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For

Nation Partners

Site location

Northern pipeline

Report type

Construction Impact Report

Prepared by

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Ref: 7088 230707 CIR NP North Yarra Main Sewer Renewal Project.Docx

Table of contents

1. Summary

This report was commissioned by Nation Partners to assess the condition of 78 trees located in close proximity to the manholes (and proposed access routes to these assets) along the northern pipeline. 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.

Access pruning is likely to 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 manhole.

All trees are located within the City of Banyule and overlays relating to vegetation removal are detailed in the report as relevant to each manhole location.

This report has been updated based on revised access requirements across the site as proposed by the works contractor.

It is understood that heavy vehicle access will not be required to each of the manholes in this section and that several manholes may be serviced by light vehicles only.

In summary:

1. The removal of three very small trees (<5 metres tall and <10cm at base) is likely to be required for access to NYM127 in Heidelberg Park.
2. The removal of one small tree (<5 metres tall & <10cm at base) is understood to be required for access to NYM117.
3. The pruning of two trees is understood to be required for access to NYM115.
4. Access to NYM113, NYM113a and NYM114 is through Yarraman Riders. Based on an alternative access proposal the removal of one dead tree and the pruning of six trees will be required for access to these three assets.
5. The removal of one to three trees and pruning of four trees will be required for access to NYM112 and NYM111a.

Ground protection may be required for vehicle movement within the TPZ of retained trees, particularly if heavy rainfall occurs immediately prior to the works being undertaken. There is some ambiguity regarding potential impacts on specific trees, and protection measures will be specified once access routes and tree removals have been confirmed.

1.1. Permit requirement

A permit is likely to be required for tree pruning or removal as set out below.

This data should be reviewed by a qualified town planner and should also be reviewed by the project arborist in conjunction with the principal contractor.

It is possible that not all of the trees listed below will need to be pruned.

Manhole ID	Permit requirement	Tree ID	Notes
NYM128	No	N/A	No tree pruning or clearance required.
NYM127A	No	N/A	No tree pruning or clearance required.
NYM127	Yes	51, 52, 76, 77 & 78	Removal of three very small exotic trees required (<6 metres tall and < 11cm diameter) very small branch pruning.
Set down area	Yes	42 & 43	Several branches > 5cm.
NYM115	No	N/A	No tree pruning or clearance required.
NYM119	No	N/A	Minor weed pruning or clearance required.
NYM118	No	N/A	Minor weed clearance only.
NYM117	No	N/A	Minor tree pruning (<5cm diameter).
NYM116	No	N/A	No tree pruning or clearance required.
NYM115	Yes	24 & 27	Significant limb removal.
NYM114	Yes	68	Limb removal for Tree 68 only.
NYM113A	Yes	4 & 5	Remove limbs.
NYM113	No	N/A	No tree pruning or clearance required.
NYM112 NYM111A	Yes	15, 16, 19, 20, 21 70, 71, 72, 73 & 75	Pruning of various branches and potentially one tree.

2. Document control

File reference	File type	Modifications	Date
7088 230323	CIR	Original document. Construction impact assessment for64 trees	23rd March 2023
7088 230503	CIR	Report revised following contractor comments, access requirement review and further site assessment.	3rd May 2023
7088 230707	CIR	Addition of three very small trees at NYM127.	7th July 2023

3. Introduction

This report was commissioned by Nation Partners P/L to assess the condition of 78 trees located in proximity to works required for the sewer relining works and to evaluate the impacts on these trees arising from the proposed works at this site.

It is proposed to undertake sewer relining / repair for a significant section of sewer main in the area of Ivanhoe East and Heidelberg in North Eastern Greater Melbourne. This will involve the heavy vehicles traversing and being located within Tree Protection Zones (TPZ) for significant trees in this area.

The entire proposed project extends from Heidelberg in the North to Alphington to the South West while the current project stage runs from Heidelberg to the Yarra Flats Park in Ivanhoe East (See Section 8 Site plan (Overview)).

The proposed access tracks for this project have been significantly redesigned since the first iteration of this report and this report has been updated based on the latest access plans.

Three very small trees have been added to the assessment at the request of Banyule City Council.

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 development.
- 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.

The sites were inspected by Nicole Vickridge of this office on the 9th and 27th February and 16th March 2023 and later by Roger Greenwood on the 2nd May and the 30th June 2023. In addition, Roger Greenwood of this office has previously visited this site as part of a walkover conducted with the client.

4. Documents reviewed

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

Date	Title	Author	Company
Not dated	Spatial files providing the location of the Melbourne Water assets in the works area.	Not stated	Not stated
Not dated	Not stated (comments from relining contractor on tree pruning)	Not stated	Not stated
Not dated	Not stated (Proposed access requirements for various manholes)	Not stated	Not stated

5. Scope

This report provides an arboricultural assessment of all significant trees in close proximity to the manholes and proposed access routes - as identified during a site walk through. 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.

Ground protection may be required for vehicle movement within the TPZ of retained trees, particularly if heavy rain fall occurs immediately prior to the works being undertaken. There is some ambiguity regarding the actual works being undertaken at each manhole and potential impacts on specific trees, and protection measures will be specified once access routes, and tree removals have been confirmed.

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.

Ground protection is likely to be required along access tracks within the Tree Protection Zone (TPZ) of significant trees. Trees have generally not been assessed where Ground Protection (GP) only is required.

5.1. Assumptions

It is generally understood 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 manholes.

It is understood that heavy vehicle access will not be required to all manholes and that some manholes might be serviced by light vehicles only.

Access pruning is likely to be required at several manholes and along access routes to enable heavy vehicle access to the manholes.

Tree removal will be required where trees prevent access to the manhole although it may be possible to orient the larger vehicles at an angle to the sewer alignment to avoid significant tree removal.

Further detail is required to fully determine the tree pruning requirements although the tree removal requirement across the project is likely to be as stated in this report.

6. Site context

This site is located entirely within with the City of Banyule.

Overlays relating to vegetation removal are listed within the report as relevant to each manhole location.

7. Notes

1. 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.
2. The proposed access tracks for this project have been significantly redesigned since the first iteration of this report and this report has been updated based on the latest access plans.
    a. Accordingly, several trees that were assessed in the original report are now not impacted by the proposed access tracks and are not included in this report.
        i. These are Trees 2, 9, 10, 11, 12 & 34.
    b. Several trees have been added to this report and these are Trees 67, 68, 69, 70, 71, 72, 73, 74 and 75.
        i. These trees are generally not in sequence with the earlier tree numbering.
3. Tree assessment was be 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. Tags are generally nailed to the trees and trees on adjoining properties will not be tagged without the written consent of the property owner. Tags may be affixed to fences or other structures to indicate trees on adjoining properties.
    a. Street Trees were generally not tagged.
5. Tree 34 was not found at the nominated location and has been removed from this report.
6. The column label **“ID”** is used in all the tables throughout this report. This refers to the tree identification number and to the tree numbering found on the “Site plan”. This number is the same as the **“Tree ID”** found in the “Tree data” section of the report.

8. Site plan (Overview)

9. Banyule SLO 1

The Banyule Significant Landscape overlay pertains to the bulk of the project with the exception of Manholes NYM126, NYM115, NYM124, NYM123, NYM122 and NYM121.

Under this overlay a permit is required to remove, destroy or lop vegetation. This does not apply to:

1. Non-native vegetation that is less than 6 metres in height, has a trunk circumference of less than 0.35 metre measured at 1.4 metres above ground level and a branch spread of less than 4 metres.
2. Pruning of dead or broken branches, or branches less than 50 millimetres in diameter at the point of contact with the larger branches or trunk, provided no more than 1/3 of the foliage of each individual plant is removed. This does not apply to the trunk of a tree.
3. Vegetation maintenance carried out by, or on behalf of, a municipal council or public authority or public land manager.
4. Non-native vegetation in preparation for revegetation works carried out by, or on behalf of, a municipal council, public authority or public land manager.
5. Vegetation that could adversely affect stream flow carried out by, or on behalf of, a municipal council, public authority or public land manager.
6. Vegetation identified as environmental weed species in the *Banyule Weed Management Strategy* (Banyule City Council, 2006).
7. Removal of street trees in accordance with *Banyule Urban Forest Strategic Plan* (Banyule City Council, 2015).

