sign off.

Final Certification

Conclusion of landscaping works:

- Project Arborist is to visit the site to provide final certification of tree protection for the project.
- The Tree Management Plan certification document can be found on page 16.
- Certification document and photos (if required) to be provided to the responsible authority, project manager and owner of the land.

Roles, responsibilities and reporting

Project Arborist – shall be engaged by and report to the construction manager. The Project Arborist shall have a minimum of five years' industry experience and minimum AQF Level 5 in arboriculture.

Pruning Arborist – shall be employed by and report to the construction manager. The Pruning Arborist must be suitably qualified (AQF 3+) and experienced (minimum 3 years' industry experience). Responsibilities and reporting for each role are set out within this document and the contract documents.

Reporting Responsibilities - should damage occur to a protected tree, it is to be immediately reported to the project/site manager. The project/site manager is to immediately contact the project arborist who is to inspect the damage and determine actions required and contact the Responsible Authority.

Tree Management Plan Certification

Site Address:			
Project Arborist:		**Contact number:**	
Project/Site manager:		**Contact number:**	

Stage 1 – Pre-demolition

Site Induction – Demolition Contractors			
Meeting onsite held?	Yes / No	Date/Time of Meeting	
Persons Present:			
TMP given to all parties	YES / No		
Site Access			
Site access determined and acceptable?			Yes / No
Modification required to Tree Protection Plan?			Yes / No
Pruning and Vegetation/Infrastructure Clearance within the TPZ			
Tree pruning required?			Yes / No / NA
Tree pruning undertaken to AS4373?			Yes / No / NA
Tree pruning undertaken in accordance with TMP recommendations?			Yes / No / NA
Vegetation cleared from TPZ in accordance with TMP recommendations?			Yes / No / NA
Infrastructure cleared from TPZ in accordance with TMP recommendations?			Yes / No / NA
Fencing/Trunk and Branch protection/Ground Protection/Mulching			
Fencing installed in correct location as per TMPP?			Yes / No / NA
Ground protection installed correctly as per TMPP?			Yes / No / NA
Trunk and branch protection installed correctly as per TMPP?			Yes / No / NA
Has the tree protection area been mulched to 100mm depth?			Yes / No / NA
Is mulch type in accordance with the TMP?			Yes / No / NA
Signage			
Signage present?			Yes / No / NA
Signage complies with TMP?			Yes / No / NA
Signage has project arborist contact details?			Yes / No / NA
Root pruning			
Has root pruning been undertaken in accordance with TMP?			Yes / No / NA
Supplementary Measures			
Has the tree protection area been watered in accordance with the TMP?			Yes / No / NA
Comments			
Photographs taken? Yes / No			
Date(s) inspected:			
Compliance date:			
Signed:			

Site Induction – Builders/Construction Trades			
Meeting onsite held?	Yes / No	Date/Time of Meeting	
Persons Present:			
TMP given to all parties	YES / No		
Site Access			
Site access determined and acceptable?			Yes / No
Modification required to Tree Protection Plan?			Yes / No
Storage of Materials			
Has an area been designated on site for the storage of materials/waste?			Yes / No / NA
Does the storage area of materials etc. comply with the TMPP?			Yes / No / NA
Utility Service Locations			
Hall all utility services been marked out on site?			Yes / No / NA
Are all services located outside of the TPZ?			Yes / No / NA
Are services required to be bored under TPZ?			Yes / No / NA
Maintenance of Tree Protection Areas			
Is all tree protection fencing in the correct location?			Yes / No / NA
Does the tree protection plan need to be modified?			Yes / No / NA
Is all trunk and branch protection or ground protection in place?			Yes / No / NA
Has the tree protection area been mulched to 100mm depth?			Yes / No / NA
Is mulch type in accordance with the TMP?			Yes / No / NA
Has the tree protection area been watered in accordance with the TMP?			Yes / No / NA
Comments			
Photographs taken? Yes / No			
Date(s) inspected:			
Compliance date:			
Signed:			

