Arboricultural Impact Assessment

Proposed Residential Development at

47-55 Bunnerong Road, Kingsford

Client: NSW Land & Housing
Date: November 2023
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1 Contents

2 Summary

This Arboricultural Impact Assessment (AIA) is based on forty nine (49) trees located at 47-55 Bunnerong Road, Kingsford (subject site).

The proposed works include demolition of the existing buildings and construction of a five to eight storey residential building with associated landscaped areas, pedestrian footpaths, vehicle crossing and basement car parks.

This report aims to describe the likely impacts of the proposed works on the site trees and make recommendations to limit the potential for adverse impacts on retained trees.

The Retention Values of the subject trees were rated as outlined in the following Table. Refer to Figure A (following page) and the Tree Protection Plan (Attachment C) for tree locations.

Table A: Retention Values of the Subject Trees.

	High Retention Value (Tree Number)	**Medium Retention Value (Tree Number)**	**Low Retention Value (Tree Number)**
To be Retained	1, 13, 29, 30, 31, 32, 33, 36, 37, 38, 48	-	14, 35
To be Removed	3, 23, 39, 40, 41	4, 5, 6, 10, 11, 15, 17, 21, 34, 47	2, 7, 8, 9, 12, 16, 18, 19, 20, 22, 24, 25, 26, 27, 28, 42, 43, 44, 45, 46, 49

The majority of the High Retention Value trees are able to be retained and remain viable in the long-term.

Thirty six (36) trees are proposed to be removed as part of this project. The majority of these are Low Retention Value trees. It will be possible to replace the landscape amenity and environmental value provided by the removal of the Medium Retention Value trees through the planting of new canopy trees.

There are construction works proposed within the Tree Protection Zones (TPZ) of Trees 13, 36, 37 and 38. The trees are worthy of retention and have a reasonable prospect of tolerating the proposed works and remaining viable in the long-term.

Recommendations have been made regarding tree protection measures to limit the potential for impact on the retained trees.

3 Introduction

3.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for NSW Land & Housing in relation to the existing trees and proposed new residential development at 47-55 Bunnerong Road, Kingsford (subject site).

The purpose of this AIA is to assess the likely impacts of the proposed works on the existing site trees and make recommendations regarding construction methods and tree protection measures to limit adverse impacts on trees recommended for retention.

This AIA has been prepared in accordance with the Australian Standard 4970-2009, *Protection of trees on development sites.*

3.2 Subject Site/Proposed Works

The subject site is currently occupied by eight residential apartment blocks.

It is proposed to demolish the existing buildings and construct a five to eight storey residential building with associated landscaped areas, pedestrian footpaths, vehicle crossing and basement car parks.

3.3 Subject Trees

All trees within the site and street frontage verges have been assessed. The tree population is made up of planted Australian natives and planted/self sown exotics.

Refer to Figure A and B (below and following page) for tree locations and numbers. A detailed description of the subject trees is included in the Tree Assessment Table (Attachment A).