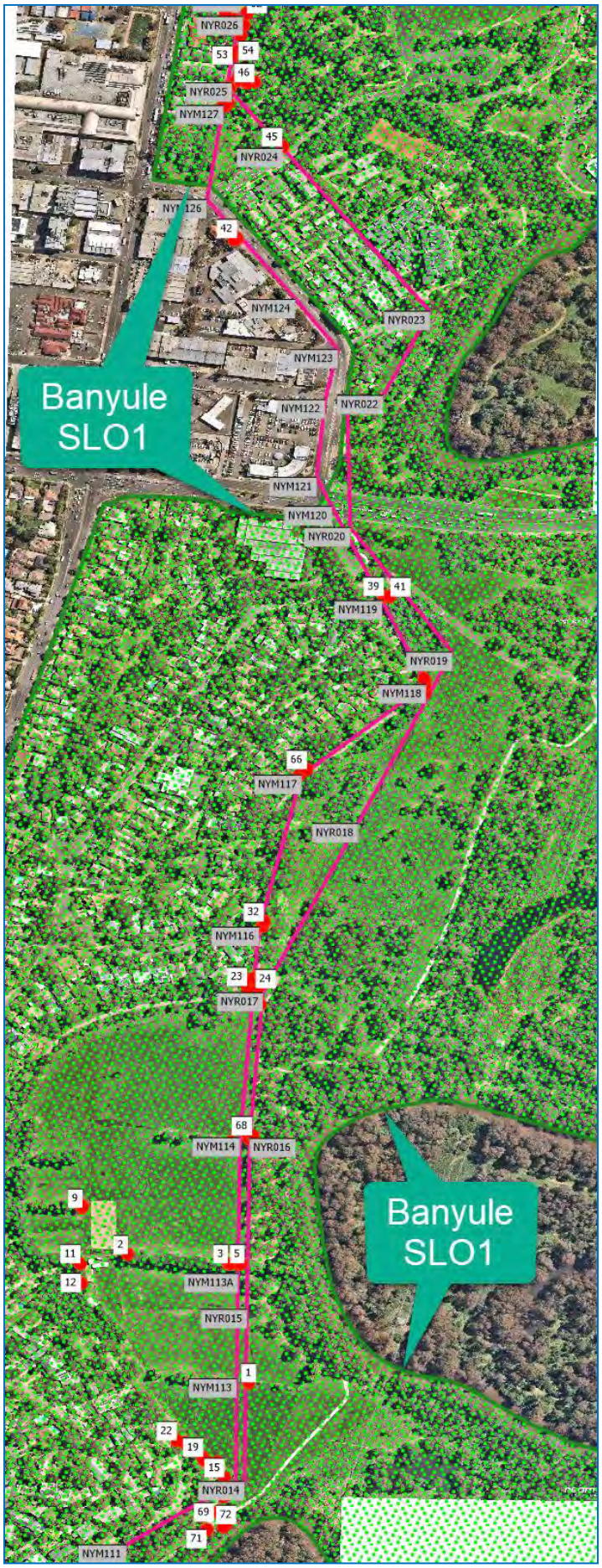

Figure 1 Banyule SLO 1 extent

10. 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):
1	Eucalyptus camaldulensis	Moderate	Retained	None	Site	1.8	2.5	6/66
2	Hesperocyparis macrocarpa	Remove.	Retained	None	Site	4.3	15	18/525
3	Hesperocyparis macrocarpa	Moderate	Retained	None	Site	3.9	15	19/399
4	Hesperocyparis macrocarpa	Moderate	Retained	Low	Site	3.7	13.9	18/364
5	Hesperocyparis macrocarpa	Moderate	Retained	Low	Site	3.7	13.6	19/355
6	Hesperocyparis macrocarpa	Moderate	Retained	None	Site	3.5	11.5	19/302
7	Hesperocyparis macrocarpa	High	Retained	None	Site	3.2	9.8	15/258
8	Eucalyptus camaldulensis	Moderate	Retained	Low	Site	1.6	2	11/50
9	Hesperocyparis macrocarpa	Moderate	Retained	None	Site	3.3	10.2	15/267
10	Hesperocyparis macrocarpa	Moderate	Retained	None	Site	3.6	13.2	15/346
11	Ulmus procera	High	Retained	None	Site	4.1	15	21/471
12	Ulmus procera	High	Retained	None	Site	3.7	13.6	19/355
13	Acacia melanoxylon	Low	Retained	None	Site	2.1	3.5	6/91
14	Casuarina cunninghamiana	Low	Retained	None	Site	1.6	2	5/47
15	Callistemon citrinus	Moderate	Retained	Low	Site	1.9	2.8	10/72
16	Casuarina cunninghamiana	Moderate	Retained	Low	Site	2.3	4.7	10/123

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
17	Casuarina cunninghamiana	Moderate	Retained	None	Site	2.2	4	10/104
18	Acacia melanoxylon	Low	Retained	None	Site	2.3	4.7	7/123
19	Acacia melanoxylon	Remove.	Retained	High	Site	1.6	2	6/47
20	Eucalyptus camaldulensis	Low	Retained	Low	Site	1.6	2	6/47
21	Eucalyptus camaldulensis	Low	Retained	Low	Site	1.6	2	6/47
22	Eucalyptus camaldulensis	Low	Retained	Low	Site	1.6	2	6/47
23	Eucalyptus camaldulensis	Moderate	Retained	Low	Site	1.6	2	7/47
24	Eucalyptus camaldulensis	Moderate	Retained	Low	Site	1.6	2	6/47
25	Eucalyptus camaldulensis	High	Retained	None	Site	2.8	7.1	12/185
26	Eucalyptus camaldulensis	Low	Retained	None	Site	1.6	2	5/31
27	Eucalyptus camaldulensis	High	Retained	Low	Site	2.3	4.7	18/123
28	Eucalyptus camaldulensis	Very high	Retained	None	Site	3.5	11.6	20/305
29	Eucalyptus sp.	Very high	Retained	None	Site	2.5	5.5	22/145
30	Eucalyptus camaldulensis	Very high	Retained	None	Site	3.6	13.2	20/346
31	Eucalyptus camaldulensis	Moderate	Retained	None	Site	2.1	3.7	10/97
32	Eucalyptus camaldulensis	Very high	Retained	None	Site	4.1	15	25/459
33	Fraxinus angustifolia	High	Retained	Low	Site	1.6	2	10/47
35	Fraxinus angustifolia	Moderate	Retained	None	Site	2.4	5	13/132
36	Fraxinus angustifolia	Moderate	Retained	Low	Site	2.5	5.5	13/145
37	Pittosporum crassifolium	Remove.	Retained	None	Site	1.6	2	4/47
38	Acacia melanoxylon	Low	Retained	None	Site	1.6	2	5/47
39	Populus alba	Low	Retained	Low	Site	1.6	2	9/50
40	Ligustrum lucidum	Very low	Retained	Low	Site	1.6	2	4/47
41	Cotoneaster glaucophyllus	Very low	Retained	Low	Site	1.6	2	6/47
42	Lophostemon confertus	Very low	Retained	None	Site	1.6	2	5/47
43	Eucalyptus sideroxylon	High	Retained	None	Site	3.5	12.1	20/317
44	Pinus sp.	High	Retained	Low	Site	3	8.8	20/229
45	Hesperocyparis lusitanica	High	Retained	Low	Site	2.9	7.9	18/207
46	Pinus sp.	High	Retained	Low	Site	3.5	12.1	25/317
47	Araucaria bidwillii	High	Retained	Low	Site	2.5	5.6	18/148
48	Hesperocyparis arizonica	High	Retained	Low	Site	3.9	15	25/399
49	Hesperocyparis arizonica	High	Retained	Low	Site	3.3	10.4	25/273
50	Quercus petraea	Remove.	Retained	Low	Site	3.3	10.4	18/273
51	Hesperocyparis arizonica	Remove.	Retained	Low	Site	2.3	4.6	17/119
52	Quercus petraea	High	Retained	Low	Site	3	8.6	18/226
53	Hesperocyparis lusitanica	High	Retained	None	Site	2.7	7	28/182
54	Pinus sp.	High	Retained	None	Site	3.5	11.9	30/311
55	Cedrus sp.	High	Retained	None	Site	2.6	5.9	18/154
56	Cedrus sp.	High	Retained	Low	Site	2.7	6.5	18/170

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
57	Cedrus sp.	High	Retained	Low	Site	2.6	6.4	18/167
58	Eucalyptus sp.	High	Retained	None	Site	3.8	14.5	20/380
59	Eucalyptus sp.	High	Retained	None	Site	3.6	12.8	20/336
60	Eucalyptus sp.	Remove.	Retained	None	Site	3	8.5	20/223
61	Eucalyptus sp.	Low	Retained	None	Site	1.9	2.9	7/75
62	Araucaria bidwillii	High	Retained	Low	Site	2.8	7.2	20/189
63	Quercus petraea	High	Retained	Low	Site	2.4	4.8	15/126
64	Quercus petraea	High	Retained	Low	Site	2.4	5	15/132
65	Quercus petraea	High	Retained	Low	Site	2.1	3.7	10/97
66	Melia azedarach	Low	Removed	High	Site	1.6	2	4/16
67	Acacia melanoxylon	Remove.	Removed	High	Site	2.4	4.8	8/126
68	Acacia dealbata	Very low	Retained	Low	Site	2.2	4.2	10/110
69	Acacia mearnsii	Low	Retained	Low	Site	1.9	2.9	12/75
70	Eucalyptus camaldulensis	High	Retained	Low	Site	2.6	6	14/157
71	Eucalyptus camaldulensis	High	Retained	Low	Site	3.2	9.6	23/251
72	Eucalyptus camaldulensis	High	Retained	Low	Site	2.2	4.2	14/110
73	Eucalyptus camaldulensis	Low	Retained	Low	Site	1.9	2.6	13/69
74	Allocasuarina torulosa	Low	Retained	None	Site	1.8	2.4	7/63
75	Acacia melanoxylon	Remove.	Removed	High	Site	2.1	3.6	7/94
76	Ulmus procera	Very low	Removed	Low	Site	1.6	2	3/9
77	Ulmus procera	Very low	Removed	Low	Site	1.6	2	4/16
78	Ulmus procera	Very low	Removed	Low	Site	1.6	2	4/13

Total number of tree/s referred to in this report(Total): 77

11. NYM127 and NYM128 (1 Beverley Road, Heidelberg - Heidelberg Park)

There are three manholes located in Heidelberg Park, NYM127, NYM127P, NYM127A and NYM128 (Figure 2**Error! Reference source not found.**).

Seventeen trees (Trees 46 to 62) were assessed at the NYM127, NTM107A and NYM128 manholes and along the proposed access route located in Heidelberg Park.

The following controls apply in this location:

1. Environmental Significance Overlay – Schedule 1
2. Environmental Significance Overlay – Schedule 4
   Under the provisions of this schedule "Bunya Bunya Pine Araucaria bidwillii" is listed at 1 Beverley Road, Heidelberg
3. Significant Landscape Overlay – Schedule 1

11.1. Tree data

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
46	**Pinus sp.**	High	Retained	Low	Site	3.5	12.1	25/317
47	**Araucaria bidwillii**	High	Retained	Low	Site	2.5	5.6	18/148
48	**Hesperocyparis arizonica**	High	Retained	Low	Site	3.9	15	25/399
49	**Hesperocyparis arizonica**	High	Retained	Low	Site	3.3	10.4	25/273
50	Quercus petraea	Remove.	Retained	Low	Site	3.3	10.4	18/273
51	Hesperocyparis arizonica	Remove.	Retained	Low	Site	2.3	4.6	17/119
52	**Quercus petraea**	High	Retained	Low	Site	3	8.6	18/226
53	**Hesperocyparis lusitanica**	High	Retained	None	Site	2.7	7	28/182
54	**Pinus sp.**	High	Retained	None	Site	3.5	11.9	30/311
55	**Cedrus sp.**	High	Retained	None	Site	2.6	5.9	18/154
56	**Cedrus sp.**	High	Retained	Low	Site	2.7	6.5	18/170
57	**Cedrus sp.**	High	Retained	Low	Site	2.6	6.4	18/167
58	**Eucalyptus sp.**	High	Retained	None	Site	3.8	14.5	20/380
59	**Eucalyptus sp.**	High	Retained	None	Site	3.6	12.8	20/336
60	Eucalyptus sp.	Remove.	Retained	None	Site	3	8.5	20/223
61	Eucalyptus sp.	Low	Retained	None	Site	1.9	2.9	7/75
62	**Araucaria bidwillii**	High	Retained	Low	Site	2.8	7.2	20/189
63	**Quercus petraea**	High	Retained	Low	Site	2.4	4.8	15/126
64	**Quercus petraea**	High	Retained	Low	Site	2.4	5	15/132
65	**Quercus petraea**	High	Retained	Low	Site	2.1	3.7	10/97
76	Ulmus procera	Very low	Removed	Low	Site	1.6	2	3/9
77	Ulmus procera	Very low	Removed	Low	Site	1.6	2	4/16
78	Ulmus procera	Very low	Removed	Low	Site	1.6	2	4/13

Total number of tree/s referred to in this report (Total): 23

Figure 2 NYM127, NYM127P, NYM127A & NYM128 (Trees46 - 65 & 76 - 78)

11.2. NYM128

Access to NYM128 is via Darebin Street, Heidelberg and it should be possible to avoid vehicular traffic beyond the end of Darebin Street. Accordingly, all vehicles should be able to avoid trafficking the TPZ for Tree 62.

