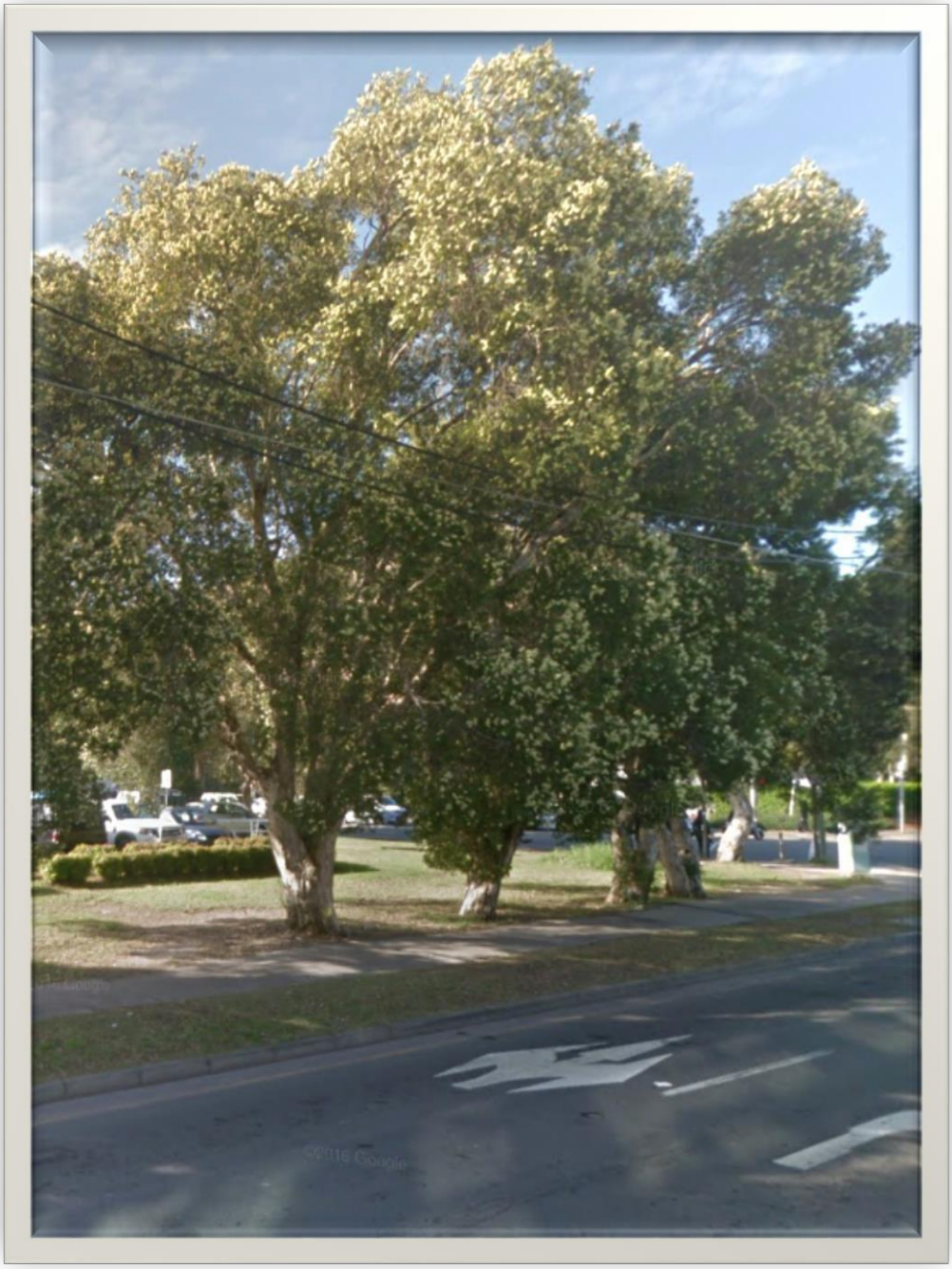
ARBORICULTURAL REPORT



Bourke Road & Burrows Road
WestConnex New M5
Prepared for CDS-JV
M5N-ES-RPT-LRW-0007-05
Date 1 March 2017

Contents

1. Introduction

The WestConnex scheme is a NSW Government initiative to connect Sydney's west and south-west with the Sydney Airport and Port Botany precinct. It is being delivered by the Sydney Motorway Corporation (SMC), formerly the WestConnex Delivery Authority (WDA). Part of that project is the WestConnex Stage 2, referred to as the New M5.

The project will run from the existing M5 East corridor at Beverly Hills via a tunnel to St Peters, providing improved access to the airport, South Sydney and Port Botany precincts. The Project will substantially improve the east - west corridor access between the Sydney CBD, Port Botany and Sydney Airport precincts and the South West growth areas. The project will deliver approximately nine (9) kilometres of two-lane twin tunnels with capacity to operate three lanes in the future, motorway to motorway connections to the King Georges Road Interchange Upgrade at Beverly Hills, and a new interchange at St Peters. Infrastructure Approval was granted for the project on 20 April 2016. Major works are expected to commence in mid-2016 and the New M5 tunnel is scheduled to open to traffic in late 2019.

The CPB Contractors Dragados Samsung Joint Venture (CDS-JV) has been awarded the design and construction of the New M5.

CPB Dragados Samsung Joint Venture (CDS-JV) has commissioned [redacted] to prepare an Arboricultural Impact Assessment Report for proposed road widening and surface works at Euston Road, Alexandria. The scopes of work being:

- Surface works along Bourke Road and Gardeners Road, including road widening, and footpath construction.

The proposed works are part of the WestConnex New M5 Development Project.

The purpose of this report is to:

- Identify trees that are likely to be affected by the scope of works.
- Assess the current overall health and condition of the subject trees.
- Evaluate the significance of the subject trees and assess their suitability for retention.

The Report has been developed to mirror the same requirements of the reports previously approved Department of Planning and Environment (DPE) and addresses the requirements of Condition B63 in accordance with **Table 1**.

Table 1: Condition of Approval B63 Compliance Table

Condition	Requirement	Addressed in:
B63	The SSI must be designed to retain as many trees as possible and provide a net increase in the number of replacement trees. The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) prior to removing any trees on the periphery and/or outside the construction footprint as identified in the figures in Section 6 of the document referred to in condition A2(b), including any tree(s) removed along Euston Road. The Tree Report may be prepared for the entire SSI or separate reports may be prepared for individual areas where trees are required to be removed. The report(s) must identify the impacts of the SSI on trees and vegetation within and adjacent to the construction footprint. The report(s) must include:	This Report
B63(a)	a visual tree assessment with inputs from the design, landscape architect, construction team;	Section 4a: Site Observation Section 4c: Documents, Inputs and Plans Referenced
B63(b)	consideration of all options to amend the SSI where a tree has been identified for removal, including realignment, relocation of services, redesign of or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services.	Section 4c: Documents, Inputs and Plans Referenced
B63(c)	Measures to avoid the removal of trees or minimise damage to existing trees and is to ensure the health and stability of those trees to be protected. This includes details of any proposed canopy or root pruning, excavation works, site controls on waste disposal, vehicular access, and storage of materials and protection of public utilities.	Section 7: Recommendations
	In the event that trees are to be removed, then replacement trees are to be planted within, or in close proximity to, the SSI boundary, including along Euston Road where feasible and reasonable The location of the trees must be determined in consultation with the relevant council(s). The replacement trees are to have a minimum pot size of 75 litres. A copy of the report(s) must be submitted to the Secretary for approval prior to the removal, damage and/or pruning of any trees, including those affected by site establishment works. All recommendations of the report must be implemented by the Proponent, unless otherwise agreed by the Secretary.	Consistent with earlier approved Tree Reports replanting will be detailed in the Urban Design and Landscape Plan in consultation with relevant councils.

2. Study Area

The study area comprises of the following areas:

- Approximately 3ha of land situated along and surrounding Bourke Road. The eastern extent of the study area is bound by industrial buildings and offices. The western extent is bound by Alexandra Canal. The southern extent of the study area is bound by Gardeners Road. This is presented in **Map 1**.

Any future works that may affect trees beyond the study area will be addressed in a tree report prepared and approved before any such works.

Map 1: The study area

The study area
Bourke Road
Date:
24/01/2017

Legend
The study area marked in blue.

3. Scope of Works

Bourke Road will be upgraded permanently to a five (5) to six (6) lane carriageway with access and egress to the surrounding road network, including with a new bridge spanning Alexandra Canal from Burrows and Campbell Roads to Bourke Road.

Works include:

- Demolition and clearing.
- Earthworks.
- Drainage and utility works.
- Provision of local parking.
- Shared cycle and pedestrian paths.
- Signal upgrades.
- Road construction.
- Ancillary works.

