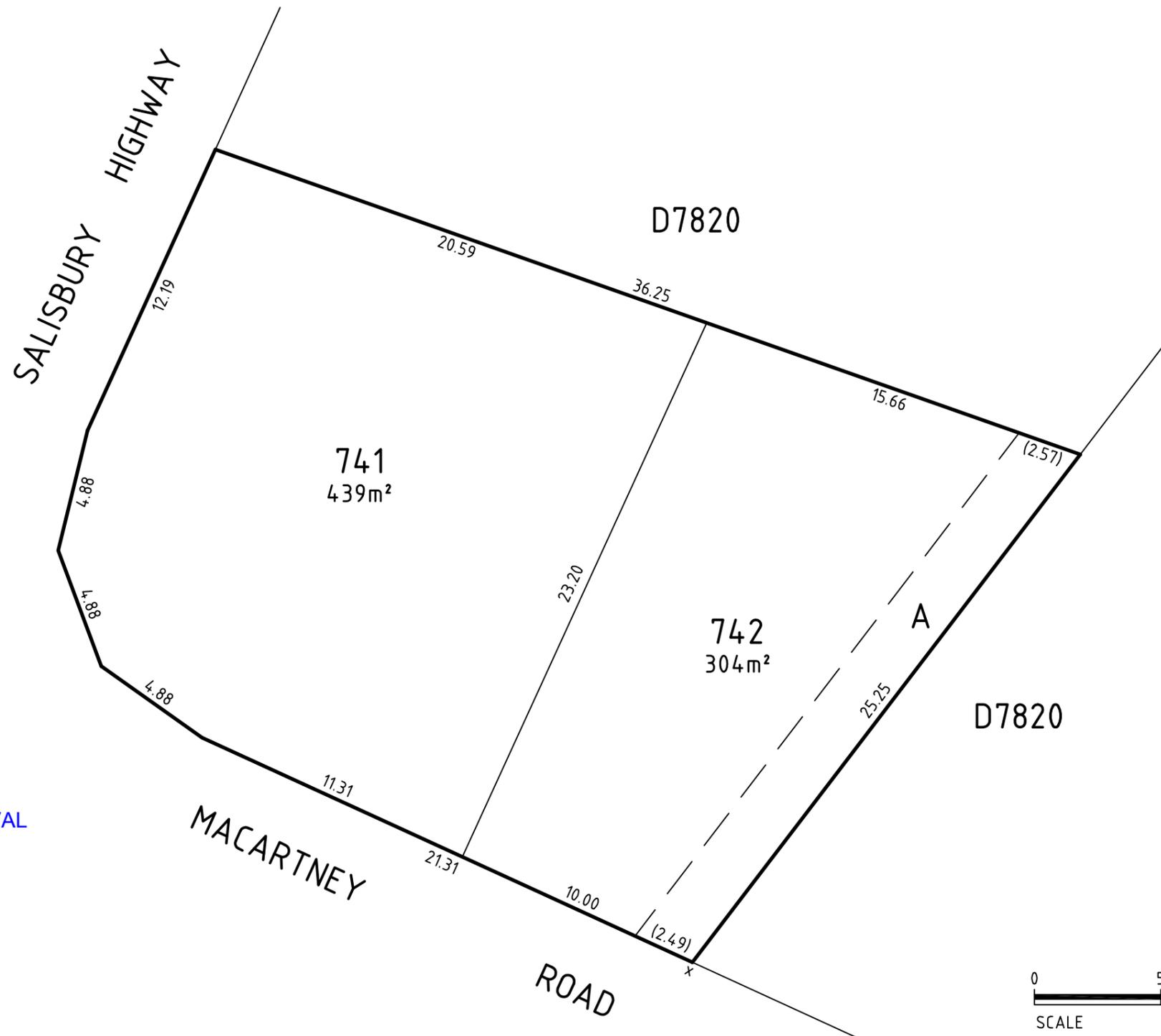


**PROPOSED DIVISION**

ALLOTMENT 313 IN D7820  
464 SALISBURY HIGHWAY

TOTAL AREA: 743m<sup>2</sup>  
HUNDRED: YATALA  
AREA: PARAFIELD GARDENS  
COUNCIL: CITY OF SALISBURY



CITY OF SALISBURY  
DEVELOPMENT APPROVAL  
GRANTED  
Development Act 1993



Email : [cameron@stocklanddivision.com.au](mailto:cameron@stocklanddivision.com.au)  
PH: 0408 801 141  
ABN: 17 244 537 643  
[www.stocklanddivision.com.au](http://www.stocklanddivision.com.au)

**STATEMENTS CONCERNING EASEMENTS ANNOTATIONS AND AMENDMENTS**

- SUBJECT LAND IS VACANT
- PORTION OF ALLOTMENT 742 MARKED A IS SUBJECT TO A SERVICE EASEMENT TO THE SOUTH AUSTRALIAN WATER CORPORATION FOR SEWERAGE PURPOSES (223LG RPA)

**IMPORTANT NOTE**

THIS PLAN WAS PREPARED AS A PROPOSED SUBDIVISION AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.  
THE DIMENSIONS SHOWN HEREON ARE SUBJECT TO SURVEY AND THE REQUIREMENTS OF COUNCIL AND OTHER RELEVANT AUTHORITIES.  
NO RELIANCE SHOULD BE PLACED ON THE INFORMATION ON THIS PLAN FOR ANY FINANCIAL DEALINGS INVOLVING THIS LAND THIS NOTE IS AN INTEGRAL PART OF THE PLAN.