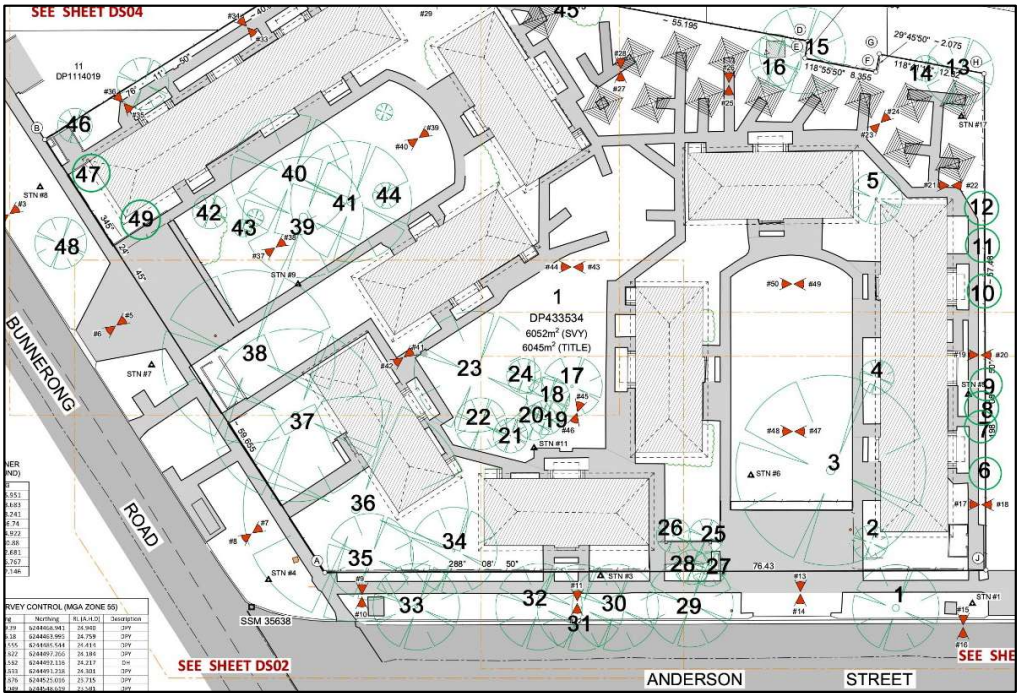

Figure A: Excerpt from the Survey Plan showing tree locations and nnumbering.

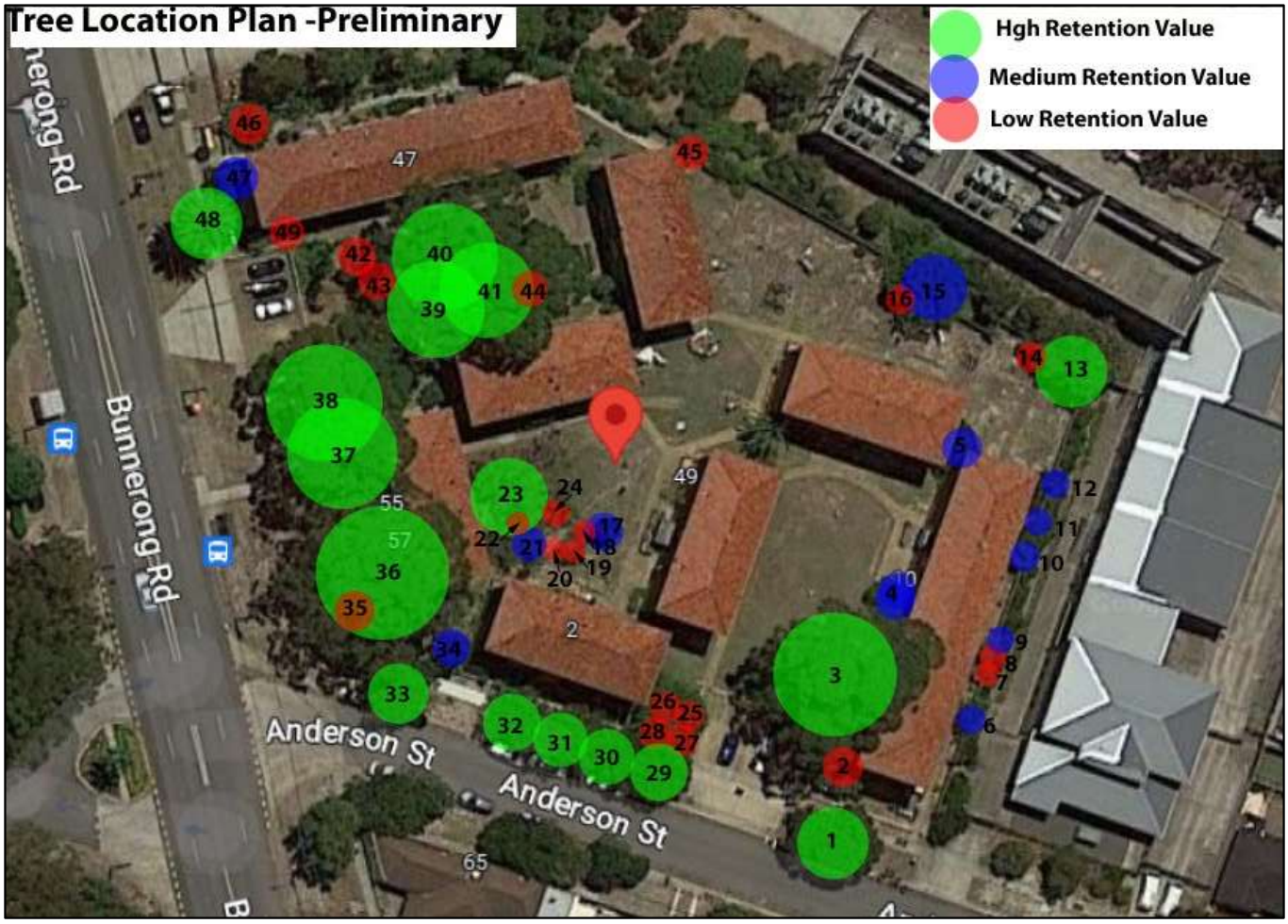

Figure B: Aerial image showing tree locations, numbering and retention values.