The width of the upgrade cannot be lessened without compromising safety design considerations and for this reason the design width cannot be decreased. The location of the road widening is provided in **Chapter 5** and is represented by the full width of the Project Deed boundary. An overview of the Project deed boundary is presented in **Map 2**.

Map 2: The project boundary

Project deed boundary: Bourke Road Date: 12/01/2017 Rev: 0	Legend: Project deed boundary shaded in green

4. Methodology

a. Site observations

The subject trees were inspected between 1st December 2016 and 10th January 2017 by [redacted] A total **77 trees** (and tree groups) within and adjacent to the project deed boundary have been surveyed by a surveyor from CDS-JV. These trees have been identified in **Chapter 5** and tabled in **Appendix B**.

A total of **109** trees (grouped as **88** trees) were identified within the study area shown in **Map 1**.

Details on species; measurements of height, canopy spread, diameter at breast height (DBH), Tree Protection Zones (TPZ) and Structural Root Zones (SRZ); and an assessment of the health and structure of the subject trees is contained in **Appendix A.**

Trees located outside of the specified study area have not been included in this report. If trees located outside of the study area are likely to be impacted, additional arboricultural assessment will be required.

b. Visual Tree Inspection

The subject trees were assessed in accordance with a stage one Visual Tree Assessment (VTA) as formulated by Mattheck & Breloer (1994), and practices consistent with modern arboriculture.

The following limitations apply to this methodology:

- Trees were inspected from ground level, without the use of any invasive or diagnostic tools and testing.
- Trees within adjacent properties or restricted areas were not subject to a complete visual inspection (i.e. defects and abnormalities may be present but not recorded).
- No aerial inspections or root mapping was undertaken.
- Tree heights, canopy spread and diameter at breast height (DBH) was estimated, unless otherwise stated.
- Tree identification was based on broad taxonomical features present and visible from ground level at the time of inspection.

c. Documents, meetings and plans referenced

Inputs from the design, landscape architect and construction teams was incorporated between 1st and 13th December 2016. Representatives include:

- CDS-JV Project Manager, Local Road Works
- CDS-JV Senior Environment Advisor, Local Road Works
- CDS-JV Design Coordinator, Local Road Works
- Hassell Studio Landscape Architect.

The CDS-JV GIS was used to review tree assessment in the study area and the road design. Options to amend the State Significant Infrastructure (SSI) for this area were considered.

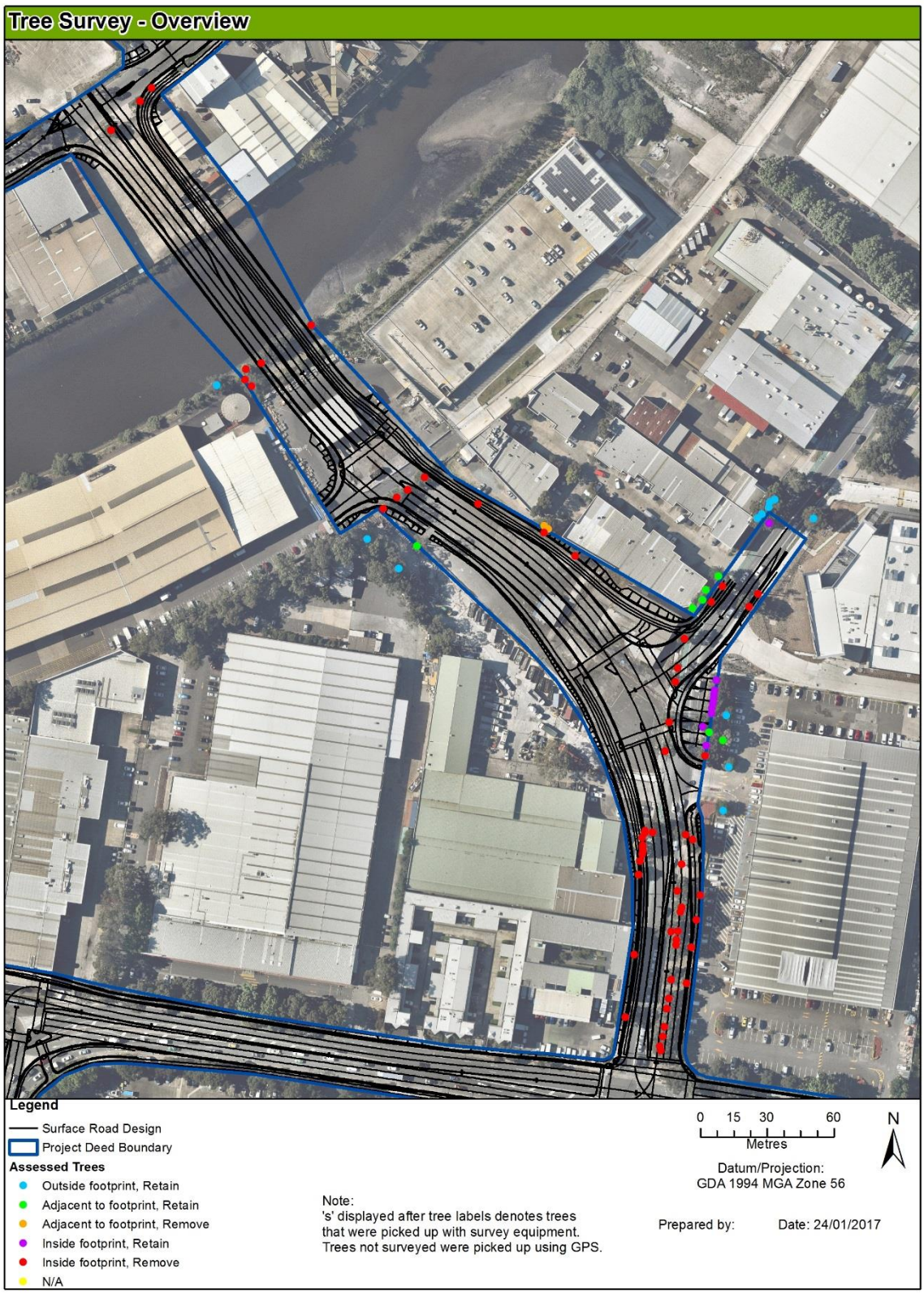
The road corridor has been designed to be as narrow as possible while conforming to relevant design standards. The road corridor and supporting pedestrian and cycling networks are built to boundary. As a result, there are no further opportunities to reduce the road corridor footprint without compromising road safety, access and design standard compliance. The construction methodology has also been considered.

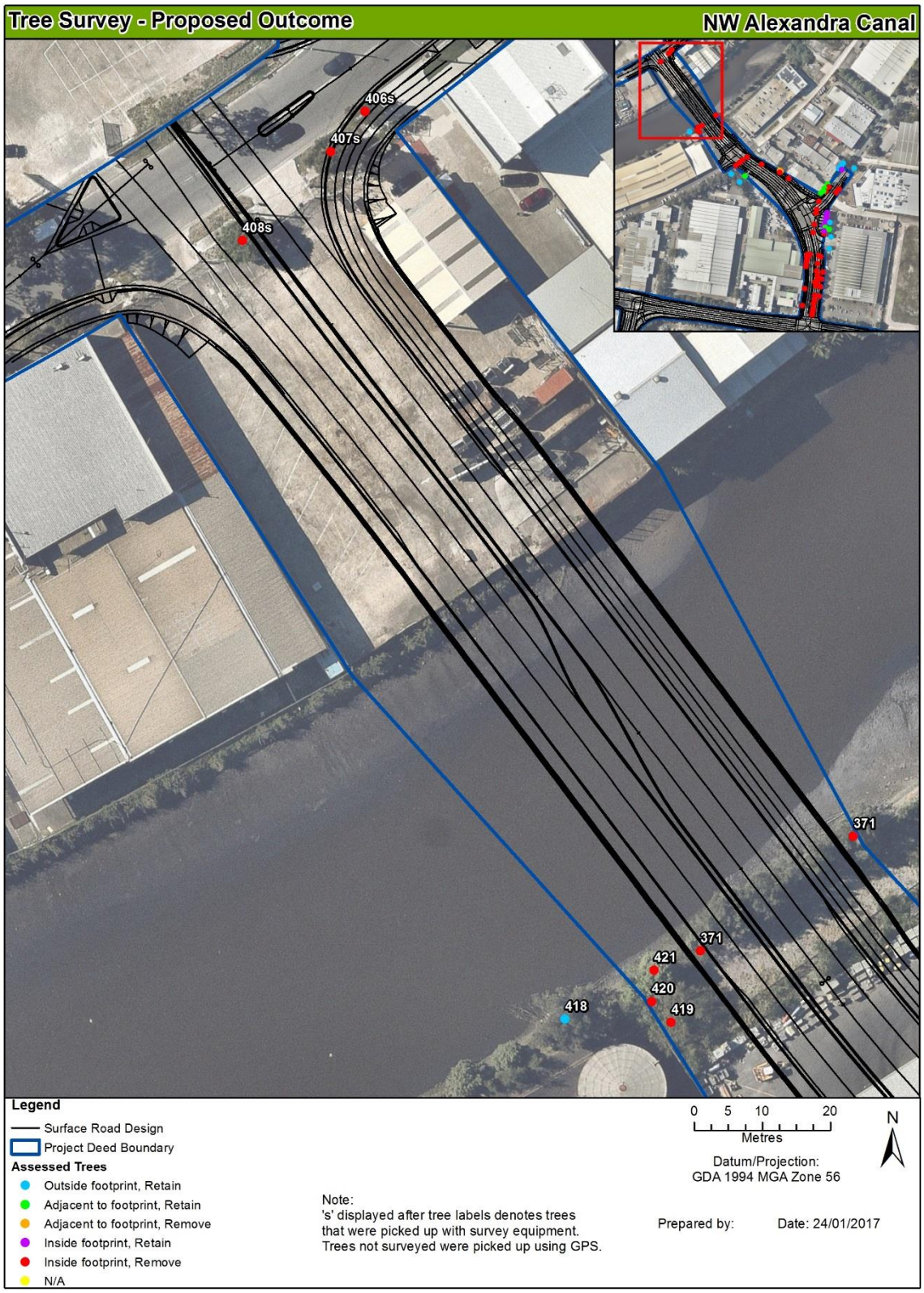
The construction of the road, underground stormwater drainage, utility and services (water, sewer, communications, power), intersection upgrades and pedestrian & shared pathways have been designed to minimize the number of trees being removed whilst delivering on key aspects of the project. Pruning, non-destructive digging techniques and changes to design have been considered so as to maximize opportunities to retain as many trees as possible.