DEVELOPMENT No:  
TITLE REFERENCE: CT 5587/148 MAP REF: 6628/29/R

**DATA SUBJECT TO SURVEY**

REFERENCE	DRAWN	DATE DRAWN
CAM9/19	BDS	19/08/19

# project GREEN

---



CITY OF SALISBURY

DEVELOPMENT APPROVAL  
GRANTED

Development Act 1993

## Pre-development Arboricultural Impact Assessment

8 November 2019

S24496

---

*Prepared for:*

**Lily Dou Lei Lei**

*Site Details:*

**Development Site**

464 Salisbury Highway  
Parafield Gardens SA

*Prepared by:*

**Project Green Pty Ltd**

25-27 Ceafield Road  
Para Hills West SA 5096

ABN: 78 088 402 706

ACN: 088 402 706

Tel: (08) 8283 1300

Fax: (08) 8258 1933

admin@projectgreen.net.au

## Contents

1	INTRODUCTION.....	3
1.1	Site Description .....	3
1.2	Background Information .....	4
1.3	Legislation and Standards.....	5
1.4	Method.....	5
1.5	Limitations.....	5
2	RESULTS AND APPRAISAL .....	6
2.1	Tree Details.....	6
2.2	Proposed Development.....	8
2.3	Tree Protection Zones .....	8
3	DEVELOPMENT GUIDELINES.....	11
4	GLOSSARY .....	13
5	BIBLIOGRAPHY .....	13
	APPENDIX – Tree Protection Zone (TPZ).....	14

### Report prepared by:

**Dr. Martin Ely PhD**

Registered Landscape Architect

Dip.Hort.(Arb)

# 1 INTRODUCTION

Project Green was engaged by Lily Dou Lei Lei to prepare a pre-development arboricultural impact report in relation to an application to subdivide an allotment at 464 Salisbury Highway, Parafield Gardens.

A Council-owned tree is located on the adjacent verge and the City of Salisbury requires an arborist's report on potential impacts to the tree due to development proceeding on the site, and to advise of any specific tree protection measures that may be necessary.



Subject tree viewed from south.

## 1.1 Site Description

The site comprises a residential allotment at the corner of Salisbury Highway and MacCartney Road (refer **Figure 1**). The site is currently vacant but historic imagery indicates that a dwelling was formerly located on the site, and was demolished sometime between Nov 2015 and Jan 2016 (refer **Figure 2**). It is understood that the dwelling may have been subject to a house fire. The subject tree is located on the Salisbury Highway verge adjacent to a brick-paved footpath.



Figure 1: Aerial view showing development site and subject tree.



Figure 2: Aerial view showing development site and subject tree in Nov 2015.

## 1.2 Background Information

### 1.2.1 Documents and Information Provided

The following document was referred to in preparation of this report:

- *Proposed division by Scott Land Division dated 19/08/19.*

### 1.3 Legislation and Standards

Regard was given to the following legislation and standard for the purpose of conducting the assessment and advising on measures to limit developmental impacts.

- South Australian Development Act 1993
- South Australian Development Regulations 2008
- Australian Standard 4970-2009 Protection of trees on development sites

### 1.4 Method

The following actions were undertaken to produce this report:

- Site inspection on 7 November 2019.
- Visual assessment of the subject tree.
- Identification of the status of the tree under the regulated tree provisions of the South Australian Development Act 1993.
- Identification of a Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) for the tree in accordance with *AS4970-2009 (Protection of trees on development sites)*.
- Calculation of TPZ encroachments and potential development impacts.
- Guidance on potential strategies for site development which will minimise TPZ encroachments.

### 1.5 Limitations

- A detailed site survey was not available showing the tree, and a site sketch was prepared based on observations and measurements made during the site visit.
- The tree was inspected visually from the ground only. No aerial, subsurface or invasive inspections were performed.
- Information contained in this report is based on observations taken on the day of inspection only. It is possible that changes in environmental conditions or subsequent information may affect these findings.
- This report has been prepared on behalf of, and for the exclusive use of, the Project Green client.

## 2 RESULTS AND APPRAISAL

### 2.1 Tree Details

The subject tree is *Eucalyptus spathulata* (Swamp Mallet) which is endemic to Western Australia but not to South Australia. It has a multi-stemmed, mallet habit with a spreading canopy, smooth bark and narrow leaves. The species is widely cultivated in southern Australia and can be grown on range of sites, including heavy soils affected by high levels of salinity, seasonally waterlogged areas and on sandy alkaline soils derived from limestone. The species is not widely planted now for a number of reasons which have emerged as trees planted in the 1980s have matured. The growth habit may include shallow roots when grown on clay soils which may out-compete adjacent plants. The tree is located in the street verge as follows:

- In a 1.3m wide open verge between the street kerb and paved footpath.
- Approx. 8.5m from the northern site boundary.