4 Methodology

4.1 Site Inspection

Site inspection and tree assessment was undertaken on the 22nd of February, 2023. The trees were assessed from ground level using a Tree Assessment Table, which is included as Attachment A. The definitions and explanations of terms used are outlined in the Tree Table Definitions page which is included at Attachment B.

The tree assessment was undertaken for the purpose of pre-development planning. Detailed tree risk assessment was not requested or included in the scope of works.

4.2 Plan Review

-The set of architectural plans provided by PTW (Planning Proposal -Revision 1) were reviewed as part of this assessment.

-The Landscape Plans prepared by Land-Form (Planning Proposal -13.11.23) were reviewed.
-No detailed Stormwater Management Plan or Underground Services plans were available for review at the time of assessment.
-No Bulk Earthworks Plans, or Engineering detail was available for review at the time of assessment.

4.3 Tree Protection Zones

Tree assessments in accordance with the Australian Standard 4970-2009, *Protection of trees on development sites*, require calculation of a Tree Protection Zone (TPZ) and Structural Root Zone (SRZ). The following is a brief explanation of these terms:

Tree Protection Zone -TPZ: This is the area that should be isolated from construction disturbance so that the tree remains viable. Some disturbance within the TPZ may be possible following arboricultural assessment.

Structural Root Zone -SRZ: This is the area or undisturbed soil and roots required to maintain tree stability. Excavation within the SRZ can lead to whole tree failure.

Refer to the Tree Assessment Table (Attachment A) for the Tree Protection Zones of the assessed trees.

4.4 Retention Values

Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings.

- **HIGH Retention Value**: These trees are worthy of retention and design consideration should be made where possible to allow their retention.
- **MEDIUM Retention Value**: These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures, stormwater pipes, garden retaining walls, driveway levels).
- **LOW Retention Value**: These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

The method of determining and defining retention values used in this report has been derived from the ©Retention Index developed by Tree Wise Men® Australia Pty Ltd.

4.5 Consideration for Tree Retention and Removal

Where demolition of existing structures, excavation or fill is proposed within the Tree Protection Zone (TPZ), arboricultural assessment and sensitive construction methods will be required. Where works are proposed outside of the TPZ, no sensitive construction methods are required.

Tree removal recommendations have been based on tree Retention Values and construction offsets. Trees may generally be recommended for removal in the following circumstances:

- Trees located within construction footprints.
- Trees with construction proposed within SRZ where root loss cannot be avoided through sensitive design.

- Trees with a TPZ loss of more than 25%, may be recommended for removal providing tree sensitive design cannot be implemented to avoid significant root and canopy loss.
- Trees with low Retention Values may be recommended for removal irrespective of proposed development.

5 Potential Impacts of Proposed Works

5.1 Trees to be Removed

Tree Number	Retention Value	Reason for Removal
3, 23, 39, 40, 41	High	Within the area of proposed basement excavation.
4, 5, 6, 10, 11, 17, 21	Medium	
9, 12, 18, 19, 20, 22, 24, 42, 43, 44	Low	
15, 34, 47	Medium	Basement level excavation is proposed within the Structural Root Zone. Major root loss and tree destabilisation is expected.
26	Low	
2, 7, 8, 16, 25, 27, 28, 45, 46, 49	Low	Weed species (African Olive, Wild Tobacco, Loquot and Mulberry). These trees have the potential to spread across the locality through seed dispersal.

5.2 Potential Impacts of Proposal on Retained Trees

Tree Number	Retention Value	Works proposed within the Tree Protection Zone (TPZ)
13	High	Basement level excavation is proposed within the TPZ (Photo A). The extent of basement encroachment is less than 10% of the TPZ area. Some pruning of fine absorbing roots and woody transport roots may be required. This is a hardy, drought tolerant species that can typically tolerate some root disturbance. The tree is likely to tolerate the basement excavation and remain viable. There is however the potential for further encroachment as part of additional excavation for edge battering and basement edge cap beam installation. Special consideration should be given to this area as part of the engineering detail and bulk earthworks/shoring plans. Refer to the Recommendations.