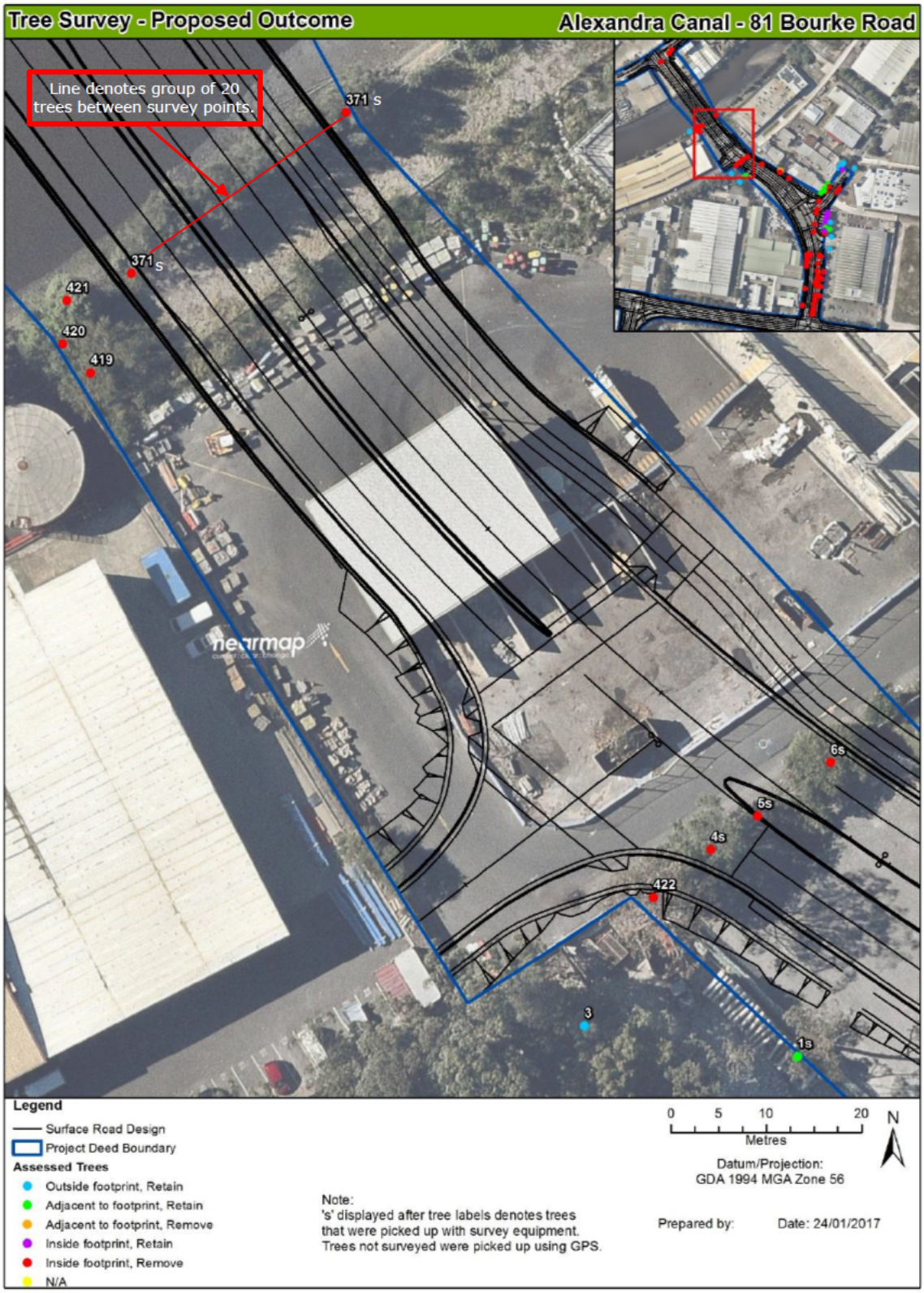
The final urban design and landscape plan will address the planting of trees, where feasible and reasonable, within the SSI boundary in accordance with the Conditions of Approval.

The conclusions and recommendations of this report incorporates the input from the design, urban landscape and construction, identifies both trees to be retained and those needed to be removed in order to deliver the pieces of infrastructure required by the project and are based on Australian Standard AS 4970-2009: *Protection of Trees on Development Sites.*

5. Tree Locations




Tree Survey - Proposed Outcome
NW Alexandra Canal
406s
407s
408s
371
371
421
420
419
418
Legend
Surface Road Design
Project Deed Boundary
Assessed Trees
Outside footprint, Retain
Adjacent to footprint, Retain
Adjacent to footprint, Remove
Inside footprint, Retain
Inside footprint, Remove
N/A
Note:
's' displayed after tree labels denotes trees
that were picked up with survey equipment.
Trees not surveyed were picked up using GPS.
0 5 10 20
Metres
N
Datum/Projection:
GDA 1994 MGA Zone 56
Prepared by:
Date: 24/01/2017


Tree Survey - Proposed Outcome
Alexandra Canal - 81 Bourke Road
Line denotes group of 20 trees between survey points.
371 s
371 s
421
420
419
6s
5s
4s
422
3
1s
nearmap
Legend
Surface Road Design
Project Deed Boundary
Assessed Trees
Outside footprint, Retain
Adjacent to footprint, Retain
Adjacent to footprint, Remove
Inside footprint, Retain
Inside footprint, Remove
N/A
Note:
's' displayed after tree labels denotes trees that were picked up with survey equipment.
Trees not surveyed were picked up using GPS.
0 5 10 20
Metres
N
Datum/Projection:
GDA 1994 MGA Zone 56
Prepared by:
Date: 24/01/2017


