



# Arboricultural Assessment 433 Smith Street, Fitzroy North

Prepared for Places Victoria

Tree Logic Ref: 007211

Prepared by Andrew Fox

23/06/2016

**tree**logic

*Tree management for the urban forest*

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## Front cover images

Left: An image showing the relative size, location and condition of the High rated Lemon-scented Gum (*Corymbia citriodora*) – Tree 40

Top Right: An image, showing the relative size, location and condition of Smooth-barked Apple (*Angophora costata*) Trees 29 – 34.

Bottom Right: A view looking southeast from within the site, showing the relative size, location and condition of some of the vegetation located along the site's southern perimeter.

Ref: 007211\_433 Smith Street, Fitzroy North

File No.	Version	Author	Issue date	Revision	Issued by.
007211	1	Andrew Fox	23/06/16	Preliminary assessment	AF

## Executive Summary

Tree Logic was engaged to undertake an arboricultural assessment of tree features within and surrounding 433 Smith Street in Fitzroy North to inform designers of tree related constraints and opportunities to any future redevelopment of the site. The survey was required to determine the type, condition and retention value of trees within the site and to provide appropriate tree protection measures.

The tree study area comprised an industrial site of the former Fitzroy North Gasworks. The site was approximately 40,214 metres squared and existed on the western side of Smith Street in Fitzroy North. The area was generally flat and highly modified, with the majority of space being covered by hard paved surfaces or built form with narrow planting sites available for trees.

The surveyed trees were collected as two hundred and one (201) tree features comprising one hundred and fifty-seven (157) individual trees, twenty-five (25) shrubs and two (2) tree groups comprising twenty (20) trees. Trees 1 – 113 were tagged with metal numbered tags, corresponding to the numbering within this report.

All trees were attributed an arboricultural rating which reflects the retention value of the trees. Of the assessed vegetation within the tree study area:

- Two (2) tree features attained an arboricultural rating of High.
- Sixty (60) tree features were attributed an arboricultural rating of Moderate.
- One hundred and thirty-seven (137) tree features were attributed a Low arboricultural rating, due to health and or structural deficiencies or being of small size.
- Three (3) tree features were attributed an arboricultural rating of None, due to very poor health and or structural condition.

From an arboricultural perspective, trees of High and Moderate arboricultural value represent the best opportunity to retain as amenity specimens, as they comprise established trees of fair or better quality. Low rated trees are not considered worthy of being a constraint on any proposed development. Trees attaining an arboricultural rating of None should be removed regardless of any proposed development.

Tree controls apply to the site under the Yarra City Council Environment Local Law, No. 3.

Any proposed removal of tree nos. 1, 2, 3, 4, 5, 10, 14, 22, 27, 29, 30, 34, 35, 37, 38, 40, 42, 43, 45, 47, 48, 50, 51, 52, 55, 58, 59, 60, 62, 63, 64, 68, 69, 70, 73, 74, 77, 79, 80, 81, 82, 83, 85, 91, 100, 105, 113, 114, 115, 116, 118, 119, 120, 121, 123, 124, 125, 126, 128, 129, 137, 138, 142 and 145 would trigger permit requirements under the Local Law.

Refer to Appendix 1 for tree assessment details, Appendix 2 for a tree location plan and Appendix 3 for tree descriptors.

## 1 Method:

### 1.1 Site inspection method;

A site inspection was undertaken on Monday, 6 June 2016, in mild conditions. The trees were inspected from the ground and observations were made of the growing environment and the surrounding area. The trees were not climbed and no samples of the trees or site soil were taken.

Tree assessment details are listed in the Tree Assessment Table in Appendix 1 and relate to the trees shown and numbered in Appendix 2.

Observations were made of the trees to determine age and condition, with measurements taken to establish tree height (measured with a height meter), crown width (paced) and trunk diameter (measured at 1.4m above grade unless otherwise stated). Definitions of arboricultural descriptors can be seen in Appendix 3.

Trees within and immediately surrounding the site (specifically nos. 1 – 113) were tagged with metal numbered tags, corresponding to the numbering within this report.

Photographs of some trees and site conditions were taken for further reference and inclusion in the report.

### 1.2 Arboricultural assessment method;

The health and structural characteristics of each tree were assessed and each tree was attributed an 'Arboricultural Rating'. The arboricultural rating correlates the combination of tree condition factors (health, structure & form) with tree amenity value. Amenity relates to the trees biological, functional and aesthetic characteristics within a built environment. The arboricultural rating in combination with other factors can assist the project team and planners in nominating trees suitable for retention. The four arboricultural ratings used by Tree Logic include:

- **High:** Trees of high quality in good to fair condition. Retention of such trees is highly desirable.
- **Moderate:** Trees with a Moderate arboricultural rating were generally suitable for retention and design should attempt to incorporate these trees and provide adequate clearances during development stages where reasonable design intent is not unduly hampered.
- **Low:** Trees with a Low arboricultural rating generally had low retention values. They were either fair specimens of relatively small size or displayed general health or structural deficiencies and were not worthy of being a constraint on reasonable design intent. Retention of Low rated trees may be considered in some instances if not requiring a disproportionate expenditure of resources to successfully incorporate into the design or manage ongoing condition.
- **None:** Trees attributed an arboricultural rating of None had health or structural characteristics that were beyond arboricultural maintenance or were environmental weed species or self-sewn trees spreading through the site to the exclusion of other plants.

Full tree descriptors are attached as Appendix 3.

### 1.3 Establishing Tree Protection Zones (TPZ);

To successfully retain suitable trees within or around a development site, consideration must be given to protecting the trunk, crown and roots of each specimen. Tree protection zones (TPZ's) are used to provide adequate space for the preservation of sufficient roots to maintain tree health (particularly important for mature trees) whilst providing a buffer zone between construction activity and the tree trunk and crown.

The method for determining tree protection zones adopted in this report is the 'Australian Standard for Protection of trees on development sites' (AS4970-2009). The TPZ area is based on the trunk diameter measurement measured in metres at 1.4m and multiplied by 12 and is a guide for planning purposes. The trunk of the tree is used as the centre point for the radial measurement. Additional guidelines are outlined in Appendix 4 for establishment and maintenance of the tree protection zone.

TPZ measurements are included in the tree assessment data in Appendix 1.

### 1.4 Documents reviewed include;

- Planning property reports and City of Yarra planning zones and overlays. The site is covered by Schedule 1 and 6 to the Public Use Zone (PUZ1/6).  
Tree controls do not appear to exist under any planning overlays.
- Yarra City Council Environment Local Law, No. 3 of 2012.
- Native Vegetation on the site is considered under Clause 52.17 given that the site is greater than 4,000 square metres in size.

## 2 Observations

Site description.

- 2.1 The tree study area comprised an industrial site of a former Gasworks, located on the western side of Smith Street in Fitzroy North. The site was generally flat and highly modified, with the majority of space being covered by hard paved surfaces or built form with narrow planting sites available for trees. The subject site was approximately 40,214 metres squared.
- 2.2 Based on the spatial arrangement, age class and the site history, it was determined that all of the assessed trees comprised introduced species of locally native, Australian native and exotic origins, planted for amenity purposes.

Tree population.

- 2.3 One hundred and fifty-seven (157) individual tree features were assessed and recorded by Tree Logic staff.
  - 2.3.1 Trees 1 to 39 along with Trees 92 - 96 were located within the subject site.
  - 2.3.2 Trees 40 – 56 were located outside of the site, along the site's eastern perimeter.
  - 2.3.3 Trees 57 – 88 were located outside of the site, along the site's southern perimeter.
  - 2.3.4 Trees 89 – 91 were located outside of the site, along the site's western perimeter.
  - 2.3.5 Trees 92 – 113 were located outside of the site, along the site's northern perimeter.
  - 2.3.6 Trees 114 – 157 were Council managed street trees, located to the north and south of the subject site.

- 2.4 Tree group features were recorded where trees were found to be closely grown and of the same species and similar size and condition and did not warrant detailed individual assessment. Twenty (20) trees were inspected and collected as two (2) tree group features with data including primary species, second species if required, number of trees within the group and average records of trunk and tree dimensions, health and structural condition and arboricultural value.

2.4.1 Group 1 contained approximately sixteen (16) semi-mature trees, comprising Weeping Bottlebrush (*Callistemon viminalis*), Lemon-scented Teatree (*Leptospermum petersonii*) and Olive (*Olea* sp.) trees, growing in linear planting to the east of the site.

2.4.2 Group 2 comprised four (4) Weeping Bottlebrush trees, growing towards the northwest section of the site.

Refer to Appendix 2 for a tree location plan.

- 2.5 The assessed tree population was diverse and comprised approximately 30 different species.

The six (6) most common species represent approximately 65% of the tree study area and are listed in Table 1 below.

Table 1: Common Name ( <i>Species</i> )	Origin	Total of Individual trees	Tree Groups
Smooth-barked Apple ( <i>Angophora costata</i> )	Australian native	31	-
English Elm ( <i>Ulmus procera</i> )	Exotic deciduous	26	-
Bracelet Honey-myrtle ( <i>Melaleuca armillaris</i> )	Australian native	25	-
Lemon-scented Tea-tree ( <i>Leptospermum petersonii</i> )	Victorian Native	16	1 (~8 trees)
Peppercorn Tree ( <i>Schinus areira</i> )	Exotic evergreen	12	
London Plane ( <i>Platanus Xacerifolia</i> )	Exotic deciduous	19	-
	Totals	119	1 (~8 trees)

Tree origin:

- 2.6 The origin of the trees was assessed to determine which trees may be indigenous to the local area or native to Victoria and may trigger permit requirement under the native vegetation clause of the planning scheme, Clause 52.17.
- 2.7 Based on the level of historic land use, development and disturbance associated with the site as well as the spatial arrangement, age class and species selection it was determined that all of the trees were introduced specimens of Victorian, Australian native and exotic species planted for amenity and screening purposes.

Tree health:

- 2.8 Tree health was assessed based on foliage colour, size and density as well as shoot initiation and elongation.
- 2.8.1 In general terms the majority of the individually assessed trees (148 trees) were displaying characteristics considered to be typical or better of the species growing in this environment under current conditions.
  - 2.8.2 Nine (9) of the individually assessed trees displayed minor health deficiencies such as reduced foliage density or minor/tip dieback which may improve or fluctuate with seasonal conditions and was relatively characteristic of trees within a given population.

Tree structure:

- 2.9 Tree structure was assessed for structural defects and deficiencies, likelihood of failures and risk to potential targets.
- 2.9.1 Approximately 55% of the individually assessed vegetation (87 trees) displayed fair or better structure considered typical and acceptable for the species.
  - 2.9.2 Fifty-nine (59) trees displayed fair to poor structural condition, with minor deficiencies, wounds, past failures and crown asymmetry. Some of the deficiencies may be manageable with arboricultural input.
  - 2.9.3 Nine (9) trees displayed poor structure and elevated risk of partial tree failure.
  - 2.9.4 Trees 86 and 90 comprised Bracelet Honey-myrtle trees in very poor structural condition, and were collapsing.

Arboricultural Rating:

- 2.10 Trees may be considered significant to the landscape because of their size, dominance within the site, presence within outlooks and general amenity in terms of shade, screen, foliage and flowers and historic, cultural or horticultural characteristics. The key to successful tree retention is to identify the trees that represent the best opportunity for retention and implement tree protection and design amendments before any site works commence.

Each of the assessed trees were attributed an 'Arboricultural Rating'. The arboricultural rating correlates the combination of tree condition factors (health, structure & form) with tree amenity value. Amenity relates to the trees biological, functional and aesthetic characteristics within an urban landscape context and its ability to continue to provide these qualities into the medium to long term future. The arboricultural rating in combination with other factors can assist the project team and planners in nominating trees suitable for retention.

