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For

Nation Partners

Site location

Northern Sewers Relining Project Southern Section

Report type

Construction Impact Report

Prepared by

Nicole Vickridge

Graduate Certificate of Arboriculture
Bachelor of Applied Science (Planning) Hons.

Wednesday 4th December 2024

Ref: 7494 241204 CIR NP South Section Northern Sewer Renewal Project.Docx

This report has been condensed and edited to remove information relating to the Banyule City Council. The remaining contents are information relevant to the Yarra City Council only.

1. Summary

This report was commissioned by Nation Partners to assess the condition of 630 trees located in close proximity to the maintenance holes (and proposed access routes to these assets) along the southern section of the northern pipeline. This report documents the tree removal and pruning required to create adequate clearance to allow access and maintenance works to be undertaken - *while minimising arboricultural impacts and tree losses.*

This report has been prepared based on access requirements across the site as proposed by the works contractor. Pruning will be required in several locations to enable vehicle access to the works areas and tree removal will be required where trees prevent access to the maintenance hole.

In summary:

1. Sixty-two trees are required to be removed.
    a. Forty-five of these trees require a planning permit for removal.
    b. The other trees are either smaller than the specified sizes that trigger a permit for removal (in terms of height and/or girth) and/or identified weed species.
2. Under the provisions of Significant Landscape Overlay – Schedule 1 within the City of Banyule all native vegetation requires a permit for removal.
    a. Within this report three patches of smaller / immature vegetation (polygons 1, 2 and 3) were identified as comprising native vegetation (adjacent to NYM091).
        i. A permit is required for the removal of this vegetation.
3. Of the 45 trees that require a planning permit for removal four have a retention value of high (Trees 331, 392, 393 and 394) and three have a retention value of moderate (330, 381 and 391). All other trees that require a planning permit for removal have a retention value of low, very low or remove.
4. Sixty-seven trees require pruning for access.
    a. The required pruning will remove less than 15% of the canopy volume of each individual tree.
        i. The only exception is the pruning of Tree 626 which will result in approximately 25% canopy loss. Provided the pruning works are undertaken in accordance with AS 4373 - 2007 Pruning of Amenity Trees, Tree 626 is likely to remain viable.
5. Given the transient nature of the works establishing Tree Protection Measures in accordance with AS 4970 - 2009 Protection of trees on development sites is neither required nor appropriate.
    a. In most locations this report specifies ground protection (Trakmat or similar rather than tree protection fencing) where vehicle movement is required within Tree Protection Zones (TPZ) of trees shown as retained.
    b. Other tree protection measures (including Tree Protection Fencing) are specified, as appropriate to each Maintenance Hole).

2. Document control

File reference	File type	Modifications	Author	Date
7494 231121	*CIR*	1st issue Construction impact assessment for 552 trees	NLV	21/11/2023
7494 240315	*CIR*	2nd Issue Construction impact assessment for 575 trees Revisions to access tracks (NYM078 and NYM091) and client feedback on the 1st Construction Impact Report.	NLV	15th March 2024
7494 240408	*CIR*	3rd Issue Construction impact assessment for 575 trees Minor revisions based on client feedback	NLV	8th April 2024
7494 240408	*CIR*	4th Issue Construction impact assessment for 576 trees. Updated to show Trees 516 and 546 from Canopy lift to 'no action'. One new tree (Tree 660) added on the by-pass route shown as 'Canopy lift'.	NLV	23rd May 2024

File reference	File type	Modifications	Author	Date
7494 240826	*CIR*	5th Issue Construction impact assessment for 630 trees. Updated to include assessment of additional trees contained with the Ecology Heritage report Final Report '*Biodiversity Assessment for North Yarra Main Sewer Rehabilitation Project – Stage 2,* May 2024'. Construction Impact Reporting added for NYM095 and NYM101 (due to proximity to trees in Ecology Heritage and Partners Report). NOTE: There are no tree removals or works associated with these Maintenance holes. Inclusion of trees adjacent to NYM094 in the NYM093 Tree summary data (which was omitted from this table in error). Other minor corrections, including the correction of spelling and inclusion of a scale bar on maps.	NLV	26th August 2024
7494 241204	*CIR*	6th Issue – this document Construction impact assessment for 630 trees. Updated based on information from the client that the contractor requires the removal of Trees 381, 390, 391 and 392 AND Amended maps to show updated work areas and access to MYN078 and NYM091, and the location of the temporary crane pad.	NLV	4th December 2024

3. Introduction

This report was commissioned by Nation Partners to assess the condition of 630 trees between the sewer maintenance holes NYM078 and NYM112 and the sewer diversion access along the Yarra River bike path between maintenance holes NYM105 and NYM112 and evaluate the impacts on these trees arising from the proposed works to reline the sewer in this location.

This will involve the heavy vehicles traversing and being located within Tree Protection Zones (TPZ) for many of the trees identified in this report.

The entire proposed project extends from Heidelberg in the North to Alphington to the South West. This (southern) section runs from the Yarra Flats Park in Ivanhoe East to the LaTrobe Golf Course in Alphington.

The proposed access tracks for this project have been significantly redesigned since the first walk over of the site conducted with Nation Partners in February 2023.

Specifically, the report addresses the following issues:

- The health and structural condition of the trees.
- The suitability of these trees for retention on the site in light of the proposed works.
- The impact of any proposed pruning of these trees.
- Recommendations for the protection of these trees.

This report is based, in part, on the plans provided and the accuracy of these plans is assumed. Inaccuracies in the plans provided may invalidate all or parts of this report.

Roger Greenwood and Nicole Vickridge visited the site on 27th February 2023 as part of a walkover conducted with the client.

Roger Greenwood inspected parts of the site on the following dates:

- 25th to 27th July 2023; and
- 1st and 2nd August 2023.

Nicole Vickridge inspected parts of the site on the following dates:

- 12th and 13th October 2023;
- 14th November 2023;
- 20th February 2024; and
- 23rd May 2024 (Tree 660 only).
- 13th and 19th of August 2024 (Trees 661 to 715 only).

4. Documents reviewed

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

Date	Title	Author	Company
08/08/2023	Preliminary Arboricultural Report for 499 trees.	RGG	Greenwood Consulting
Not dated	Spatial files providing the location of the Melbourne Water assets in the works area.	Not stated	Not stated
17 November 2023	North Yarra Main Impact Area – Indicative UV Lining Set Up MEG250-14_North_Yarra_Main (Rev F)	Not stated	KBR
6 November 2023	Planning Permit P607/2023 For the *'removal and lopping of trees and other works associated with the upgrade of a minor utility installation (sewer upgrade)'* at 1 Beverley Road, HEIDELBERG (Heidelberg Park), 340-680 The Boulevard, IVANHOE EAST (Yarra Flats) and adjoining road reserves.	n/a	Banyule City Council
Provided 13 March 2024	Updated spatial files providing the location of the Melbourne Water assets in the works area.	Not stated	KBR
2006	*'Banyule Weed Management Strategy'**	Not stated	Banyule City Council
Final 9/5/2024	Final Report Biodiversity Assessment for North Yarra Main Sewer Rehabilitation Project – Stage 2 Prepared for Melbourne Water	Not stated	Ecology Heritage and Partners
2nd July 2024	Proposal: Lopping and removal of trees and native vegetation associated with minor utility installation (sewer upgrades) Address: multiple land parcels spanning different tenures within Banyule Letter Ref: P498/2024	Erin Baldwin	Department of Energy, Environment and Climate Action
Provided 19th August 2024	Updated spatial files providing the location access and works areas.	Not stated	KBR
Provided via e-mail 25th November 2024	Confirmation contractors require removal of trees 381, 390, 391 and 392.	Adrian Yeung	KBR
Provided 27th November 2024	Updated spatial files providing the location access and works areas (specifically NYM078 and NYM091).	Not stated	KBR

Date	Title	Author	Company
Provided via e-mail 2nd December 2024	Information on the proposed crane and crane pad (Darebin Creek Crossing adjacent to NYM078 and NYM091)	Adrian Yeung	KBR

** Banyule City Council adopted a new Weed Management Strategy in February 2022. However, it is the 2006 strategy that is referenced in the Planning Scheme, in terms of weed species that are exempt from a planning permit.*

5. Scope

1. The scope of this report was informed by the study areas and associated notes provided by Nation Partners. Significant trees were assessed within these areas as required. Large trees adjacent to these areas were also assessed where it was thought likely that they might reasonably be impact by the proposed works and access to the maintenance holes.
2. This report provides an arboricultural assessment of all significant trees in close proximity to the maintenance holes and proposed access routes - as identified during the site walk through on 12th to 13th October 2023, and shown on the plans in this report. This report documents the likely tree removal and pruning required to create adequate clearance to allow access and maintenance works to be undertaken, while minimising arboricultural impacts and tree losses.
3. Significant vegetation is broadly defined as being trees larger than 5 metres in height and/or with a DBH (Diameter at Breast Height) of greater that 15cm.
    a. Following a site walk over on 20th February 2024 this report identifies four patches of smaller / immature vegetation (polygons 1 to 4) that were identified as being required to be removed to enable access to the maintenance hole. The assessment was limited to woody vegetation only and does not include any grasses.
4. The scope was amended in August 2024 to include the assessment of 54 additional trees captured in the Ecology Heritage and Partners report *'Final Report Biodiversity Assessment for North Yarra Main Sewer Rehabilitation Project – Stage 2, May 2024'.*
    a. There are 55 additional trees within the Ecology Heritage and Partners report. Only 54 trees were assessed, Tree EHP31 was not found at the coordinates or address provided.