Tree Survey - Proposed Outcome
81 Bourke Road
6s
5s
4s
422
7s
8s
9s
10s
1s
11s
2
Legend
Surface Road Design
Project Deed Boundary
Assessed Trees
Outside footprint, Retain
Adjacent to footprint, Retain
Adjacent to footprint, Remove
Inside footprint, Retain
Inside footprint, Remove
N/A
Note:
's' displayed after tree labels denotes trees
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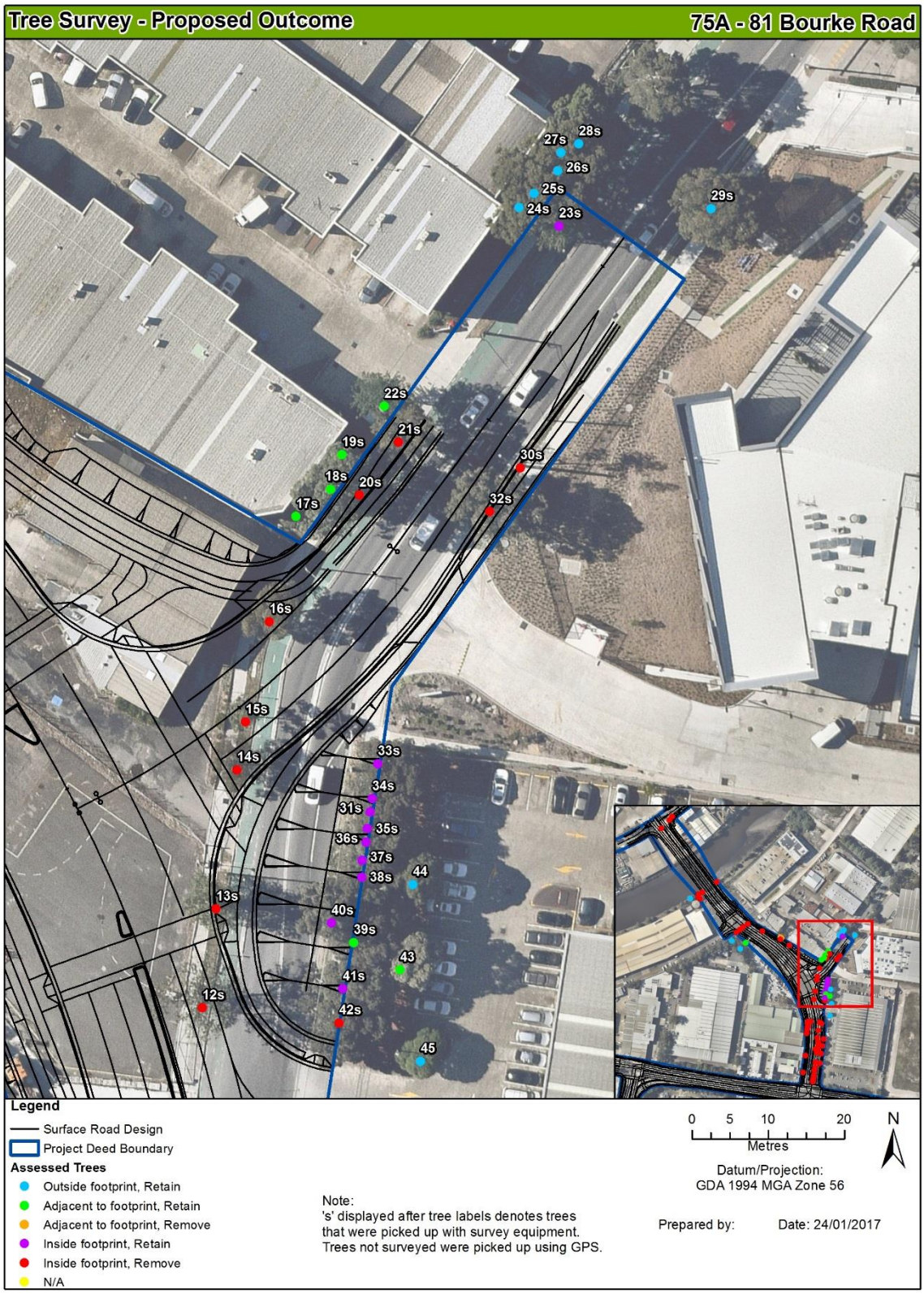
Tree Survey - Proposed Outcome
75A - 81 Bourke Road
27s
28s
26s
25s
24s
23s
29s
22s
21s
19s
18s
20s
17s
30s
32s
16s
15s
14s
33s
34s
31s
35s
36s
37s
38s
44
13s
40s
39s
43
41s
12s
42s
45
Legend
Surface Road Design
Project Deed Boundary
Assessed Trees
Outside footprint, Retain
Adjacent to footprint, Retain
Adjacent to footprint, Remove
Inside footprint, Retain
Inside footprint, Remove
N/A
Note:
's' displayed after tree labels denotes trees
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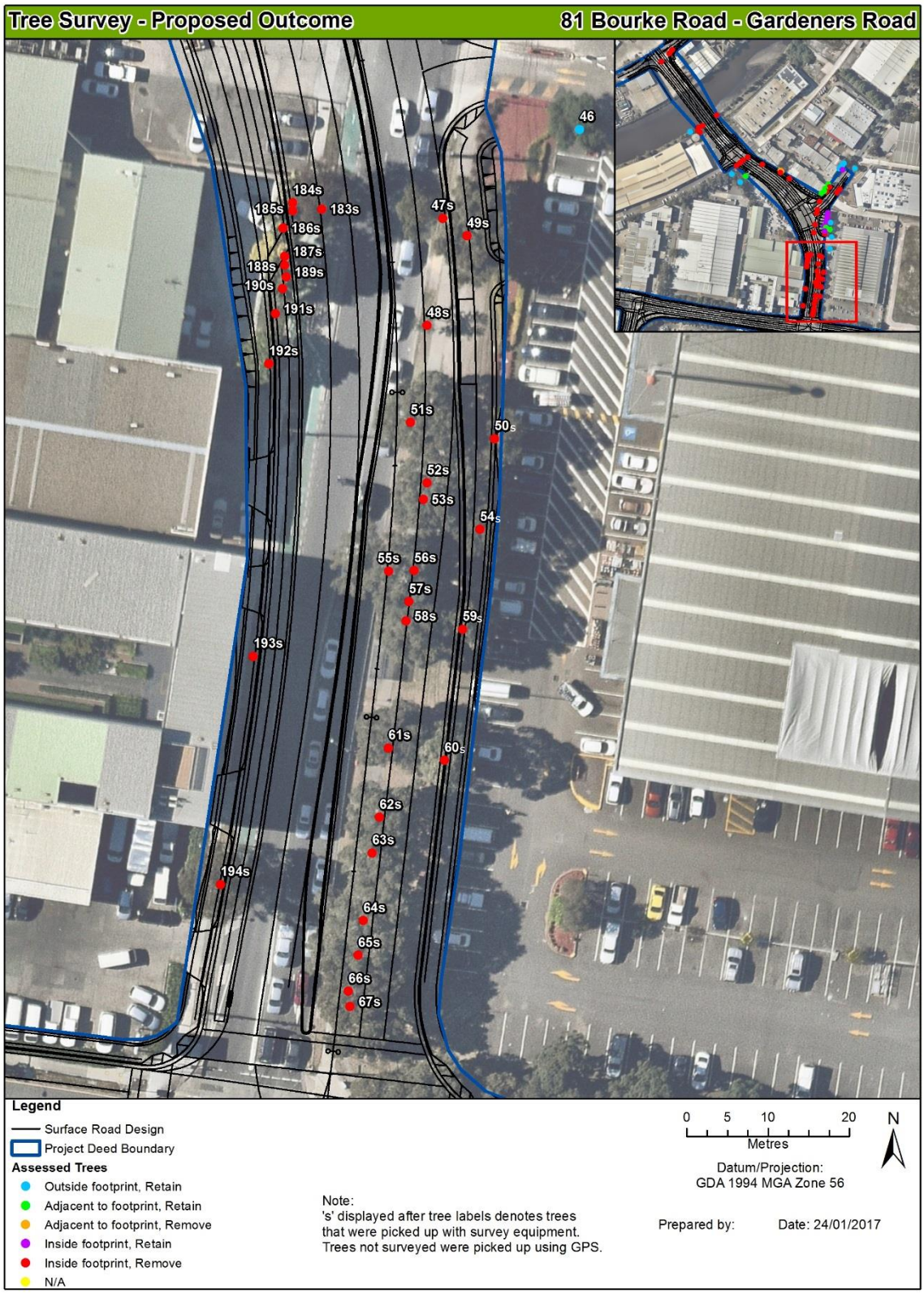
Tree Survey - Proposed Outcome
81 Bourke Road - Gardeners Road
46
184s
185s
183s
186s
187s
188s
189s
190s
191s
192s
47s
49s
48s
51s
50s
52s
53s
54s
55s
56s
57s
58s
59s
193s
61s
60s
62s
63s
194s
64s
65s
66s
67s
Legend
Surface Road Design
Project Deed Boundary
Assessed Trees
Outside footprint, Retain
Adjacent to footprint, Retain
Adjacent to footprint, Remove
Inside footprint, Retain
Inside footprint, Remove
N/A
Note:
's' displayed after tree labels denotes trees that were picked up with survey equipment.
Trees not surveyed were picked up using GPS.
0 5 10 20
Metres
N
Datum/Projection:
GDA 1994 MGA Zone 56
Prepared by:
Date: 24/01/2017

6. Impact Assessment & Results

This impact assessment has been undertaken in accordance with the Australian Standard, AS 4970-2009, *Protection of Trees on Development Sites*. It includes an assessment of retention value, tree location, encroachment into TPZ, cause of encroachment, proposed outcome and reasons for proposed outcome. Results are contained in **Table 2**.

a. Retention value

Tree Retention Value takes into account the significance of each of the subject trees and an assessment of their health and suitability for retention within the development site (refer **Appendix C**).

b. Tree location

The location of a tree is one of the primary contributing factors to the level of impact likely to be sustained by the proposed construction activities.