It should be noted that the arboricultural rating is different to the conservation/ecological values placed on trees by other professions.

Definitions of arboricultural ratings can be seen in Appendix 3.

Table 2 indicates the arboricultural ratings attributed to the trees inspected.

Table 2: Arboricultural Rating for Individual Trees		
Rating	Total	Individual Tree numbers
High	2	34, 40
Moderate	60	3, 4, 14, 22, 27, 28, 29, 30, 31, 33, 35, 37, 38, 42, 43, 45, 46, 47, 48, 50, 51, 52, 53, 55, 57, 59, 62, 69, 70, 77, 79, 82, 83, 84, 98, 100, 104, 108, 110, 112, 113, 115, 116, 127, 128, 129, 130, 131, 136, 137, 141, 144, 145, 146, 147, 148, 149, 150, 155, 156
Low	119	1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 32, 36, 39, 41, 44, 49, 54, 56, 58, 60, 61, 63, 64, 65, 66, 67, 68, 71, 72, 73, 74, 75, 76, 78, 80, 81, 85, 87, 88, 89, 91, 92, 93, 94, 95, 96, 97, 99, 101, 102, 103, 105, 106, 107, 109, 111, 114, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 132, 133, 134, 134, 135, 138, 139, 140, 142, 143, 151, 152, 153, 154, Grp, 1, Grp, 2, Shrb 1, Shrb 2, Shrb 3, Shrb 4, Shrb 5, Shrb 6, Shrb 7, Shrb 8, Shrb 9, Shrb 10, Shrb 11, Shrb 12, Shrb 13, Shrb 15, Shrb 16, Shrb 17, Shrb 18, Shrb 19, Shrb 20, Shrb 21, Shrb 22, Shrb 23, Shrb 24, Shrb 25
None	3	86, 90, Shrb 14

- 2.10.1 High and Moderate rated trees were deemed suitable to retain, having the potential to be medium to long term features of the surrounding landscape if retained.
- 2.10.2 Low rated trees were generally either of unremarkable quality, displayed below typical health or structure or were regarded as being environmental weed species and were not considered to be worthy of being a constraint on any proposed development.
- 2.10.3 Trees that attributed an arboricultural value of None were not suitable to retain on arboricultural grounds, having significant health and/or structural defects.
- 2.11 All Council managed trees, regardless of Arboricultural Rating, must be afforded appropriate protection to sustain the tree within any proposed redevelopment of the site, unless otherwise negotiated with the relevant authority.

### 3 Tree permit requirements

- 3.1 The site falls within the City of City of Yarra planning scheme and is covered by Schedules 1 and 6 to the Public Use Zone (PUZ1/6).  
Tree controls do not appear to exist under any planning overlays.
- 3.2 Tree controls apply to the site under the Yarra City Council Environment Local Law, No. 3 of 2012. Any proposed removal of tree nos. 1, 2, 3, 4, 5, 10, 14, 22, 27, 29, 30, 34, 35, 37, 38, 40, 42, 43, 45, 47, 48, 50, 51, 52, 55, 58, 59, 60, 62, 63, 64, 68, 69, 70, 73, 74, 77, 79, 80, 81, 82, 83, 85, 91, 100, 105, 113, 114, 115, 116, 118, 119, 120, 121, 123, 124, 125, 126, 128, 129, 137, 138, 142 and 145 would trigger permit requirements under the Local Law.
- 3.3 Tree controls also apply to Victorian Native trees under Clause 52.17 – Native Vegetation.
- Permitted clearing of Native Vegetation-Biodiversity Assessment Guidelines, Clause 52.17 of the local planning scheme is applicable to sites greater than 4,000 m<sup>2</sup> in area.

Clause 52.17 applies only to vegetation native to Victoria.

Native vegetation planted for purposes of 'shelter belts, woodlots, street trees, gardens or the like' are generally exempt under 52.17-7.

It was determined all of the the tree study area comprised introduced specimens of Victorian, Australian native and exotic species, planted for amenity and screening purposes and are therefore exempt from Clause 52.17



## 4 Tree protection

- 4.1 The preliminary arboricultural assessment report provides planners and designers with information on the measures required to protect trees suitable for retention.
- 4.2 The most important consideration for the successful retention of trees is to allow appropriate above and below ground space for the trees to continue to grow. This requires the allocation of tree protection zones for retained trees.
- 4.3 The Australian Standard AS 4970-2009 Protection of trees on development sites has been used as a guide in the allocation of TPZs for the assessed trees. The TPZ for individual trees is calculated based on trunk diameter (DBH measured in metres), measured at 1.4 metres up from ground level. The radius of the TPZ is calculated by multiplying the trees' DBH by 12. The method provides a TPZ that addresses both the stability and growing requirements of a tree. TPZ distances are measured as a radius from the centre of the trunk at (or near) ground level. The maximum TPZ should be no more than 15m radius and the minimum TPZ should be no less than 2m radius.
- 4.4 Encroachment into the TPZ is permissible under certain circumstances though this is dependent on both site conditions and tree characteristics. Minor encroachment, up to 10% of the TPZ, is generally permissible provided encroachment is compensated for by recruitment of an equal area contiguous with the TPZ and the crown of the tree will not require excessive pruning that would cause the tree to become unbalanced or disfigured.
- The 10% encroachment on one side equates to approximately a  $\frac{1}{3}$  reduction of the radial distance.
- 4.5 Encroachment of the recommended reduced TPZ area must not occur unless based on results of Non-destructive Root Investigation (NDRI) and approved by the appointed site arborist and the relevant authority.
- 4.6 The Structural Root Zone (SRZ) represents the minimum area required to maintain tree stability without consideration of tree health. No works should occur within the SRZ.
- 4.7 Examples of minor encroachment are provided in Figure 1A & 1B.

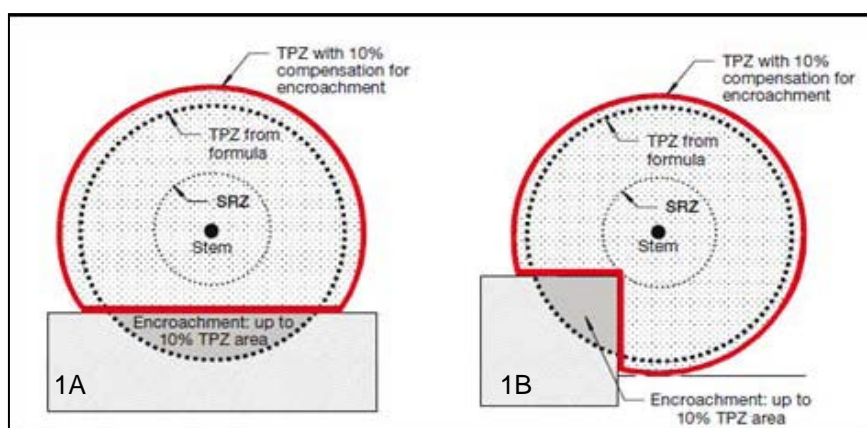


Diagram 1A & 1B: Examples of minor encroachment into a TPZ  
Extract from: AS4970-2009, Appendix D, p30 of 32

- 4.8 All TPZ measurements are provided in the tree assessment data in Appendix 1.
- 4.9 It is understood that redevelopment of the site is under consideration although no exact design proposal or information relating to the scale of redevelopment was supplied at the time of assessment.
- 4.10 In the absence of site design plans, it is not appropriate to speculate on which trees are most suitable to retain apart from the general guide provided by the arboricultural ratings attributed to

each tree. Retention suitability is dependent on the proposed landscape setting in which trees are intended to be retained. The following recommendations are provided for consideration in the design process.

- 4.11 The majority of trees were located along the site's perimeters and as such could potentially be incorporated into a future design proposal.
- 4.12 On the basis of tree quality, safety and potential amenity, preference should be given to retaining trees of High and Moderate arboricultural value in areas of built form or areas of increased target potential.
- 4.13 The two (2) high rated trees, along with the sixty (60) moderate rated trees are already prominent features of the landscape or have potential to become such features and contribute benefits to their surrounds such as shade, biodiversity, habitat, reduction of the urban heat island and visual buffering to the surrounding industrial zone.
- 4.14 Trees of Low arboricultural value should not compromise reasonable design intent.
  - 4.14.1 The thirty-four (34) small trees of Low arboricultural value that are otherwise in reasonable condition (Fair-poor or better Health and /or Structure) may offer a potential established tree resource, even if only as an interim measure.
  - 4.14.2 The fifty (50) Low rated trees with health or structural deficiencies (Poor or worse Health and/or Structure) are not worthy of being a constraint on reasonable design outcomes.
- 4.15 The two trees (2) that attributed a rating of None were in very poor structural condition. These trees were not suitable to retain on arboricultural grounds.
- 4.16 TPZs have been indicated on the tree location plan attached at Appendix 2. Given that many of the trees exist with asphalt car park, concrete hard stand and kerb and channel on at least one side of their trunk, it is reasonable to assume development precedence has occurred and the trees can be reasonably allocated a reduced TPZ, in accordance with AS4970 – 2009 by offsetting the TPZ away from the hard surface. The reduced TPZs allow for up to 10% encroachment, with the area lost to encroachment being compensated elsewhere and contiguous with the TPZ. It is recommended that all construction occur outside of the reduced TPZs.

Measurements for the reduced TPZs are provided in Appendix 1.
- 4.17 To successfully retain the suitable trees, tree protection fencing and management must be implemented prior to commencing any construction related activity including demolition, bulk earthworks and landscaping.
  - 4.17.1 TPZ fencing must be maintained for the duration of the construction process including landscaping. Where TPZ fencing is impractical, ground protection measures will be required in order to prevent root damage and soil compaction (refer to Diagram 2 in Appendix 4).

Appendix 4 provides tree protection guidelines that should be incorporated into the design and management plans for retained trees.
- 4.18 Existing soil levels within the TPZ's must not be altered during construction activities including the landscape phase.
- 4.19 It is imperative that no open cut excavation occurs within the recommended TPZ area of any retained trees for installation of underground services such as water, drainage, electricity, gas, telecommunications, security or any other landscape feature.



## 5 Photographic examples



- 1 A view looking south from within the site showing the relative size, location and condition of Early-mature to mature Smooth-barked Apple Trees 2 – 4, to the south east of the site.
- 2 Shows the relative size, location and condition of Group 1, the group contained approximately sixteen (16) trees, comprising Weeping Bottlebrush, Lemon-scented Tea-tree and Olive trees, growing in linear planting.
- 3 A view looking southeast from within the site showing the relative size, location and condition of some of the vegetation located along the site's southern perimeter.
- 4 A view looking west from within the site, showing the relative size, location and condition of Smooth-barked Apple Trees 29 – 34.
- 5 Shows the relative size and condition of the Moderately rated Smooth-barked Apple – Tree 113.
- 6 A view from outside of the site looking north west, showing the relative size, location and condition of the vegetation located along the site's southern perimeter.