6. Site context

This site is located within The City of Yarra (maintenance hole NYM078) and The City of Banyule (all other maintenance holes).

6.1. City of Yarra

The following control applies at NYM078:

1. Environmental Significance Overlay – Schedule 3

6.2. City of Banyule

The following controls (relevant to vegetation pruning and removal) apply to various locations across the study area within the City of Banyule:

1. Environmental Significance Overlay – Schedule 1 and Schedule 4
2. Vegetation Protection Overlay – Schedule 3
3. Significant Landscape Overlay – Schedule 1
4. Heritage Overlay

The specific overlays are listed within the report as relevant to each maintenance hole location.

7. Assumptions

1. We understand that the relining process will require a large vacuum truck to clear the sewer and then a large relining truck to be positioned on the upstream side of selected maintenance holes. Heavy vehicle access may not be required to all maintenance holes and that some maintenance holes might be serviced by light vehicles only.
    a. Trees have generally been assessed where it is likely that tree removal or pruning might reasonably be required to allow the works to be undertaken.
    b. Tree removal will be required where trees prevent access to the maintenance hole. Where possible larger vehicles will be oriented at an angle to the sewer alignment to avoid significant tree removal.
    c. Access pruning will be required at several maintenance holes and along access routes to enable heavy vehicle access to the maintenance holes.
        i. The precise location of several access tracks has not been determined.
2. A temporary crane pad will be constructed between NYM078 and Darebin Creek.
3. Tree assessment was undertaken using sub metre Global Positioning Systems (GPS) with a nominal horizontal accuracy of ± 1 metre.
    a. However, in difficult GPS conditions it is likely that accuracies of ± 2 – 4 metres may be the best that can be achieved.
4. Given the transient nature of the works (in particular the access tracks) establishing Tree Protection Measures in accordance with AS 4970 - 2009 Protection of trees on development sites is neither required nor appropriate.
    a. In most locations this report specifies ground protection (Trakmat or similar rather than tree protection fencing) where vehicle movement is required within Tree Protection Zones (TPZ) of trees shown as retained.
    b. Other tree protection measures (including some Tree Protection Fencing) are specified, as appropriate to each site.
    c. Bunting style tree protection zone / access track delineation may be required in some situations.

Contents relating to the Banyule City Council removed.

14. NYM078 8 Farm Road, Alphington (LaTrobe Golf Club)

NYM078 is located in the City of Yarra, at the LaTrobe Golf Club (8 Farm Road, Alphington). **This is the only site within this report that is outside the City of Banyule.**

Twenty-one trees (Trees 601 to 605 and 682 and 683) were assessed at this location and along the proposed access between this maintenance hole and NYM091 (which is located on the other side of Darebin Creek in the City of Banyule).

The following control applies in this location:

1. Environmental Significance Overlay – Schedule 3

14.1. NYM078 Site Plan

14.2. NYM078 Tree summary data

This table contains a summary of data pertaining to all trees shown and numbered on the enclosed feature and levels survey.

Underlined and italicised species names have not been assessed. Generally these trees are <5m tall, not found or stumps. The construction impact values are blank for these records.

1. **Retention value**: The retention value of the tree to the site.
    a. Tree number and species name are **Bold** for High and Very high values trees.
2. **Retained?:** Indicates whether the tree is proposed to be retained on the site.
3. **Construction impact:** Indicates the impact of the proposed development on the tree.
    a. **None:** Works do not intrude onto the tree's TPZ.
    b. **Low:** Construction intrusion is less than 10% of TPZ and contiguous area exists to compensate for any loss.
    c. **Moderate:** Construction intrusion exceeds 10% of TPZ but construction methods or other factors make tree retention possible.
    d. **High:** Construction intrusion is excessive and tree retention is generally considered not possible within the development as currently proposed.
    e. **Blank:** The tree has not been assessed.
4. **Location:** Whether the tree is located on the site or adjacent to the site.
    a. **Site:** the tree is located on the site.
    b. **Off site:** the tree is located on land adjoining the site.
        i. Trees in this category should generally be preserved without significant impact.

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
601	Eucalyptus botryoides	Low	Removed	High	Site	1.6	2	7/47
602	Eucalyptus botryoides	Low	Removed	High	Site	1.6	2	5/38
603	Eucalyptus botryoides	Very low	Removed	High	Site	1.6	2	4/25
604	**Eucalyptus sp.**	Very high	Retained	Moderate	Site	3	8.9	17/233
605	**Eucalyptus sp.**	High	Retained	Moderate	Site	2.4	4.8	14/126
638	Eucalyptus sp.	Very low	Removed	High	Site	1.6	2	4/9
639	Eucalyptus sp.	Very low	Removed	High	Site	1.6	2	3/9
640	Eucalyptus sp.	Very low	Removed	High	Site	1.6	2	3/16
641	Eucalyptus sp.	Very low	Removed	High	Site	1.6	2	3/16
642	Eucalyptus sp.	Very low	Removed	High	Site	1.6	2	3/16
643	Eucalyptus botryoides	Low	Retained	Low	Site	1.6	2	8/41
644	Eucalyptus sp.	Very low	Removed	High	Site	1.6	2	2/6
645	Eucalyptus sp.	Low	Retained	Low	Site	1.6	2	5/25
646	Unknown sp.	Very low	Removed	High	Site	1.6	2	4/19
647	Unknown sp.	Very low	Removed	High	Site	1.6	2	4/22

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
648	**Eucalyptus sp.**	High	Retained	Moderate	Site	2.5	5.4	20/141
649	Acacia melanoxylon	Very low	Removed	High	Site	1.6	2	4/16
650	Acacia melanoxylon	Very low	Removed	High	Site	1.6	2	4/16
651	Acacia melanoxylon	Very low	Removed	High	Site	1.6	2	4/16
682	**Eucalyptus camaldulensis**	High	Retained	None	Site	3.3	10.2	18/267
683	**Eucalyptus camaldulensis**	Very high	Retained	None	Site	3.7	13.8	22/361

Total number of tree/s referred to in this report(Total): 21

14.3. NYM078 Works and Impact on Trees

There are two access tracks to NYM078. Via Farm Road and the LaTrobe Golf Club, and along the Darebin Creek Shared path.

Pruning and tree removal will be required for access to NYM078 where trees prevent access to the maintenance hole. Works to provide access between NYM078 to NYM091 (located on the other side of Darebin Creek in the City of Banyule) include pruning and removal of trees adjacent to the Darebin Creek Trail. A temporary crane pad will be constructed to provide access between these two maintenance holes.