- Trees inside the footprint - Trees located within the construction footprint cannot be retained without design modification. In order to retain significant trees, design modification or the use of tree sensitive (alternative) construction methods may be recommended or already adopted.

- Trees outside the footprint - Trees located outside of the construction footprint, which are not likely to be significantly impacted by the proposed works can be successfully retained. These trees will require tree protection and ongoing monitoring throughout the entirety of the project.

- Trees adjacent to footprint - Trees located adjacent to the construction footprint or proposed construction activities may be impacted. These impacts will be determined by the level of encroachment that is likely to occur within the TPZ.

Trees located within areas not yet finalised/approved for construction will require further assessment. If the final level of encroachment cannot be determined based on information provided to the arborist at the time of inspection, further assessment will be required.

c. Encroachment into TPZ

Encroachment includes, but is not limited to: excavation, compacted fill, machine trenching, ground penetration, soil disturbance.

- None - The tree is located outside of the proposed footprint and is unlikely to be affected by construction activities.

- Minor Encroachment - If the proposed encroachment is less than 10% (total area) of the TPZ, and outside of the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere, and be contiguous with the TPZ.

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

When determining the potential impacts of encroachment into the TPZ consideration will need to be made to the location and distribution of the roots, including above or below ground restrictions affecting root growth. Location and distribution of roots may be determined through Non-Destructive Excavation (NDE) methods such as; hydro-vacuum excavation (sucker truck), air spade and manual excavation (hand tools). Root investigation is used to determine the extent and location of roots within the zone of conflict. Root investigation does not guarantee the retention of the tree.

d. Cause of encroachment

This determines which particular part of the proposed construction activities will cause the impact to the tree.

e. Proposed outcome

The proposed outcome is the recommended solution for conflicts between trees and the proposed works.

- Remove - Tree is recommended for complete removal. Trees may be recommended for removal regardless of their location. Removal may be recommended based on the species, health, structure, location or risk associated with the tree.

- Retain - Tree can be successfully retained. Trees suitable for retention will require tree protection and ongoing monitoring. Protection is the preferred option in all cases, but pruning and cutting will be implemented by an arborist where the arborist recommends it is required to maintain the viability of the tree being retained. These recommendations will be considered during the regular arborist inspections specified in Section 7b.

f. Reason for proposed outcome

Provides a brief explanation for why the proposed outcome was recommended.

Table 2: Impact Assessment Results

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
1s	Eucalyptus species	High	Adjacent to footprint	Minor	<10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
2	Eucalyptus species	High	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
3	Casuarina glauca	High	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
4s	Eucalyptus species	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
5s	Acacia species	Low	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
6s	Acacia species	Low	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. . Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
7s	Eucalyptus species	Low	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. . Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
8s	Callistemon viminalis	Low	Adjacent footprint	Major	>40%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required. Permission must be obtained from the third party property owner to remove this tree.
9s	Corymbia gummifera	Medium	Adjacent footprint	Major	>40%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is substantially within batters for road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, fill using geotechnically stable layers is required. Permission must be obtained from the third party property owner to remove this tree.
10s	Callistemon species	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is substantially within batters for road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, fill using geotechnically stable layers is required.
11s	Casuarina glauca	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
12s	Populus deltoides	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
13s	Populus nigra	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
14s	Eucalyptus scoparia	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
15s	Corymbia citriodora	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
16s	Eucalyptus scoparia	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
17s	Callistemon species	Medium	Adjacent to footprint	Minor	<10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
18s	Corymbia maculata	High	Adjacent to footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
19s	Callistemon species	Medium	Adjacent to footprint	Minor	<10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
20s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, of Bourke Road incorporating drainage and shared access pathways. In this area, excavation and backfill using geotechnically stable layers is required.
21s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, of Bourke Road incorporating drainage and shared access pathways. In this area, excavation and backfill using geotechnically stable layers is required.
22s	Robinia pseudoacacia	Medium	Adjacent to footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
23s	Populus nigra	High	Inside footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
24s	Lophostemon confertus	Medium	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
25s	Eucalyptus botryoides	High	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
26s	Lophostemon confertus	High	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
27s	Tristaniopsis laurina	Medium	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
28s	Melaleuca quinquenervia	High	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
29s	Melaleuca quinquenervia	High	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
30s	Eucalyptus species	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint of Bourke Road incorporating drainage and pedestrian access pathways. In this area, excavation and backfill using geotechnically stable layers is required.
31s	Melaleuca quinquenervia	High	Inside footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
32s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint of Bourke Road incorporating drainage and pedestrian access pathways. In this area, excavation and backfill using geotechnically stable layers is required.
33s	Melaleuca quinquenervia	High	Inside footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
34s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
35s	Melaleuca quinquenervia	High	Inside footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
36s	Melaleuca quinquenervia	High	Inside footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
37s	Melaleuca quinquenervia	High	Inside footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
38s	Melaleuca quinquenervia	High	Inside footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
39s	Melaleuca quinquenervia	High	Adjacent to footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
40s	Melaleuca quinquenervia	High	Inside footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
41s	Melaleuca quinquenervia	High	Inside footprint	Major	>10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
42s	Melaleuca quinquenervia	High	Inside footprint	Major	>40%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is within the corridor construction footprint of Bourke Road access and egress drive and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
43	Eucalyptus microcorys	High	Adjacent to footprint	Minor	<10%	Construction	Retain	To be retained through implementation of non-destructive construction and/or tree protection.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
44	Eucalyptus microcorys	Medium	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
45	Ulmus parvifolia	High	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
46	Ulmus parvifolia	High	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.
47s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
48s	Eucalyptus species	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
49s	Eucalyptus species	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
50s	Angophora costata	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
51s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
52s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
53s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
54s	Eucalyptus microcorys	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
55s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
56s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
57s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
58s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
59s	Eucalyptus microcorys	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
60s	Eucalyptus microcorys	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
61s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
62s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
63s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
64s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and pathways. In this area, excavation and backfill using geotechnically stable layers is required.
65s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and intersection upgrade. In this area, excavation and backfill using geotechnically stable layers is required.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
66s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and intersection upgrade. In this area, excavation and backfill using geotechnically stable layers is required.
67s	Melaleuca quinquenervia	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and intersection upgrade. In this area, excavation and backfill using geotechnically stable layers is required.
183s	Eucalyptus species	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
184s	Livistona australis	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
185s	Livistona australis	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
186s	Howea forsteriana	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
187s	Howea forsteriana	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
188s	Melaleuca species	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
189s	Acmena smithii	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
190s	Howea forsteriana	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
191s	Plumeria species	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
192s	Ficus macrophylla	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
193s	Eucalyptus species	Low	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area, excavation and backfill using geotechnically stable layers is required.
194s	Eucalyptus species	High	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within the corridor construction footprint of Bourke Road corridor, drainage and intersection upgrade. In this area, excavation and backfill using geotechnically stable layers is required.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
371s	Casuarina species	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area temporary works using cranes, piles, and significant cut and fill with geotechnically stable layers is required so as to provide a safe ground conditions for bridge abutments.
406s	Eucalyptus elata	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Burrows Road to newly constructed bridge. In this area fill using geotechnically stable layers is required
407s	Melaleuca quinquenervia	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Burrows Road to newly constructed bridge. In this area fill using geotechnically stable layers is required
408s	Unknown species	Medium	Inside footprint	Major	100%	Construction	Remove	Subject tree cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Burrows Road to newly constructed bridge. In this area fill using geotechnically stable layers is required
418	Casuarina glauca	Medium	Outside footprint	None	-	-	Retain	To be retained through implementation of non-destructive construction and/or tree protection.