## 6 Conclusion and Recommendations:

- 6.1 The tree study area comprised trees located within and adjacent to the site of the former Gasworks on the western side of Smith Street in Fitzroy North. The total area of the site was approximately 40,214 metres squared.
- 6.2 Two hundred and one (201) trees were inspected and recorded in the form of one hundred and fifty-seven (157) individual trees, twenty-five (25) shrubs and two (2) tree groups comprising twenty (20) trees.  
Trees 1 – 113 were tagged with metal numbered tags, corresponding to their numbering within this report.
- 6.3 Thirty (30) different species were recorded within the tree study area, with approximately 65% of the assessed trees found to be made up of six (6) species, being Smooth-barked Apple, English Elm, Bracelet Honey-myrtle, Lemon-scented Tea-tree, Peppercorn Tree and London Plane.
- 6.4 The majority of trees were located around the site's perimeters and as such could potentially be incorporated into a future design proposal.
- 6.5 Tree controls apply to the site under the Yarra City Council Environment Local Law, No. 3.  
Any proposed removal of tree nos. 1, 2, 3, 4, 5, 10, 14, 22, 27, 29, 30, 34, 35, 37, 38, 40, 42, 43, 45, 47, 48, 50, 51, 52, 55, 58, 59, 60, 62, 63, 64, 68, 69, 70, 73, 74, 77, 79, 80, 81, 82, 83, 85, 91, 100, 105, 113, 114, 115, 116, 118, 119, 120, 121, 123, 124, 125, 126, 128, 129, 137, 138, 142 and 145 would trigger permit requirements under the Local Law.  
Refer to Section 3 for further information on tree permit requirements.
- 6.6 All trees were attributed an arboricultural rating that reflects the retention value of each tree.
- Two (2) individual trees attributed an arboricultural rating of High.
  - Sixty (60) individual trees attributed a Moderate arboricultural rating.
  - One hundred and thirty-seven (137) tree features were attributed a Low arboricultural rating, due to health and or structural deficiencies or being of small size.
  - Three (3) features were attributed an arboricultural rating of None, due to very poor health and or structural condition.
- Refer to Table 2 in Section 2 and Appendix 1 for the specific tree and group numbers.
- 6.7 Preference should be given to retaining trees of High and Moderate arboricultural value in areas of built form or areas of increased target potential.
- 6.8 Trees rated Low were considered to be of reduced arboricultural and landscape value that were not worthy of being a constraint on reasonable design intent.
- Small trees of Low arboricultural value that are otherwise in reasonable condition may offer a potential established tree resource, even if only as an interim measure.
  - Retention of any Low rated trees will still require appropriate tree protection measures to be implemented.
- 6.9 Trees that were attributed an arboricultural value of None are not suitable to retain on arboricultural grounds, having significant health and/or structural defects.

6.10 To successfully retain suitable trees within the site, TPZs must be established and fenced prior to commencing any works on site. Tree protection measures must be adopted including the following:

- Tree protection fencing must be erected around trees to be retained to the satisfaction of the council or as described in Appendix 4 prior to commencing any works on site including demolition, bulk earth works, construction and landscaping and maintained for the duration of the redevelopment works.
- Any design proposal must accommodate the nominated TPZ area and allow for future crown spread and root growth of any trees that are to be retained.
- All TPZ dimensions are provided in the tree assessment data in Appendix 1 and relate to the trees identified in Appendix 2. TPZ management guidelines are included in Appendix 4.
- All conditions of the tree protection guidelines attached as Appendix 4 should be adopted and applied for the duration of site works.
- Existing soil grades should remain unaltered within any tree protection zone adopted on site. Trenching for installation of services must not occur within the recommended reduced TPZ of any retained trees.
- Any further encroachment of the recommended reduced TPZ must be based on consultation with the site arborist, the results of non-destructive root investigation and utilise root sympathetic construction methods.
- Where pruning is recommended or required, it must be undertaken by a suitably qualified and experienced arborist and comply with Australian Standard AS 4373-2007 - Pruning of amenity trees.
- Where tree removals are proposed and permitted in the vicinity of other trees nominated to be retained suitably qualified and experienced arborists must undertake the tree removal in a controlled manner so that retained trees are not damaged.

I am available to answer any questions arising from this report.

No part of this report is to be reproduced unless in full.



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### References:

Australian Standard (4970-2009) Protection of Trees on development sites. Standards Australia, Sydney NSW Australia

Australian Standard (4373-2007) Pruning of Amenity trees. Standards Australia, Sydney NSW Australia

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Harris, R.W, Clark, J.R. & Matheny, N.P. (2004), Arboriculture: Integrated Management of Landscape trees, shrubs and vines, Prentice Hall, New Jersey.

Clark, J.R. & Matheny, N.P (1998), Trees and Development: A technical guide to preservation of trees during land development. ISA , Champaign, Illinois.

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## **Appendix 1: Tree details: 433 Smith Street, Fitzroy North.**

Refer to the following 9 pages.

DBH = Diameter at Breast Height (measured in centimetres at 1.3m above ground unless otherwise stated).

TPZ = Tree Protection Zone (metre radius).

Calculated using AS 4970-2009 and described in Section 4.

Reduced TPZ = TPZ reduced by 10% area on one side only

SRZ = Structural Root Zone (No Go Zone)

ULE = Useful Life Expectancy. - Estimate of useful life for species in site conditions.

Radius distances measured in metres from the centre of the trunk.

Refer to Appendix 2 for a tree location plan. See Appendix 3 for Tree descriptors.



No	Common Name (Botanic name)	Age	Origin	DBH	Height x Width (m)	Health	Structure	Arb. Value	Comments	TPZ (m radius)	SRZ (m radius)	Reduced TPZ (m)	Requires Permit under Local Law
1	Sweet Pittosporum (Pittosporum undulatum)	Early-maturity	Australian native	17, 28	8 x 8	Fair	Fair	Low (weed)		3.9	2.4	2.8	YES
2	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	28, 41, 43	19 x 14	Fair	Poor	Low	Co-dominant stems at base with fungal bracket.	7.9	3.3	5.5	YES
3	Smooth-barked Apple (Angophora costata)	Maturing	Australian native	40, 59	19 x 14	Fair	Fair	Moderate	Co-dominant stems.	8.6	3.1	6.0	YES
4	Smooth-barked Apple (Angophora costata)	Maturing	Australian native	54	17 x 13	Fair	Fair	Moderate		6.5	2.9	4.5	YES
5	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Australian native	29, 29, 30	7 x 7	Fair	Fair to poor	Low		6.1	3.2	4.3	YES
6	Common European Olive (Olea sp.)	Early-maturity	Exotic evergreen	18, 21 @ 1 m	7 x 5	Fair	Fair to poor	Low (size)		3.3	2.1	2.3	NO
7	Lemon-scented Tea-tree (Leptospermum petersonii)	Early-maturity	Victorian native	31 @ 1 m	6 x 5	Fair	Fair to poor	Low (size)		3.7	2.2	2.6	NO
8	Common European Olive (Olea sp.)	Early-maturity	Exotic evergreen	17	7 x 5	Fair	Fair to poor	Low (size)		2.0	1.8	2.0	NO
9	Lemon-scented Tea-tree (Leptospermum petersonii)	Early-maturity	Exotic evergreen	35	6 x 5	Fair	Fair to poor	Low		4.2	2.4	2.9	NO
10	Willow-leaved Hakea (Hakea salicifolia)	Early-maturity	Australian native	19, 22	7 x 5	Fair	Fair to poor	Low	Lopped.	3.5	2.4	2.4	YES
11	Sweet Pittosporum (Pittosporum undulatum)	Semi-mature	Victorian native	12	5 x 4	Fair	Fair to poor	Low (weed)		2.0	1.8	2.0	NO
12	Common European Olive (Olea sp.)	Semi-mature	Exotic evergreen	12, 14	6 x 5	Fair	Fair to poor	Low (size)		2.2	1.8	2.0	NO
13	Common European Olive (Olea sp.)	Semi-mature	Exotic evergreen	15, 19	7 x 5	Fair	Fair to poor	Low (size)		2.9	2.0	2.0	NO
14	Chinese Elm (Ulmus parvifolia)	Maturing	Exotic deciduous	54 @ 1 m	11 x 14	Fair	Fair to poor	Moderate	Kerb and channel to north.	6.5	2.8	4.5	YES
15	Bottle Tree (Brachychiton sp.)	Semi-mature	Australian native	15 @ 0.5 m	4 x 3	Fair	Poor	Low	Lopped.	2.0	1.6	2.0	NO
16	Blackwood (Acacia melanoxylon)	Maturing	Victorian native	19	10 x 4	Fair	Fair to poor	Low	Reduced foliage density. Trunk decay.	2.3	2.0	2.0	NO
17	Blackwood (Acacia melanoxylon)	Maturing	Victorian native	15	10 x 4	Fair	Fair to poor	Low	Reduced foliage density. Trunk decay.	2.0	1.8	2.0	NO
18	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Victorian native	19	5 x 4	Fair	Fair to poor	Low (size)	Acute forks.	2.3	1.9	2.0	NO
19	White Cedar (Melia azedarach)	Semi-mature	Australian native	9, 10 @ 1 m	4 x 5	Good	Fair	Low (size)		2.0	1.5	2.0	NO
20	Bracelet Honey-myrtle (Melaleuca armillaris)	Early-maturity	Victorian native	24	7 x 5	Fair	Fair	Low		2.9	2.2	2.2	NO
21	Narrow-leaved Peppermint (Eucalyptus nicholii)	Semi-mature	Australian native	26	6 x 6	Fair	Poor	Low	Lopped.	3.1	2.1	2.2	NO
22	Lemon-scented Gum (Corymbia citriodora)	Maturing	Australian native	59	18 x 16	Fair	Fair	Moderate	cable brace requires adjustment, pavement/kerb damage west of tree	7.1	2.9	5.0	YES

No	Common Name (Botanic name)	Age	Origin	DBH	Height x Width (m)	Health	Structure	Arb. Value	Comments	TPZ (m radius)	SRZ (m radius)	Reduced TPZ (m)	Requires Permit under Local Law
23	Chinese Hawthorn (Photinia serratifolia)	Semi-mature	Exotic evergreen	9, 10	4 x 4	Fair	Fair to poor	Low (size)		2.0	1.8	2.0	NO
24	Chinese Hawthorn (Photinia serratifolia)	Semi-mature	Exotic evergreen	12, 12	4 x 4	Fair to poor	Fair to poor	Low	Foliage sparse.	2.0	1.7	2.0	NO
25	Lemon-scented Gum (Corymbia citriodora)	Semi-mature	Australian native	14	9 x 5	Fair	Fair	Low (size)		2.0	1.6	2.0	NO
26	Lemon-scented Gum (Corymbia citriodora)	Semi-mature	Australian native	16	7 x 6	Good	Fair	Low (size)		2.0	1.8	2.0	NO
27	Lemon-scented Gum (Corymbia citriodora)	Maturing	Australian native	51	17 x 15	Good	Fair to poor	Moderate	Epicormics. Past branch failure.	6.1	2.8	4.3	YES
28	Lemon-scented Gum (Corymbia citriodora)	Semi-mature	Australian native	21	11 x 7	Good	Fair	Moderate		2.5	1.9	2.0	NO
29	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	25, 38	16 x 10	Good	Fair	Moderate		5.5	2.6	3.8	YES
30	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	43	15 x 11	Fair	Fair to poor	Moderate	Lopped.	5.2	2.5	3.6	YES
31	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	35	18 x 10	Fair	Fair	Moderate		4.2	2.4	2.9	NO
32	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	35	18 x 10	Fair	Fair to poor	Low	Fungal bracket.	4.2	2.6	2.9	NO
33	Smooth-barked Apple (Angophora costata)	Semi-mature	Australian native	28	17 x 9	Fair	Fair to poor	Moderate	Co-dominant stems with acute forks. Recent excavation 85 cm to south. Severed several roots up to 70 mm diameter.	3.4	2.1	2.4	NO
34	Smooth-barked Apple (Angophora costata)	Semi-mature	Australian native	62 @ 1 m	17 x 14	Fair	Fair	High	Minor uplift of kerb to south.	7.4	2.9	5.2	YES
35	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	48	16 x 13	Fair	Fair	Moderate	Cable brace fitted.	5.8	2.5	4.0	YES
36	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	39	15 x 7	Fair	Poor	Low	Crossing branches. Trunk wounds.	4.7	2.4	3.3	NO
37	London Plane (Platanus Xacerifolia)	Maturing	Exotic deciduous	63	16 x 14	Fair	Fair	Moderate		7.6	2.9	5.3	YES
38	London Plane (Platanus Xacerifolia)	Semi-mature	Exotic deciduous	27, 33	10 x 9	Fair	Fair	Moderate		5.1	2.5	3.6	YES
39	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	18	7 x 6	Fair	Fair	Low (size)	Elm Leaf Beetle active. Suckering habit.	2.2	2.0	2.0	NO
40	Lemon-scented Gum (Corymbia citriodora)	Maturing	Australian native	49	16 x 14	Fair	Fair	High	Outside eastern perimeter. Footpath pavement damage.	5.9	2.6	4.1	YES
41	Hakea (Hakea stenophylla)	Maturing	Australian native	21 @ 1 m	7 x 5	Fair	Fair	Low (size)	Outside eastern perimeter.	2.5	1.9	2.0	NO
42	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	46	14 x 12	Fair to poor	Fair	Moderate	Outside eastern perimeter. Reduced foliage density.	5.5	2.6	3.9	YES
43	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	16, 35	16 x 12	Fair	Fair	Moderate	Outside eastern perimeter.	4.6	2.5	3.2	YES