Photo showing tree base and growing environment.

The trunk circumference measures 3.15m at 1 metre above natural ground level therefore it is deemed to be a 'significant tree' when assessed against the South Australian Development Act 1993. The tree is also a Council-owned asset.

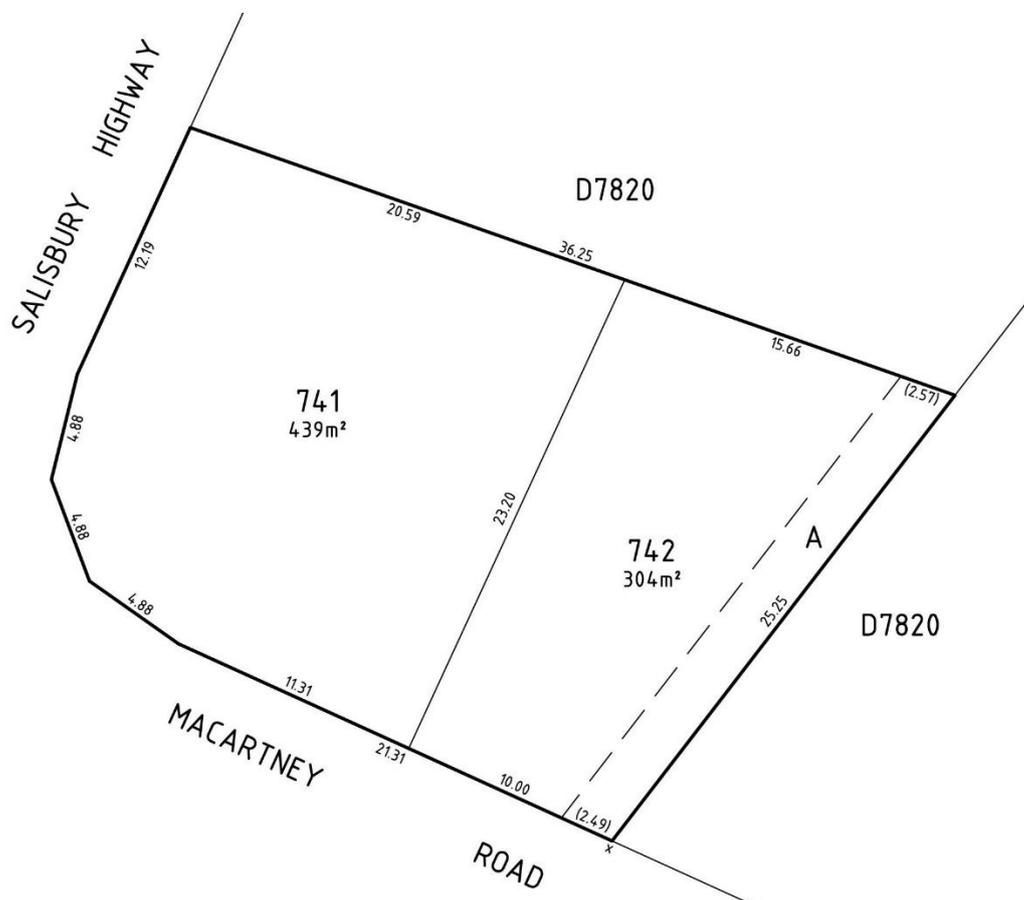
The tree exhibits good health and vigour, and average structure with a spreading crown biased to the west over Salisbury Highway. The tree has a pronounced basal flare and root buttressing with large exposed surface roots disrupting the kerb and brick paved footpath. This is typical of older specimens of the species.



**Photo showing exposed surface roots and disruption of adjacent infrastructure.**

## 2.2 Proposed Development

The proposed development includes division of the land into two new allotments (**refer plan below**). The plans do not indicate building footprints, driveway locations or new service connections. The larger allotment 741 can provide some placement options.



## 2.3 Tree Protection Zones

All parts of the tree, including its root system, trunk and crown, may be damaged by development and construction activities if tree protection measures are not implemented. Damage to any one part of the tree may affect its functioning as a whole.

Under 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 a tree's TPZ is calculated by multiplying its DBH (Diameter at Breast Height) by 12. The TPZ is to be observed in a symmetrical manner with the tree being in a central position.

The TPZ also incorporates the Structural Root Zone (SRZ) which comprises the area around the base of a tree required for the tree's stability and viability.

Table 1 describes the TPZ and SRZ for the subject tree.

**Table 1: Tree Protection Zones**

Tree species	<i>Eucalyptus spathulata</i>
DBH (mm)	1010
TPZ (radius m)	12.12
TPZ (area m <sup>2</sup> )	461
Diam. at base (m)	1050
SRZ (radius m)	3.38

The TPZ occupies approx. **152m<sup>2</sup> or 34%** of Lot 741 providing some constraints on site development (refer Figure 3).