No.	Botanical name	Retention value	Tree Location	Encroachment into TPZ		Cause of encroachment	Proposed outcome	Reason for proposed outcome
419	Casuarina species	Medium	Inside footprint	Major	100%	Construction	Remove	Subject shrub cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. . In this area temporary works using cranes, piles, and significant cut and fill with geotechnically stable layers is required so as to provide a safe ground conditions for bridge abutments.
420	Casuarina species	Medium	Inside footprint	Major	100%	Construction	Remove	Subject shrub cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. . In this area temporary works using cranes, piles, and significant cut and fill with geotechnically stable layers is required so as to provide a safe ground conditions for bridge abutments.
421	Casuarina species	Low	Inside footprint	High	100%	Construction	Remove	Subject shrub cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. . In this area temporary works using cranes, piles, and significant cut and fill with geotechnically stable layers is required so as to provide a safe ground conditions for bridge abutments.
422	Unknown species – Dead tree	Low (dead)	Inside footprint	High	100%	Construction	Remove	Subject tree is dead, and cannot be retained under the current proposal. Non-destructive construction not viable as tree is wholly within road corridor construction footprint, linking Bourke Road to newly constructed bridge. In this area significant filling using geotechnically stable layers is required so as to bring the bridge up to required grades.

7. Recommendations

A total of **109** trees (grouped as **88** trees) were inspected and assessed within the study area. **80** trees (grouped as **59** trees) are marked for removal. **29** trees are marked for retention.

- **88** trees (grouped as **67** trees) are located wholly within the development footprint.
    - **78** trees (grouped as **57** trees) cannot be retained due to the need to conduct significant excavation and / or filling in order to deliver the required infrastructure. These trees are recommended for removal.
    - **10** individual trees are to be retained through tree sensitive construction techniques and/or further arboricultural input in order to reduce impacts to these trees.

- **21** trees are adjacent the development footprint.
    - **2** have been recommended for removal as they will be significantly impacted by fill required to build the new bridge connecting Bourke Road to Burrows and Campbell Roads. Permission from the landholder must be obtained prior to removal of trees on third party land.
    - **19** trees have been recommended for retention. These trees are located adjacent to the proposed works and will require tree sensitive construction techniques and/or further arboricultural input in order to reduce impacts to these trees.

a. Tree protection

The following tree protection measures will be required for the **29** trees suitable for retention (see **Table 2**).

- Tree protection fencing must be established around the perimeter of the TPZ of potentially affected trees. If the protective fencing requires temporary removal, trunk, branch and ground protection must be installed and must comply with AS 4970-2009 - Protection of trees on development sites.

- Any additional construction activities within the TPZ of the subject trees must be assessed and approved by the project arborist, and must comply with AS 4970-2009 - Protection of trees on development sites.

- If any changes are made to Tree Protection Fencing it must be authorised by the site arborist prior to the fencing being removed.

Further information and guidelines on tree protection if required can be provided by [redacted]

b. Inspections

- The site arborist will be required on site to supervise all excavations within the TPZ.

- Scheduled inspections should be undertaken for all subject trees assessed for retention during the course of construction. Normally this is every two (2) weeks. Site diary for Arboricultural works must be kept at the onsite

office for the duration of the project. All matters pertaining to tree management must be documented in this diary and signed of as each issue is resolved.

Trees outside of the study area that may be impacted during the works will require additional Arboricultural Assessment.

c. Tree work

- All pruning and/or tree removal work is to be carried out by, or under supervision of, an arborist with a minimum AQF Level 3 qualification in Arboriculture or equivalent.
- All pruning must be in accordance with Australian Standard AS4373-2007, *Pruning of Amenity Trees*.
- All pruning and/or tree removal work is to be carried out in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998).
- Reference should also be undertaken for any tree works to the SafeWork Australia Guide to Managing Risks of Tree Trimming and Removal Work – 2016.
- Permission must be granted from the relevant consent authority, prior to removing or pruning of any of the subject trees.
- Tree material to used for landscaping where practical or disposed of off-site.

References

Australian Standard, AS 4373-2007, *Pruning of Amenity Trees*.

Australian Standard, AS 4970-2009, *Protection of Trees on Development Sites*.

Mattheck, C & Breloer, H (1994) *'Field Guide for Visual Tree Assessment'* Arboricultural Journal, Vol 18 pp 1-23.

SafeWork Australia Guide to Managing Risks of Tree Trimming and Removal Work – 2016.

WorkCover NSW. 1998. Code of Practice: *Amenity Tree Industry*

Appendix A: Tree Schedule

No	Botanical name	Height (m)	Spread (m)	DBH (mm)	TPZ (m)	SRZ (m)	Health	Structure	Coordinates	Groups
1s	Eucalyptus species	10	7	400	4.8	2.5	Good	Good	-33.917991, 151.186817	
2	Eucalyptus species	10	5	300	3.6	2	Good	Good	-33.918081, 151.186726	
3	Casuarina glauca	8	5	350	4.2	2	Good	Good	-33.917959, 151.186576	
4s	Eucalyptus species	14	8	500	6	2.5	Poor	Good	-33.917794, 151.186723	
5s	Acacia species	8	4	100	2	1.5	Fair	Poor	-33.917763, 151.186776	
6s	Acacia species	5	3	300	3.6	2	Poor	Poor	-33.917713, 151.186861	
7s	Eucalyptus species	4	2	150	2	1.5	Good	Good	-33.917825, 151.187115	
8s	Callistemon viminalis	4	3	200	2.4	2	Good	Fair	-33.917918, 151.187434	
9s	Corymbia gummifera	8	4	200	2.4	2	Good	Good	-33.917931, 151.187455	
10s	Callistemon species	4	3	150	2	1.5	Good	Good	-33.917946, 151.187434	
11s	Casuarina glauca	7	2	150	2	1.5	Fair	Fair	-33.918042, 151.187584	
12s	Populus deltoides	15	8	900	10.8	3	Fair	Fair	-33.918838, 151.188003	
13s	Populus nigra	16	5	950	11.4	3	Good	Fair	-33.918722, 151.188025	
14s	Eucalyptus scoparia	6	6	250	3	2	Good	Good	-33.918559, 151.188058	
15s	Corymbia citriodora	11	3	200	2.4	2	Good	Good	-33.918503, 151.188071	
16s	Eucalyptus scoparia	8	6	350	4.2	2	Good	Fair	-33.918385, 151.188107	
17s	Callistemon species	5	4	150	2	1.5	Good	Fair	-33.918261, 151.188147	
18s	Corymbia maculata	18	8	550	6.6	2.5	Good	Good	-33.91823, 151.188197	
19s	Callistemon species	4	2	150	2	1.5	Good	Good	-33.918189, 151.188214	
20s	Melaleuca quinquenervia	12	5	600	7.2	2.5	Good	Good	-33.918238, 151.188238	
21s	Melaleuca quinquenervia	10	7	800	9.6	3	Good	Good	-33.918176, 151.188294	
22s	Robinia pseudoacacia	11	5	400	4.8	2.5	Good	Good	-33.918133, 151.188276	
23s	Populus nigra	16	5	700	8.4	3	Good	Fair	-33.917924, 151.188527	
24s	Lophostemon confertus	7	5	250	3	2	Good	Fair	-33.917902, 151.188471	
25s	Eucalyptus botryoides	20	10	1000	12	3.5	Good	Good	-33.917885, 151.188492	
26s	Lophostemon confertus	15	8	550	6.6	2.5	Good	Good	-33.917859, 151.188527	
27s	Tristaniopsis laurina	5	4	150	2	1.5	Good	Good	-33.917838, 151.188532	