All vehicles must be parked on the street or Ground Protection (GP) must be installed where any vehicle is parked on the lawn areas within the TPZ for Tree 62.

Action	Type	Notes
Vehicular access	Large trucks	On street only
TPZ intrusion	No	TPZ intrusion should not be required.
Ground protection	Should not be required	Only required if traffic is off street.
Tree protection fencing	Not required	

Tree pruning	No	
Tree removal	No	
Pruning permit required	No	

11.3. NYM127

Access to NYM127 is now proposed from Darebin Street along the footpath to the South East of Darebin Street and then across the park to the west.

It is understood that the only vehicles required at NYM 127 is a utility and a light tip truck and, provided that these vehicles are only required to enter and exit the site once, will have little impact on the health and longevity of the surrounding trees.

However, should multiple trips be required to this manhole, then Ground Protection should be installed along the entire route where it is within the TPZ for retained trees.

If multiple trips (more than once in and once out) in and out of the site are required then Ground Protection should be installed along the western side of the existing path and over the full vehicle track where it is within the TPZ for any retained trees.

The dimensions and location of the GP must be determined by the Project Arborist in conjunction with the project foreman / manager.

The number of trips in and out must be determined prior to the commencement of works.

Figure 3 Access widening and small tree removal to NYM127

Minor tree pruning (<10cm diameter) will be required for access to this manhole.

The removal of a small number of very small trees will be required for access to NTM127 with the removal of approximately four (4) trees being required. These trees are less than 5

metres tall, have a diameter at base of approximately 5cm and are either self-seeded or suckers from adjacent trees (Figure 3).

The construction of a small work platform is required around NYM127 and this could impact the trees closest to the manhole. The construction of the manhole should supervised by the project arborist.

Action	**Type**	**Notes**
Vehicular access	Utility & small tipper	Along path and through TPZ's
TPZ intrusion	Yes	Vehicular access through several TPZ's
Ground protection	Required if multiple vehicle trips in and out are required	If required then along west side of path and through TPZ's
Tree protection fencing	Not required	
Tree pruning	Yes	Small low branches <10cm
Tree removal	Yes	Several very small trees
Permit required	Yes	Tree pruning around manhole.

Figure 4 NYM 127, NYM127P, NYM127A & NYM128 (Trees 46 – 65 & 76 – 78)

12. Heidelberg Park set down and parking area (Burgundy Street)

Set down and parking for NYM127 and NYM128 (located in Heidelberg Park) is proposed along Burgundy Street, Heidelberg. Two trees (Tree 44 and 45) were assessed adjacent to set down and parking area (Figure 6).

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
44	**Pinus sp.**	High	Retained	Low	Site	3	8.8	20/229
45	**Hesperocyparis lusitanica**	High	Retained	Low	Site	2.9	7.9	18/207

Total number of tree/s referred to in this report (Total): 2

Figure 5 Set down area (Trees 44 & 45)

12.1. Tree dataNYR024

The following controls apply in this location:

- Environmental Significance Overlay – Schedule 1
- Significant Landscape Overlay – Schedule 1

Figure 6 Heidelberg Park set down and parking area (Burgundy Street) (Tree 44 and Tree 45)

Tree 44 and Tree 45 require pruning to provide clearance:

- Tree 44 requires access pruning (one 20cm diameter branch).
- Tree 45 requires access pruning (one 15cm diameter branch).

The removal of these branches from each of these two trees will remove less than 10% 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 four individual trees (Figure 7).

Figure 7 Pruning Tree 44 and Tree 45 (Heidelberg Park set down and parking area (Burgundy Street))

Action	Type	Notes
Vehicular access	Various large vehicles	Parked along street frontage
TPZ intrusion	Yes	Over existing pavement
Ground protection	Not required	Over existing pavement
Tree protection fencing	Not required	Over existing pavement
Tree pruning	Yes	Several low branches >10cm
Tree removal	No	
Permit required	Yes	Tree pruning.

13. NYM125 (Jika Street, Heidelberg)

Access to NYM125 is on Jika Street, Heidelberg. Two trees (Tree 42 and 43) were assessed adjacent to this manhole (Figure 8). Tree 42 is a street tree.

13.1. Tree data

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
42	Lophostemon confertus	Very low	Retained	None	Site	1.6	2	5/47
43	**Eucalyptus sideroxylon**	High	Retained	None	Site	3.5	12.1	20/317

Total number of tree/s referred to in this report (Total): 2

Figure 9 NYM125 (Trees 42 & 43)

Figure 8 Trees 42 & 43 NYM125 (Trees 42 & 43)

The following controls apply in this location:

- Vegetation Protection Overlay – Schedule 5

No pruning or tree removal is required in this location.

Action	Type	Notes
Vehicular access	Various large vehicles	Over existing pavement only
TPZ intrusion	Yes	Over existing pavement
Ground protection	Not required	Over existing pavement
Tree protection fencing	Not required	Over existing pavement
Tree pruning	No	
Tree removal	No	
Permit required	No	

14. NYM119 (The Boulevard, Ivanhoe East)

Access to NYM119 is via The Boulevard, Eaglemont. While three trees (Trees 39 to 41) were assessed adjacent to this manhole it is now understood that clearing is only required around 2 metres from the manhole.

This is likely to require the pruning of several fallen tree limbs and the removal of several very small weed species. Both tree removal and pruning will be of local weed species.

14.1. Tree data

The following controls apply in this location:

- Environmental Significance Overlay – Schedule 1
- Significant Landscape Overlay – Schedule 1
- Heritage Overlay - HO134 Yarra Flats (340-680 The Boulevard, Eaglemont).
  NOTE: While HO134 includes tree controls it is unclear if they apply to any of the trees assessed in this location.

Tree 39 (*Populus alba*), Tree 40 (*Ligustrum lucidum*) and Tree 41(*Cotoneaster glaucophyllus*)

Figure 11 NYM119 (Trees 39 - 41)

are species recognised in the 2006 *'Banyule Weed Management Strategy'* as a weed species. Therefore, a planning permit would not be required for the pruning or removal of any of these three trees.

Action	**Type**	**Notes**
Vehicular access	Various large vehicles	Over existing pavement only
TPZ intrusion	No	
Ground protection	Not required	
Tree protection fencing	Not required	
Tree pruning	Yes	Local weed species
Tree removal	Yes	Local weed species
Permit required	No	Minor weed clearance

15. NYM118 (The Boulevard, Eaglemont)

Access to NYM118 is via a grass track from Yarra Flats Entry Road, Eaglemont. Four trees (Trees 35 to 38) were assessed adjacent to this manhole.

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
35	Fraxinus angustifolia	Moderate	Retained	None	Site	2.4	5	13/132
36	Fraxinus angustifolia	Moderate	Retained	Low	Site	2.5	5.5	13/145
37	Pittosporum crassifolium	Remove.	Retained	None	Site	1.6	2	4/47
38	Acacia melanoxylon	Low	Retained	None	Site	1.6	2	5/47

Total number of tree/s referred to in this report (Total): 4

Figure 12 NYM118 (Trees 35 - 38)

15.1. Tree data

The following controls apply in this location:

- Environmental Significance Overlay – Schedule 1
- Significant Landscape Overlay – Schedule 1
- Heritage Overlay - HO134 Yarra Flats (340-680 The Boulevard, Eaglemont).
  NOTE: While HO134 includes tree controls it is unclear if they apply to any of the trees assessed in this location.

Tree 36 (*Fraxinus angustifolia*) will likely need to be pruned due to its proximity to NYM118. This species is recognised in the 2006 *'Banyule Weed Management Strategy'* as a weed species. Therefore, a planning permit is not required for the pruning of Tree 36.

It is understood that no other trees will require pruning at this site.

Figure 13 NYM118 Tree 36 pruning requirement

Action	Type	Notes
Vehicular access	Various large vehicles	In park land
TPZ intrusion	Yes	Tree 36
Ground protection	Required	Over vehicle path within TPZ
Tree protection fencing	Not required	
Tree pruning	Yes	Local weed species
Tree removal	No	
Permit required	No	

Figure 14 NYM118 (Trees 35, 36 & 37)

16. NYM117 (The Boulevard, Eaglemont)

Access to NYM117 is from The Boulevard, Eaglemont. Two trees (Tree 33 & 66) were assessed at this manhole (Figure 16, Figure 17).

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
33	**Fraxinus angustifolia**	High	Retained	Low	Site	1.6	2	10/47
66	Melia azedarach	Low	Removed	High	Site	1.6	2	4/16
Total number of tree/s referred to in this report (Total): 2								

Figure 15 NYM117 (Trees 33 & 66)

16.1. Tree data

The following controls apply in this location:

- Environmental Significance Overlay – Schedule 1
- Significant Landscape Overlay – Schedule 1
- Heritage Overlay - HO134 Yarra Flats (340-680 The Boulevard, Eaglemont).
  NOTE: While HO134 includes tree controls it is unclear if they apply to any of the trees assessed in this location.

Tree 33 (a *Fraxinus angustifolia* with a moderate retention value) (Figure 16) will require minor pruning where it overhangs the manhole. The required pruning is of branches that are up to approximately 5 cm so no planning permit is required for these works.

Tree 66 (a *Melia azedarach* with low retention value) (Figure 17) is understood to be required to be removed to facilitate the proposed works. It is understood that the contractors regard this tree as a self seeded specimen although this would seem unlikely.

This species does not, to my experience, self seed and this specimen has been formatively pruned which supports the contention that it is a deliberate planting.

While this tree is very small and could be readily replaced, it would be preferable that it be preserved at the site.

Figure 16 Tree 33 pruning

The possibility of working around this tree should be explored.

Figure 17 Tree 66 removal

Action	Type	Notes
Vehicular access	Various large vehicles	On nature strip
TPZ intrusion	Yes	Tree 33
Ground protection	Required	Over vehicle path within TPZ for Tree 33
Tree protection fencing	Not required	
Tree pruning	Yes	Local weed species Tree 33
Tree removal	Yes	Small specimen Tree 66
Permit required	No	

Figure 18 NYM117 Trees 33 & 66

NYM116 (The Boulevard, Eaglemont)

Access to NYM116 is on The Boulevard, Eaglemont. Two trees (Tree 31 and Tree 32) were assessed adjacent to this manhole (Figure 20).

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
31	Eucalyptus camaldulensis	Moderate	Retained	None	Site	2.1	3.7	10/97
32	**Eucalyptus camaldulensis**	Very high	Retained	None	Site	4.1	15	25/459
Total number of tree/s referred to in this report (Total): 2								

Figure 19 NYM116 (Trees 31 & 32)

16.2. Tree data

The following controls apply in this location:

- Environmental Significance Overlay – Schedule 1
- Significant Landscape Overlay – Schedule 1
- Heritage Overlay - HO134 Yarra Flats (340-680 The Boulevard, Eaglemont).
  NOTE: While HO134 includes tree controls it is unclear if they apply to any of the trees assessed in this location.

No pruning or tree removal is required in this location.