Action	**Type**	**Notes**
Vehicular access	Various large trucks	
TPZ intrusion	Yes	The impact on Trees 604, 605 and 648 has been documented as moderate based on the proximity of these trees to the location of the temporary crane pad. Construction of the temporary crane pad must be completed under the supervision of the project arborist.
Ground protection	Required.	1. Along all unpaved access tracks within the LaTrobe Golf Course. Access tracks within the golf course must be clearly delineated. 2. Within the TPZ of trees 604, 605 and 648.
Tree protection fencing	Yes 1. Trees 604, 605 and 648 2. Tree 683 (EHP Tree 90)	1. Tree protection fencing to be erected for Trees 604, 605 and 648 within the works area. The fencing should include as large an area as possible based on the location and construction techniques associated with the temporary crane pad. This fencing must be erected under the supervision of the project arborist. 2. Tree protection fencing to be erected for Tree 683 (EHP90) within the works area. The TPZ fencing should be erected adjacent to the existing gravel access track.
Tree removal	Yes	Trees 601, 602, 603, 638, 639, 640, 641, 642, 644, 646, 647, 649, 650 and 651.
Permit required for removal?	Yes	Trees 601 and 602
Tree pruning	Yes	Tree 604, 605, 643 and 645.

Action	Type	Notes
Permit required for pruning?	Yes	Tree 604, 605, 643 and 645.

The removal of 14 Trees (Trees 601, 602, 603, 638, 639, 640, 641, 642, 644, 646, 647, 649, 650 and 651) is required for access to NYM078.

The requirement for a permit to remove, destroy or lop vegetation does not apply to trees with a single trunk circumference of less than 0.35 meters; and which is less than 6 metres high. Therefore a permit is not required to remove:

1. Tree 603 which is 4 metres high with a truck circumference of 25cm
2. Tree 638 which is 4 metres high with a trunk circumference of 9cm
3. Tree 639 which is 3 metres high with a trunk circumference of 9cm
4. Tree 640 which is 3 metres high with a trunk circumference of 16cm
5. Trees 641 which is 3 metres high with a trunk circumference of 16cm
6. Trees 642 which is 3 metres high with a trunk circumference of 16cm
7. Tree 644 which is 2 metres high with a trunk circumference of 6cm
8. Tree 646 which is 4 metres high with a trunk circumference of 6cm
9. Tree 647 which is 4 metres high with a trunk circumference of 7cm
10. Tree 649 which is 4 metres high with a trunk circumference of 5cm
11. Tree 650 which is 4 metres high with a trunk circumference of 5cm
12. Tree 651 which is 4 metres high with a trunk circumference of 5cm

A permit is required to remove Trees 601 and 602.

The pruning of four Trees (Trees 604, 605, 643 and 645) is required to enable access between this maintenance hole (NYM078) and NYM091 (which is located on the other side of Darebin Creek in the City of Banyule).

Figure 1 Indicative location of temporary crane pad, adjacent to Darebin Creek.

	
NYM078 Tree 604 pruning	**NYM078 Tree 605 pruning**

	
NYM078 Tree 643 pruning	**NYM078 Tree 645 pruning**

Figure 2 NYM078 Pruning (City of Yarra)

The removal of these branches from each of these four trees will remove less than 15% of the canopy volume of each individual tree. Provided that the pruning works are undertaken in accordance with *AS 4373 - 2007 Pruning of Amenity Trees*, it will have little or no impact on the health or longevity of the two individual trees.

Contents relating to the Banyule City Council removed.

32. Recommendations

1. The findings for this report should be verified with the principal contractor for this project.
2. A Tree Management Plan should be created for this site to inform tree management guide construction within the Tree Protection Zones for retained trees across this project once a more detailed understanding of the vehicular movements.
3. Tree pruning to AS 4373 Pruning of Amenity Trees specifies that internodal pruning should be avoided if possible.
    a. Accordingly, tree pruning should be undertaken back to the nearest branch union.
    b. Where trees are located on adjoining properties this means that the pruning cuts may need to be made back beyond the property boundary.
4. The required pruning works must be undertaken by qualified arborists and in accordance with AS 4373 - 2007 Pruning of Amenity Trees.
5. Generally ground protection (Trakmat or similar) will be required where heavy vehicle movement is required within Tree Protection Zones (TPZ).
    a. Tree Protection fencing is generally not necessary, except where specified.
6. Appropriate ground protection measures within the laydown areas must be detailed in the Tree Management Plan
7. Bunting style tree protection zone / access track delineation may be appropriate in some situations, where the access track/ Tree Protection Zone is required to be delineated.

33. References

Coder, K.D 1996, Construction Damage Assessments, University of Georgia. http://www.forestry.uga.edu/warnell/service/library/for96-039a/index.html

Harris, R.W., Clark, J.R. & Matheny, N.P. 2004, *Arboriculture: Integrated management of landscape trees, shrubs and vines,* 4th edn., Prentice Hall, New Jersey, USA.

Hitchmough, J. D. 1994, *Urban Landscape Management*, Inkata Press, Chatswood, NSW.

Society for Growing Australian Plants Maroondah, 1991, *Flora of Melbourne*, *a guide to the indigenous plants of the greater Melbourne area,* Society for Growing Australian Plants, Maroondah.

Mattheck, C., Bethge, K. & Weber, K., 2015, *The body language of trees*, Karlsruhe Institute of Technology – Campus North, KS Druck GmbH, Germany.

Standards Australia, 2009, *AS 4970 - 2009 Protection of trees on development sites*, Standards Australia, Sydney.

34. Appendix 1 - Tree protection guidelines

The following tree protection guidelines should be observed as appropriate. Where it is not possible to comply with these recommendations alternative arrangements should be decided with a qualified arborist.

1. A site-specific Tree Protection Report should be commissioned prior to the commencement of construction to guide construction activity around any retained trees on or adjacent to the site.
2. Clearly marked as being retained on the site to avoid confusion during the tree removal phase.
3. The stumps of removed trees should be ground out rather than pulled to avoid injury to adjacent trees.
4. Construction specifications should include the plan location of those trees that are to be retained.
5. Penalties should be included in the construction specifications for damage to trees that are to be retained.
6. The trees to be retained should be enclosed with a 1.8 meter high chain link fence supported on steel posts driven 0.6 meters into the ground.

    6.1. Tree protection fencing should be established as shown.

        6.1.1. If tree protection fencing is not detailed in the report it should enclose, at a minimum, the entire **Structural Root Zone** and as much of the **Tree Protection Zone** as possible.

    6.2. Access should be provided by a single gate that should be kept locked at all times except when required for tree inspection or maintenance.

    6.3. Tree protection fencing should be installed following the removal of trees and prior to any other works being commenced.

    6.4. The area inside the fence should be mulched to a depth of 0.15 meters with general arboricultural wood chip mulch or similar.

7. Where construction clearance is required and areas of the Tree Protection Zone cannot be fenced the ground in these areas should be protected from compaction with **Ground Protection.**

    7.1. **Ground Protection** can consist of any constructed platform that prevents point loads on the soil within the Tree Protection Zone. These could include:

        7.1.1. Industrial pallets joined together to form a platform.

        7.1.2. 12 mm plywood joined together to form a platform.

        7.1.3. Planks of timber joined together to form a platform.

    7.2. **Ground Protection** should be constructed with sufficient strength to allow it to survive the entire construction process.

    7.3. **Ground Protection** should be installed following the removal of trees and prior to any other works being commenced.

8. Excavation within the **Structural Root Zone** should be avoided unless absolutely necessary.

    8.1. Any excavation within the **Structural Root Zone** should be performed by hand.

    8.2. Any excavation within or tunnelling under the **Structural Root Zone** should be supervised by a qualified arborist.

    8.3. Any roots encountered from the retained trees should be pruned carefully and cleanly, preferably back to a branch root.

    8.4. Before any roots are pruned the effect of such pruning on the health and structural stability of the tree should be evaluated by a qualified arborist.

9. Excavation within the **Tree Protection Zone** should be avoided where possible.

    9.1. Any excavation within the **Tree Protection Zone** should be performed carefully to minimise root injury.

    9.2. Any roots encountered from the retained trees should be pruned carefully and cleanly, preferably back to a branch root.

    9.3. Before any excavation occurs the effect of such excavation on the health and structural stability of the tree should be evaluated by a qualified arborist.

10. Concrete and other washout or waste disposal areas should be kept well away from trees to be retained.

11. Where automatic irrigation systems are installed the amount of irrigation that is applied should be checked against the requirements of the existing trees on the site.