		The proposed ground level deck is within the TPZ of Tree 13. The finished level must be at least FL. 24.75 to allow space for aeration, bearers and joists without needing to excavate.
36, 37, 38	High	The roots of these trees are likely to be growing in contact with the existing building footings (Photo B). There is a potential for root damage during demolition/removal of the existing footings. Removal of the existing building footings must be undertaken under guidance of the Project Arborist. All roots that are exposed following removal of the footings must be buried in site soil. Tree protection fencing must be extended to enclose this area. The existing building footprint is likely to have restricted root spread towards the east. All basement excavation and construction works are within the footprint of the existing building. No root loss is expected as part of proposed excavation and construction. The new entrance walkway deck is within the TPZ of Trees 36 and 37. The finished level must be at least FL. 24.32 to allow space for aeration, bearers and joists without needing to excavate. Soft landscaping works are proposed within the TPZ and Structural Root Zones of these trees. These trees have large structural roots visible on the ground surface (Photo B). Even minor ground level adjustments could result in major impacts. All new soil and lawn must be installed above existing ground levels.
1, 14, 35, 29, 30, 31, 32, 33, 48	High	No works are proposed within the TPZ. No direct impact is expected. There is the potential for accidental injury during unloading/loading of materials.

Incidental Impacts: There is the potential for incidental/accidental damage to the trunk, canopy and shallow roots of all retained trees throughout the construction process. Trees are commonly impacted on construction sites in the following ways.

- Stripping of topsoil and removal of organic material form the soil surface.
- Compaction of the topsoil and damage to surface roots through use of heavy machinery and frequent foot traffic.
- Soil contamination through washing out barrows and disposal or spillage of chemical materials.
- Root loss due to unforeseen excavation for plumbing upgrades and landscape construction.
- Bark/trunk and branch injuries from accidental contact with machinery.

These impacts can be easily avoided through communication with building contractors and basic tree protection measures.

Photo A: Tree 3. Red lines show the approximate line of basement excavation.

Photo B: Trees 36, 37, 38. Shows structural roots on the surface and location of the existing building.

6 Recommendations

6.1 Engineering Detail

Basement excavation is proposed within the TPZ of Tree 13. There is a potential for excavation to extend into the Structural Root Zone and destabilise Tree 13 if battering is required at the basement edge. Engineering detail must specify piling with minimal spread of the piling edge cap beam. Shot-crete could be used to stabilise the exposed soil edge as an alternative to battering. Refer to Figure C below for detail.

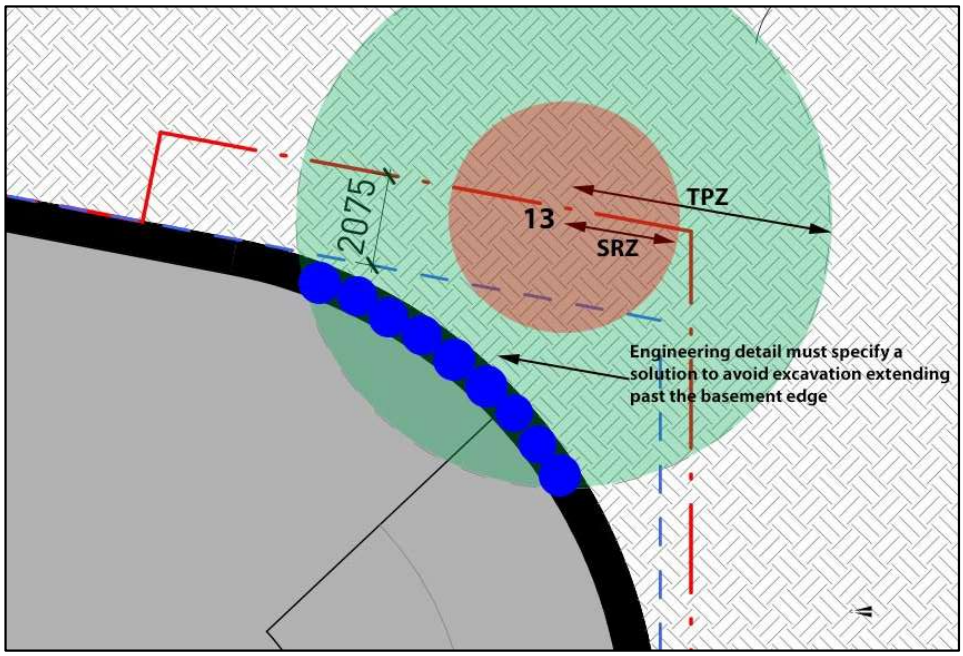

Figure C: Basement Plan mark-up showing the area where excavation must be limited.