Figure 20 NYM116 (Tree 31 and Tree 32)

Action	Type	Notes
Vehicular access	Various large vehicles	On road pavement
TPZ intrusion	Yes	Tree 31
Ground protection	Not required	
Tree protection fencing	Not required	
Tree pruning	No	
Tree removal	No	
Permit required	No	

17. NYM115 (The Boulevard, Eaglemont)

Access to NYM115 is off The Boulevard, Eaglemont. Eight trees (Trees 23 to 30) were assessed adjacent to this manhole (Figure 40).

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
23	Eucalyptus camaldulensis	Moderate	Retained	Low	Site	1.6	2	7/47
24	Eucalyptus camaldulensis	Moderate	Retained	Low	Site	1.6	2	6/47
25	**Eucalyptus camaldulensis**	High	Retained	None	Site	2.8	7.1	12/185
26	Eucalyptus camaldulensis	Low	Retained	None	Site	1.6	2	5/31
27	**Eucalyptus camaldulensis**	High	Retained	Low	Site	2.3	4.7	18/123
28	**Eucalyptus camaldulensis**	Very high	Retained	None	Site	3.5	11.6	20/305
29	**Eucalyptus sp.**	Very high	Retained	None	Site	2.5	5.5	22/145
30	**Eucalyptus camaldulensis**	Very high	Retained	None	Site	3.6	13.2	20/346

Total number of tree/s referred to in this report (Total): 8

Figure 21 NYM115 (Trees 23 - 30)

17.1. Tree data

The following controls apply in this location:

- Environmental Significance Overlay – Schedule 1
- Significant Landscape Overlay – Schedule 1
- Heritage Overlay - HO134 Yarra Flats (340-680 The Boulevard, Eaglemont).
  NOTE: While HO134 includes tree controls it is unclear if they apply to any of the trees assessed in this location.

Figure 22 NYM115 (Trees 23 to 30)

Figure 23 NYM115 Access arrangements (view from The Boulevard, Ivanhoe East to south-west)

It is understood that the proposed works will require the pruning of Trees 24 & 27 at NYM115.

Trees 24 & 27 will likely require pruning to provide clearance (Figure 22 and Figure 23).

1. Tree 24 requires access pruning (one 20cm diameter branch).
2. Tree 27 requires access pruning (one 10cm diameter branch).

The removal of these branches from each of these three trees will remove less than 10% 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 these three trees.

Figure 24 Tree 27 pruning (10cm limb)

Figure 25 Tree 24 pruning (20cm Limb)

Action	Type	Notes
Vehicular access	Various large vehicles	Over existing pavement / tracks
TPZ intrusion	Yes	Likely to be all trees
Ground protection	Required	Where movement is required outside existing tracks
Tree protection fencing	Not required	
Tree pruning	Yes	Trees 24 & 27
Tree removal	No	
Permit required	Yes	Pruning > 5cm

18. Access for NYM111A, NYM112, NYM113, NYM113a and MYM 114 (The Boulevard, Ivanhoe East)

Access to NYM111A, NYM112, NYM113, NYM113a and NYM114 is off The Boulevard, Ivanhoe East and through Yarraman Riders. Thirty one (31) trees (Trees 1 to 22 and 67 - 75) were assessed adjacent to access tracks and these five (5) manholes (Figure 28).

The revised access track is set out below.

Access for NYM114 and NYM113A is proposed from the ramp to the east of NYM115 and may impact Trees 3, 4, 5, 6, 7, 8 and 67 & 68.

Access for NYM113 is currently proposed through the main access for the Yarraman Riders buildings and Boulevard access. Access to NYM113 may impact Tree 12.

Access for NYM112 & NYM111A is via the access track opposite 499 The Boulevard Ivanhoe East.

Figure 26 Access for NYM111A, NYM112, NYM113, NYM113A & NYM114

19. NYM113 (Yarraman Riders)

Access to NYM113 is off The Boulevard, Ivanhoe East and through Yarraman Riders. The proposed access is shown below in (Figure 28).

The proposed access is between two existing buildings, adjacent to Tree 12 (Figure 27). Tree 12 (*Ulmus procera*) has a high retention value and is actively be cared for by the Yarraman Riders Group. The retention of Tree 12 may not be possible under this arrangement and further investigations are likely to be required.

Following the site assessment an alternative access may be possible that would require the pruning of Trees 9 to 11. The extent of pruning required will have little or no impact on the health or longevity of the three individual trees; provided that the pruning works are undertaken in accordance with *AS 4373 - 2007 Pruning of Amenity Trees*.

Figure 27 Proposed access adjacent to Tree 12 (NYM 113, NYM113a and NYM114)

If access to NYM113 is not possible without the removal of Tree 12 then it would be preferable to continue the access track from NYM113A directly to the south to NYM 113. While this would require the temporary relocation of the farm fencing for the duration of the works and its reinstatement following the completion of works.

Figure 28 Alternative access to NYM113

20. NYM114 (Yarra Flats Park – Yarraman Riders)

Access to NYM114 is via the access track to the north and east of NYM115 and through the gate at the north end of the Yarra Flats Park – Yarraman Riders area. Trees potentially impacted by these works include Trees 7, 8, 67 & 68.

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
7	**Hesperocyparis macrocarpa**	High	Retained	None	Site	3.2	9.8	15/258
8	Eucalyptus camaldulensis	Moderate	Retained	Low	Site	1.6	2	11/50
67	Acacia melanoxylon	Remove.	Removed	High	Site	2.4	4.8	8/126
68	Acacia dealbata	Very low	Retained	Low	Site	2.2	4.2	10/110

Total number of tree/s referred to in this report (Total): 4

Figure 29 NYM114 (Trees 7, 8, 67, 68)

20.1. Tree data

The following controls apply in this location:

1) Environmental Significance Overlay – Schedule 1
2) Environmental Significance Overlay – Schedule 4
   Under the provisions of this schedule "Monterey Cypress Cupressus macrocarpa 'Horizontalis' and C. macrocarpa 'Horizontalis aurea' (Many)" are listed at 340-680 The Boulevard, Ivanhoe East.
3) Significant Landscape Overlay – Schedule 1
4) Heritage Overlay - HO134 Yarra Flats (340-680 The Boulevard, Eaglemont).
   NOTE: While HO134 includes tree controls it is unclear if they apply to any of the trees assessed in this location.

It is understood that the access track in this area will be alongside the Yarraman Riders property boundary and that the removal of Tree 67 and the pruning of Trees 8 and 68 is likely to be required to create clearance for heavy vehicles along the fence.

It is unlikely that Tree 7 will require pruning.

Of the trees at site:

1) The pruning of Tree 8 will require the pruning of several small branches back to the trunk.
   a) 2x <5cm branches will be removed.
2) Tree 67 will require removal.
   a) This tree is dead and a permit is not required for its removal.
3) Tree 68 will require some pruning as set out below.
   a) 1 x 20cm branch will be removed.
   b) 1 x 12cm branch will be removed.
   c) 1 x 8cm branch will be removed.

The pruning of these branches from each of these two trees (Trees 8 & 68) will remove less than 20%% of the canopy volume of each 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 three individual trees.

Action	**Type**	**Notes**
Vehicular access	CCTV van only	Over low lying and wet area
TPZ intrusion	Yes	Tree 7 & Tree 8
Ground protection	Required	Where movement is required within TPZ
Tree protection fencing	Not required	
Tree pruning	Yes	Trees 8 & 68
Tree removal	Yes	Tree 67 Dead
Permit required	Yes	Pruning > 5 cm

Figure 30 NYM114 Tree 68 pruning

Figure 31 NYM114 Tree 8 pruning

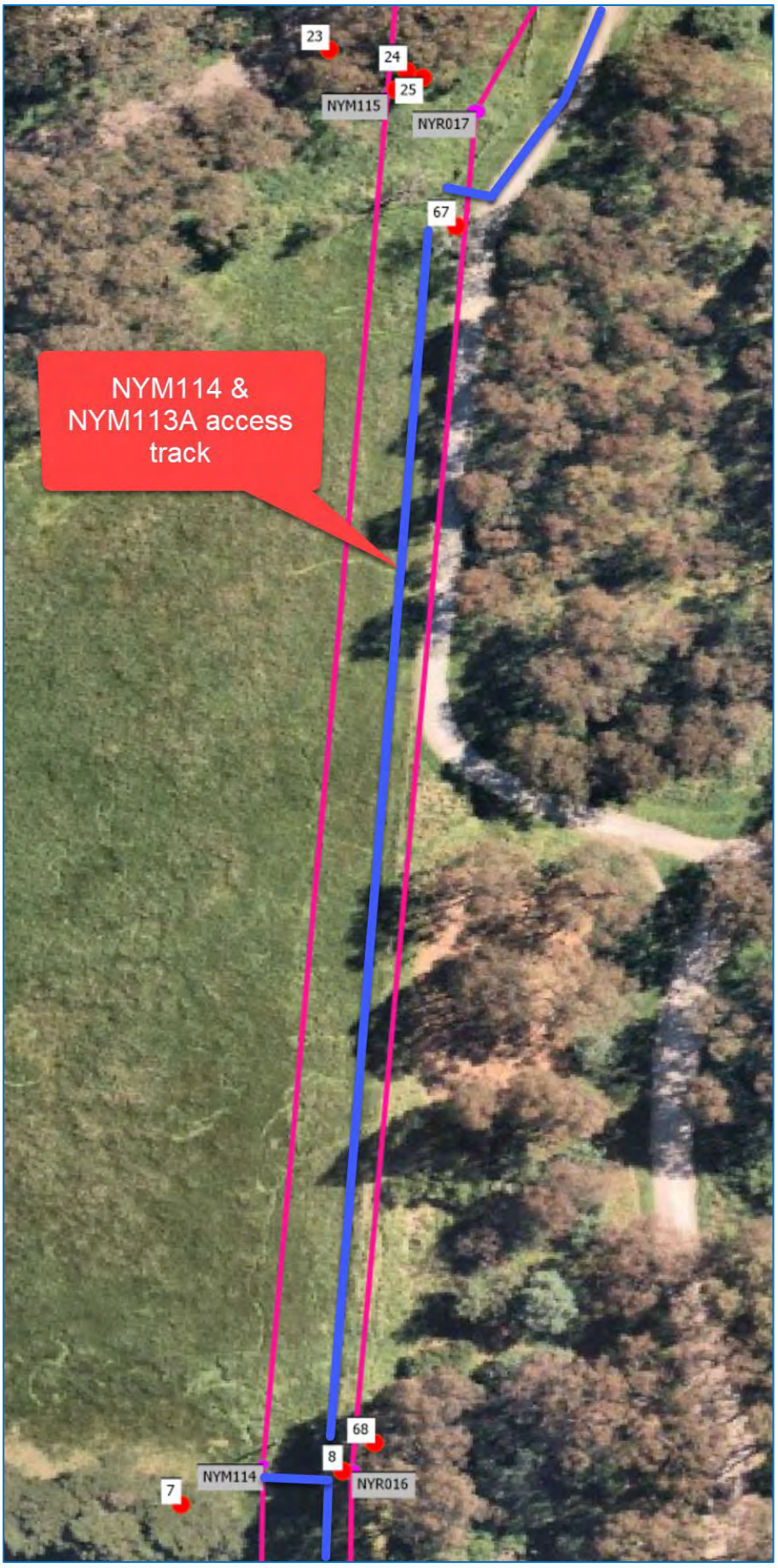

Figure 32 NYM114 (Trees 7, 8, 67 & 68)

21. NYM113A (The Boulevard, Ivanhoe East)

Access to NYM113A is off through Yarraman Riders. Four Trees (Trees 3 - 6) were assessed adjacent to this manhole (Figure 35).