AS4970-2009 allows for a level of encroachment into the TPZ. Encroachments can be by earthworks, paving and trenching for services, as well as building works.

- Development encroachment less than 10% of the TPZ area and not within the SRZ is considered to be a 'minor encroachment' which is likely to be acceptable to council.
- Development encroachment greater than 10% of the TPZ area or within the SRZ is considered to be a 'major encroachment'. With a major encroachment the project arborist must show that the tree will remain viable when subjected to development and considers factors outlined in section 3.3.4 of AS 4970-2009 *Protection of trees on development sites*. This includes the tree species and its tolerance to root disturbance, the presence of existing or past structures or obstacles affecting root growth, and the use of 'tree sensitive' construction methods such as permeable paving, and pier and beam footings.

Consideration is also given to the presence of any pre-existing structures within the TPZ. The existing roadway occupies an area of approximately **205m<sup>2</sup> (44%)** of the TPZ. This has been established for a long period of time at it is likely that the tree would have adapted to its presence.

The former dwelling occupied an area of approximately **15.0m<sup>2</sup> (3.2%)** of the TPZ. Tree roots are unlikely to have colonized the area under the former building footprint. Any new building work on the former building footprint would not be considered as a new encroachment.

It is possible to investigate the site for root activity utilising low impact methods such as water jet excavation (hydro-vac). This work can more accurately determine the nature of root activity on the site and indicate to regulating authorities how development can be located on a site without major impacts on a tree.

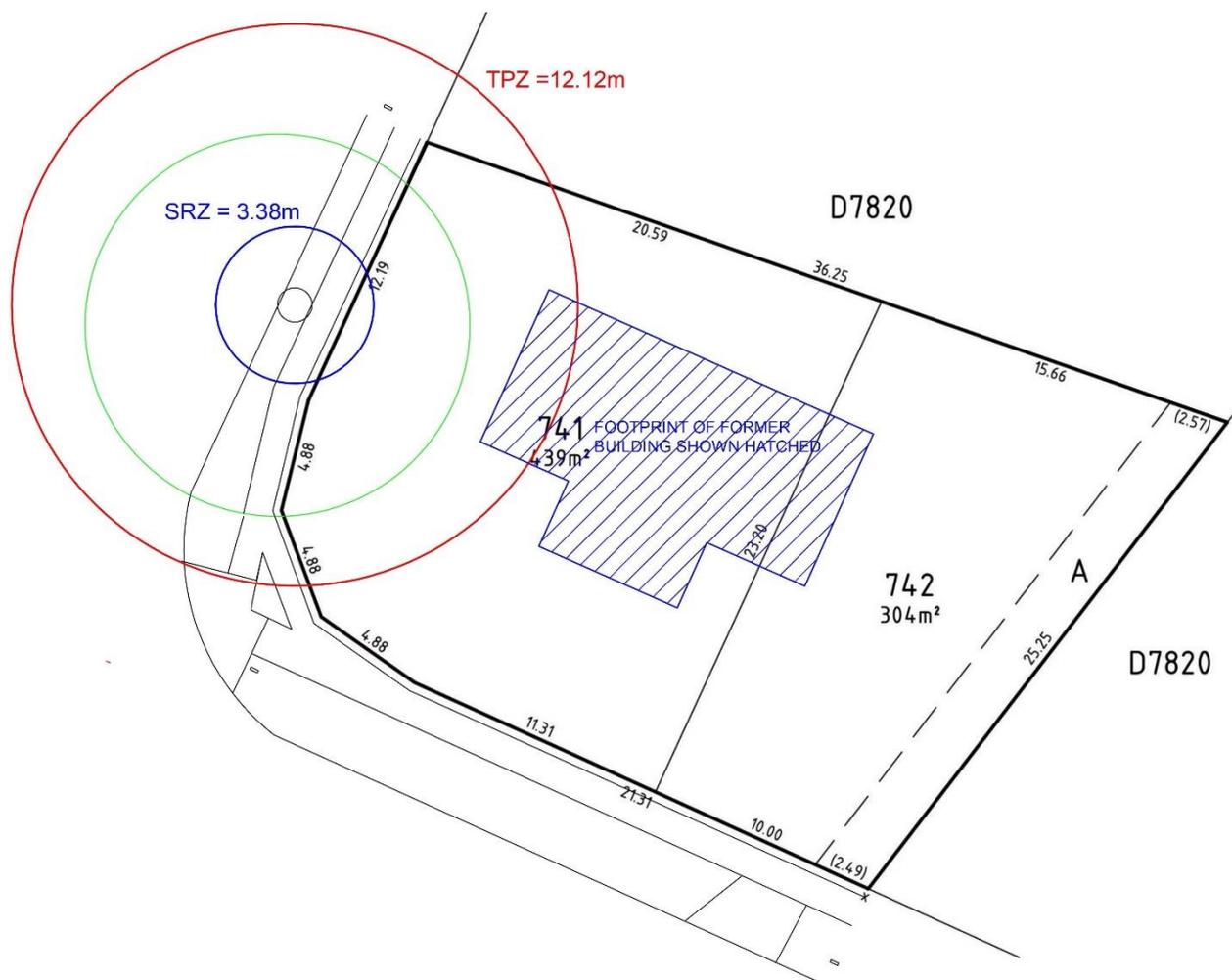


Figure 3: TPZ Plan (TPZ [red], SRZ [blue], approximation of crown [green]).