No	Botanical name	Height (m)	Spread (m)	DBH (mm)	TPZ (m)	SRZ (m)	Health	Structure	Coordinates	Groups
28s	Melaleuca quinquenervia	16	10	650	6.6	2.5	Good	Good	-33.917828, 151.188557	
29s	Melaleuca quinquenervia	16	10	1500	12	3.5	Good	Fair	-33.917907, 151.188742	
30s	Eucalyptus species	12	3	200	2.4	2	Good	Good	-33.918209, 151.188466	
32s	Melaleuca quinquenervia	12	10	1000	12	3.5	Good	Good	-33.918611, 151.188245	
34s	Melaleuca quinquenervia	10	8	500	6	2.5	Good	Fair	-33.91826, 151.188422	
31s	Melaleuca quinquenervia	10	5	850	10.2	3	Good	Good	-33.918554, 151.188257	
33s	Melaleuca quinquenervia	8	7	800	9.6	3	Good	Good	-33.918595, 151.188249	
35s	Melaleuca quinquenervia	8	8	500	6	2.5	Good	Good	-33.918631, 151.188241	
36s	Melaleuca quinquenervia	8	7	900	10.3	3	Good	Good	-33.918647, 151.188239	
37s	Melaleuca quinquenervia	10	8	1000	12	3.5	Good	Good	-33.918668, 151.188233	
38s	Melaleuca quinquenervia	8	6	950	11.4	3	Good	Fair	-33.918688, 151.188232	
39s	Melaleuca quinquenervia	8	8	900	10.8	3	Good	Good	-33.918765, 151.188218	
40s	Melaleuca quinquenervia	12	6	1000	12	3.5	Good	Fair	-33.918741, 151.188188	
41s	Melaleuca quinquenervia	8	7	1400	12	3.5	Good	Good	-33.918819, 151.188202	
42s	Melaleuca quinquenervia	10	8	1400	12	3.5	Good	Good	-33.918859, 151.188196	
43	Eucalyptus microcorys	8	6	450	5.4	2.5	Good	Good	-33.918798, 151.188284	
44	Eucalyptus microcorys	7	5	200	2.4	2	Good	Good	-33.918698, 151.188304	
45	Ulmus parvifolia	5	6	400	4.8	2.5	Good	Good	-33.918906, 151.18831	
46	Ulmus parvifolia	6	6	500	6	2.5	Good	Good	-33.919083, 151.18828	
47s	Melaleuca quinquenervia	8	8	1500	12	3.5	Good	Good	-33.919178, 151.188096	
48s	Eucalyptus species	8	6	350	4.2	2	Good	Fair	-33.919296, 151.188073	
49s	Eucalyptus species	4	3	150	2	1.5	Good	Fair	-33.919198, 151.188128	
50s	Angophora costata	7	5	400	4.8	2.5	Good	Good	-33.919423, 151.18816	
51s	Melaleuca quinquenervia	10	8	1000	12	3.5	Good	Fair	-33.919403, 151.188049	
52s	Melaleuca quinquenervia	8	7	800	9.6	3	Good	Good	-33.91947, 151.188069	
53s	Melaleuca quinquenervia	7	5	1000	12	3.5	Good	Good	-33.919489, 151.188064	
54s	Eucalyptus microcorys	7	6	400	4.8	2.5	Good	Good	-33.919523, 151.188138	
55s	Melaleuca quinquenervia	10	6	650	7.8	3	Good	Good	-33.919567, 151.188016	

No	Botanical name	Height (m)	Spread (m)	DBH (mm)	TPZ (m)	SRZ (m)	Health	Structure	Coordinates	Groups
56s	Melaleuca quinquenervia	7	6	550	6.6	2.5	Good	Fair	-33.919567, 151.18805	
57s	Melaleuca quinquenervia	7	7	1000	12	3.5	Good	Good	-33.919601, 151.188042	
58s	Melaleuca quinquenervia	7	5	950	11.4	3	Good	Fair	-33.919623, 151.188038	
59s	Eucalyptus microcorys	6	5	450	5.4	2.5	Good	Good	-33.919633, 151.188113	
60s	Eucalyptus microcorys	9	6	450	5.4	2.5	Good	Good	-33.919777, 151.188086	
61s	Melaleuca quinquenervia	7	6	750	9	3	Good	Good	-33.919763, 151.188012	
62s	Melaleuca quinquenervia	9	10	700	8.4	3	Good	Fair	-33.919839, 151.187998	
63s	Melaleuca quinquenervia	8	8	850	10.2	3	Good	Fair	-33.919878, 151.187988	
64s	Melaleuca quinquenervia	9	7	1050	12	3.5	Good	Good	-33.919953, 151.187975	
65s	Melaleuca quinquenervia	7	6	650	6.6	2.5	Good	Fair	-33.919991, 151.187967	
66s	Melaleuca quinquenervia	8	8	900	10.8	3	Good	Good	-33.920031, 151.187953	
67s	Melaleuca quinquenervia	8	6	800	9.6	2.5	Good	Fair	-33.920048, 151.187955	
183s	Eucalyptus species	8	10	450	5.4	2.5	Good	Good	-33.919166, 151.187936	
184s	Livistona australis	5	5	400	4.8	2.5	Good	Good	-33.919158, 151.187897	
185s	Livistona australis	6	6	400	4.8	2.5	Good	Good	-33.919167, 151.187897	
186s	Howea forsteriana	5	4	200	2.4	2	Good	Good	-33.919186, 151.187884	
187s	Howea forsteriana	6	5	200	2.4	2	Good	Good	-33.919217, 151.187885	
188s	Melaleuca species	7	6	250	3	2	Good	Fair	-33.919227, 151.187885	
189s	Acmena smithii	8	4	400	4.8	2.5	Good	Good	-33.91924, 151.187887	
190s	Howea forsteriana	6	6	400	4.8	2.5	Good	Good	-33.919253, 151.187882	
191s	Plumeria species	5	6	600	7.2	2.5	Good	Fair	-33.91928, 151.187872	
192s	Ficus macrophylla	8	8	450	5.4	2.5	Good	Good	-33.919335, 151.187862	
193s	Eucalyptus species	4	2	150	2	1.5	Good	Good	-33.919659, 151.187835	
194s	Eucalyptus species	10	10	450	5.4	2.5	Good	Good	-33.91991, 151.187786	
371s	Casuarina species	7	3	200	2.4	2	Fair	Fair	-33.917091, 151.186324	Two coordinates covering group of 20 trees
371s	Casuarina species - Grouped with that above								-33.91724, 151.186077	
406s	Eucalyptus elata	4	3	200	2.4	2	Fair	Poor	-33.91612, 151.185568	

No	Botanical name	Height (m)	Spread (m)	DBH (mm)	TPZ (m)	SRZ (m)	Health	Structure	Coordinates	Groups
407s	Melaleuca quinquenervia	10	6	400	4.8	2.5	Good	Fair	-33.916173, 151.185512	
408s	Unknown species	6	5	200	2.4	2	Good	Fair	-33.916288, 151.18537	Group of 3 trees
418	Casuarina glauca	7	3	300	3.6	2	Good	Good	-33.917326, 151.18586	
419	Casuarina species	3	3	150	2	1.5	Good	Fair	-33.917333, 151.186029	
420	Casuarina species	3	3	150	2	1.5	Good	Fair	-33.917305, 151.185998	
421	Casuarina species	3	3	150	2	1.5	Good	Fair	-33.917264, 151.186004	
422	Unknown species – Dead tree	15	7	350	NA	NA	Poor	Poor	-33.917838, 151.186657	

Appendix B: Surveyed Trees

No	Botanical name	Height (m)	Spread (m)	DBH (mm)	TPZ (m)	SRZ (m)	Health	Structure	Coordinates
1s	Eucalyptus species	10	7	400	4.8	2.5	Good	Good	-33.917991, 151.186817
4s	Eucalyptus species	14	8	500	6	2.5	Poor	Good	-33.917794, 151.186723
5s	Acacia species	8	4	100	2	1.5	Fair	Poor	-33.917763, 151.186776
6s	Acacia species	5	3	300	3.6	2	Poor	Poor	-33.917713, 151.186861
7s	Eucalyptus species	4	2	150	2	1.5	Good	Good	-33.917825, 151.187115
8s	Callistemon viminalis	4	3	200	2.4	2	Good	Fair	-33.917918, 151.187434
9s	Corymbia gummifera	8	4	200	2.4	2	Good	Good	-33.917931, 151.187455
10s	Callistemon species	4	3	150	2	1.5	Good	Good	-33.917946, 151.187434
11s	Casuarina glauca	7	2	150	2	1.5	Fair	Fair	-33.918042, 151.187584
12s	Populus deltoides	15	8	900	10.8	3	Fair	Fair	-33.918838, 151.188003
13s	Populus nigra	16	5	950	11.4	3	Good	Fair	-33.918722, 151.188025
14s	Eucalyptus scoparia	6	6	250	3	2	Good	Good	-33.918559, 151.188058
15s	Corymbia citriodora	11	3	200	2.4	2	Good	Good	-33.918503, 151.188071
16s	Eucalyptus scoparia	8	6	350	4.2	2	Good	Fair	-33.918385, 151.188107
17s	Callistemon species	5	4	150	2	1.5	Good	Fair	-33.918261, 151.188147
18s	Corymbia maculata	18	8	550	6.6	2.5	Good	Good	-33.91823, 151.188197
19s	Callistemon species	4	2	150	2	1.5	Good	Good	-33.918189, 151.188214
20s	Melaleuca quinquenervia	12	5	600	7.2	2.5	Good	Good	-33.918238, 151.188238
21s	Melaleuca quinquenervia	10	7	800	9.6	3	Good	Good	-33.918176, 151.188294
22s	Robinia pseudoacacia	11	5	400	4.8	2.5	Good	Good	-33.918133, 151.188276
23s	Populus nigra	16	5	700	8.4	3	Good	Fair	-33.917924, 151.188527
24s	Lophostemon confertus	7	5	250	3	2	Good	Fair	-33.917902, 151.188471
25s	Eucalyptus botryoides	20	10	1000	12	3.5	Good	Good	-33.917885, 151.188492
26s	Lophostemon confertus	15	8	550	6.6	2.5	Good	Good	-33.917859, 151.188527
27s	Tristaniopsis laurina	5	4	150	2	1.5	Good	Good	-33.917838, 151.188532
28s	Melaleuca quinquenervia	16	10	650	6.6	2.5	Good	Good	-33.917828, 151.188557
29s	Melaleuca quinquenervia	16	10	1500	12	3.5	Good	Fair	-33.917907, 151.188742