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
3	Hesperocyparis macrocarpa	Moderate	Retained	None	Site	3.9	15	19/399
4	Hesperocyparis macrocarpa	Moderate	Retained	Low	Site	3.7	13.9	18/364
5	Hesperocyparis macrocarpa	Moderate	Retained	Low	Site	3.7	13.6	19/355
6	Hesperocyparis macrocarpa	Moderate	Retained	None	Site	3.5	11.5	19/302
Total number of tree/s referred to in this report (Total): 4								

Figure 33 NYM113A (Trees 3 - 6)

21.1. Tree data

It is understood that some pruning will be required on these trees to facilitate the proposed relining works although the extent of this pruning is not clear.

However, if the access track is continued past this manhole to NYM113 then it is likely that this pruning could be avoided and the required vehicles could be located along the access track.

To enable access to NYM113a Tree 4 and Tree 5 are likely to require pruning to provide clearance:

1) Tree 4 requires access pruning (two 30cm diameter branches).

2) Tree 5 requires access pruning (one 25cm diameter branch).

The removal of these branches from each of these two trees will remove less than 10% 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.

Figure 34 Pruning Tree4 and Tree 5 (NYM1113a)

Action	Type	Notes
Vehicular access	Yes	Over low lying and wet area
TPZ intrusion	Yes	Tree 4 & Tree 5
Ground protection	Required	Where movement is required within TPZ
Tree protection fencing	Not required	
Tree pruning	Yes	Trees 4 & 5
Tree removal	No	
Permit required	Yes	Likely to be required.

Figure 35 NYM113A (Trees 3, 4, 5 & 6)

22. NYM113 (The Boulevard, Ivanhoe East)

Access to NYM113 is off The Boulevard, Ivanhoe East and through Yarraman Riders. One tree (Tree 1) was assessed adjacent to this manhole (Figure 37).

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
1	Eucalyptus camaldulensis	Moderate	Retained	None	Site	1.8	2.5	6/66

Total number of tree/s referred to in this report (Total): 1

Figure 36 NYM113 (Tree 1)

22.1. Tree data

No pruning or tree removal is required.

Action	Type	Notes
Vehicular access	Yes	Over low lying and wet area
TPZ intrusion	No	
Ground protection	Not required	
Tree protection fencing	Not required	
Tree pruning	No	
Tree removal	No	
Permit required	No	

Figure 37 NYM113 (Tree 1)

23. NYM112 and NYM111a (The Boulevard, Ivanhoe East)

Access to NYM112 and NYM11a is via a shared path from The Boulevard, Ivanhoe East. Seventeen trees (Trees 13 – 22 & 69 - 73) were assessed along this path and adjacent to these manholes (Figure 39).

The following controls apply in this location:

- Environmental Significance Overlay – Schedule 1
- Significant Landscape Overlay – Schedule 1
- Heritage Overlay - HO134 Yarra Flats (340-680 The Boulevard, Eaglemont).
  NOTE: While HO134 includes tree controls it is unclear if they apply to any of the trees assessed in this location.

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
13	Acacia melanoxylon	Low	Retained	None	Site	2.1	3.5	6/91
14	Casuarina cunninghamiana	Low	Retained	None	Site	1.6	2	5/47
15	Callistemon citrinus	Moderate	Retained	Low	Site	1.9	2.8	10/72
16	Casuarina cunninghamiana	Moderate	Retained	Low	Site	2.3	4.7	10/123
17	Casuarina cunninghamiana	Moderate	Retained	None	Site	2.2	4	10/104
18	Acacia melanoxylon	Low	Retained	None	Site	2.3	4.7	7/123
19	Acacia melanoxylon	Remove.	Retained	High	Site	1.6	2	6/47
20	Eucalyptus camaldulensis	Low	Retained	Low	Site	1.6	2	6/47
21	Eucalyptus camaldulensis	Low	Retained	Low	Site	1.6	2	6/47
22	Eucalyptus camaldulensis	Low	Retained	Low	Site	1.6	2	6/47
69	Acacia mearnsii	Low	Retained	Low	Site	1.9	2.9	12/75
70	**Eucalyptus camaldulensis**	High	Retained	Low	Site	2.6	6	14/157
71	**Eucalyptus camaldulensis**	High	Retained	Low	Site	3.2	9.6	23/251
72	**Eucalyptus camaldulensis**	High	Retained	Low	Site	2.2	4.2	14/110
73	Eucalyptus camaldulensis	Low	Retained	Low	Site	1.9	2.6	13/69
74	Allocasuarina torulosa	Low	Retained	None	Site	1.8	2.4	7/63

Figure 38 NYM111A & NYM112 (Trees 13 – 22 & 69 – 75)

23.1. Tree data

Pruning and tree removal will be required for access to NYM112 and NYM111a where trees prevent access to the manhole.

1. Tree 15 requires access pruning (two branches, approximately 10cm and 5cm diameter).
2. Tree 16 requires access pruning (one 15cm diameter branch).
3. Tree 19 requires access pruning (three branches of <6cm, 10cm & 5cm).
    a. This pruning is likely to remove approximately 40% of the tree canopy and may result in the destruction of the tree.
    b. However, this is a young tree that may tolerate the required level of pruning.

4. Tree 20 requires access pruning (one 5cm diameter branch – Impact = Very low).
5. Tree 21 requires access pruning (one 5cm diameter branch – Impact = Very low).
6. Tree 69 requires access pruning (several small branches <5cm – Impact = Very low).
7. Tree 70 requires access pruning (two small branches of approximately 10cm – Impact = Very low).
8. Tree 71 requires access pruning (one small branch approximately 15cm – Impact = Very low).
9. Tree 72 requires access pruning (two branches of approximately 23cm & 25cm – Impact = Low).
10. Tree 73 requires access pruning (Two branches of approximately 10cm & 5cm) – Impact = Very low).
11. Tree 75 requires access pruning (One branch of 18cm – Impact = High).)
    a. However, this tree exhibits very poor health and the removal of this single limb will almost certainly result in the death of the tree.
    b. The removal of this tree is recommended.

The removal of these branches from each of these four trees will remove less than 10% 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 four individual trees.

Tree 19 (an *Acacia melanoxylon* with a low retention value) will likely need to be removed, as the extent of pruning required to provide clearance would impact on the health or longevity of this tree.

Three trees (Tree 13, 14 and Tree 15) are located within approximately 10m of NYM111a. If additional clearance is required around the manholes, we recommend the retention of tree 15 (a *Corymbia citriodora* with a moderate retention value), and the removal of Tree 13 (an *Acacia melanoxylon* with a low retention value) and Tree 14 (a *Casuarina cunninghamiana* with a low retention value). Tree 15 is a mature 10 metre tall tree with an estimated ULE of 30 to 60 year; while Tree 13 and 14 are both under 6 metres tall. In comparison Trees 13 and 14 provides less amenity value. Refer to Figure 39Figure 40.

Action	**Type**	**Notes**
Vehicular access	Yes	Over low lying and wet areas
TPZ intrusion	Yes	
Ground protection	Required	May be required
Tree protection fencing	Not required	
Tree pruning	Yes	Several trees
Tree removal	Yes	One dying tree.
Permit required	Yes	Tree pruning & removal

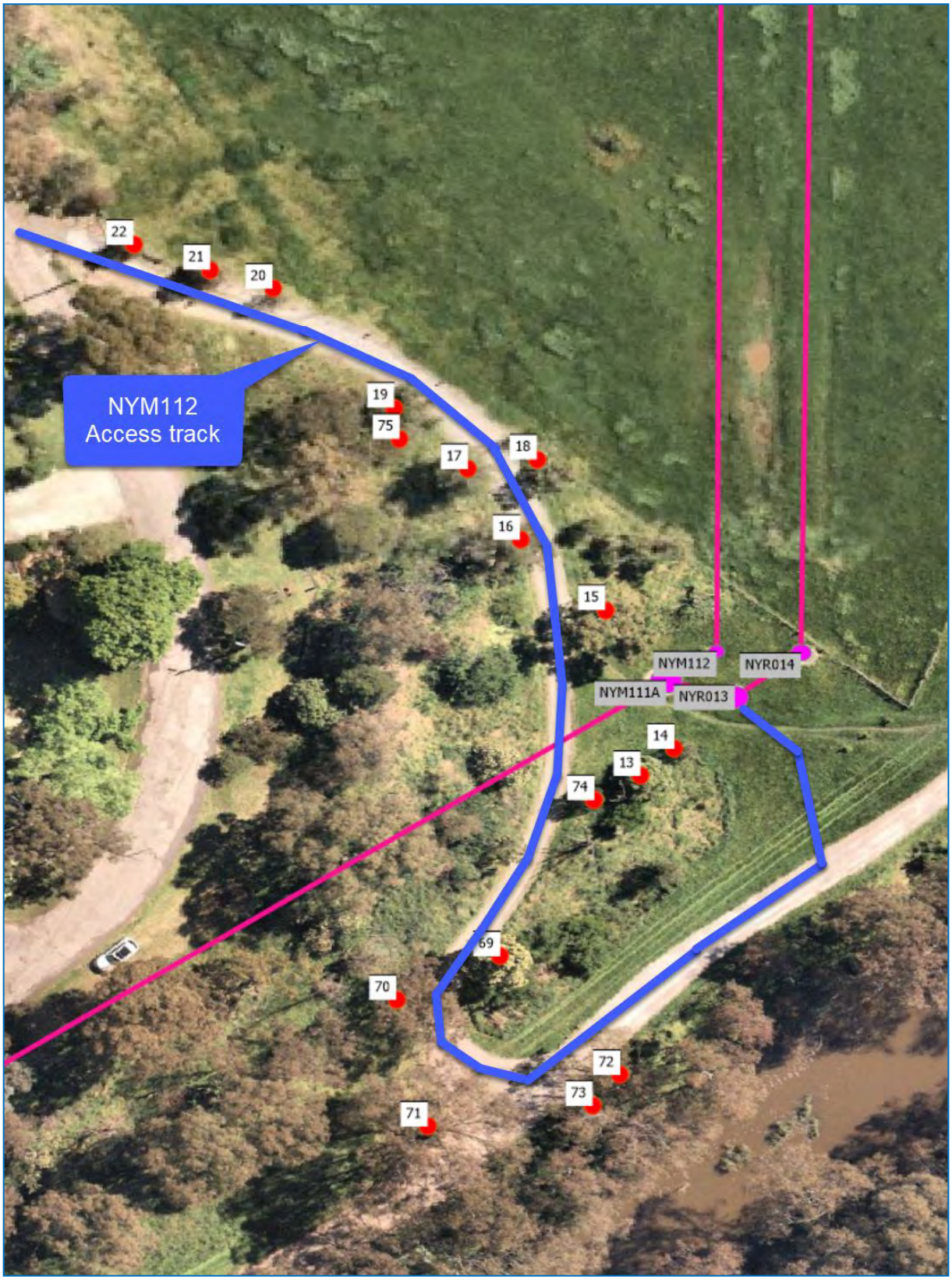

Figure 39 NYM112 (Trees 15, 16, 17, 18, 19, 20, 21, 22, 69, 70., 71, 72 & 730

Figure 40 Pruning Trees 15, 16, 20 and 21 (NYM111a and NYM112)