6.2 Site Establishment –Prior to Demolition

Appointment of a Project Arborist: An Arborist with an AQF Level 5 qualification in Arboriculture and experience in tree protection within construction sites should be engaged prior to the commencement of work on the site. The Project Arborist should be present at the following times:

- Project Commencement to meet with the Site Foreman and discuss tree protection requirements.
- Following installation of tree protection fencing, signage and mulch.
- During demolition within the TPZ of Trees 36, 37, 38.
- During excavation within the TPZ of Tree 13.
- At any time that tree roots greater than 40mm diameter are exposed with the TPZ of any retained tree.
- At project completion to verify tree protection and retention.

Tree Protection Fencing: Tree Protection Fencing should be installed prior to any machinery or materials being bought on site and remain in position throughout the entire project. Tree Protection Fencing should be erected around the Tree Protection Zones as defined in the Tree Protection Plan (Attachment C). Tree Protection Fencing should consist of 1.8 metre high chainlink panels on moveable concrete pads. Tree Protection Fencing should be clamped at each panel junction.

Each section of tree protection fencing should have signage attached identifying it as tree protection zone.

Tree Protection Fencing should not be moved at any time without consultation with the Project Arborist. Tree protection fencing must be extended past the existing building edge following demolition within the TPZ of Trees 36, 37 and 38. An example of adequate tree protection fencing is detailed below.