Footings	
Are all footings and installation in accordance with the TMP?	Yes / No / NA
Maintenance of Tree Protection Areas	
Is all tree protection fencing in the correct location?	Yes / No / NA
Does the tree protection plan need to be modified?	Yes / No / NA
Is all trunk and branch protection or ground protection in place?	Yes / No / NA
Has the tree protection area been mulched to 100mm depth?	Yes / No / NA
Is mulch type in accordance with the TMP?	Yes / No / NA
Has the tree protection area been watered in accordance with the TMP?	Yes / No / NA
Comments	
Photographs taken? Yes / No	
Date(s) inspected:	
Compliance date:	
Signed:	

Stage 4 – Post Construction and Landscape Construction

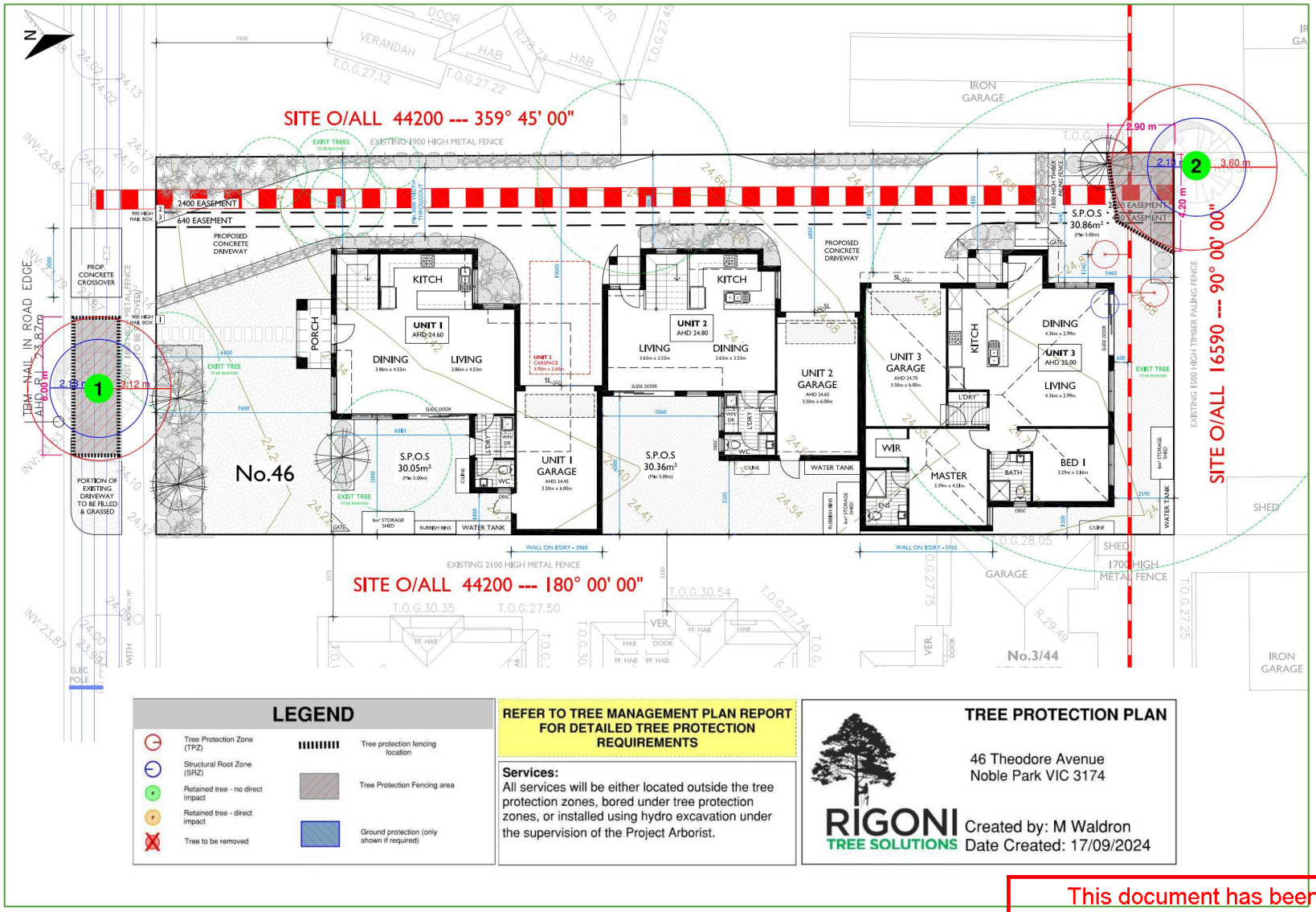
Site Induction – Landscape Construction			
Meeting onsite held?	Yes / No	Date/Time of Meeting	
Persons Present:			
TMP given to all parties	YES / No		
Site Access			
Site access acceptable for landscape construction?			Yes / No
Modification required to Tree Protection Plan?			Yes / No
Storage of Materials			
Has an area been designated on site for the storage of materials/waste?			Yes / No / NA
Does the storage area of materials etc. comply with the TMP?			Yes / No / NA
Removal of Tree Protection Fencing			
Can tree protection fencing and or ground protection be removed?			Yes / No / NA
Are some specialised tree protection measures required?			Yes / No / NA
Landscape Construction			
Do all works within the tree protection area comply with the TMP?			Yes / No / NA
Has the tree protection area been watered in accordance with the TMP?			Yes / No / NA
Comments			
Photographs taken? Yes / No			
Date(s) inspected:			
Compliance date:			
Signed:			