Figure 43 NYM111A & NYM112 Tree 69 pruning

Figure 41 NYM111A & NYM112 Tree 70 pruning

Figure 42 NYM111A & NYM112 Tree 71 pruning

Figure 44 NYM111A & NYM112 Tree 72 pruning

Figure 45 NYM111A & NYM112 Tree 73 pruning

Figure 46 NYM111A & NYM112 Tree 75 pruning

Figure 47 NYM111A & NYM112 Tree 19 pruning

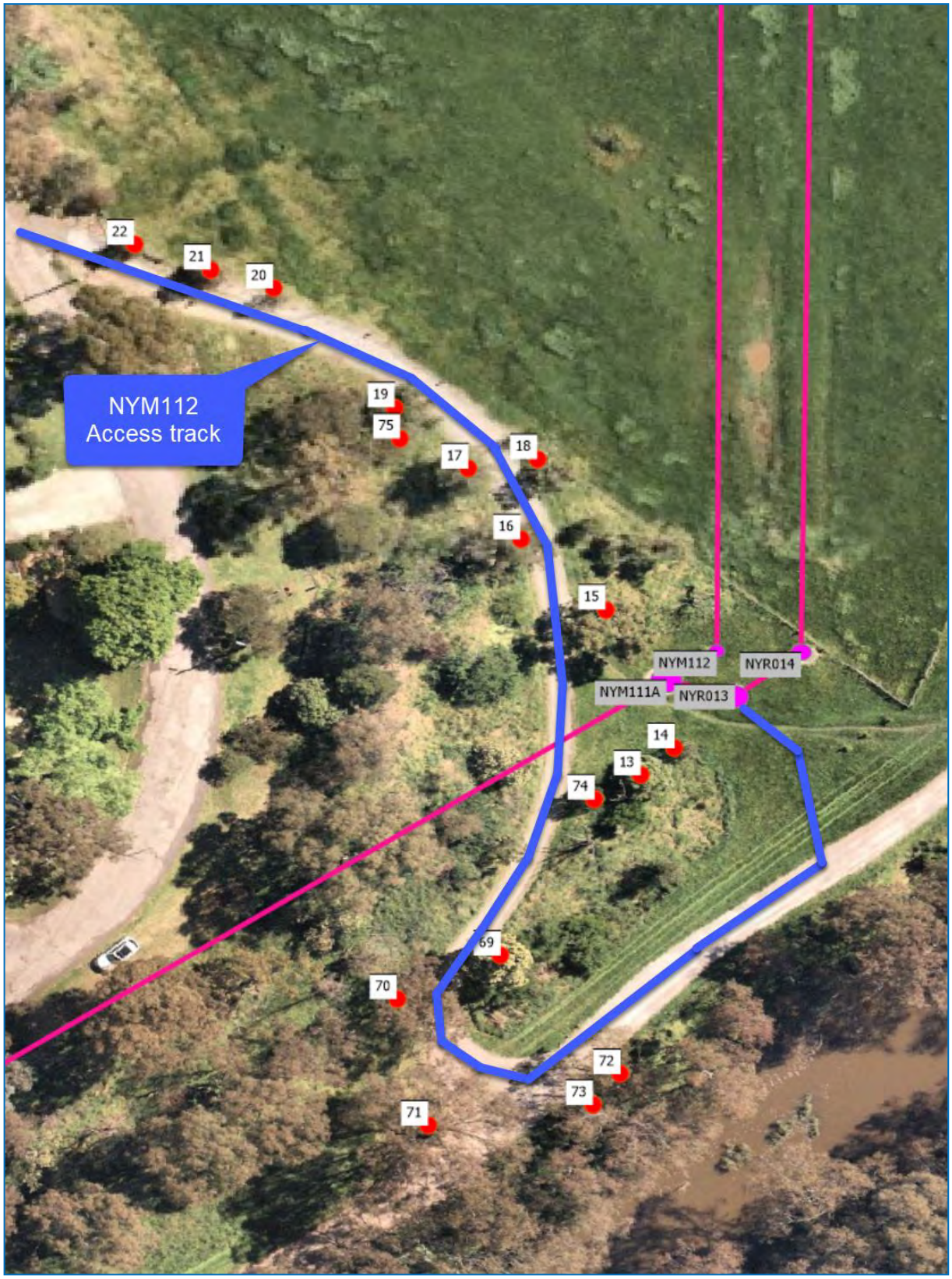

Figure 48 NYM111A & MYM112 Trees 15 - 22 and 69 - 75

24. General site recommendations

1. The findings for this report should be verified with the principal contractor for this project.
2. The permit requirements should be verified with a qualified town planner.
3. 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.
4. The required pruning works must be undertaken by qualified arborists and in accordance with *AS 4373 - 2007 Pruning of Amenity Trees.*
5. It is generally the case that ground protection (Trakmat or similar rather than tree protection fencing) will be required where heavy vehicle movement is required within Tree Protection Zones (TPZ).
6. Bunting style tree protection zone / access track delineation may be required in some situations.
7. Given the transient nature of the works it is likely that full blown tree protection, as specified in *AS 4970 - 2009 Protection of trees on development sites* will be neither required or appropriate.
    a. However, council may specify a more robust level of tree protection and a more robust approach to tree protection may be required to address public concerns.

25. References

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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.

26. 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)

27. Appendix 1 - Tree data

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

- The following information should be read in conjunction with the **'Explanation of Terms'** and the **'Glossary / Notes'** sections found later in this report.

Structural Root Zone (SRZ) (m):	Standards Australia, 2009, AS 4970	Total Number of trees	77
Tree Protection Zone (TPZ) (m):	Standards Australia, 2009, AS 4970		
Modified Tree Protection Zone (mTPZ):	TPZ modification to protect canopy as required		

Tree ID: **1**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	6	**Structure:**	Good
Width (m):	4	**Health:**	Good
DBH (cm):	21 Measured	**Maturity:**	Young
Origin:	Melbourne	**ULE (years):**	> 60
Form:	Good		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.8 TPZ (m): 2.5 mTPZ:

Tree ID: **2**

Genus / species: *Hesperocyparis macrocarpa*

Evergreen Monterey Cypress

Height (m):	18	**Structure:**	Poor
Width (m):	7	**Health:**	Fair
DBH (cm):	167 Measured	**Maturity:**	Over mature
Origin:	Exotic	**ULE (years):**	1 - 5
Form:	Fair		

Retention value: Remove.

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 4.3 TPZ (m): 15.0 mTPZ:

Tree ID: **3**

Genus / species: *Hesperocyparis macrocarpa*

Evergreen Monterey Cypress

Height (m):	19	**Structure:**	Fair
Width (m):	8	**Health:**	Fair
DBH (cm):	127 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	5 - 15
Form:	Fair		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3.9 TPZ (m): 15.0 mTPZ:

Tree ID: **4**

Genus / species: *Hesperocyparis macrocarpa*

Evergreen Monterey Cypress

Height (m):	18	**Structure:**	Fair
Width (m):	8	**Health:**	Fair
DBH (cm):	116 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	5 - 15
Form:	Fair		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 3.7 TPZ (m): 13.9 mTPZ:

Tree ID: **5**

Genus / species: *Hesperocyparis macrocarpa*

Evergreen Monterey Cypress

Height (m):	19	**Structure:**	Fair
Width (m):	8	**Health:**	Fair
DBH (cm):	113 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	5 - 15
Form:	Fair		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 3.7 TPZ (m): 13.6 mTPZ:

Tree ID: **6**

Genus / species: *Hesperocyparis macrocarpa*

Evergreen Monterey Cypress

Height (m):	19	**Structure:**	Fair
Width (m):	8	**Health:**	Fair
DBH (cm):	96 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	5 - 15
Form:	Fair		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3.5 TPZ (m): 11.5 mTPZ:

Tree ID: **7**

Genus / species: *Hesperocyparis macrocarpa*

Evergreen Monterey Cypress

Height (m):	15	**Structure:**	Fair
Width (m):	8	**Health:**	Good
DBH (cm):	82 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Form:	Fair		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 3.2 TPZ (m): 9.8 mTPZ:

Tree ID: **8**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	11	**Structure:**	Good
Width (m):	5	**Health:**	Good
DBH (cm):	16 Measured	**Maturity:**	Immature
Origin:	Melbourne	**ULE (years):**	> 60
Form:	Good		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **9**

Genus / species: *Hesperocyparis macrocarpa*

Evergreen Monterey Cypress

Height (m):	15	**Structure:**	Fair
Width (m):	8	**Health:**	Good
DBH (cm):	85 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Form:	Fair		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 3.3 TPZ (m): 10.2 mTPZ:

Tree ID: **10**

Genus / species: *Hesperocyparis macrocarpa*

Evergreen Monterey Cypress

Height (m):	15	**Structure:**	Fair
Width (m):	8	**Health:**	Fair
DBH (cm):	110 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Form:	Fair		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 3.6 TPZ (m): 13.2 mTPZ:

Tree ID: **11**

Genus / species: *Ulmus procera*

Deciduous English Elm

Height (m):	21	**Structure:**	Good
Width (m):	10	**Health:**	Fair
DBH (cm):	150 Estimated	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 4.1 TPZ (m): 15.0 mTPZ:

Tree ID: **12**

Genus / species: *Ulmus procera*

Deciduous English Elm

Height (m):	19	**Structure:**	Good
Width (m):	10	**Health:**	Fair
DBH (cm):	113 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3.7 TPZ (m): 13.6 mTPZ:

Tree ID: **13**

Genus / species: *Acacia melanoxylon*

Evergreen Blackwood

Height (m):	6	**Structure:**	Good
Width (m):	5	**Health:**	Good
DBH (cm):	29 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	15 - 30
Form:	Good		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.1 TPZ (m): 3.5 mTPZ:

Tree ID: **14**

Genus / species: *Casuarina cunninghamiana*

Evergreen River She - Oak

Height (m):	5	**Structure:**	Good
Width (m):	2	**Health:**	Fair
DBH (cm):	15 Estimated	**Maturity:**	Young
Origin:	Australian	**ULE (years):**	15 - 30
Form:	Good		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **15**

Genus / species: *Callistemon citrinus*

Evergreen Crimson Bottle Brush

Height (m):	10	**Structure:**	Good
Width (m):	8	**Health:**	Good
DBH (cm):	23 Measured	**Maturity:**	Mature
Origin:	Victorian	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 1.9 TPZ (m): 2.8 mTPZ:

Tree ID: **16**

Genus / species: *Casuarina cunninghamiana*

Evergreen River She - Oak

Height (m):	10	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	39 Measured	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	15 - 30
Form:	Good		

Retention value: Moderate

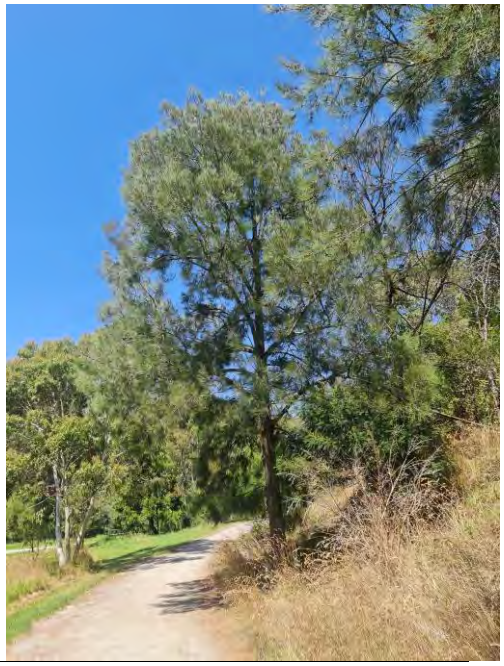
Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 2.3 TPZ (m): 4.7 mTPZ:



Tree ID: **17**

Genus / species: *Casuarina cunninghamiana*

Evergreen River She - Oak

Height (m):	10	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	33 Measured	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.2 TPZ (m): 4.0 mTPZ:

Tree ID: **18**

Genus / species: *Acacia melanoxylon*

Evergreen Blackwood

Height (m):	7	**Structure:**	Fair
Width (m):	5	**Health:**	Fair
DBH (cm):	39 Measured	**Maturity:**	Over mature
Origin:	Melbourne	**ULE (years):**	5 - 15
Form:	Fair		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.3 TPZ (m): 4.7 mTPZ:

Tree ID: **19**

Genus / species: *Acacia melanoxylon*

Evergreen Blackwood

Height (m):	6	**Structure:**	Good
Width (m):	5	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Young
Origin:	Melbourne	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Remove.

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** Very low

Remove.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **20**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	6	**Structure:**	Good
Width (m):	3	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Young
Origin:	Melbourne	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **21**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	6	**Structure:**	Good
Width (m):	3	**Health:**	Good
DBH (cm):	15 Measured	**Maturity:**	Young
Origin:	Melbourne	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **22**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	6	**Structure:**	Good
Width (m):	3	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Young
Origin:	Melbourne	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **23**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	7	**Structure:**	Good
Width (m):	4	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Immature
Origin:	Melbourne	**ULE (years):**	> 60
Form:	Good		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **24**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	6	**Structure:**	Good
Width (m):	4	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Immature
Origin:	Melbourne	**ULE (years):**	> 60
Form:	Good		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **25**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	12	**Structure:**	Good
Width (m):	9	**Health:**	Fair
DBH (cm):	59 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	> 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 2.8 TPZ (m): 7.1 mTPZ:

Tree ID: **26**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	5	**Structure:**	Good
Width (m):	2	**Health:**	Fair
DBH (cm):	10 Measured	**Maturity:**	Immature
Origin:	Melbourne	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** Very low

Remove.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **27**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	18	**Structure:**	Good
Width (m):	10	**Health:**	Good
DBH (cm):	39 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	> 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 2.3 TPZ (m): 4.7 mTPZ:

Tree ID: **28**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	20	**Structure:**	Good
Width (m):	10	**Health:**	Good
DBH (cm):	97 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	> 60
Form:	Good		

Retention value: Very high

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 3.5 TPZ (m): 11.6 mTPZ:

Tree ID: **29**

Genus / species: *Eucalyptus sp.*

Evergreen Gum

Height (m):	22	**Structure:**	Good
Width (m):	10	**Health:**	Good
DBH (cm):	46 Measured	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	> 60
Form:	Good		

Retention value: Very high

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.5 TPZ (m): 5.5 mTPZ:

Tree ID: **30**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	20	**Structure:**	Good
Width (m):	15	**Health:**	Good
DBH (cm):	110 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	> 60
Form:	Good		

Retention value: Very high

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3.6 TPZ (m): 13.2 mTPZ:

Tree ID: **31**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	10	**Structure:**	Fair
Width (m):	5	**Health:**	Good
DBH (cm):	31 Measured	**Maturity:**	Young
Origin:	Melbourne	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.1 TPZ (m): 3.7 mTPZ:

Tree ID: **32**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	25	**Structure:**	Good
Width (m):	15	**Health:**	Good
DBH (cm):	146 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	> 60
Form:	Good		

Retention value: Very high

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 4.1 TPZ (m): 15.0 mTPZ:

Tree ID: **33**

Genus / species: *Fraxinus angustifolia*

Deciduous Narrow Leaf Ash

Height (m):	10	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	15 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **35**

Genus / species: *Fraxinus angustifolia*

Deciduous Narrow Leaf Ash

Height (m):	13	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	42 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.4 TPZ (m): 5.0 mTPZ:

Tree ID: **36**

Genus / species: *Fraxinus angustifolia*

Deciduous Narrow Leaf Ash

Height (m):	13	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	46 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.5 TPZ (m): 5.5 mTPZ:

Tree ID: **37**

Genus / species: *Pittosporum crassifolium*

Evergreen Karo

Height (m):	4	**Structure:**	Poor
Width (m):	2	**Health:**	Fair
DBH (cm):	15 Measured	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	1 - 5
Form:	Poor		

Retention value: Remove.

Removal / retention reason: N/A.

Amenity value: Very low

Works Required: **Works priority:** Very low

Remove.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **38**

Genus / species: *Acacia melanoxylon*

Evergreen Blackwood

Height (m):	5	**Structure:**	Good
Width (m):	2	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Immature
Origin:	Melbourne	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **39**

Genus / species: *Populus alba*

Deciduous White Poplar

Height (m):	9	**Structure:**	Fair
Width (m):	4	**Health:**	Good
DBH (cm):	16 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Form:	Fair		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **40**

Genus / species: *Ligustrum lucidum*

Evergreen Privet

Height (m):	4	**Structure:**	Good
Width (m):	2	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Immature
Origin:	Exotic	**ULE (years):**	15 - 30
Form:	Good		

Retention value: Very low

Removal / retention reason: N/A.

Amenity value: Very low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **41**

Genus / species: *Cotoneaster glaucophyllus*

Evergreen Cotoneaster

Height (m):	6	**Structure:**	Good
Width (m):	4	**Health:**	Good
DBH (cm):	15 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Form:	Good		

Retention value: Very low

Removal / retention reason: N/A.

Amenity value: Very low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **42**

Genus / species: *Lophostemon confertus*

Evergreen Queensland Brush Box

Height (m):	5	**Structure:**	Good
Width (m):	3	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Young
Origin:	Australian	**ULE (years):**	0
Form:	Good		

Retention value: Very low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **43**

Genus / species: *Eucalyptus sideroxylon*

Evergreen Red Ironbark

Height (m):	20	**Structure:**	Good
Width (m):	15	**Health:**	Good
DBH (cm):	101 Measured	**Maturity:**	Mature
Origin:	Victorian	**ULE (years):**	30 - 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3.5 TPZ (m): 12.1 mTPZ:

Tree ID: **44**

Genus / species: *Pinus sp.*

Evergreen Pine

Height (m):	20	**Structure:**	Good
Width (m):	15	**Health:**	Good
DBH (cm):	73 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 3 TPZ (m): 8.8 mTPZ:

Tree ID: **45**

Genus / species: *Hesperocyparis lusitanica*

Evergreen Mexican Cypress

Height (m):	18	**Structure:**	Good
Width (m):	10	**Health:**	Good
DBH (cm):	66 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune.

SRZ (m): 2.9 TPZ (m): 7.9 mTPZ:

Tree ID: **46**

Genus / species: *Pinus sp.*

Evergreen Pine

Height (m): 25 **Structure:** Good

Width (m): 15 **Health:** Fair

DBH (cm): 101 Measured **Maturity:** Mature

Origin: Exotic **ULE (years):** 15 - 30

Form: Good

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3.5 TPZ (m): 12.1 mTPZ:

Tree ID: **47**

Genus / species: *Araucaria bidwillii*

Evergreen Bunya Bunya Pine

Height (m): 18 **Structure:** Good

Width (m): 9 **Health:** Fair

DBH (cm): 47 Measured **Maturity:** Mature

Origin: Australian **ULE (years):** 15 - 30

Form: Fair

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.5 TPZ (m): 5.6 mTPZ:

Tree ID: **48**

Genus / species: *Hesperocyparis arizonica*

Evergreen Arizona Cypress

Height (m): 25 **Structure:** Fair

Width (m): 18 **Health:** Good

DBH (cm): 127 Measured **Maturity:** Mature

Origin: Exotic **ULE (years):** 30 - 60

Form: Fair

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3.9 TPZ (m): 15.0 mTPZ:

Tree ID: **49**

Genus / species: *Hesperocyparis arizonica*

Evergreen Arizona Cypress

Height (m):	25	**Structure:**	Fair
Width (m):	18	**Health:**	Good
DBH (cm):	87 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Fair		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Broken branch/s.

SRZ (m): 3.3 TPZ (m): 10.4 mTPZ:

Tree ID: **50**

Genus / species: *Quercus petraea*

Deciduous Durmast Oak

Height (m):	18	**Structure:**	Fair
Width (m):	12	**Health:**	Fair
DBH (cm):	87 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Fair		

Retention value: Remove.

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3.3 TPZ (m): 10.4 mTPZ:

Tree ID: **51**

Genus / species: *Hesperocyparis arizonica*

Evergreen Arizona Cypress

Height (m):	17	**Structure:**	Fair
Width (m):	6	**Health:**	Poor
DBH (cm):	38 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	5 - 15
Form:	Fair		

Retention value: Remove.