12. Any pruning works that are required to facilitate construction should be performed by a qualified arborist.

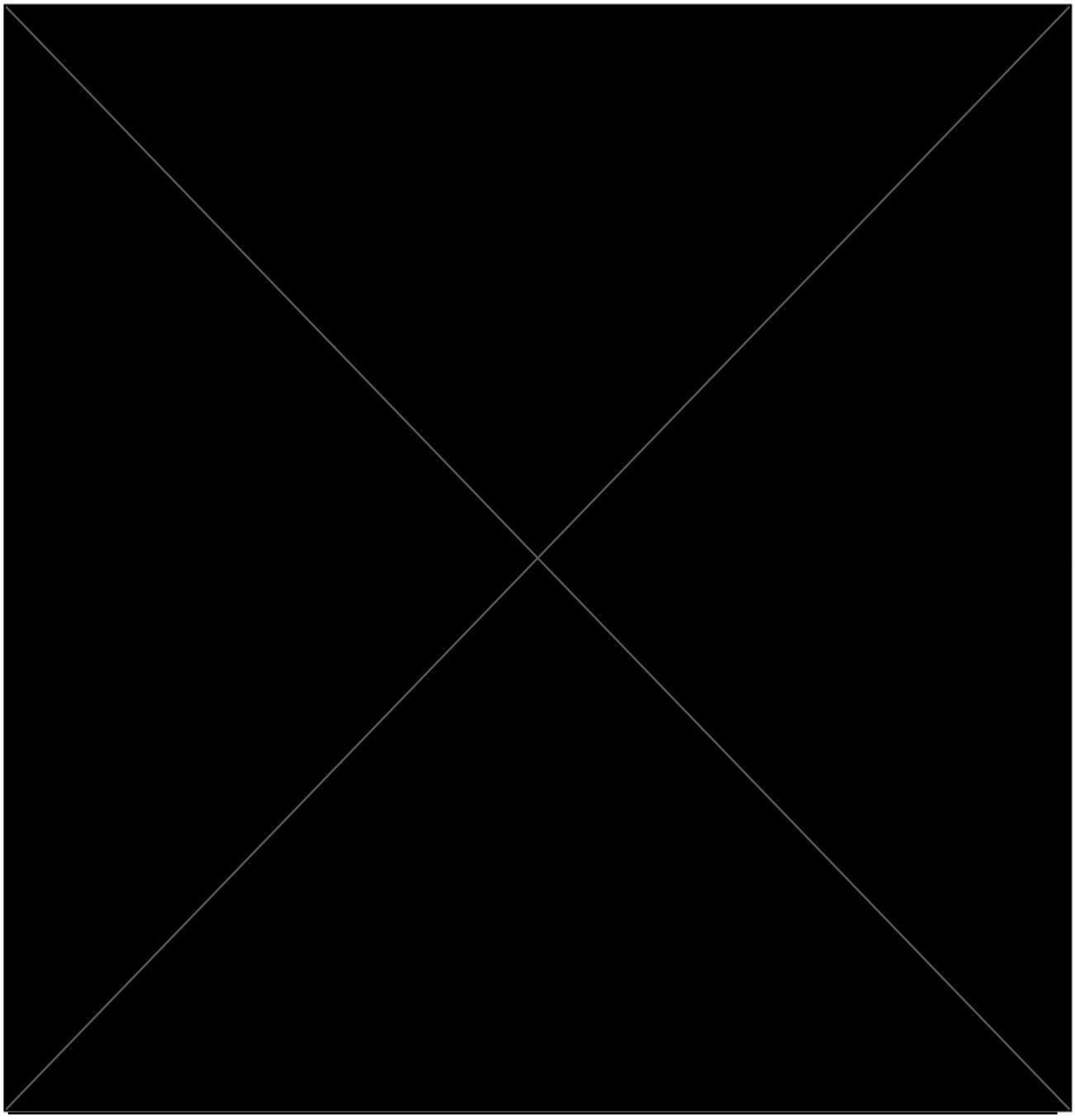
Adapted from Harris, Clark and Matheny (2004)

35. Appendix 2 - Tree data

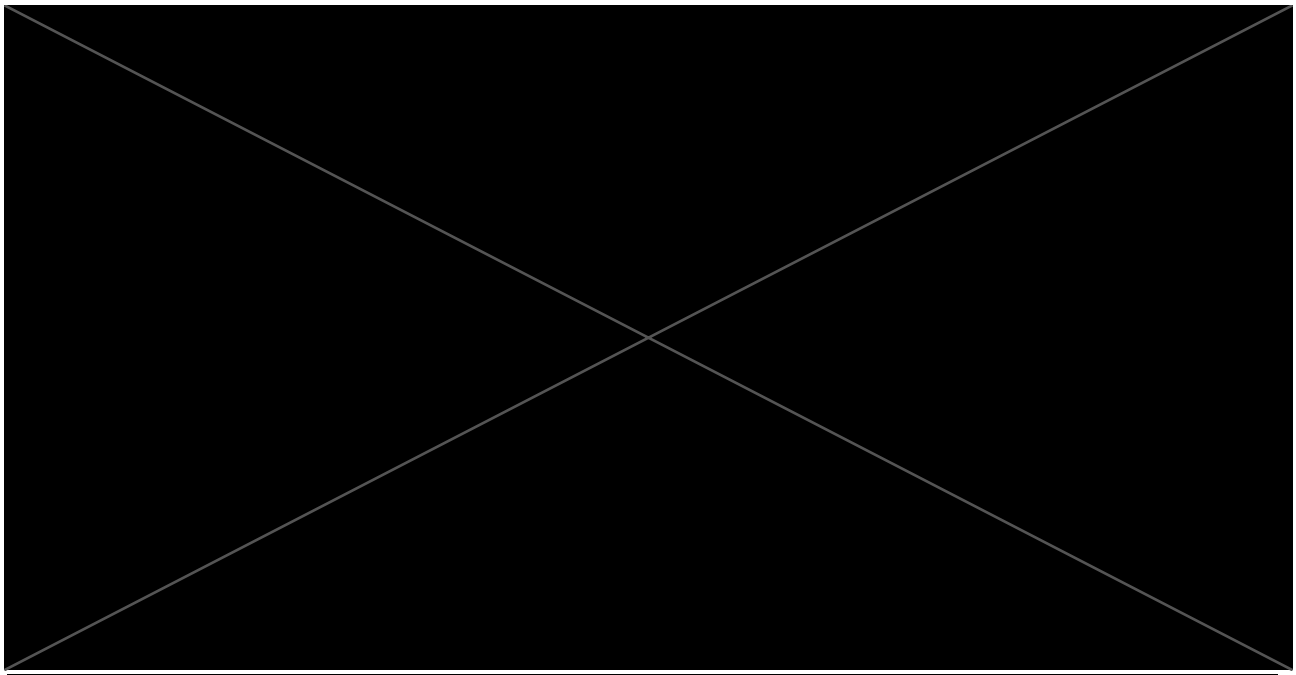
Note: Where **Retention value** = **"Remove"** only the arboricultural attributes of the tree (i.e. health, structure and ULE) are considered. Other factors that may affect the decision to retain or remove the tree are not considered.

- Where the **'Construction Proximity'** is larger than the **'Tree Protection Zone (TPZ)'** it is probable that the development will have **no significant impact on the health and longevity** of the tree.
- Where the **'Construction Proximity'** is larger than the **'Structural Root Zone (SRZ)'** it is probable that the development will have **no significant impact on the stability** of the tree.
- The following information should be read in conjunction with the **'Explanation of Terms'** and the **'Glossary / Notes'** sections found later in this report.

SRZ (m):	AS 4970-2009 Protection of trees on development sites. (Radius)	Total Number of trees
TPZ (m):	AS 4970-2009 Protection of trees on development sites (Radius)	630
mTPZ (m):	Modification to TPZ as required to protect canopy	
Construction Proximity:	0.1 indicates construction over or immediately adjacent to the tree	



Contents relating to the Banyule City Council removed.



Tree ID: **601**

Genus / species: *Eucalyptus botryoides*
Evergreen Southern Mahogany

Height (m):	7	**Structure:**	Good
Width (m):	4	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Immature
Origin:	Victorian	**ULE (years):**	30 - 60
Retained?:	Removed	**Form:**	Good

Retention Value: Low
Removal / retention reason: N/A.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.6*** ***Works priority:*** N/A
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **602**

Genus / species: *Eucalyptus botryoides*
Evergreen Southern Mahogany

Height (m):	5	**Structure:**	Good
Width (m):	3	**Health:**	Good
DBH (cm):	12 Estimated	**Maturity:**	Immature
Origin:	Victorian	**ULE (years):**	30 - 60
Retained?:	Removed	**Form:**	Good

Retention Value: Low
Removal / retention reason: N/A.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.6*** ***Works priority:*** N/A
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **603**

Genus / species: *Eucalyptus botryoides*
Evergreen Southern Mahogany

Height (m):	4	**Structure:**	Good
Width (m):	3	**Health:**	Good
DBH (cm):	8 Estimated	**Maturity:**	Immature
Origin:	Victorian	**ULE (years):**	30 - 60
Retained?:	Removed	**Form:**	Good

Retention Value: Very low
Removal / retention reason: N/A.
Amenity value: Very low
Works Required: N/A.