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44	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	35	14 x 10	Fair	Poor	Low	Outside eastern perimeter. Codominant stems with acute forks. Cable brace fitted.	4.2	2.3	2.9	NO
45	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	48	15 x 12	Fair	Fair	Moderate	Outside eastern perimeter.	5.8	2.7	4.0	YES
46	Smooth-barked Apple (Angophora costata)	Semi-mature	Australian native	32	13 x 7	Fair	Fair	Moderate	Outside eastern perimeter.	3.8	2.3	2.7	NO
47	Smooth-barked Apple (Angophora costata)	Maturing	Australian native	67	15 x 13	Fair	Fair	Moderate	Outside eastern perimeter. Fungal brackets. Trunk decay. Requires crown reduction if retained.	8.0	2.9	5.6	YES
48	Peppercorn Tree (Schinus areira)	Maturing	Exotic evergreen	29, 54	13 x 11	Fair	Fair	Moderate	Outside eastern perimeter.	7.4	3.0	5.1	YES
49	Peppercorn Tree (Schinus areira)	Semi-mature	Exotic evergreen	32	10 x 8	Fair	Poor	Low	Outside eastern perimeter. Suppressed.	3.8	2.5	2.7	NO
50	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	49	17 x 10	Fair	Fair to poor	Moderate	Outside eastern perimeter. Fungal brackets. Trunk decay. Requires crown reduction if retained.	5.9	2.7	4.1	YES
51	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	54	18 x 14	Fair	Fair	Moderate	Outside eastern perimeter.	6.5	2.8	4.5	YES
52	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	47	16 x 10	Fair	Fair	Moderate	Outside eastern perimeter. Co-dominant stems	5.6	2.6	3.9	YES
53	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	37	17 x 12	Fair	Fair	Moderate	Outside eastern perimeter. Co-dominant stems	4.4	2.4	3.1	NO
54	Peppercorn Tree (Schinus areira)	Semi-mature	Exotic evergreen	28	10 x 5	Fair	Fair to poor	Low	Outside eastern perimeter.	3.4	2.1	2.4	NO
55	Peppercorn Tree (Schinus areira)	Semi-mature	Exotic evergreen	34, 39	14 x 10	Fair	Fair to poor	Moderate	Outside eastern perimeter.	6.2	2.6	4.3	YES
56	Peppercorn Tree (Schinus areira)	Semi-mature	Exotic evergreen	29	9 x 6	Fair	Fair to poor	Low	Outside eastern perimeter.	3.5	2.1	2.4	NO
57	Smooth-barked Apple (Angophora costata)	Semi-mature	Australian native	33	12 x 7	Fair	Fair to poor	Moderate	Outside southern perimeter. Co-dominant stems. Past branch failure.	4.0	2.3	2.8	NO
58	Smooth-barked Apple (Angophora costata)	Semi-mature	Australian native	22, 24	12 x 7	Fair	Fair to poor	Low	Outside southern perimeter. Past stem failure.	3.9	2.2	2.7	YES
59	River Red Gum (Eucalyptus camaldulensis)	Early-maturity	Planted Indigenous	64	18 x 16	Fair to poor	Fair	Moderate	Outside southern perimeter. Minor dieback. Requires deadwood removal.	7.7	2.9	5.4	YES
60	Sweet Pittosporum (Pittosporum undulatum)	Semi-mature	Victorian native	17, 25	10 x 8	Fair	Fair to poor	Low (weed)	Outside southern perimeter.	3.6	2.0	2.5	YES
61	Snow in Summer (Melaleuca linariifolia)	Semi-mature	Victorian native	13, 13	7 x 4	Fair to poor	Fair to poor	Low	Outside southern perimeter. Suppressed.	2.2	1.8	2.0	NO
62	Peppercorn Tree (Schinus areira)	Maturing	Exotic evergreen	71	14 x 14	Fair	Fair	Moderate	Outside southern perimeter.	8.5	3.1	6.0	YES
63	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	63 @ 1 m	8 x 8	Fair	Fair to poor	Low	Outside southern perimeter.	7.6	2.9	5.3	YES
64	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	15, 21, 22	8 x 9	Fair	Poor	Low	Outside southern perimeter. Acute forks.	4.1	2.5	2.8	YES

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65	Blackwood (Acacia melanoxylon)	Maturing	Victorian native	28	12 x 6	Fair	Poor	Low	Outside southern perimeter. Acute forks. Borer damage. Trunk decay.	3.4	2.1	2.4	NO
66	Lemon-scented Tea-tree (Leptospermum petersonii)	Early-maturity	Victorian native	19	6 x 5	Fair	Fair to poor	Low (size)	Outside southern perimeter.	2.3	1.9	2.0	NO
67	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	37	6 x 5	Fair	Fair to poor	Low	Outside southern perimeter. Acute forks.	4.4	2.4	3.1	NO
68	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	20, 21, 21	6 x 6	Fair	Fair to poor	Low	Outside southern perimeter. Acute forks.	4.3	2.5	3.0	YES
69	Peppercorn Tree (Schinus areira)	Maturing	Exotic evergreen	65	12 x 12	Fair	Fair	Moderate	Outside southern perimeter.	7.8	2.9	5.5	YES
70	Peppercorn Tree (Schinus areira)	Maturing	Exotic evergreen	88 @ 0.5 m	10 x 12	Fair	Fair	Moderate	Outside southern perimeter. Photo of base.	10.6	3.3	7.4	YES
71	Sweet Pittosporum (Pittosporum undulatum)	Semi-mature	Victorian native	9, 10	4 x 5	Fair	Fair	Low (weed)	Outside southern perimeter.	2.0	1.6	2.0	NO
72	Smooth-barked Apple (Angophora costata)	Semi-mature	Australian native	12	6 x 6	Good	Fair	Low (size)	Outside southern perimeter. Requires formative pruning.	2.0	1.5	2.0	NO
73	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	29, 35	7 x 6	Fair	Fair to poor	Low	Outside southern perimeter. Acute forks.	5.5	2.3	3.8	YES
74	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	20, 28, 29	7 x 7	Fair	Fair to poor	Low	Outside southern perimeter.	5.4	2.5	3.8	YES
75	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	26	7 x 5	Fair	Fair	Low	Outside southern perimeter. Past branch failure	3.1	2.4	2.2	NO
76	Peppercorn Tree (Schinus areira)	Semi-mature	Exotic evergreen	38	10 x 12	Fair	Fair to poor	Low	Outside southern perimeter. Suppressed.	4.6	2.4	3.2	NO
77	Peppercorn Tree (Schinus areira)	Early-maturity	Exotic evergreen	83 @ 1 m	12 x 12	Fair	Fair to poor	Moderate	Outside southern perimeter. Trunk decay	10.0	3.4	7.0	YES
78	Smooth-barked Apple (Angophora costata)	Semi-mature	Australian native	15, 17	8 x 7	Fair	Fair to poor	Low (size)	Outside southern perimeter. Acute forks. Co-dominant stems.	2.7	2.0	2.0	NO
79	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	27, 34	12 x 12	Fair	Fair	Moderate	Outside southern perimeter. Requires formative pruning. Remove basal shoots.	5.2	2.6	3.6	YES
80	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	41, 52	10 x 11	Fair	Fair to poor	Low	Outside southern perimeter.	7.9	2.9	5.6	YES
81	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	20, 29	8 x 8	Fair	Fair to poor	Low	Outside southern perimeter. Acute forks.	4.2	2.5	3.0	YES
82	Peppercorn Tree (Schinus areira)	Early-maturity	Victorian native	45	9 x 11	Fair	Fair	Moderate	Outside southern perimeter.	5.4	2.7	3.8	YES
83	River Red Gum (Eucalyptus camaldulensis)	Maturing	Planted Indigenous	73	16 x 14	Good	Fair to poor	Moderate	Outside southern perimeter. Past branch failure.	8.8	3.3	6.1	YES
84	Peppercorn Tree (Schinus areira)	Semi-mature	Exotic evergreen	38	9 x 9	Fair	Fair	Moderate	Outside southern perimeter.	4.6	2.7	3.2	NO
85	Bracelet Honey-myrtle (Melaleuca armillaris)	Early-maturity	Victorian native	15, 17, 21	6 x 7	Fair	Fair to poor	Low	Outside southern perimeter. Acute forks. Partly suppressed.	3.7	2.3	2.6	YES
86	Bracelet Honey-myrtle (Melaleuca armillaris)	Early-maturity	Victorian native	27	7 x 7	Fair	Collapsing	None	Outside southern perimeter.	3.2	2.2	2.3	NO