Stage 5 – Final Certification

The Project Arborist has inspected all stages of the project as defined by the Tree Protection Management Plan. Any action that has not complied has been rectified and approved by the Project Arborist. All works as noted within the approved Tree Protection Management Plan have been undertaken and any modifications to the Tree Protection Management Plan have been approved in writing by the local responsible authority.

Final certification approved?	Yes / No
Photographs taken?	Yes / No
Date of final certification:	
Project Arborist:	
Signed:	

Appendix 1 – Tree Protection Plan (TPP)



LEGEND

- Tree Protection Zone (TPZ)
- Structural Root Zone (SRZ)
- Retained tree - no direct impact
- Retained tree - direct impact
- Tree to be removed
- Tree protection fencing location
- Tree Protection Fencing area
- Ground protection (only shown if required)

REFER TO TREE MANAGEMENT PLAN REPORT FOR DETAILED TREE PROTECTION REQUIREMENTS

Services:
All services will be either located outside the tree protection zones, bored under tree protection zones, or installed using hydro excavation under the supervision of the Project Arborist.

TREE PROTECTION PLAN

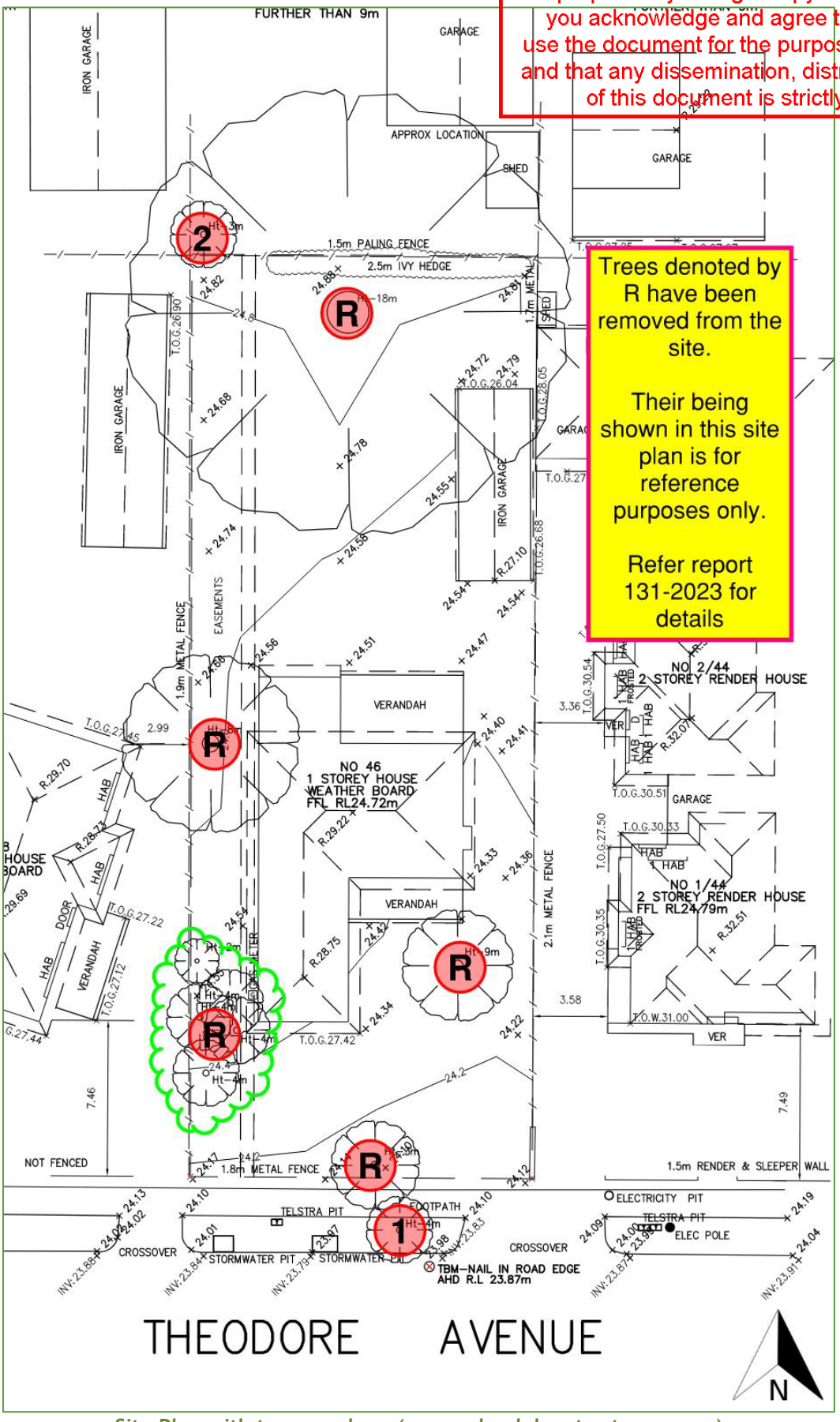
46 Theodore Avenue
Noble Park VIC 3174

RIGONI TREE SOLUTIONS

Created by: M Waldron
Date Created: 17/09/2024

All mark ups are scaled to source plan.
Source: Ground Floor Plan by Jova Drafting Consultants dated Dec 2022

Appendix 2 – Existing Site



Site Plan with tree numbers (green cloud denotes tree group)
Source: Feature survey by NLS dated 16/12/2022

Appendix 3 – Tree photos

Tree 1

Tree 2

Appendix 4 - Glossary

Australian Qualification Framework (AQF) A national framework for all educational and training purposes in Australia.

Arborist: The person with training to AQF Level 3 in Arboriculture, or above, or equivalent recognized and relevant experience that enables the person to perform the tasks required by this Standard.

Branch: A lateral shoot on a main axis such as a trunk or another branch. A branch arising off a trunk is a first order branch. A branch arising off a first order branch is a second order branch and so on. Second and successive orders of branches may be referred to as 'lateral branches.'

Buttress root: Roots at the trunk base that help support the tree.

Bulge: Swellings on branches, trunks or root flares; often caused by new tissue formed as a response to movement and that reinforces the wood structure at the weak area

Canopy: A layer or multiple layers of branches and foliage at the top or crown of the tree.