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.3 TPZ (m): 4.6 mTPZ:

Tree ID: **52**

Genus / species: *Quercus petraea*

Deciduous Durmast Oak

Height (m):	18	**Structure:**	Good
Width (m):	9	**Health:**	Fair
DBH (cm):	72 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3 TPZ (m): 8.6 mTPZ:

Tree ID: **53**

Genus / species: *Hesperocyparis lusitanica*

Evergreen Mexican Cypress

Height (m):	28	**Structure:**	Good
Width (m):	12	**Health:**	Good
DBH (cm):	58 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.7 TPZ (m): 7.0 mTPZ:

Tree ID: **54**

Genus / species: *Pinus sp.*

Evergreen Pine

Height (m):	30	**Structure:**	Good
Width (m):	20	**Health:**	Good
DBH (cm):	99 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune

SRZ (m): 3.5 TPZ (m): 11.9 mTPZ:

Tree ID: **55**

Genus / species: *Cedrus sp.*

Evergreen Cedar

Height (m):	18	**Structure:**	Fair
Width (m):	71	**Health:**	Good
DBH (cm):	49 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Fair		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.6 TPZ (m): 5.9 mTPZ:

Tree ID: **56**

Genus / species: *Cedrus sp.*

Evergreen Cedar

Height (m):	18	**Structure:**	Fair
Width (m):	11	**Health:**	Good
DBH (cm):	54 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Fair		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune

SRZ (m): 2.7 TPZ (m): 6.5 mTPZ:

Tree ID: **57**

Genus / species: *Cedrus sp.*

Evergreen Cedar

Height (m):	18	**Structure:**	Fair
Width (m):	11	**Health:**	Good
DBH (cm):	53 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Fair		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.6 TPZ (m): 6.4 mTPZ:

Tree ID: **58**

Genus / species: *Eucalyptus sp.*

Evergreen Gum

Height (m):	20	**Structure:**	Fair
Width (m):	15	**Health:**	Good
DBH (cm):	121 Measured	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	30 - 60
Form:	Fair		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3.8 TPZ (m): 14.5 mTPZ:

Tree ID: **59**

Genus / species: *Eucalyptus sp.*

Evergreen Gum

Height (m):	20	**Structure:**	Fair
Width (m):	15	**Health:**	Fair
DBH (cm):	107 Measured	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	30 - 60
Form:	Fair		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3.6 TPZ (m): 12.8 mTPZ:

Tree ID: **60**

Genus / species: *Eucalyptus sp.*

Evergreen Gum

Height (m):	20	**Structure:**	Fair
Width (m):	15	**Health:**	Poor
DBH (cm):	71 Measured	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	0
Form:	Poor		

Retention value: Remove.

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 3 TPZ (m): 8.5 mTPZ:

Tree ID: **61**

Genus / species: *Eucalyptus sp.*

Evergreen Gum

Height (m):	7	**Structure:**	Fair
Width (m):	5	**Health:**	Fair
DBH (cm):	24 Measured	**Maturity:**	Young
Origin:	Australian	**ULE (years):**	15 - 30
Form:	Fair		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.9 TPZ (m): 2.9 mTPZ:

Tree ID: **62**

Genus / species: *Araucaria bidwillii*

Evergreen Bunya Bunya Pine

Height (m):	20	**Structure:**	Good
Width (m):	10	**Health:**	Good
DBH (cm):	60 Estimated	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	30 - 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.8 TPZ (m): 7.2 mTPZ:

Tree ID: **63**

Genus / species: *Quercus petraea*

Deciduous Durmast Oak

Height (m):	15	**Structure:**	Good
Width (m):	10	**Health:**	Good
DBH (cm):	40 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune

SRZ (m): 2.4 TPZ (m): 4.8 mTPZ:

Tree ID: **64**

Genus / species: *Quercus petraea*

Deciduous Durmast Oak

Height (m):	15	**Structure:**	Good
Width (m):	10	**Health:**	Good
DBH (cm):	42 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune

SRZ (m): 2.4 TPZ (m): 5.0 mTPZ:

Tree ID: **65**

Genus / species: *Quercus petraea*

Deciduous Durmast Oak

Height (m):	10	**Structure:**	Good
Width (m):	8	**Health:**	Good
DBH (cm):	31 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	30 - 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

Prune

SRZ (m): 2.1 TPZ (m): 3.7 mTPZ:

Tree ID: **66**

Genus / species: *Melia azedarach*

Deciduous White Cedar

Height (m):	4	**Structure:**	Good
Width (m):	2	**Health:**	Good
DBH (cm):	5 Estimated	**Maturity:**	Immature
Origin:	Australian	**ULE (years):**	> 60
Form:	Good		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Very low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **67**

Genus / species: *Acacia melanoxylon*

Evergreen Blackwood

Height (m):	8	**Structure:**	Poor
Width (m):	8	**Health:**	Dead
DBH (cm):	40 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	0
Form:	Very poor		

Retention value: Remove.

Removal / retention reason: N/A.

Amenity value: Very low

Works Required: **Works priority:** Very low

Remove.

SRZ (m): 2.4 TPZ (m): 4.8 mTPZ:

Tree ID: **68**

Genus / species: *Acacia dealbata*

Evergreen Silver Wattle

Height (m):	10	**Structure:**	Fair
Width (m):	10	**Health:**	Good
DBH (cm):	35 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	5 - 15
Form:	Fair		

Retention value: Very low

Removal / retention reason: N/A.

Amenity value: Very low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 2.2 TPZ (m): 4.2 mTPZ:

Tree ID: **69**

Genus / species: *Acacia mearnsii*

Evergreen Black Wattle

Height (m):	12	**Structure:**	Good
Width (m):	8	**Health:**	Good
DBH (cm):	24 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	5 - 15
Form:	Fair		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** Very low

A Prune.

SRZ (m): 1.9 TPZ (m): 2.9 mTPZ:

Tree ID: **70**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	14	**Structure:**	Good
Width (m):	12	**Health:**	Good
DBH (cm):	50 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	> 60
Form:	Fair		

Retention value: High

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** Very low

A Prune.

SRZ (m): 2.6 TPZ (m): 6.0 mTPZ:

Tree ID: **71**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	23	**Structure:**	Fair
Width (m):	18	**Health:**	Good
DBH (cm):	80 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Form:	Good		

Retention value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: **Works priority:** Very low

A Prune.

SRZ (m): 3.2 TPZ (m): 9.6 mTPZ:

Tree ID: **72**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	14	**Structure:**	Good
Width (m):	9	**Health:**	Good
DBH (cm):	35 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	> 60
Form:	Fair		

Retention value: High

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: **Works priority:** Very low

A Prune.

SRZ (m): 2.2 TPZ (m): 4.2 mTPZ:

Tree ID: **73**

Genus / species: *Eucalyptus camaldulensis*

Evergreen River Red Gum

Height (m):	13	**Structure:**	Good
Width (m):	7	**Health:**	Fair
DBH (cm):	22 Measured	**Maturity:**	Immature
Origin:	Melbourne	**ULE (years):**	15 - 30
Form:	Poor		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** Very low

A Prune.

SRZ (m): 1.9 TPZ (m): 2.6 mTPZ:

Tree ID: **74**

Genus / species: *Allocasuarina torulosa*

Evergreen Forest Oak

Height (m):	7	**Structure:**	Fair
Width (m):	5	**Health:**	Good
DBH (cm):	20 Estimated	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	30 - 60
Form:	Good		

Retention value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.8 TPZ (m): 2.4 mTPZ:

Tree ID: **75**

Genus / species: *Acacia melanoxylon*

Evergreen Blackwood

Height (m):	7	**Structure:**	Poor
Width (m):	5	**Health:**	Poor
DBH (cm):	30 Estimated	**Maturity:**	Over mature
Origin:	Melbourne	**ULE (years):**	1 - 5
Form:	Poor		

Retention value: Remove.

Removal / retention reason: N/A.

Amenity value: Very low

Works Required: **Works priority:** Very low

Remove.

SRZ (m): 2.1 TPZ (m): 3.6 mTPZ:

Tree ID: **76**

Genus / species: *Ulmus procera*

Deciduous English Elm

Height (m):	3	**Structure:**	Good
Width (m):	2	**Health:**	Good
DBH (cm):	3 Estimated	**Maturity:**	Young
Origin:	Exotic	**ULE (years):**	5 - 15
Form:	Good		

Retention value: Very low

Removal / retention reason: N/A.

Amenity value: Very low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **77**

Genus / species: *Ulmus procera*

Deciduous English Elm

Height (m):	4	**Structure:**	Good
Width (m):	2	**Health:**	Good
DBH (cm):	5 Estimated	**Maturity:**	Young
Origin:	Exotic	**ULE (years):**	5 - 15
Form:	Good		

Retention value: Very low

Removal / retention reason: N/A.

Amenity value: Very low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

Tree ID: **78**

Genus / species: *Ulmus procera*

Deciduous English Elm

Height (m):	4	**Structure:**	Good
Width (m):	2	**Health:**	Good
DBH (cm):	4 Estimated	**Maturity:**	Young
Origin:	Exotic	**ULE (years):**	5 - 15
Form:	Good		

Retention value: Very low

Removal / retention reason: N/A.

Amenity value: Very low

Works Required: **Works priority:** N/A

N/A.

SRZ (m): 1.6 TPZ (m): 2.0 mTPZ:

28. 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.

28.1. 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:

28.1.1. 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.

28.1.2. 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.

28.2. 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.

28.3. 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.

29. 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”.

30. 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.

30.1. 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.

30.2. 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.

30.3. 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.

30.4. 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.

30.5. 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

30.6. 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.**

30.7. 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.**

30.8. 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.**

31. 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.

32. 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.

33. Practice Note VCAT 2 — Expert Evidence

33.1. Name & address of consultant

33.2. Name & address of consultant

Roger George Greenwood of 172 Ridge Road, Mt Dandenong Vic 3767.

33.3. Qualifications & experience

Roger Greenwood has the following qualifications and experience:

- Graduate Certificate of Arboriculture
- Bachelor of Applied Science (Horticulture).
- Diploma of Applied Science (Horticulture).
- Advanced Certificate of Arboriculture.
- 38 years experience in arboriculture.
  - 8 years as a partner in The Tree Works dealing with all aspects of commercial arboriculture. The Tree Works provided a range of arboricultural services to government, commercial and domestic clients.
  - 6 years as a contract climber, crew manager and consulting arborist with a range of companies while completing higher education qualifications.
  - 24 years as a consulting arborist.

33.4. Area of expertise

Roger Greenwood provides specialist technical advice in the field of arboriculture. This includes the provision of technical expertise relating to problem diagnosis, management programs, tree appraisal and valuation and the relationship between trees and the built environment.

33.5. Expertise to report

Roger Greenwood has, by training, education, experience and research, considerable knowledge relating to the care, maintenance and management of trees in a wide variety of contexts.

Significant areas of operation and expertise include the provision of tree and built structure conflict reports, hazard assessment, tree condition appraisal and broad scale tree inventories.

Considerable effort is expended in research to remain current with the latest advances in all areas relating to tree care.

33.6. Declaration

“I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld from the Tribunal.”

34. Assumptions & limiting conditions

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Yours sincerely,

Roger Greenwood

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