### 3 DEVELOPMENT GUIDELINES

The following guidance is provided to assist in developing designs for the site which minimise development impacts on the tree.

As a general guideline, site development should aim for a maximum 10% TPZ encroachment for the tree (this includes site works and services as well as building footprints).

No excavation is permitted within the SRZ of a tree.

#### **Building footprints**

- The new dwelling on Lot 471 should be set back from Salisbury Highway frontage at the setback of the former dwelling if possible, to avoid encroaching into the TPZ.
- Some building encroachment is allowed within the 10% guidelines. Any new building work on the former building footprint would not be considered as a new encroachment.

#### **Crossovers and driveways**

- The new crossover to Lot 471 should be located on MacCartney Street near the eastern site boundary, outside the TPZ of the tree.
- The new driveway at Lot 471 should be located outside the TPZ of the tree. Any driveway within the TPZ should comprise an approved permeable paving system or open jointed pavers.

#### **Underground services**

- New underground services will be required to service the new dwelling at Lot 471.
- These should be located outside the TPZ if possible (i.e. on MacCartney Street).
- If underground services cannot be routed outside of the TPZ, they should be installed using 'soft dig' methods such as hydro-excavation or direction boring under guidance of the project arborist.

#### **Fencing**

- Any new fencing within the TPZ is to be installed using fence panels on bored pier footings without continuous trenching.

### **Earthworks**

- Existing site levels should be retained within the TPZ.

### **Landscaping**

- Landscaping to the front yard within the TPZ should be retained as an open lawn area or mulched garden bed without the installation of impervious surfaces.

### **General tree protection**

- A range of tree protection measures, including TPZ fencing, will be required during the construction phase at the site. These will provided be when the designs for the site are finalised (**refer Appendix**).

### **Site survey**

- The tree should be accurately located by survey and shown on the drawings provided to Council.

## 4 GLOSSARY

<b><i>Mallet</i></b>	A mallet is a tree with a slender trunk with branches steeply angled on it, and lacks both lignotuber and epicormic buds.
<b><i>Structural Root Zone (SRZ)</i></b>	The area required for tree stability and is incorporated in the Tree Protection Zone. (AS4970:2009).
<b><i>Tree Protection Zone (TPZ)</i></b>	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 (AS4970:2009).

## 5 BIBLIOGRAPHY

**Draper, D.B & Richards P.A** (2009) Dictionary for Managing Trees in Urban Environments, CSIRO Australia.

**Matheny, N.P: & Clark, J.R** (1994) Evaluation of Hazard Trees in Urban Areas. ISA Publications.

**Matheny, N.P: & Clark, J.R** (1998) Trees and Development. A Technical Guide to Preservation of Trees During Land Development. ISA Publications.

**Shigo, A.L.** (1999) A New Tree Biology (9<sup>th</sup> edition) Sherwin Dodge Printers, Littleton, New Hampshire.

## APPENDIX – Tree Protection Zone (TPZ)

### Definition of TPZ

Tree Protection Zone (TPZ) has been identified for the subject tree. The TPZ is a restricted area usually delineated by protective fencing, which is installed prior to site establishment and retained intact until completion of the works. The intent of the TPZ is to protect the tree and to ensure that its health and stability are maintained.

### Implementation

To protect trees during development *Australian Standard 4970-2009 Protection of Trees on Development Sites* (AS4970-2009) prescribes activities within the TPZ and Structural Root Zone (SRZ) as described in more detail below. Contractors and staff must be informed by the site supervisor to take precautions when working within the designated TPZs, to prevent tree damaging activity occurring. Any authorized works and activities within the TPZ must be supervised by the project Arborist.

The project specifications must acknowledge the need to protect the subject tree and the role of the project Arborist. Additional arboricultural assessment may be required if the design changes from that originally approved.

### Activities restricted within the TPZ

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

- a) machine excavation including trenching;
- b) excavation for silt fencing;
- c) cultivation;
- d) storage;
- e) preparation of chemicals, including preparation of cement products;
- f) parking of vehicles and plant;
- g) refuelling;
- h) dumping of waste;
- i) wash down and cleaning of equipment;

- j) placement of fill;
- k) lighting of fires;
- l) soil level changes;
- m) temporary or permanent installation of utilities and signs, and
- n) physical damage to the tree.

### **Tree protection zone fencing**

Fencing should be erected before any machinery or materials are brought onto the site and before the commencement of works including demolition. Once erected, protective fencing must not be removed or altered without approval by the project arborist. The TPZ should be secured to restrict access.

AS 4687-2007 (Temporary fencing and hoardings) 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.