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87	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Victorian native	13	5 x 4	Fair	Fair	Low (size)	Outside southern perimeter.	2.0	1.7	2.0	NO
88	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Victorian native	13	5 x 4	Fair	Fair	Low (size)	Outside southern perimeter.	2.0	1.6	2.0	NO
89	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	14, 15, 17 @ 0.5 m	6 x 9	Good	Fair to poor	Low	Outside western perimeter.	3.2	2.2	2.2	NO
90	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	19, 22	6 x 15	Good	Collapsing	None	Outside western perimeter. Lopped.	3.5	2.7	2.7	NO
91	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	24, 29	6 x 12	Fair	Fair to poor	Low	Outside western perimeter.	4.5	2.6	3.2	YES
92	Narrow-leaved Ash (Fraxinus angustifolia)	Semi-mature	Exotic deciduous	26	9 x 6	Fair	Fair	Low (weed)	Outside northern perimeter.	3.1	2.2	2.2	NO
93	Narrow-leaved Ash (Fraxinus angustifolia)	Semi-mature	Exotic deciduous	19	9 x 6	Fair	Fair	Low (weed)	Outside northern perimeter.	2.3	2.0	2.0	NO
94	Narrow-leaved Ash (Fraxinus angustifolia)	Semi-mature	Exotic deciduous	16	9 x 5	Fair	Fair	Low (weed)	Outside northern perimeter.	2.0	2.0	2.0	NO
95	Narrow-leaved Ash (Fraxinus angustifolia)	Semi-mature	Exotic deciduous	12	9 x 4	Fair	Fair	Low (weed)	Outside northern perimeter.	2.0	1.7	2.0	NO
96	Narrow-leaved Ash (Fraxinus angustifolia)	Semi-mature	Exotic deciduous	27	12 x 6	Fair	Fair	Low (weed)	Outside northern perimeter.	3.2	2.3	2.3	NO
97	Bracelet Honey-myrtle (Melaleuca armillaris)	Maturing	Victorian native	30	7 x 7	Fair	Fair to poor	Low	Outside northern perimeter.	3.6	2.7	2.7	NO
98	Narrow-leaved Peppermint (Eucalyptus nicholii)	Semi-mature	Victorian native	38	9 x 7	Fair	Fair	Moderate	Outside northern perimeter.	4.6	2.2	3.2	NO
99	Bracelet Honey-myrtle (Melaleuca armillaris)	Early-maturity	Victorian native	13, 21	7 x 6	Fair	Fair to poor	Low	Outside northern perimeter.	3.0	2.2	2.1	NO
100	Narrow-leaved Peppermint (Eucalyptus nicholii)	Early-maturity	Victorian native	51	14 x 12	Fair	Fair	Moderate	Outside northern perimeter.	6.1	2.7	4.3	YES
101	Bracelet Honey-myrtle (Melaleuca armillaris)	Early-maturity	Victorian native	14, 18	6 x 5	Fair	Fair to poor	Low	Outside northern perimeter. Acute forks.	2.7	1.9	2.0	NO
102	Smooth-barked Apple (Angophora costata)	Semi-mature	Australian native	19	9 x 5	Fair	Fair	Low (size)	Outside northern perimeter.	2.3	1.8	2.0	NO
103	Bracelet Honey-myrtle (Melaleuca armillaris)	Early-maturity	Victorian native	22	6 x 6	Fair	Fair	Low	Outside northern perimeter.	2.6	2.0	2.0	NO
104	Smooth-barked Apple (Angophora costata)	Semi-mature	Australian native	32	14 x 12	Good	Fair	Moderate	Outside northern perimeter.	3.8	2.3	2.7	NO
105	Bracelet Honey-myrtle (Melaleuca armillaris)	Early-maturity	Victorian native	14, 28	6 x 5	Fair	Fair	Low	Outside northern perimeter.	3.8	2.2	2.6	YES
106	Bracelet Honey-myrtle (Melaleuca armillaris)	Semi-mature	Victorian native	15	5 x 5	Fair	Fair	Low (size)	Outside northern perimeter.	2.0	1.8	2.0	NO
107	Bracelet Honey-myrtle (Melaleuca armillaris)	Semi-mature	Victorian native	13	5 x 5	Fair	Fair to poor	Low	Outside northern perimeter. Acute forks. Lopped.	2.0	1.8	2.0	NO
108	Narrow-leaved Peppermint (Eucalyptus nicholii)	Semi-mature	Victorian native	29	11 x 7	Fair	Fair	Moderate	Outside northern perimeter.	3.5	2.2	2.4	NO

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109	Bracelet Honey-myrtle (Melaleuca armillaris)	Semi-mature	Victorian native	16, 21	6 x 6	Fair	Fair	Low	Outside northern perimeter.	3.2	2.4	2.4	NO
110	Smooth-barked Apple (Angophora costata)	Semi-mature	Australian native	24	12 x 7	Fair	Fair	Moderate	Outside northern perimeter.	2.9	2.1	2.1	NO
111	Chinese Elm (Ulmus parvifolia)	Semi-mature	Exotic deciduous	11	5 x 5	Fair	Fair	Low (size)	Outside northern perimeter. Formative pruning.	2.0	1.5	2.0	NO
112	Smooth-barked Apple (Angophora costata)	Semi-mature	Australian native	32	14 x 8	Fair	Fair	Moderate	Outside northern perimeter. Minor deadwood. Past branch failure.	3.8	2.3	2.7	NO
113	Smooth-barked Apple (Angophora costata)	Early-maturity	Australian native	42	16 x 10	Fair	Fair to poor	Moderate	Outside northern perimeter. Minor deadwood. Co-dominant stems. Past branch failure.	5.0	2.5	3.5	YES
114	English Elm (Ulmus procera)	Over-mature	Exotic deciduous	50	10 x 10	Fair	Fair	Low	Street tree.	6.0	2.8	4.2	YES
115	English Elm (Ulmus procera)	Maturing	Exotic deciduous	43	9 x 10	Fair	Fair	Moderate	Street tree.	5.2	2.7	3.6	YES
116	Narrow-leaved Ash (Fraxinus angustifolia)	Maturing	Exotic deciduous	48	11 x 12	Fair	Fair	Moderate	Street tree.	5.8	2.8	4.0	YES
117	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	16	6 x 5	Fair	Fair	Low (size)	Street tree.	2.0	1.8	2.0	NO
118	English Elm (Ulmus procera)	Over-mature	Exotic deciduous	65	11 x 10	Fair	Fair	Low	Street tree.	7.8	3.1	5.5	YES
119	English Elm (Ulmus procera)	Over-mature	Exotic deciduous	55	10 x 9	Fair	Fair	Low	Street tree.	6.6	2.9	4.6	YES
120	English Elm (Ulmus procera)	Over-mature	Exotic deciduous	58	10 x 9	Fair	Fair to poor	Low	Street tree. Past branch failure.	7.0	2.9	4.9	YES
121	English Elm (Ulmus procera)	Over-mature	Exotic deciduous	59	12 x 9	Fair	Fair to poor	Low	Street tree.	7.1	3.0	5.0	YES
122	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	34	9 x 7	Fair to poor	Poor	Low	Street tree. Borer damage. Minor dieback. Trunk decay.	4.1	2.3	2.9	NO
123	London Plane (Platanus Xacerifolia)	Over-mature	Exotic deciduous	49	12 x 12	Fair	Fair to poor	Low	Street tree.	5.9	2.8	4.1	YES
124	English Elm (Ulmus procera)	Over-mature	Exotic deciduous	58	12 x 12	Fair	Fair to poor	Low	Street tree.	7.0	3.1	4.9	YES
125	English Elm (Ulmus procera)	Over-mature	Exotic deciduous	49	10 x 7	Fair	Fair to poor	Low	Street tree.	5.9	2.8	4.1	YES
126	English Elm (Ulmus procera)	Over-mature	Exotic deciduous	55	10 x 10	Fair	Fair to poor	Low	Street tree.	6.6	2.9	4.6	YES
127	Narrow-leaved Ash (Fraxinus angustifolia)	Maturing	Exotic deciduous	39	9 x 11	Fair	Fair	Moderate	Street tree.	4.7	2.5	3.3	NO
128	English Elm (Ulmus procera)	Maturing	Exotic deciduous	55	10 x 13	Fair	Fair	Moderate	Street tree. Minor dieback.	6.6	2.9	4.6	YES
129	English Elm (Ulmus procera)	Maturing	Exotic deciduous	55	9 x 12	Fair to poor	Fair	Moderate	Street tree. Minor dieback.	6.6	2.9	4.6	YES
130	London Plane (Platanus Xacerifolia)	Semi-mature	Exotic deciduous	24	11 x 7	Fair	Fair	Moderate	Outer separator. Powerline pruned.	2.9	2.1	2.1	NO



No	Common Name (Botanic name)	Age	Origin	DBH	Height x Width (m)	Health	Structure	Arb. Value	Comments	TPZ (m radius)	SRZ (m radius)	Reduced TPZ (m)	Requires Permit under Local Law
131	London Plane (Platanus Xacerifolia)	Semi-mature	Exotic deciduous	30	11 x 8	Fair	Fair	Moderate	Outer separator. Powerline pruned.	3.6	2.2	2.5	NO
132	Turkey Oak (Quercus cerris)	Young	Exotic deciduous	8	3 x 3	Fair	Fair	Low (size)	Outer separator.	2.0	1.4	2.0	NO
133	Scarlet Oak (Quercus coccinea)	Young	Exotic deciduous	9	4 x 2	Fair	Fair	Low (size)	Outer separator.	2.0	1.4	2.0	NO
134	Scarlet Oak (Quercus coccinea)	Young	Exotic deciduous	3	3 x 2	Fair	Fair	Low (size)	Outer separator.	2.0	1.1	2.0	NO
135	Scarlet Oak (Quercus coccinea)	Young	Exotic deciduous	4	4 x 2	Fair	Fair	Low (size)	Outer separator.	2.0	1.3	2.0	NO
136	Scarlet Oak (Quercus coccinea)	Young	Exotic deciduous	4	3 x 2	Fair to poor	Fair	Low (size)	Outer separator. Foliage sparse.	2.0	1.1	2.0	NO
137	London Plane (Platanus Xacerifolia)	Maturing	Exotic deciduous	51	11 x 12	Fair	Fair to poor	Moderate	Outer separator. Lopped.	6.1	2.7	4.3	YES
138	London Plane (Platanus Xacerifolia)	Maturing	Exotic deciduous	56	11 x 12	Fair	Fair to poor	Moderate	Outer separator. Lopped.	6.7	2.8	4.7	YES
139	Scarlet Oak (Quercus coccinea)	Young	Exotic deciduous	4	3 x 2	Good	Fair	Low (size)	Outer separator.	2.0	1.2	2.0	NO
140	Scarlet Oak (Quercus coccinea)	Young	Exotic deciduous	5 @ 1 m	3 x 2	Fair	Fair	Low (size)	Outer separator.	2.0	1.2	2.0	NO
141	Scarlet Oak (Quercus coccinea)	Young	Exotic deciduous	3 @ 1 m	3 x 2	Fair	Fair	Low (size)	Outer separator.	2.0	1.2	2.0	NO
142	London Plane (Platanus Xacerifolia)	Early-maturity	Exotic deciduous	46	11 x 10	Fair	Fair to poor	Moderate	Outer separator. Cavity.	5.5	2.6	3.9	YES
143	Turkey Oak (Quercus cerris)	Young	Exotic deciduous	4	4 x 2	Fair	Fair	Low (size)	Outer separator.	2.0	1.1	2.0	NO
144	Scarlet Oak (Quercus coccinea)	Young	Exotic deciduous	4	3 x 2	Fair to poor	Fair	Low (size)	Outer separator. Reduced foliage density.	2.0	1.1	2.0	NO
145	London Plane (Platanus Xacerifolia)	Maturing	Exotic deciduous	52	12 x 12	Fair	Fair	Moderate	Outer separator. Listed on the City of Yarra Significant Tree Register.	6.2	2.7	4.4	YES
146	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	33	12 x 6	Fair	Fair	Moderate	Street tree. Significant grade difference to site.	4.0	2.3	2.8	NO
147	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	16	12 x 5	Fair	Fair	Moderate	Street tree. Significant grade difference to site.	2.0	1.8	2.0	NO
148	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	17	12 x 4	Fair	Fair	Moderate	Street tree. Significant grade difference to site.	2.0	1.9	2.0	NO
149	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	22	12 x 6	Fair	Fair	Moderate	Street tree. Significant grade difference to site.	2.6	2.0	2.0	NO
150	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	23	10 x 5	Fair	Fair	Moderate	Street tree. Significant grade difference to site.	2.8	2.1	2.1	NO
151	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	20	10 x 6	Fair	Fair	Moderate	Street tree. Significant grade difference to site.	2.4	2.0	2.0	NO
152	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	17	9 x 4	Fair	Fair	Low (size)	Street tree. Significant grade difference to site.	2.0	1.8	2.0	NO