No	Botanical name	Height (m)	Spread (m)	DBH (mm)	TPZ (m)	SRZ (m)	Health	Structure	Coordinates
30s	Eucalyptus species	12	3	200	2.4	2	Good	Good	-33.918209, 151.188466
32s	Melaleuca quinquenervia	12	10	1000	12	3.5	Good	Good	-33.918611, 151.188245
34s	Melaleuca quinquenervia	10	8	500	6	2.5	Good	Fair	-33.91826, 151.188422
31s	Melaleuca quinquenervia	10	5	850	10.2	3	Good	Good	-33.918554, 151.188257
33s	Melaleuca quinquenervia	8	7	800	9.6	3	Good	Good	-33.918595, 151.188249
35s	Melaleuca quinquenervia	8	8	500	6	2.5	Good	Good	-33.918631, 151.188241
36s	Melaleuca quinquenervia	8	7	900	10.3	3	Good	Good	-33.918647, 151.188239
37s	Melaleuca quinquenervia	10	8	1000	12	3.5	Good	Good	-33.918668, 151.188233
38s	Melaleuca quinquenervia	8	6	950	11.4	3	Good	Fair	-33.918688, 151.188232
39s	Melaleuca quinquenervia	8	8	900	10.8	3	Good	Good	-33.918765, 151.188218
40s	Melaleuca quinquenervia	12	6	1000	12	3.5	Good	Fair	-33.918741, 151.188188
41s	Melaleuca quinquenervia	8	7	1400	12	3.5	Good	Good	-33.918819, 151.188202
42s	Melaleuca quinquenervia	10	8	1400	12	3.5	Good	Good	-33.918859, 151.188196
47s	Melaleuca quinquenervia	8	8	1500	12	3.5	Good	Good	-33.919178, 151.188096
48s	Eucalyptus species	8	6	350	4.2	2	Good	Fair	-33.919296, 151.188073
49s	Eucalyptus species	4	3	150	2	1.5	Good	Fair	-33.919198, 151.188128
50s	Angophora costata	7	5	400	4.8	2.5	Good	Good	-33.919423, 151.18816
51s	Melaleuca quinquenervia	10	8	1000	12	3.5	Good	Fair	-33.919403, 151.188049
52s	Melaleuca quinquenervia	8	7	800	9.6	3	Good	Good	-33.91947, 151.188069
53s	Melaleuca quinquenervia	7	5	1000	12	3.5	Good	Good	-33.919489, 151.188064
54s	Eucalyptus microcorys	7	6	400	4.8	2.5	Good	Good	-33.919523, 151.188138
55s	Melaleuca quinquenervia	10	6	650	7.8	3	Good	Good	-33.919567, 151.188016

No	Botanical name	Height (m)	Spread (m)	DBH (mm)	TPZ (m)	SRZ (m)	Health	Structure	Coordinates
56s	Melaleuca quinquenervia	7	6	550	6.6	2.5	Good	Fair	-33.919567, 151.18805
57s	Melaleuca quinquenervia	7	7	1000	12	3.5	Good	Good	-33.919601, 151.188042
58s	Melaleuca quinquenervia	7	5	950	11.4	3	Good	Fair	-33.919623, 151.188038
59s	Eucalyptus microcorys	6	5	450	5.4	2.5	Good	Good	-33.919633, 151.188113
60s	Eucalyptus microcorys	9	6	450	5.4	2.5	Good	Good	-33.919777, 151.188086
61s	Melaleuca quinquenervia	7	6	750	9	3	Good	Good	-33.919763, 151.188012
62s	Melaleuca quinquenervia	9	10	700	8.4	3	Good	Fair	-33.919839, 151.187998
63s	Melaleuca quinquenervia	8	8	850	10.2	3	Good	Fair	-33.919878, 151.187988
64s	Melaleuca quinquenervia	9	7	1050	12	3.5	Good	Good	-33.919953, 151.187975
65s	Melaleuca quinquenervia	7	6	650	6.6	2.5	Good	Fair	-33.919991, 151.187967
66s	Melaleuca quinquenervia	8	8	900	10.8	3	Good	Good	-33.920031, 151.187953
67s	Melaleuca quinquenervia	8	6	800	9.6	2.5	Good	Fair	-33.920048, 151.187955
183s	Eucalyptus species	8	10	450	5.4	2.5	Good	Good	-33.919166, 151.187936
184s	Livistona australis	5	5	400	4.8	2.5	Good	Good	-33.919158, 151.187897
185s	Livistona australis	6	6	400	4.8	2.5	Good	Good	-33.919167, 151.187897
186s	Howea forsteriana	5	4	200	2.4	2	Good	Good	-33.919186, 151.187884
187s	Howea forsteriana	6	5	200	2.4	2	Good	Good	-33.919217, 151.187885
188s	Melaleuca species	7	6	250	3	2	Good	Fair	-33.919227, 151.187885
189s	Acmena smithii	8	4	400	4.8	2.5	Good	Good	-33.91924, 151.187887
190s	Howea forsteriana	6	6	400	4.8	2.5	Good	Good	-33.919253, 151.187882
191s	Plumeria species	5	6	600	7.2	2.5	Good	Fair	-33.91928, 151.187872
192s	Ficus macrophylla	8	8	450	5.4	2.5	Good	Good	-33.919335, 151.187862
193s	Eucalyptus species	4	2	150	2	1.5	Good	Good	-33.919659, 151.187835
194s	Eucalyptus species	10	10	450	5.4	2.5	Good	Good	-33.91991, 151.187786
371s	Casuarina species	7	3	200	2.4	2	Fair	Fair	-33.917091, 151.186324
406s	Eucalyptus elata	4	3	200	2.4	2	Fair	Poor	-33.91612, 151.185568

No	Botanical name	Height (m)	Spread (m)	DBH (mm)	TPZ (m)	SRZ (m)	Health	Structure	Coordinates
407s	Melaleuca	10	6	400	4.8	2.5	Good	Fair	-33.916173, 151.185512
408s	Unknown species	6	5	200	2.4	2	Good	Fair	-33.916288, 151.18537

Appendix C: Tree Retention Assessment

Tree Significance - Assessment Criteria - STARS©		
Low	**Medium**	**High**
The tree is in fair-poor condition and good or low vigour. The tree has form atypical of the species The tree is not visible or is partly visible from the surrounding properties or obstructed by other vegetation or buildings The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms The tree has a wound or defect that has the potential to become structurally unsound. The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties. The tree is a declared noxious weed by legislation	The tree is in fair to good condition The tree has form typical or atypical of the species The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street The tree provides a fair contribution to the visual character and amenity of the local area The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ	The tree is in good condition and good vigour The tree has a form typical for the species The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age. The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on councils significant tree register The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity. The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values. The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions.

Useful Life Expectancy - Assessment Criteria – Tree AZ©			
Dead	**Short**	**Medium**	**Long**
Trees that should be removed within the next 5 years. Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. Dangerous trees because of instability or recent loss of adjacent trees. Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. Damaged trees that are clearly not safe to retain. Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. Trees that are damaging or may cause damage to existing structures within 5 years. Trees that will become dangerous after removal of other trees for the reasons.	Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk. Trees that may only live between 5 and 15 more years. Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. Trees that could be made suitable for retention in the medium term by remedial tree care.	Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk. Trees that may only live between 15 and 40 more years. Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. Trees that could be made suitable for retention in the medium term by remedial tree care.	Trees that appear to be retainable at the time of the assessment for more than 40 years with an acceptable level of risk. Structurally sound trees located in positions that can accommodate future growth. Trees that could be made suitable for retention in the long term by remedial tree care. Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.

Tree Significance

Useful Life Expectancy		High	Medium	Low		
	Long >40 years					
	Medium 15-40 years					
	Short <1-15 years					
	Dead					

Legend for Matrix Assessment

	Priority for retention (High): These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 Protection of trees on development sites. Tree sensitive construction measures must be implemented if works are to proceed within the Tree Protection Zone.
	Consider for retention (Medium): These trees may be retained and protected. These are considered less critical; however their retention should remain priority with the removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for removal (Low): These tree are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Consider for removal (Low): These tree are not considered important for retention, nor require special works or design modification to be implemented for their retention.