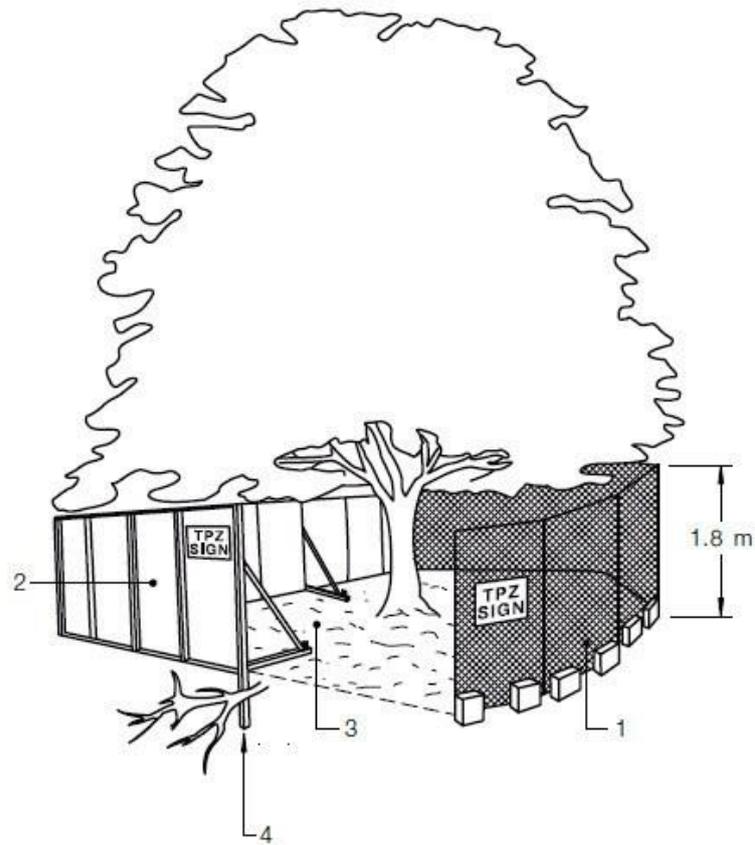
Fence posts and supports should have a diameter greater than 20 mm and be located clear of roots.

Existing perimeter fencing and other structures may be suitable as part of the protective fencing.

Figures 1 & 2 indicate an example of protective fencing.

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 1319-1994 (Safety signs for the occupational environment).

Figure 3 gives an example of TPZ signage.



**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.

**Figure 1: Example of protective fencing**



Figure 2: Typical TPZ fencing



Figure 3: Example of TPZ signage

## Other tree protection measures

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

## Trunk and branch protection

Where necessary, install protection to the trunk and branches of trees as shown on Figure 4.

The materials and positioning of protection are to be specified by the project arborist. A minimum height of 2 m is recommended.

Do not attach temporary power lines, 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 as illustrated in Figure 4.
- These measures may be applied to root zones beyond the TPZ.

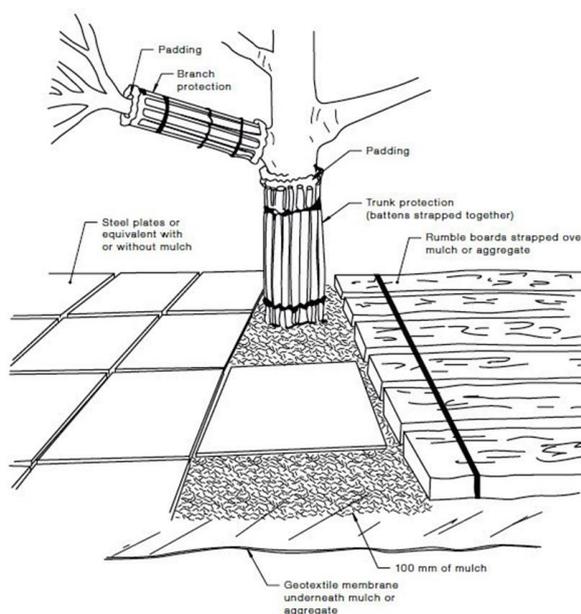


Figure 4: Examples of trunk, branch and ground protection.

### **Root protection during works within the TPZ**

Some approved works within the TPZ, such as regrading, installation of piers or landscaping may have the potential to damage roots.

If the grade is to be raised the material should be coarser or more porous than the underlying material. Depth and compaction should be minimised.

Manual excavation should be carried out under the supervision of the project arborist to identify roots critical to tree stability. Relocation or redesign of works may be required.

Where the project arborist identifies roots to be pruned within or at the outer edge of the TPZ, they should be pruned with a final cut to undamaged wood. Pruning cuts should be made with sharp tools such as secateurs, pruners, handsaws or chainsaws. Pruning wounds should not be treated with dressings or paints. It is not acceptable for roots within the TPZ to be 'pruned' with machinery such as backhoes or excavators.

Where roots within the TPZ are exposed by excavation, temporary root protection should be installed to prevent them drying out. This may include jute mesh or hessian sheeting as multiple layers over exposed roots and excavated soil profile, extending to the full depth of the root zone. Root protection sheeting should be pegged in place and kept moist during the period that the root zone is exposed.