No	Common Name (Botanic name)	Age	Origin	DBH	Height x Width (m)	Health	Structure	Arb. Value	Comments	TPZ (m radius)	SRZ (m radius)	Reduced TPZ (m)	Requires Permit under Local Law
153	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	15	7 x 4	Fair	Fair to poor	Low (size)	Street tree. Significant grade difference to site.	2.0	1.8	2.0	NO
154	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	14	6 x 4	Fair	Fair	Low (size)	Street tree. Significant grade difference to site.	2.0	1.6	2.0	NO
155	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	15	7 x 3	Fair to poor	Fair to poor	Low	Street tree. Significant grade difference to site. Borer damage. Trunk decay. Trunk wounds.	2.0	1.6	2.0	NO
156	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	23	9 x 6	Fair	Fair to poor	Moderate	Street tree. Significant grade difference to site. Borer damage. Trunk decay. Trunk wounds.	2.8	2.0	2.0	NO
157	English Elm (Ulmus procera)	Semi-mature	Exotic deciduous	37	8 x 7	Fair	Fair	Moderate	Street tree. Significant grade difference to site.	4.4	2.4	3.1	NO
Grp 1	Callistemon viminalis, Leptospermum petersonii, Olea sp.	Semi-mature	Victorian native, Australian native, exotic evergreen	12	5 x 5	Fair	Fair to poor	Low (size)	16 trees in group.	2.0			
Grp 2	Callistemon viminalis	Semi-mature	Australian native	12	4 x 4	Fair	Fair	Low (size)	4 trees in group.	2.0			
Shrb 1	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Victorian Native	<10	<5m x <4m	Fair-poor	Poor	Low		2.0			
Shrb 2	Mauve-flowered Bottlebrush (Callistemon viminalis)	Semi-mature	Australian Native	<10	<5m x <4m	Fair	Poor	Low (size)		2.0			
Shrb 3	Mauve-flowered Bottlebrush (Callistemon viminalis)	Semi-mature	Australian Native	<10	<5m x <4m	Fair	Fair	Low (size)		2.0			
Shrb 4	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Victorian Native	<10	<5m x <4m	Fair	Fair	Low (size)		2.0			
Shrb 5	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Victorian Native	<10	<5m x <4m	Fair	Fair-poor	Low (size)		2.0			
Shrb 6	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Victorian Native	<10	<5m x <4m	Fair	Fair-poor	Low (size)		2.0			
Shrb 7	Wattle Tree (Acacia sp.)	Semi-mature	Australian Native	<10	<5m x <4m	Fair	Fair-poor	Low (size)		2.0			
Shrb 8	Hakea (Hakea stenophylla)	Semi-mature	Australian Native	<10	<5m x <4m	Fair	Fair-poor	Low (size)		2.0			
Shrb 9	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Australian Native	<10	<5m x <4m	Fair	Fair-poor	Low (size)		2.0			
Shrb 10	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Australian Native	<10	<5m x <4m	Fair	Fair-poor	Low (size)		2.0			
Shrb 11	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Australian Native	<10	<5m x <4m	Fair	Fair-poor	Low (size)		2.0			
Shrb 12	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Australian Native	<10	<5m x <4m	Fair	Fair-poor	Low (size)		2.0			

No	Common Name (Botanic name)	Age	Origin	DBH	Height x Width (m)	Health	Structure	Arb. Value	Comments	TPZ (m radius)	SRZ (m radius)	Reduced TPZ (m)	Requires Permit under Local Law
Shrb 13	Strawberry Tree (Arbutus sp.)	Semi-mature	Exotic evergreen	<10	<4m x <4m	Fair	Fair-poor	Low (size)		2.0			
Shrb 14	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Exotic evergreen	<10	<4m x <4m	Dead	Fair-poor	None		2.0			
Shrb 15	Bracelet Honey-myrtle (Melaleuca armillaris)	Semi-mature	Victorian Native	<10	<4m x <4m	Fair	Fair-poor	Low (size)		2.0			
Shrb 16	Lemon-scented Tea-tree (Leptospermum petersonii)	Semi-mature	Victorian Native	<10	<4m x <4m	Fair	Fair	Low (size)		2.0			
Shrb 17	Oleander (Nerium oleander)	Semi-mature	Exotic evergreen	<10	<4m x <4m	Fair	Fair	Low (size)		2.0			
Shrb 18	Oleander (Nerium oleander)	Semi-mature	Exotic evergreen	<10	<4m x <4m	Fair	Fair	Low (size)		2.0			
Shrb 19	Oleander (Nerium oleander)	Semi-mature	Exotic evergreen	<10	<4m x <4m	Fair	Fair	Low (size)		2.0			
Shrb 20	Oleander (Nerium oleander)	Semi-mature	Exotic evergreen	<10	<4m x <4m	Fair	Fair	Low (size)		2.0			
Shrb 21	Oleander (Nerium oleander)	Semi-mature	Exotic evergreen	<10	<4m x <4m	Fair	Fair	Low (size)		2.0			
Shrb 22	Oleander (Nerium oleander)	Semi-mature	Exotic evergreen	<10	<4m x <4m	Fair	Fair	Low (size)		2.0			
Shrb 23	Mauve-flowered Bottlebrush (Callistemon viminalis)	Semi-mature	Australian Native	<10	<4m x <4m	Fair	Fair	Low (size)		2.0			
Shrb 24	Mauve-flowered Bottlebrush (Callistemon viminalis)	Semi-mature	Australian Native	<10	<4m x <4m	Fair	Fair	Low (size)		2.0			
Shrb 25	Chinese Elm (Ulmus parvifolia)	Semi-mature	Australian Native	<10	<3m x <3m	Fair	Fair	Low (size)		2.0			

**Appendix 2: Tree location plan: 433 Smith Street, Fitzroy North.**

Refer to the following 3 pages.



## Legend

- Tree data
- Shrub data
- Tree group

## TPZ

- High
- Moderate
- Low
- None
- SRZ

0 10 20 30 m



## Overview





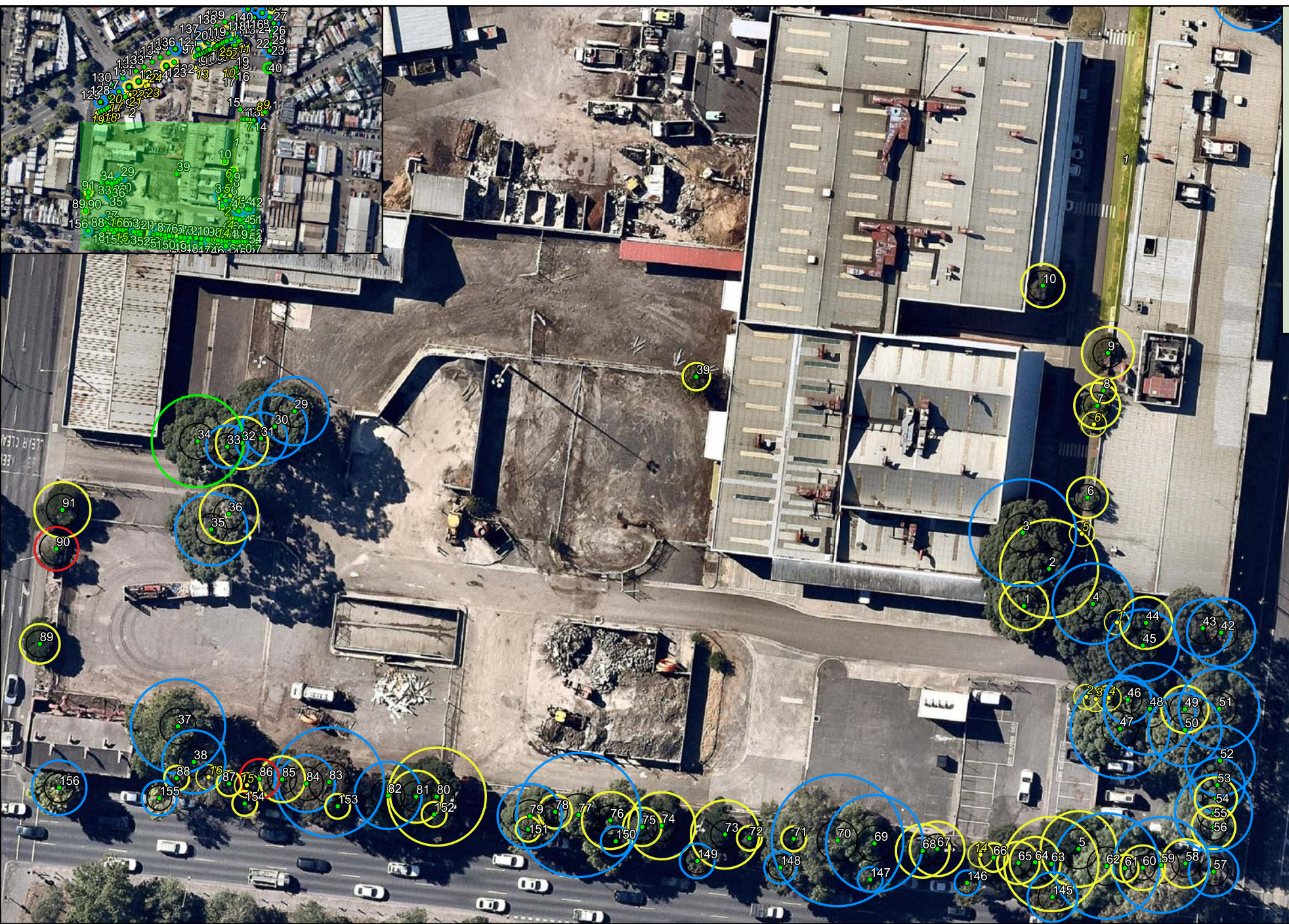
# Legend

- Tree data
- Shrub data
- Tree group

## TPZ

- High
- Moderate
- Low
- None
- SRZ

0 10 20 30 m







**Legend**

- Tree data
- Shrub data
- Tree group

**TPZ**

- High
- Moderate
- Low
- None
- SRZ



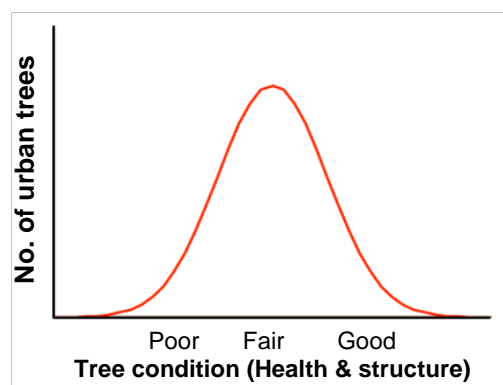
## Appendix 3: Arboricultural Descriptors

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Note that not all of the described tree descriptors may be used in a tree assessment and report. The assessment is undertaken with regard to contemporary arboricultural practices and consists of a visual inspection of external and above-ground tree parts.

### 1. Tree Condition

The assessment of tree condition evaluates factors of health and structure. The descriptors of health and structure attributed to a tree evaluate the individual specimen to what could be considered typical for that species growing in its location under current climatic conditions. For example, some species can display inherently poor branching architecture, such as multiple acute branch attachments with included bark. Whilst these structural defects may technically be considered arboriculturally poor, they are typical for the species and may not constitute an increased risk of failure. These trees may be assigned a structural rating of fair-poor (rather than poor) at the discretion of the assessor.



**Diagram 1:** Indicative normal distribution curve for tree condition

Diagram 1, provides an indicative distribution curve for tree condition to illustrate that within a normal tree population the majority of specimens are centrally located within the condition range (normal distribution curve). Furthermore, that those individual trees with an assessed condition approaching the outer ends of the spectrum occur less often.

### 2. Tree Name

Provides botanical name, (genus, species, variety and cultivar) according to accepted international code of taxonomic classification, and common name.

### 3. Tree Type

Describes the general geographic origin of the species and its type e.g. deciduous or evergreen.

Category	Description
Indigenous	Occurs naturally in the area or region of the subject site
Victorian native	Occurs naturally within some part of the State of Victoria (not exclusively) but is not indigenous (component of EVC benchmark).
Australian native	Occurs naturally within Australia but is not a Victorian native or indigenous
Exotic deciduous	Occurs outside of Australia and typically sheds its leaves during winter
Exotic evergreen	Occurs outside of Australia and typically holds its leaves all year round
Exotic conifer	Occurs outside of Australia and is classified as a gymnosperm
Native conifer	Occurs naturally within Australia and is classified as a gymnosperm
Native Palm	Occurs naturally within Australia. Woody monocotyledon
Exotic Palm	Occurs outside of Australia. Woody monocotyledon

### 4. Height and Width

Indicates height and width of the individual tree; dimensions are expressed in metres. Crown heights are measured with a height meter where possible. Due to the topography of some sites and/or the density of vegetation it may not be possible to do this for every tree. Tree heights may be estimated in line with previous height meter readings in conjunction with assessor's experience. Crown widths are generally paced (estimated) at the widest axis or can be measured on two axes and averaged. In some instances the crown width can be measured on the four cardinal direction points (North, South, East and West).