Codominant stems: Stems or trunks of about the same size originating from the same position from the main stem.

Competition: Reduction in fitness due to shared use of a resource that is in limited supply.

Crown: Portion of the tree consisting of branches and leaves and any part of the trunk from which branches arise.

Decay: The process of degradation of woody tissues by micro-organisms.

Defect: An imperfection, weakness, or lack of something necessary. In trees, defects are injuries, growth patterns, decay, or other conditions that reduce the tree's structural strength.

Duty of care: Legal obligation that requires an individual to apply reasonable actions when performing tasks that may potentially harm others.

Epicormic bud: Latent or adventitious bud located at the cambium and concealed by the bark.

Epicormic shoots: Shoots produced from epicormic buds at the cambium of trunks or branches.

Failure: (Of tree or tree part) – breakage of stem, branch or roots, or loss of mechanical support in the root system

Hanging branches: Unattached, cut or broken branches that are caught in the canopy.

Hazard: Situation or condition that is likely to lead to a loss, personal injury, property damage, or disruption of activities; a likely source of harm. In relation to trees, a hazard is the tree part(s) identified as a likely source of harm.

Included bark: Bark that grows between two closely positioned limbs or stems that eventually seals and joins the two structures together seemingly as one.

Lever arm: The distance between the applied force (or centre of force) and the point where the object will bend or rotate

Likelihood: The chance of an event occurring. In the context of tree failures, the term may be used to specify: (1) the chance of a tree failure occurring; (2) the chance of impacting a specified target; and (3) the combination of the likelihood of a tree failing and the likelihood of impacting a specified target.

Lopping: The practice of cutting branches or stems between branch unions or internodes.

Mitigation: In tree risk management, the process for reducing risk.

Overextended branch: Branch that extends outside the normal crown area.

Pruning: Removing branches (or occasionally roots) from a tree or other plant, using approved practices, to achieve a specified objective.

Reaction wood: Wood formed in leaning or crooked stems, or on upper or lower sides of branches, as a means of counteracting the effects of gravity (*or other forces*).

Risk: The combination of the likelihood of an event and the severity of the potential consequences. In the context of trees, risk is the likelihood of a conflict or tree failure occurring affecting a target, and the severity of the associated consequences-personal injury, property damage, or disruption of activities.

Scaffold limbs: Permanent or structural limbs that form the scaffold architecture or structure of the tree.

Structural defect: Feature, condition, or deformity of a tree that indicates a weak structure or instability that could contribute to tree failure.

Target: people, property, or activities that could be injured, damaged, or disrupted by a tree.

Union: The action of joining together or the fact of being joined together.

Woundwood: Lignified, differentiated tissue produced on woody plants as a response to wounding.

Appendix 5 - Tree descriptor

AGE	
Young	Juvenile or recently planted approximately 1-7 years.
Semi-mature	Tree actively growing.
Mature	Tree has reached expected size in situation.
Senescent	Tree is over mature and has started to decline.

HEALTH	
Good	Foliage of tree is entire, with good colour, very little sign of pathogens and of good density. Growth indicators are good i.e., Extension growth of twigs and wound wood development. Minimal or no canopy dieback (deadwood).
Fair	Tree is showing one or more of the following symptoms: <25% dead wood, minor canopy dieback, foliage generally with good colour though some imperfections may be present. Minor pathogen damage present, with growth indicators such as leaf size, canopy density and twig extension growth typical for the species in this location.
Poor	Tree is showing one or more of the following symptoms of decline; >25% deadwood, canopy dieback is observable, discoloured or distorted leaves. Pathogens present, stress symptoms are observable as reduced leaf size, extension growth and canopy density.
Dead or dying	Tree is in severe decline; >55% deadwood, very little foliage, possibly epicormic shoots and minimal extension growth.