Other excavation works in proximity to trees, including landscape works such as paving, irrigation and planting can adversely affect root systems. Seek advice from the project arborist.

### **Installing underground services within TPZ**

All services should be routed outside the TPZ. If underground services must be routed within the TPZ, they should be installed by directional drilling or in manually excavated trenches.

The directional drilling bore should be at least 600 mm deep. The project arborist should assess the likely impacts of boring and bore pits on retained trees.

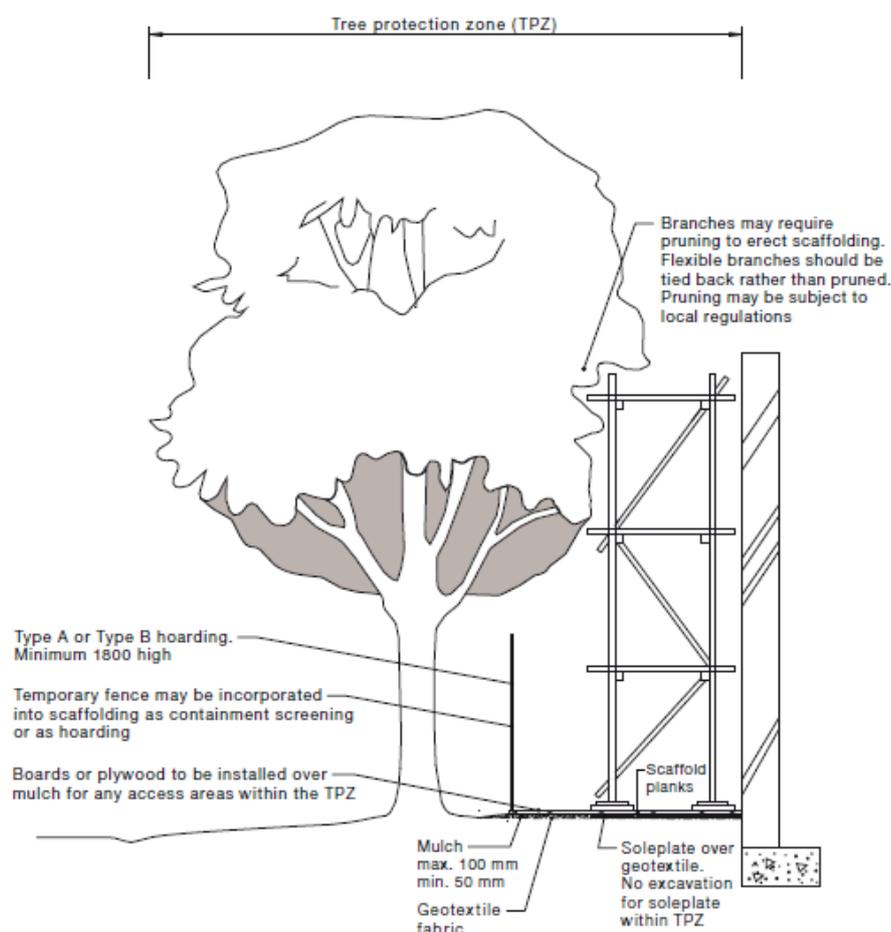
For manual excavation of trenches the project arborist should advise on roots to be retained and should monitor the works. Manual excavation may include the use of pneumatic and hydraulic tools.

## Scaffolding

Where scaffolding is required it should be erected outside the TPZ. Where it is essential for scaffolding to be erected within the TPZ, branch removal should be minimized. This can be achieved by designing scaffolding to avoid branches or tying back branches. Where pruning is unavoidable it must be specified by the project arborist in accordance with AS 4373-2007.

NOTE: Pruning works may require approval by the determining authority.

The ground below the scaffolding should be protected by boarding (e.g. scaffold board or plywood sheeting) as shown in Figure 5. Where access is required, a board walk or other surface material should be installed to minimize soil compaction. Boarding should be placed over a layer of mulch and impervious sheeting to prevent soil contamination. The boarding should be left in place until the scaffolding is removed.



NOTE: Excavation required for the insertion of support posts for tree protection fencing should not involve the severance of any roots greater than 20 mm in diameter, without the prior approval of the project arborist.

**Figure 5: Indicative scaffolding within a TPZ**

## **Maintaining the TPZ**

### **Mulching**

The area within the TPZ should be mulched. The mulch must be maintained to a depth of 50–100 mm using material that complies with AS 4454. Where the existing landscape within the TPZ is to remain unaltered (e.g. garden beds or turf) mulch may not be required.

### **Watering**

Soil moisture levels should be regularly monitored by the project arborist. Temporary irrigation or watering may be required within the TPZ. An above-ground irrigation system should be installed and maintained by competent person.

### **Weed removal**

All weeds should be removed by hand without soil disturbance or should be controlled with appropriate use of herbicide.

### **Monitoring and certification**

There are many stages in the development process from site acquisition to completion where the project arborist is required to monitor or certify tree protection. Table 1 summarizes the process and indicates the stages that normally require certification (a written statement of compliance).