Crown height, crown spread are generally recorded to the nearest metre (crown spread would be rounded up) for dimensions up to 10 m and the nearest whole metre for dimensions over 10 m. Estimated dimensions (e.g. for off-site or otherwise inaccessible trees where accurate data cannot be recovered) shall be clearly identified in the assessment data.

## 5. Trunk diameters

The position where trunk diameters are captured may vary dependent on the requirements of the specific assessment and an individual trees specific characteristics. DBH is the typical trunk diameter captured as it relates to the allocation of tree protection distances. The basal trunk diameter assists in the allocation of a structural root zone. Some municipalities require trunk diameters be captured at different heights, with 1.0 m above grade being a common requirement. The specific planning schemes will be checked to ascertain requirements.

Stem diameters shall be recorded in centimetres, rounded to the nearest 1 cm (0.01 m).

### ***Diameter at Breast Height (DBH)***

Indicates the trunk diameter (expressed in centimetres) of an individual tree measured at 1.4m above the existing ground level or where otherwise indicated, multiple leaders are measured individually. Plants with multiple leader habit may be measured at the base. The range of methods to suit particular trunk shapes, configurations and site conditions can be seen in Appendix A of Australian Standard AS 4970-2009 *Protection of trees on development sites*. Measurements undertaken with forestersØ tape or builders tape.

### ***Basal trunk diameter***

The basal dimension is the trunk diameter measured at the base of the trunk or main stem(s) immediately above the root buttress. Used to ascertain the Structural Root Zone (SRZ) as outlined in AS4970.

## 6. Health

Assesses various attributes to describe the overall health and vigour of the tree.

Category	Vigour, Extension growth	Decline symptoms, Deadwood, Dieback	Foliage density, colour, size, intactness	Pests and or disease
<b>Good</b>	Above typical. Excellent. Full canopy density	Negligible	Better than typical	Negligible
<b>Fair</b>	Typical. 90-100% canopy density	Minor or expected. Little or no dead wood	Typical	Minor, within damage thresholds
<b>Fair to Poor</b>	Below typical - low vigour	More than typical. Small sub-branch dieback	Exhibiting deficiencies	Exceeds damage thresholds
<b>Poor</b>	Minimal - declining	Excessive, large and/or prominent amount & size of dead wood	Exhibiting severe deficiencies	Extreme and contributing to decline
<b>Dead</b>	N/A	N/A	N/A	N/A

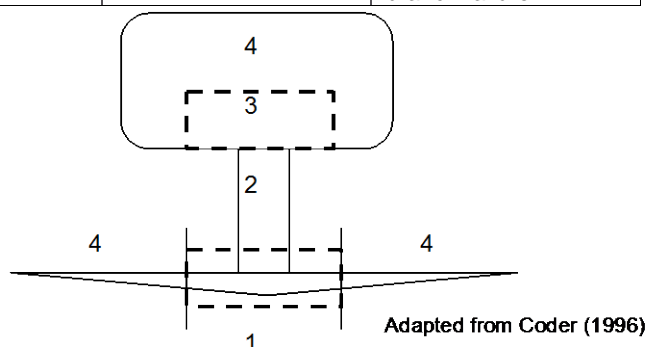
## 7. Structure

Assesses principal components of tree structure (Diagram 2).

Descriptor	Zone 1 - Root plate & lower stem	Zone 2 - Trunk	Zone 3 - Primary branch support	Zone 4 - Outer crown and roots
<b>Good</b>	No obvious damage, disease or decay; obvious basal flare / stable in ground	No obvious damage, disease or decay; well tapered	Well formed, attached, spaced and tapered. No history of failure.	No obvious damage, disease, decay or structural defect. No history of failure.
<b>Fair</b>	Minor damage or decay. Basal flare present.	Minor damage or decay	Typical main branch architecture, well attached, spaced and tapered. No history of branch failure.	Minor damage, disease or decay; minor branch end-weight or over-extension. No history of branch failure.
<b>Fair to Poor</b>	Moderate damage or decay; minimal basal flare	Moderate damage or decay; approaching recognised thresholds	Weak, decayed or with acute branch attachments; previous branch failure evidence	Moderate damage, disease or decay; moderate branch end-weight or over-extension. Minor branch failure evident.
<b>Poor</b>	Major damage, disease or decay; fungal fruiting bodies present. Excessive lean placing pressure on root plate	Major damage, disease or decay; exceeds recognised thresholds; fungal fruiting bodies present. Acute lean. Stump re-sprout	Decayed, cavities or has acute branch attachments with included bark; excessive compression flaring; failure likely. Evidence of major branch failure.	Major damage, disease or decay; fungal fruiting bodies present; major branch end-weight or over-extension. Branch failure evident.
<b>Very Poor</b>	Excessive damage, disease or decay; unstable / loose in ground; altered exposure; failure probable	Excessive damage, disease or decay; cavities. Excessive lean. Stump re-sprout	Decayed, cavities or branch attachments with active split; failure imminent. History of major branch failure.	Excessive damage, disease or decay; excessive branch end-weight or over-extension. History of branch failure.

**Diagram 2:** Tree structure zones

1. Root plate & lower stem
2. Trunk
3. Primary branch support
4. Outer crown & roots



Structure ratings will also take into account general branching architecture, stem taper, live crown ratio, crown symmetry (bias or lean) and crown position such as tree being suppressed amongst more dominant trees.

The lowest or worst descriptor assigned to the tree in any column could generally be the overall rating assigned to the tree. The assessment for structure is limited to observations of external and above ground tree parts. It does not include any exploratory assessment of underground or internal tree parts unless this is requested as part of the investigation. Trees are assessed and then given a rating for a point in time. Generally, trees with a poor or very poor structure are beyond the benefit of practical arboricultural treatments.

The management of trees in the urban environment requires appropriate arboricultural input and consideration of risk. Risk potential will take into account the combination of likelihood of failure and impact, including the perceived importance of the target(s).

## 8. Age class

Relates to the physiological stage of the tree's life cycle.

Category	Description
Young	Sapling tree and/or recently planted. Approximately 5 or less years in location.
Semi-mature	Tree increasing in size and yet to achieve expected size in situation. Primary developmental stage.
Early mature	Tree established. Usually vigorous. 50% of attainable age/size.
Maturing	Specimen approaching expected size in situation, with reduced incremental growth
Over-mature	Mature full-size with a retrenching crown. Tree is senescent and in decline. Significant decay generally present

## 9. Arboricultural Rating

Relates to the combination of tree condition factors, including health and structure (arboricultural merit), and also conveys an amenity value. Amenity relates to the trees biological, functional and aesthetic characteristics (Hitchmough 1994) within an urban landscape context. The presence of any serious disease or tree-related hazards that would impact risk potential are taken into account.

Category	Description
High	Tree of high quality in good to fair condition. Generally a prominent arboricultural/landscape feature. These trees have the potential to be a medium- to long-term component of the landscape if managed appropriately. Retention of these trees is highly desirable.
Moderate	Tree of moderate quality, in fair or better condition. Tree may have a condition, and or structural problem that will respond to arboricultural treatment. These trees have the potential to be a medium- to long-term component of the landscape if managed appropriately. Retention of these trees is generally desirable.
Low	Unremarkable tree of low quality or little amenity value. Tree in either poor health or with poor structure or a combination. Tree is not significant because of either its size or age. Young trees with a stem diameter below 15 cm. These trees are easily replaceable. Tree (species) is functionally inappropriate to specific location and would be expected to be problematic if retained. Retention of such trees may be considered if not requiring a disproportionate expenditure of resources for a tree in its condition and location.
None	Trees of low quality with an estimated remaining life expectancy of less than 10 years, or young trees with a stem diameter below 15 cm. Tree has either a severe structural defect or health problem or combination that cannot be sustained with practical arboricultural techniques and the loss of tree would be expected in the short term. Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline. Tree infected with pathogens of significance to either the health or safety of the tree or other adjacent trees. Tree whose retention would not be viable after the removal of adjacent trees (includes trees that have developed in close spaced groups and would not be expected to acclimatise to severe alterations to surrounding environment – removal of adjacent shelter trees). Tree has a detrimental effect on the environment, for example, the tree is a recognised environmental woody weed with potential to spread into waterways or natural areas.

Trees have many values, not all of which are considered when an arboricultural assessment is undertaken. However, individual trees or tree group features may be considered important community resources because of unique or noteworthy characteristics or values other than their age, dimensions, health or structural condition. Recognition of one or more of the following criterion is designed to highlight other considerations that may influence the future management of such trees.

Significance	Description
Horticultural Value/ Rarity	Outstanding horticultural or genetic value; could be an important source of propagating stock, including specimens that are particularly resistant to disease or exposure. Any tree of a species or variety that is rare.
Historic, Aboriginal Cultural or Heritage Value	Tree could have value as a remnant of a particular important historical period or a remnant of a site or activity no longer in action. Tree has a recognised association with historic aboriginal activities, including scar trees.  Tree commemorates a particular occasion, including plantings by notable people, or having associations with an important event in local history.
Ecological Value	Tree could have value as habitat for indigenous wildlife, including providing breeding, foraging or roosting habitat, or is a component of a wildlife reserve.  Remnant Indigenous vegetation that contribute to biological diversity

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## **Appendix 4: Tree protection zones.**

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### **Introduction**

In order to sustain trees on a development site consideration must be given to the establishment of tree protection zones.

The physical dimensions of tree protection zones can sometimes be difficult to define. The projection of a tree's crown can provide a guide but is by no means the definitive measure. The unpredictable nature of roots and their growth, differences between species and their tolerances, and observable and hidden changes to the trees growing environment, as a result of development, are variables that must be considered.

Most vigorous, broad canopied trees survive well if the area within the drip-line of the canopy is protected. Fine root density is usually greater beneath the canopy than beyond (Gilman, 1997). If few to no roots over 3cm in diameter are encountered and severed during excavation the tree will probably tolerate the impact and root loss. A healthy tree can sustain a loss of between 30% and 50% of absorbing roots (Harris, Clark, Matheny, 1999), however encroachment into the structural root system of a tree may be problematic.

The structural root system of a tree is responsible for ensuring the stability of the entire tree structure in the ground. A tree could not sustain loss of structural root system and be expected to survive let alone stand up to average annual wind loads upon the crown.

### **Allocation of tree protection zone (TPZ)**

The method of allocating a TPZ to a particular tree will be influenced by site factors, the tree species, its age and developed form.

Once it has been established, through an arboricultural assessment, which trees and tree groups are to be retained, the next step will require careful management through the development process to minimise any impacts on the designated trees. The successful retention of trees on any particular site will require the commitment and understanding of all parties involved in the development process. The most important activity, after determining the trees that will be retained is the implementation of a TPZ.

The intention of tree protection zones is to:

- mitigate tree hazards;
- provide adequate root space to sustain the health and aesthetics of the tree into the future;
- minimise changes to the trees growing environment, which is particularly important for mature specimens;
- minimise physical damage to the root system, canopy and trunk; and
- define the physical alignment of the tree protection fencing

### **Tree protection**

The most important consideration for the successful retention of trees is to allow appropriate above and below ground space for the trees to continue to grow. This requires the allocation of tree protection zones for retained trees.