SRZ (m): ***1.6*** **Works priority:** N/A
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **604**

Genus / species: *Eucalyptus sp.*
Evergreen Gum

Height (m):	17	**Structure:**	Fair
Width (m):	15	**Health:**	Fair
DBH (cm):	74 Measured	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	> 60
Retained?:	Retained	**Form:**	Fair

Retention Value: Very high
Removal / retention reason: N/A.
Amenity value: High
Works Required: Canopy lift.

SRZ (m): ***3*** **Works priority:** Very low
TPZ (m): ***8.9*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **605**

Genus / species: *Eucalyptus sp.*
Evergreen Gum

Height (m):	14	**Structure:**	Fair
Width (m):	10	**Health:**	Fair
DBH (cm):	40 Measured	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	> 60
Retained?:	Retained	**Form:**	Fair

Retention Value: High
Removal / retention reason: N/A.
Amenity value: Moderate
Works Required: Canopy lift.

SRZ (m): ***2.4*** **Works priority:** Very low
TPZ (m): ***4.8*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Contents relating to the Banyule City Council removed.

[redacted]

Tree ID: **638**

Genus / species: *Eucalyptus sp.*

Evergreen Gum

Height (m):	4	**Structure:**	Good
Width (m):	2	**Health:**	Poor
DBH (cm):	3 Measured	**Maturity:**	Immature
Origin:	Australian	**ULE (years):**	5 - 15
Retained?:	Removed	**Form:**	Fair

Retention Value: Very low

Removal / retention reason: N/A.

Amenity value: Very low

Works Required: N/A.

SRZ (m):	***1.6***	**Works priority:**	Very low
TPZ (m):	***2.0***	***Construction Proximity:***	***0.1***
mTPZ (m):			

Tree ID: **639**

Genus / species: *Eucalyptus sp.*
Evergreen Gum
Height (m): 3 **Structure:** Good
Width (m): 2 **Health:** Good
DBH (cm): 3 Measured **Maturity:** Immature
Origin: Australian **ULE (years):** 15 - 30
Retained?: Removed **Form:** Good
Retention Value: Very low
Removal / retention reason: N/A.
Amenity value: Very low
Works Required: N/A.

SRZ (m): ***1.6*** **Works priority:** Very low
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **640**

Genus / species: *Eucalyptus sp.*
Evergreen Gum
Height (m): 3 **Structure:** Fair
Width (m): 3 **Health:** Fair
DBH (cm): 5 Estimated **Maturity:** Immature
Origin: Australian **ULE (years):** 15 - 30
Retained?: Removed **Form:** Fair
Retention Value: Very low
Removal / retention reason: N/A.
Amenity value: Very low
Works Required: N/A.

SRZ (m): ***1.6*** **Works priority:** Very low
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **641**

Genus / species: *Eucalyptus sp.*
Evergreen Gum
Height (m): 3 **Structure:** Fair
Width (m): 3 **Health:** Fair
DBH (cm): 5 Measured **Maturity:** Immature
Origin: Australian **ULE (years):** 15 - 30
Retained?: Removed **Form:** Fair
Retention Value: Very low
Removal / retention reason: N/A.
Amenity value: Very low
Works Required: N/A.

SRZ (m): ***1.6*** **Works priority:** Very low
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **642**

Genus / species: *Eucalyptus sp.*
Evergreen Gum

Height (m):	3	**Structure:**	Fair
Width (m):	1	**Health:**	Good
DBH (cm):	5 Estimated	**Maturity:**	Immature
Origin:	Australian	**ULE (years):**	15 - 30
Retained?:	Removed	**Form:**	Fair

Retention Value: Very low
Removal / retention reason: N/A.
Amenity value: Very low
Works Required: N/A.

SRZ (m): ***1.6*** ***Works priority:*** Very low
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **643**

Genus / species: *Eucalyptus botryoides*
Evergreen Southern Mahogany

Height (m):	8	**Structure:**	Good
Width (m):	5	**Health:**	Good
DBH (cm):	13 Measured	**Maturity:**	Immature
Origin:	Victorian	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: Low
Removal / retention reason: N/A.
Amenity value: Low
Works Required: Canopy lift.

SRZ (m): ***1.6*** ***Works priority:*** Very low
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **644**

Genus / species: *Eucalyptus sp.*
Evergreen Gum

Height (m):	2	**Structure:**	Good
Width (m):	1	**Health:**	Good
DBH (cm):	2 Measured	**Maturity:**	Immature
Origin:	Australian	**ULE (years):**	15 - 30
Retained?:	Removed	**Form:**	Good

Retention Value: Very low
Removal / retention reason: N/A.
Amenity value: Very low
Works Required: N/A.

SRZ (m): ***1.6*** ***Works priority:*** Very low
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **645**

Genus / species: *Eucalyptus sp.*

Evergreen Gum

Height (m): 5 **Structure:** Good
Width (m): 3 **Health:** Good
DBH (cm): 8 Measured **Maturity:** Immature
Origin: Australian **ULE (years):** 15 - 30
Retained?: Retained **Form:** Good
Retention Value: Low
Removal / retention reason: N/A.
Amenity value: Low
Works Required: Canopy lift.

SRZ (m): ***1.6*** **Works priority:** Very low
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **646**

Genus / species: *Unknown sp.*

Unknown Unknown

Height (m): 4 **Structure:** Fair
Width (m): 2 **Health:** Poor
DBH (cm): 6 Measured **Maturity:** Immature
Origin: Unknown **ULE (years):** 5 - 15
Retained?: Removed **Form:** Fair
Retention Value: Very low
Removal / retention reason: N/A.
Amenity value: Very low
Works Required: N/A.

SRZ (m): ***1.6*** **Works priority:** Very low
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **647**

Genus / species: *Unknown sp.*

Unknown Unknown

Height (m): 4 **Structure:** Fair
Width (m): 3 **Health:** Poor
DBH (cm): 7 Estimated **Maturity:** Immature
Origin: Unknown **ULE (years):** 5 - 15
Retained?: Removed **Form:** Fair
Retention Value: Very low
Removal / retention reason: N/A.
Amenity value: Very low
Works Required: N/A.

SRZ (m): ***1.6*** **Works priority:** Very low
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **648**

Genus / species: *Eucalyptus sp.*
Evergreen Gum

Height (m):	20	**Structure:**	Good
Width (m):	8	**Health:**	Good
DBH (cm):	45 Measured	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: High
Removal / retention reason: N/A.
Amenity value: High
Works Required: N/A.

SRZ (m): ***2.5*** **Works priority:** Very low
TPZ (m): ***5.4*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **649**

Genus / species: *Acacia melanoxylon*
Evergreen Blackwood

Height (m):	4	**Structure:**	Good
Width (m):	1	**Health:**	Good
DBH (cm):	5 Measured	**Maturity:**	Immature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Removed	**Form:**	Good

Retention Value: Very low
Removal / retention reason: N/A.
Amenity value: Very low
Works Required: N/A.

SRZ (m): ***1.6*** **Works priority:** Very low
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **650**

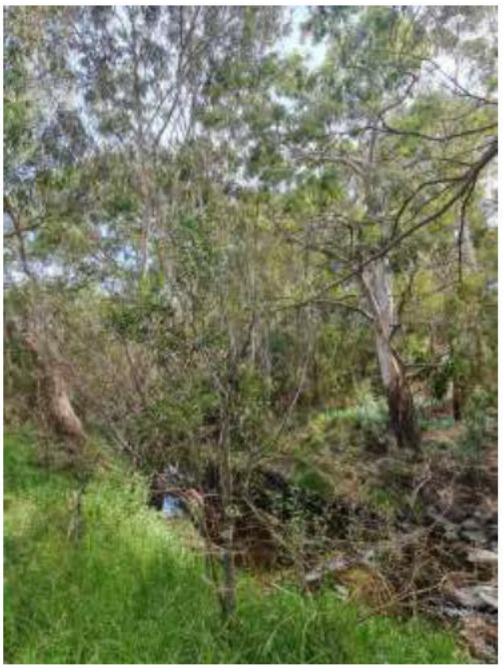
Genus / species: *Acacia melanoxylon*
Evergreen Blackwood

Height (m):	4	**Structure:**	Good
Width (m):	1	**Health:**	Fair
DBH (cm):	5 Measured	**Maturity:**	Immature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Removed	**Form:**	Good

Retention Value: Very low
Removal / retention reason: N/A.
Amenity value: Very low
Works Required: N/A.