**Table 2: Stages in Development and the Tree Management Process**

Stage in development	Tree management process	
	Matters for consideration	Actions and certification
<b>Pre-construction</b>		
Initial site preparation	State based OHS requirements for tree work	Compliance with conditions of consent
	Approved retention/removal	Tree removal/tree retention/transplanting
	Refer to AS 4373 for the requirements on the pruning of amenity trees	Tree pruning Certification of tree removal and pruning
	Specifications for tree protection measures	Establish/delineate TPZ Install protective measures Certification of tree protection measures
<b>Construction</b>		
Site establishment	Temporary infrastructure Demolition, bulk earthworks, hydrology	Locate temporary infrastructure to minimize impact on retained trees Maintain protective measures Certification of tree protection measures
Construction work	Liaison with site manager, compliance Deviation from approved plan	Maintain or amend protective measures Supervision and monitoring
Implement hard and soft landscape works	Installation of irrigation services Control of compaction work Installation of pavement and retaining walls	Remove selected protective measures as necessary Remedial tree works Supervision and monitoring
Practical completion	Tree vigour and structure	Remove all remaining tree protection measures Certification of tree protection
<b>Post construction</b>		
Defects liability/maintenance period	Tree vigour and structure	Maintenance and monitoring Final remedial tree works Final certification of tree condition

### Tree Protection Plan

The approved tree protection plan must be available onsite prior to the commencement of and during works. The tree protection plan will identify key stages where monitoring and certification will be required.

A pre-construction meeting should be attended by the site manager, the project arborist and contractors to introduce the tree protection plan and its requirements.

## **PRE-CONSTRUCTION**

### **Tree removal and pruning**

Trees for removal or transplanting should be marked onsite as per the approved tree protection plan. Before removal, the project arborist should confirm that all marked trees correspond with those shown on the schedule or plan. Other tree work may be specified in the tree protection plan.

Tree removal should be carried out prior to erection of protection fencing. Contractors should be instructed to avoid damage to trees within protection areas when removing or pruning trees. This may include restrictions of vehicle movements.

Any approved pruning required to allow for works should be done at this stage. AS 4373-2007 specifies requirements for pruning.

Stumps to be removed from within a TPZ must be removed in a manner that avoids damaging or disturbing roots of trees to be retained.

The project arborist should supervise tree removal, transplanting and pruning and certify the works on completion.

### **Installing tree protection fencing and other protection measures**

Fencing and other protection measures are to be installed in compliance with Section 4 and as detailed in the tree protection plan.

Protection measures are to be certified by the project arborist.

## **CONSTRUCTION STAGE**

### **General**

In order to ensure that protection measures are being adhered to during the pre-construction and construction stages, there should be a predetermined number of site inspections carried out by the project arborist. Matters to be monitored and reported should include tree condition, tree protection measures and impact of site works which may arise from changes to the approved plans.

If there is non-compliance with tree protection measures or if trees have been damaged, a time frame for compliance and remedial works should be specified by the project arborist.

The determining authority may need to be notified of non-compliance issues. Monitoring, reporting and certification should be carried out at the following critical stages of construction.

### **Site establishment**

The project arborist will monitor the impacts of demolition, bulk earth works, installation of temporary infrastructure including bunting, sediment control works and drainage works.

The construction management plan (site establishment plan) should be checked for compliance with the tree protection plan. The construction management plan normally includes location of site sheds, stockpile areas, temporary access roads and sediment control devices.

At completion of site establishment, the project arborist should certify that tree protection measures comply with the tree protection plan.

### **Construction work**

The project arborist will monitor the impacts of general construction works on retained trees. Monitoring should be done at regular intervals or in consultation with the site manager. Monitoring is to be recorded for inclusion in certification at practical completion.

Critical stages typically include installation of services, footings and slabs, scaffolding, works within the TPZ and at completion of building works.

### **Landscape works**

The landscape plan should be checked for compliance with the tree protection plan. The project arborist may need to approve the staged removal of protection measures required to allow for landscape works.

The project arborist should supervise any works within TPZs, including retaining walls, irrigation and lighting installation, topdressing, planting and paving.

The project arborist should specify any remedial works above and below ground.

Monitoring is to be recorded for inclusion in certification at practical completion.

### **Practical completion**

Practical completion assumes that all construction and landscaping works are finished. At practical completion all remaining tree protection measures should be removed. The project arborist should assess tree condition and provide certification of tree protection.

### **POST-CONSTRUCTION**

#### **Defects liability period**

Completion of outstanding building or landscaping works following the construction period must not injure trees.

#### **Final certification**

The project arborist should assess the condition of trees and their growing environment, and make recommendations for any necessary remedial actions.

Following the final inspection and the completion of any remedial works, the project arborist should certify (as appropriate) that the completed works have been carried out in compliance with the approved plans and specifications for tree protection. Certification should include a statement on the condition of the retained trees, details of any deviations from the approved tree protection measures and their impacts on trees. Copies of monitoring documentation may be required.