The Australian Standard AS 4970-2009 Protection of trees on development sites has been used as a guide in the allocation of TPZs for the assessed trees. The TPZ for individual trees is calculated based on trunk (stem) diameter (DBH), measured at 1.4 metres up from ground level. The radius of the TPZ is calculated by multiplying the trees DBH by 12. The method provides a TPZ that addresses both the stability and growing requirements of a tree. TPZ distances are measured as a radius from the centre of the trunk at (or near) ground level. The minimum TPZ should be no less than 2m and the maximum no more than 15m radius. The TPZ of palms should be not less than 1.0m outside the crown projection.

Encroachment into the TPZ is permissible under certain circumstances though is dependent on both site conditions and tree characteristics. Minor encroachment, up to 10% of the TPZ, is generally permissible provided encroachment is compensated for by recruitment of an equal area contiguous with the TPZ. Examples are provided in Diagram 1. Encroachment greater than 10% is considered major encroachment under AS4970-2009 and is only permissible if it can be demonstrated that after such encroachment the tree would remain viable.

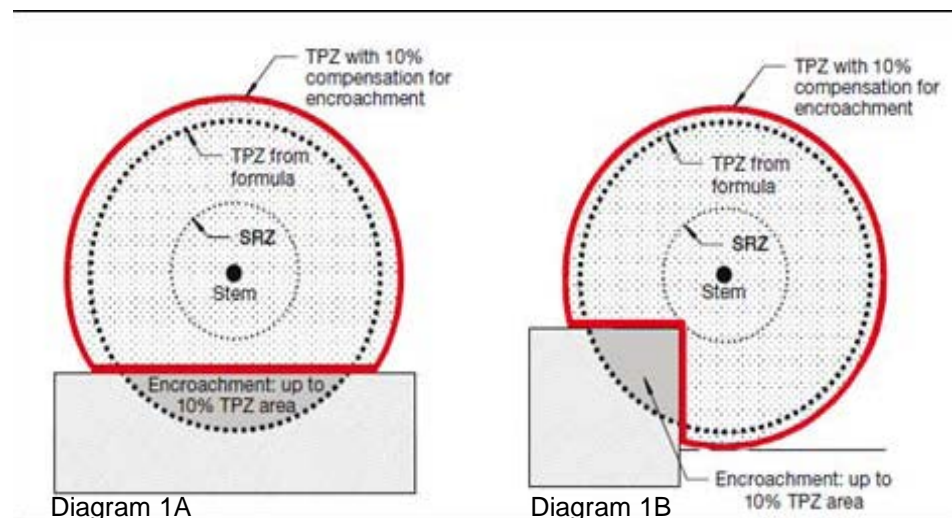


Diagram 1: Examples of minor encroachment into a TPZ.

(Extract from: AS4970-2009, Appendix D, p30 of 32)

The 10% encroachment on one side equates to approximately  $\frac{1}{3}$  radial distance. Tree root growth is opportunistic and occurs where the essentials to life (primarily air and water) are present. Heterogeneous soil conditions, existing barriers, hard surfaces and buildings may have inhibited the development of a symmetrically radiating root system.

Existing infrastructure around some trees may be within the TPZ or root plate radius. The roots of some trees may have grown in response to the site conditions and therefore if existing hard surfaces and building alignments are utilised in new designs the impacts on the trees should be minimal. The most reliable way to estimate root disturbance is to find out where the roots are in relation to the demolition, excavation or construction works that will take place (Matheny & Clark, 1998). Exploratory excavation prior to commencement of construction can help establish the extent of the root system and where it may be appropriate to excavate or build.

The TPZ should also give consideration to the canopy and overall form of the tree. If the canopy requires severe pruning in order to accommodate a building and in the process the form of the tree is diminished it may be worthwhile considering altering the design or removing the tree.

### **General tree protection guidelines**

The most important factors are:

- Prior to construction works the trees nominated for tree works should be pruned to remove larger dead wood. Pruning works may also identify other tree hazards that require remedial works.
- Installation of tree protection fencing. Once the tree protection zones have been determined the next step is to mulch the zone with woodchip and erect tree protection fencing. This must be completed prior to any materials being brought on-site, erection of temporary site facilities or demolition/earth works. The protection fencing must be sturdy and withstand winds and construction impacts. The protection fence should only be moved with approval of the site supervisor. Other root zone protection methods can be incorporated if the TPZ area needs to be traversed.
- Appropriate signage is to be fixed to the fencing to alert people as to importance of the tree protection zone.
- The importance of tree preservation must be communicated to all relevant parties involved with the site.
- Inspection of trees during excavation works.

### **Exploratory excavation**

The most reliable way to estimate root disturbance is to find out where the roots are in relation to the demolition, excavation or construction works that will take place (Matheny & Clark, 1998).

Exploratory excavation prior to commencement of construction can help establish the extent of the root system and where it may be appropriate to excavate or build. This also allows management decisions to be made and allows time for redesign works if required.

Any exploratory excavation within the allocated TPZ is to be undertaken with due care of the roots. Minor exploration is possible with hand tools. More extensive exploration may require the use of high pressure water or air excavation techniques. Either hydraulic or pneumatic excavation techniques will safely expose tree roots; both have specific benefits dependent on the situation and soil type. An arborist is to be consulted on which system is best suited for the site conditions.

Substantial roots are to be exposed and left intact.

Once roots are exposed decisions can be made regarding the management of the tree. Decisions will be dependent on the tree species, its condition, its age, its relative tolerance to root loss, and the amount of root system exposed and requiring pruning.

Other alternative measures to encroaching the TPZ may include boring or tunnelling.

### **How to determine the diameter of a substantial root**

The size of a substantial root will vary according to the distance of the exposed root to the trunk of the tree. The further away from the trunk of a tree that a root is, the less significant the root is likely to be to the tree's health and stability.

The determination of what is a substantial root is often difficult because the form, depth and spread of roots will vary between species and sites. However, because smaller roots are connected to larger roots in a framework, there can be no doubt that if larger roots are

severed, the smaller roots attached to them will die. Therefore, the larger the root, the more significant it may be.

Gilman (1997) suggests that trees may contain 4-11 major lateral roots and that the five largest lateral roots account (act as a conduit) for 75% of the total root system. These large lateral roots quickly taper within a distance to the tree, this distance is identified as the Structural Root Zone (SRZ). Within the SRZ distance, all roots and the soil surrounding the roots are deemed significant.

No root or soil disturbance is permitted within the SRZ.

In the area outside the SRZ the tree may tolerate the loss of one or a number of roots. The table below indicates the size of tree roots, outside the SRZ that would be deemed substantial for various tree heights. The assessment of combined root loss within the TPZ would need to be undertaken by an arborist on an individual basis because the location of the tree, its condition and environment would need to be assessed.

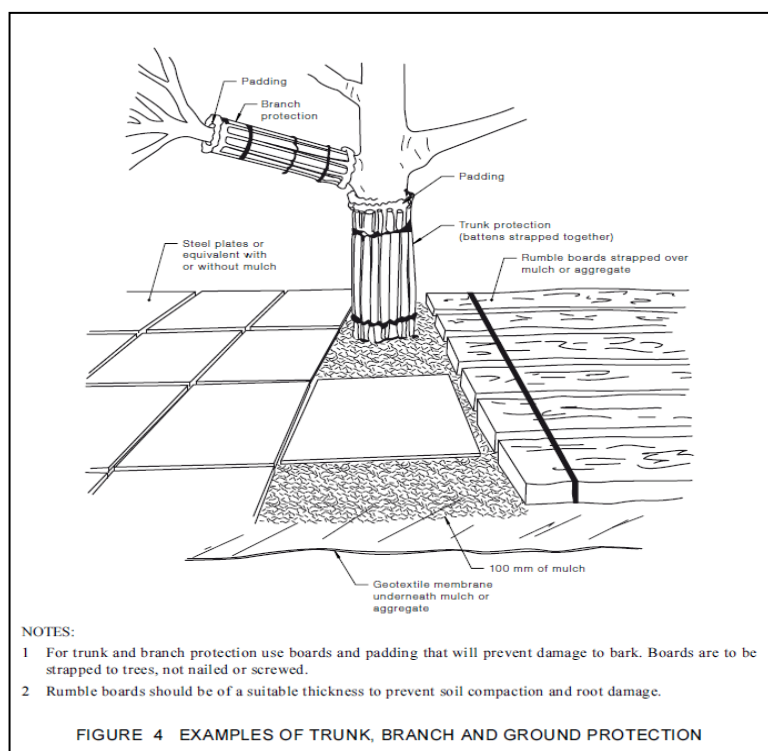
Table 1: Estimated significant root sizes outside SRZ

Height of tree	Diameter of root
Less than 5m	≥ 30mm
Between 5m - 15m	≥ 50mm
More than 15m	≥ 70mm

### Ground buffering

Where works are required to be undertaken within the Tree root zone without penetration of the surface, ground buffering and trunk and limb protection must be provided to minimise the potential for soil to become compacted and avoid potential for impact wounds to occur to surface roots, trunk or limbs. Refer below.

Diagram 2: Examples of ground buffering and trunk and limb protection.



(Extract from: AS4970-2009, Appendix D, pg17)

## Construction Guidelines

The following are guidelines that must be implemented to minimise the impact of the proposed construction works on the retained trees.

- The Tree Protection Zone (TPZ) is fenced and clearly marked at all times. The actual fence specifications should be a minimum of 1.2 - 1.5 metres of chain mesh or like fence with 1.8 meter posts (e.g. treated pine or star pickets) or like support every 3-4 metres and a top line of high visibility plastic hazard tape. The posts should be strong enough to sustain knocks from on site excavation equipment. This fence will deter the placement of building materials, entry of heavy equipment and vehicles and also the entry of workers and/or the public into the TPZ. Note: There are many different variations on the construction type and material used for TPZ fences, suffice to say that the fence should satisfy the responsible authority.
- Contractors and site workers should receive written and verbal instruction as to the importance of tree protection and preservation within the site. Successful tree preservation occurs when there is a commitment from all relevant parties involved in designing, constructing and managing a development project. Members of the project team need to interact with each other to minimise the impacts to the trees, either through design decisions or construction practices. The importance of tree preservation must be communicated to all relevant parties involved with the site.
- The consultant arborist is on-site to supervise excavation works around the existing trees where the TPZ will be encroached.
- A layer of organic mulch (woodchips) to a depth of no more than 100mm should be placed over the root systems within the TPZ of trees, which are to be retained so as to assist with moisture retention and to reduce the impact of compaction.
- No persons, vehicles or machinery to enter the TPZ without the consent of the consulting arborist or site manager.
- Where machinery is required to operate inside the TPZ it must be a small skid drive machine (i.e Dingo or similar) operating only forwards and backwards in a radial direction facing the tree trunk and not altering direction whilst inside the TPZ to avoid damaging, compacting or scuffing the roots.
- Any underground service installations within the allocated TPZ should be bored and utility authorities should common trench where possible.
- No fuel, oil dumps or chemicals shall be allowed in or stored on the TPZ and the servicing and re-fuelling of equipment and vehicles should be carried out away from the root zones.
- No storage of material, equipment or temporary building should take place over the root zone of any tree.
- Nothing whatsoever should be attached to any tree including temporary services wires, nails, screws or any other fixing device.
- Supplementary watering should be provided to all trees through any dry periods during and after the construction process. Proper watering is the most important maintenance task in terms of successfully retaining the designated trees. The areas under the canopy drip lines should be mulched with woodchip to a depth of no more than 100mm. The mulch will help maintain soil moisture levels. Testing with a soil probe in a number

of locations around the tree will help ascertain soil moisture levels and requirements to irrigate. Water needs to be applied slowly to avoid runoff. A daily watering with 5 litres of water for every 30 mm of trunk calliper may provide the most even soil moisture level for roots (Watson & Himelick, 1997), however light frequent irrigations should be avoided. Irrigation should wet the entire root zone and be allowed to dry out prior to another application. Watering should continue from October until April.

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