SRZ (m): ***1.6*** **Works priority:** Very low
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **651**



Genus / species: *Acacia melanoxylon*

Evergreen Blackwood

Height (m):	4	**Structure:**	Fair
Width (m):	2	**Health:**	Fair
DBH (cm):	5 Measured	**Maturity:**	Immature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Removed	**Form:**	Good

Retention Value: Very low

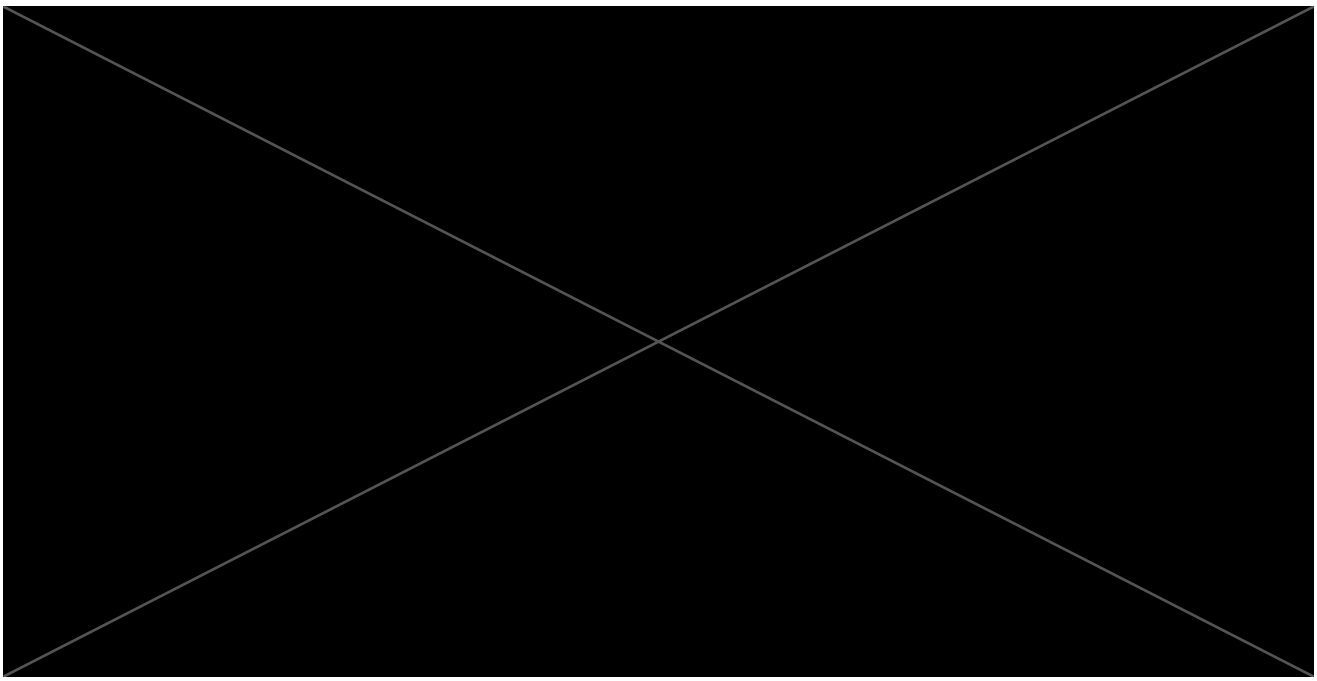
Removal / retention reason: N/A.

Amenity value: Very low

Works Required: N/A.

SRZ (m):	***1.6***	**Works priority:**	Very low
TPZ (m):	***2.0***	***Construction Proximity:***	***0.1***
mTPZ (m):			

Contents relating to the Banyule City Council removed.



Tree ID: 682

Genus / species: *Eucalyptus camaldulensis*
Evergreen River Red Gum

Height (m):	18	**Structure:**	Good
Width (m):	16	**Health:**	Good
DBH (cm):	85 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	> 60
Retained?:	Retained	**Form:**	Good

Retention Value: High
Removal / retention reason: N/A.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): ***3.3*** ***Works priority:*** N/A
TPZ (m): ***10.2*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 683

Genus / species: *Eucalyptus camaldulensis*
Evergreen River Red Gum

Height (m):	22	**Structure:**	Fair
Width (m):	20	**Health:**	Good
DBH (cm):	115 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	> 60
Retained?:	Retained	**Form:**	Good

Retention Value: Very high
Removal / retention reason: N/A.
Amenity value: High
Works Required: N/A.

SRZ (m): ***3.7*** ***Works priority:*** N/A
TPZ (m): ***13.8*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Contents relating to the Banyule City Council removed.

36. Appendix 3 – Arboricultural information

The following sections are presented to provide an introduction to the process of tree root system protection. A trees root system is the critical element to be protected during the development process and if the trees roots are adequately protected then the rest of the tree will generally survive without significant injury.

36.1. Root plate estimation

One of the primary purposes of this report is to estimate the impact of the development on the trees on this site. This is mainly achieved by estimating the extent of the root plate area of the trees that are proposed to be retained and the proportion of this area that is likely to be excised or affected during the construction process.

In this report two elements of the tree root area are described. These are:

36.1.1. Structural Root Zone

This is an estimate of the radius that is likely to encompass the major scaffold roots of the tree. These roots are critical to anchoring the tree and damage to these roots will increase the risk of entire tree failure (i.e. uprooting). This radius is based on AS 4970-2009.

36.1.2. Tree Protection Zone

This is an estimate of the radius that is likely to encompass enough of the smaller absorbing roots to allow the tree to obtain sufficient nutrients and water to allow it to survive in the long term. This is radius is based on AS 4970-2009 and is based on the size of the tree.

Estimation of the likely root plate radius for both methods are based on the DBH (Diameter at Breast Height) of each tree. This is usually measured but where the tree is inaccessible or has numerous trunks a visual estimation may be used. Whether the DBH is estimated or measured is noted within the ”Tree Data” section of the report.

The two elements of each trees’ root zone is transposed over the site survey and building footprint and the degree of root injury is calculated from this.

36.2. Tree rooting patterns

Contrary to common belief, trees usually have a broad flat plate of roots that may extend 1.5 – 3 times the radius of the canopy (Harris, Matheny & Clark, 1999; Coder, 1996; Hitchmough, 1994). Relatively few trees have deep roots and Harris, Matheny and Clark (2004) note that most tree roots will be found in the top 1.0 metre of the soil profile.

While the models used to approximate the size of tree root plates assume a uniformly radial root system, in highly disturbed urban soils root systems often develop in a highly asymmetric manner (Matheny & Clarke, 2004). This may require the modification of the models used where it is likely that the root system is asymmetric.

36.3. Construction impacts

Construction in the vicinity of trees can have several negative impacts on their health, longevity and structural stability. Harris, Matheny and Clark (2004) note that some level of tree root injury or root zone change is almost inevitable during construction around trees and maintain that the goal of tree preservation is to reduce the injury or change to a level that will enable the long term preservation of the retained trees.

Negative impacts can include:

- Root severance from trenching and grading activities. Damage to the transport and absorbing root system may deprive the tree of the ability to absorb nutrients and water and damage to the structural scaffold roots that support the tree may result in instability and uprooting. Depending on the percentage of the root plate affected and proximity to the tree, the affects can range from minor degradation of health through to total root plate failure (i.e. uprooting).
- Compaction and root injury. Most trees require a well aerated and friable soil to allow normal physiological processes to occur and to allow root growth. Soil compaction from pedestrian or vehicular traffic can result in direct injury to the roots, indirect injury through soil drainage changes, reduced soil aeration or decreased soil penetrability. If severe enough soil compaction can lead to a rapid decline in many tree species and may eventually result in instability and uprooting.
- Changes in drainage patterns. Changes in drainage patterns may result from hard surfacing, trenching, land shaping and other construction activities. These can result in either drought stress or waterlogging, both of which can cause a rapid decline in trees and may result in instability and uprooting.