STRUCTURE	
Good	Trunk and scaffold branches show good taper and attachment with minor or no structural defects. Tree is a good example of species with well-developed form showing no obvious root problems or pests and diseases.
Fair	Tree shows minor structural defects or minor damage to trunk e.g., bark missing, there could be cavities present. Minimal damage to structural roots. Tree could be seen as typical for this species.
Poor	There are major structural defects, damage to trunk or bark missing. Co-dominant stems could be present with likely points of failure. Girdling or damaged roots obvious. Tree is structurally problematic.
Hazardous	Tree is immediate hazard with potential to fail, this should be rectified as soon as possible.

HAZARD	
Low	Tree appears to be structurally sound, is healthy with no signs of pests and disease, has good health and is clear of any hazards.
Medium	Tree displays signs of structural problems, evidence of pests or disease, signs of poor health, deadwood, decay, may be growing into an area that could create a hazard.
High	Tree is immediate hazard with the potential to fail, this should be rectified as soon as possible.

ULE - Useful Life Expectancy	
Long	• Trees that appear to be retainable with an acceptable level of risk for more than 40 years. • Structurally sound trees located in positions that can accommodate future growth. • Storm damaged or defective trees that could be made suitable for retention in the long term by remedial tree surgery. • Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.
Medium	• Trees that appear to be retainable with an acceptable level of risk for 15-40 years. • Trees that may only live between 15-40 years. • Trees that may live for more than 40 years but would be removed to allow the safe development of more suitable individuals. • Trees that may live for more than 40 years but would be removed during the course of normal management for safety and nuisance reasons. • Storm damaged or defective trees that can be made suitable for retention in the medium term by remedial work.
Short	• Trees that appear to be retainable with an acceptable level of risk for 5-15 years. • Trees that may live for 5-15 years. • Trees that may live for more than 15 years but would be removed to allow the safe development of more suitable individuals. • Trees that may live for more than 15 years but would be removed during the course of normal management for safety and nuisance reasons. • Storm damaged or defective trees that can be made suitable for retention in the medium term by remedial work.
Remove	• Trees with a high level of risk that would need removal within the next 5 years.
Dead Tree	• Dying or suppressed and declining trees through disease or inhospitable conditions. • Dangerous trees through instability or recent loss of adjacent trees. • Dangerous trees through structural defects including decay, included bark, wounds or poor form. • Damaged trees that are considered unsafe to retain.

ORIGIN	
Indigenous	Occurs naturally in the area of the subject site
Victorian native	Occurs naturally in some parts of the State of Victoria
Australian native	Occurs naturally in some parts of Australia
Exotic	Occurs naturally outside of Australia

Tree Significance

IACA Significance of a Tree, Assessment Rating System (STARS)

The tree is to have a minimum of 3 criteria in a category to be classified in that group.

High	• The tree is in good condition and good vigour. • The tree has a form typical for the species. • The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age. • The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register. • The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity. • The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values. • The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ - tree is appropriate to the site conditions.
Medium	• The tree is in fair-good condition and good or low vigour. • The tree has form typical or atypical of the species. • The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area • The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street, • The tree provides a fair contribution to the visual character and amenity of the local area, • The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.
Low	• The tree is in fair-poor condition and good or low vigour. • The tree has form atypical of the species. • The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings, • The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area, • The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen, • The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ - tree is inappropriate to the site conditions, • The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms, • The tree has a wound or defect that has potential to become structurally unsound. Environmental Pest / Noxious Weed Species • The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties, • The tree is a declared noxious weed by legislation. Hazardous/Irreversible Decline • The tree is structurally unsound and/or unstable and is considered potentially dangerous, - The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term. • It is insignificant within the landscape and could not reasonably tolerate changes to its environment.

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DISCLAIMER

- Rigoni Tree Solutions shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including the payment of an additional fee for such services.
- The risk of trees remains the responsibility of the client or property owner.
- All, or any part of the contents of this report, or any copy thereof, shall not be used for any purpose by anyone but the person to whom it is addressed, without the written consent of Rigoni Tree Solutions.
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