37. Appendix 4 - AS 4970 *-2009*

This report generally conforms to *AS 4970 – 2009 Protection of Trees on Development Sites* except in the following areas.

1. AS 4970 notes that the project arborist should verify the accuracy of feature survey for the subject site.
    a. This is generally not feasible and the feature survey is taken as being an accurate representation of the features of the site.
    b. However if trees are found on the site that are not represented in the feature survey then these trees will be added to the report plans based on a visual estimation of their location.
        i. Accordingly the location of these trees may not be sufficiently accurate for the purposes of the report.
        ii. The location of these trees should verified by a qualified surveyor where appropriate.
2. *AS 4970-2009 Protection of Trees on Development Sites* makes no differentiation between the Tree Protection Zone (TPZ) derived from the trees DBH and the modified TPZ derived from the trees canopy where it extends past the DBH derived TPZ. As the two forms of TPZ are independent a differentiation between the two forms of TPZ needs to be made. In this report:
    a. “TPZ” refers to the DBH derived Tree Protection Zone (12 x DBH) and “mTPZ” pertains to the TPZ where it is modified to account for a canopy that extends beyond the DBH derived TPZ.
    b. The modified Tree Protection Zone (mTPZ) for all trees is taken as being identical to the Tree Protection Zone (TPZ) except where the canopy of the tree extends beyond the TPZ. Where this is the case the TPZ is shown on the site plans and any tree canopy impacts are addressed as required within the report. Otherwise the mTPZ is recorded within this report as “= TPZ”.

38. Appendix 5 - Explanation of terms

The assessment of Health, Structure, Condition, U.L.E. (Useful Life Expectancy), Origin, Maturity, Form and Retention value are based on the following definitions. In the case of health and structure these definitions encompass only the more common indicators for these assessments. Other indicators not included in these definitions may lead to the ascribing of a particular health or structure category.

38.1. Origin

The notation of "Origin" is based on the following categories.

Category	Description
Melbourne	Native to the greater Melbourne metropolitan area as defined by Flora of Melbourne (S. G. A. P. M., 1991).
Victorian	Native to Victoria but not the greater Melbourne Metropolitan area.
Australian	Native to Australia but not Victoria.
Exotic	Not native to Australia.

38.2. Maturity

The notation of "Maturity" is based on the following categories.

Category	Description
Immature	Less than 20% of the life expectancy for that tree.
Mature	20 – 80% of the life expectancy for that tree.
Over mature	> 80% of the life expectancy for that tree.

38.3. Works required

The works required listed in this report are of a general nature only and should be reviewed following the completion of any works on the site.

Where a tree is recommended for removal (Recommendation) it is not listed in the Works required section of the report.

38.4. Priority

The priority accorded particular works is based on a projected increased site usage following the completion of a development on the site. The priority is of a general nature only and should be reviewed following the completion of any works on the site.

“Priority” is based on the following categories.

Category	Description
➢ **N/A.**	No tree works are required
➢ **Very low**	Tree works are optional and could be performed at any time..
➢ **Low**	Works should be performed within five years.
➢ **Moderate**	Works should be performed within 3 years.
➢ **High**	Works should be performed within 12 months.
➢ **Urgent**	Works should be performed immediately.

38.5. Retention value (RV)

The Retention value ascribed to each tree in this report is not definitive and should be used as a guide only. Many factors influence the comparative value of a tree and a number of these factors are outside the scope of arboricultural assessment. These factors cannot therefore be addressed in a single rating system.

Retention value is comprised of two parts. These are the Amenity Value of the tree rated as Very Low to Very high and the Useful Life Expectancy (ULE) of the tree.

The Amenity Value of the tree relates to the contribution of the tree to the aesthetic amenity of the area. The primary determinants of amenity value are tree health, size and form. Amenity value is, to some extent relative and is dependant on the size of the surrounding vegetation. For example a 16 metre tree in suburban Melbourne that exhibits good health would usually be ascribed an amenity value of high while the same tree, in a forest of 50 metre trees, might be ascribed an amenity value of moderate or even low.

The Amenity Value is then modified by the ULE of the tree with short ULE values reducing the RV of the tree and long ULE values increasing the RV of the tree.

Trees that are listed on a register of heritage or significant trees are not accommodated within this rating system as these values are often independent from the arboricultural attributes of the tree. Heritage and significant trees may be ascribed a very low retention value despite their listing on any register. Where known, any heritage or significant register listing it will be noted in the report.

RV is assessed on each tree as a single entity. The value of a group of trees is not considered in this context and each tree within the group will be assessed as an individual.

Amenity value is based on the following categories and is ascribed an Amenity Value Value (AVV) ranging from 2 - 10.

Category	Example	AVV
➢ **Very high**	Generally a very large tree that exhibits excellent health and/or form or a tree that is listed on a heritage or significant tree register. Usually more than 15 metres tall.	10
➢ **High**	Generally a large tree that exhibits good health and/or form. If the tree exhibits good health and structure then generally more than 15 metres tall.	8
➢ **Medium**	Generally a medium tree that exhibits good health and/or form. May be a large tree that exhibits fair health and/or form. If the tree exhibits good health and structure then generally between 10 & 15 metres tall.	6
➢ **Low**	Generally a small tree that exhibits good health and/or form. May be a large or medium tree that exhibits fair or poor health and/or form. If the tree exhibits good health and structure then generally between 5 & 10 metres tall.	4
➢ **Very low**	Generally a small tree that exhibits poor health and/or form. May be a large or medium tree that exhibits poor, or worse, health and/or form. If the tree exhibits good health and structure then generally a tree less than 5 metres tall.	2

U.L.E. is based on the following categories each of which have a modifier (ULEM) ranging from 0 – 12.

Category	Example	ULEM
➢ **0**	The tree is dead or almost dead or constitutes an immediate and unacceptable hazard.	0
➢ **0 – 5**	The tree is unlikely to provide useful amenity for longer than 5 years. The tree is in serious decline, poses an unacceptable hazard that is not correctable with reasonable maintenance.	4

➢ **5 – 15**	The tree is unlikely to provide useful amenity for longer than 15 years. The tree may be in serious decline or a very short lived species.	7
➢ **15 – 30**	The tree is unlikely to provide useful amenity for longer than 30 years. The tree may be in moderate decline or a short lived species.	10
➢ **30 – 60**	The tree is likely to provide useful amenity for up to 60 years. The tree may be in fair to good condition and has a moderate life-span.	11
➢ **> 60**	The tree is likely to provide useful amenity for greater than 60 years. The tree may be in good to excellent condition and a long lived species.	12

RV is then derived from the multiplication of AVV by ULEM and the resulting score is categorised as Very high to Very low.

Category	**Example**	**RV value**
➢ **Very high**	Every effort should be made to preserve trees in this category	96 - 120
➢ **High**	These trees should be retained if at all possible	72 - 95
➢ **Moderate**	These trees should be retained if they do not overly constrain development on the site.	48 - 71
➢ **Low**	These trees should not create a material constraint on development of the site. These trees should be removed where they conflict with development of the site.	24 - 47
➢ **Very low**	Generally a very small tree or a tree that exhibits poor health, structure and form. May be a large or medium tree that exhibits poor, or worse, health and/or form. These trees should generally be removed.	1 – 23
➢ **Remove**	These trees are not suitable for retention within the site and are recommended to be removed.	0

38.6. Health

Pertains to the health and growth potential of the tree.

The notation of “Health” is based on the following categories.

Category	Example
➢ **Good**	Crown full, with good foliage density. Foliage is entire with average colour, minimal or no pathogen damage. Above average growth indicators such as extension growth, leaf size and canopy density. Little or no canopy die-back. Generally no dead wood on the perimeter of the canopy. Good wound wood development. **Tree exhibits above average health and no works are required.**
➢ **Fair**	Tree may have more than 30% dead wood, or may have minor canopy dieback. Foliage density may be slightly below average for the species. Foliage colour may be slightly lower than average and some discolouration may be present. Typical growth indicators, e.g. extension growth, leaf size, canopy density for species in location. Average wound wood development. **The tree exhibits below average health and remedial works may be employed to improve health.**
➢ **Poor**	Tree may have more than 30% dead wood and canopy die back may be present. Leaves may be discoloured and/or distorted, often small, and excessive epicormic growth may be present. Pathogens and/or stress agents may be present that could lead, or are leading to, the decline of tree. Poor wound wood development. **The tree exhibits low health and remedial works or removal may be required.**
➢ **Very poor**	The tree has more than 30% dead wood. Extensive canopy die back is present. Canopy is very sparse. Pathogens and/or stress agents are present that are leading to the decline of the tree. Very poor wound wood development. **The tree exhibits very low health and remedial works or removal are required.**
➢ **Dead**	**Tree is dead and generally should be removed.**

38.7. Structure

Pertains to the physical structure of the tree including the main scaffold branches and roots. Structure includes those attributes that may influence the probability of major trunk, root or limb failure.

The notation of “Structure” is based on the following categories.

Category	Example
➢ **Good**	The tree has a well-defined and balanced crown. Branch unions appear to be strong with no defects evident in the trunk or the branches. The tree is unlikely to suffer trunk or branch failure under normal conditions. **The tree is considered a good example of the species with a well-developed form.**
➢ **Fair**	The tree has some minor problems in the structure of the crown. The crown may be slightly out of balance and some branch unions may exhibit minor structural faults or have the potential to create faults. If the tree is single trunked, this may be on a slight lean or be exhibiting minor defects. **These defects are not likely to result in catastrophic trunk or branch failure although some branch failure may occur under normal conditions.**
➢ **Poor**	The tree has significant problems in the structure of the scaffold limbs or trunk. It may be lop-sided or have few branches on one side or have large gaps in the crown. Large branches may be rubbing or crossing over. Branch unions may be poor, and faults at the point of attachment or along the branches may be evident. The tree may have a substantial lean. The tree may have suffered significant root damage. The tree may have some degree of basal or trunk damage. **These defects may predispose the tree to major trunk or branch failure.**
➢ **Very poor**	The tree has some very significant problems in the structure of the crown. It may be lop-sided or have few branches on one side or have large gaps in the crown. Branches may be rubbing or crossing over and causing damage to each other. Branch unions may be poor, and faults at the point of attachment or along the branches may be evident. The tree may have a substantial lean. The tree may have suffered major root damage. The tree may have extensive basal or trunk damage. **These defects are likely to predispose the tree to trunk or scaffold limb failure.**

38.8. U.L.E. (Useful Life Expectancy)

U.L.E. pertains to the span of time that the tree might reasonably be expected to provide useful amenity value with an acceptable level of safety at an acceptable cost. Depending on the situation, available financial resources and other factors, two identical trees may be accorded different longevity ratings.

The notation of U.L.E. is based on the following categories.

Category	Example
➢ **0**	The tree is dead or almost dead or constitutes an immediate and unacceptable hazard. **The tree should generally be removed unless other considerations require its' retention.**
➢ **0 – 5**	The tree is unlikely to provide useful amenity for longer than 5 years. The tree is in serious decline, poses an unacceptable hazard and/or requires a level of maintenance disproportionate with its' value. **The tree should generally be removed unless other considerations require its' retention.**
➢ **5 – 15**	The tree is unlikely to provide useful amenity for longer than 15 years. The tree may be in serious decline, be a very short lived species, present a moderately elevated hazard and/or require high levels of maintenance. **The tree could be retained or removed depending on the situation.**
➢ **15 – 25**	The tree is unlikely to provide useful amenity for longer than 25 years. The tree may be in moderate decline, be a short lived species, present a slightly elevated hazard and/or require moderate levels of maintenance. **The tree should generally be retained unless other factors dictate its' removal.**
➢ **25 – 50**	The tree is likely to provide useful amenity for up to 50 years. The tree may be in fair to good condition, have a moderate life-span, present a low to moderate level of hazard and/or require moderate levels of maintenance. **The tree should generally be retained unless other factors dictate its' removal.**
➢ **> 50**	The tree is likely to provide useful amenity for greater than 50 years. The tree may be in good to excellent condition, a long lived species, present a low level of hazard and/or require low levels of maintenance. **The tree should generally be retained unless other factors dictate its' removal.**

39. Form

The notation of “Form” pertains to the aesthetic qualities of the trees live canopy. Generally good form is indicative of a symmetrical, well-balanced canopy although this is dependent on the particular species. Some species naturally develop an asymmetric canopy and in this case a highly irregular canopy might be described as good.

The form of a tree is considered assuming that the tree stands in isolation from any surrounding trees. This may mean that a group of trees that exhibit good form as a group, may be described as having poor form as individuals.

The notation of “Form” is based on the following categories.

Category	Example
➢ **Very good**	An outstanding specimen of that species. Generally a very evenly balanced and symmetrical canopy with no deformation. If the development of that species is naturally irregular then an outstanding specimen of that species.
➢ **Good**	A good specimen of that species. Generally a well balanced and symmetrical canopy with minor deformation. If the development of that species is naturally irregular then a good specimen of that species.
➢ **Fair**	An average specimen of that species. Generally a balanced canopy with some minor to moderate asymmetry. If the development of that species is naturally irregular then an average specimen of that species.
➢ **Poor**	A below average specimen of that species. Generally a moderate to high degree of asymmetry. If the development of that species is naturally irregular then a poor specimen of that species.
➢ **Very poor**	A very poor specimen of that species. Generally a high to extreme degree of asymmetry. If the development of that species is naturally irregular then a very poor specimen of that species.

40. Glossary / notes

Tree Protection Zone (TPZ)	Is based on AS 4970-2009 *Protection of trees on development sites* and defines the soil volume that is likely to be required to encompass enough of the trees absorbing root system to ensure the long-term survival of the tree. The radius specified as the TPZ is an estimate of the minimum distance from the tree that excavation or other activities that might result in root damage should occur to avoid negative impacts on the health and longevity of the tree. AS 4970 states that intrusion of up to 10% of the surface area of the TPZ may occur without further assessment or analysis.
Structural Root Zone (SRZ)	Is based on AS 4970-2009 (Protection of trees on development sites) and defines the likely spread of the trees scaffold root system. These roots are the primary anchoring roots for the tree and damage to these roots may render the tree liable to uprooting. SRZ is based on measurement of the trunk above the root flair (AS 4970) However in this report SRZ is based on the measured or estimated DBH and there should be taken as an estimate only. Additional measurement may be required if construction near the SRZ is expected to occur.
Modified Tree Protection Zone (mTPZ)	Is based on the TPZ and includes any requirement to protect the above ground parts of the tree that project beyond the TPZ. However generally the mTPZ will be equal to the TPZ. TPZ extension beyond the TPZ to protect the tree canopy will be shown on the site plan but will not be reflected in the TPZ radius measurements quoted in this report.
DBH (Diameter at Breast Height)	Is the diameter of the tree at approximately 1.4 meters above ground level. Where a trunk is divided at or near 1.4 meters above ground the DBH is generally measured at the narrowest point of the trunk between ground level and 1.4 meters. Alternatively, where a higher level of accuracy is required with multi stemmed trees, DBH is derived from the combined cross-sectional area of all trunks. The DBH of all accessible trees is measured unless otherwise stated in the Tree Data section of this report. The DBH of trees on adjoining properties is measured where access can be readily gained to the property, otherwise it is estimated.
Measured	Indicates whether the DBH has been measured or estimated. DBH may be estimated for small low value multi stem trees or trees that are inaccessible.
Retained?	Indicates whether the tree is shown as being removed or retained on the plans provided. This is generally derived from the site plans provided but the removal or retention of trees might be communicated by other means.

Recommendation reason	Pertains to the reason that removal or retention or other works are recommended. Other than trees on adjoining properties or road reserves a reason for retention is usually not given. In this case N/A is used.
Height & width	Tree height is generally measured for moderate, high and very high value trees and is measured with an Impulse Laser infrared range finder. The height of low and very low value trees is usually estimated. Canopy width is estimated unless otherwise stated.
Genus / species	The identification of trees is based on accessible visual characteristics and given that key identifying features are often not available at the time of assessment the accuracy of identification is not guaranteed. Where the species of any tree is not known, **sp.** is used.

41. Assumptions & limiting conditions

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    9.1. The information in this report covers only those items which were examined and reflects the condition of those items at the time of the inspection.
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Yours sincerely,

Nicole Vickridge
Graduate Certificate of Arboriculture
Bachelor of Applied Science (Planning) Hons.