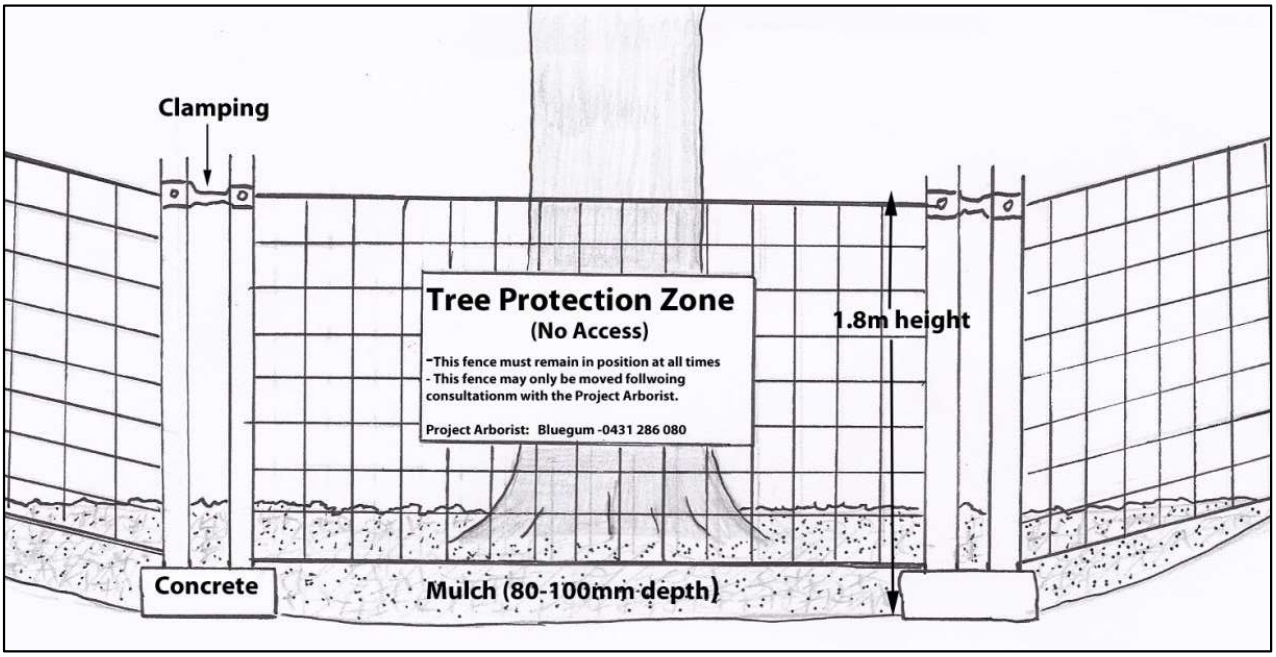

Figure D: Example of adequate tree protection fencing

Compost and Irrigation (Trees 13, 36, 37, 38): Installation of mulch and irrigation is recommended within the Tree Protection Zones of Trees 13, 36. 37 and 38 to improve soil conditions and encourage new root growth. The purpose of this is to help offset the likely loss of roots and soil moisture from proposed excavation within the TPZ's. Refer to Figure C below for detail of the recommended soil improvement works. The sprinkler should be installed on a timer with settings to be determined in consultation between the Site Foreman and Project Arborist.

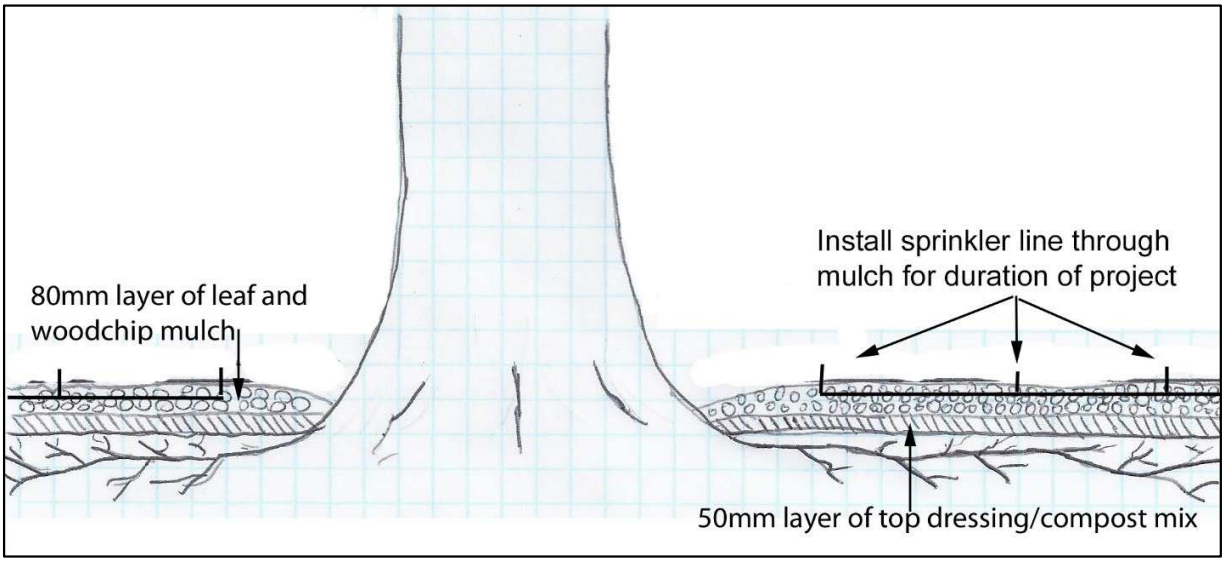

Figure C: Detail of mulch and irrigation for Trees 13, 36, 37, 38.

Tree Removal: Thirty six (36) trees are proposed to be removed as part of the project. Tree removal contractors should be briefed on the need to protect retained trees during tree removal operations.

Tree removal works should be undertaken in accordance with the WorkSafe Australia *Guide to Managing Risks of Tree Trimming & Removal Work.*

6.3 During Demolition

Site Clearing and Grading: There must no soil scraping or grading within the Tree Protection Zones of retained trees. The existing ground cover vegetation and topsoil within the Tree Protection Zones must be retained throughout the project.

Removal of Building Footings (Trees 36, 37, 38): There is a potential for root damage during demolition/removal of the existing footings. Removal of the existing building footings must be undertaken under guidance of the Project Arborist. All roots that are exposed following removal of the footings must be buried in site soil. The tree protection fencing must be extended past the edge of the removed building to enclose the roots that were growing against the building footings. The area where this is required is detailed on the Tree Protection Plan (Attachment C).

6.4 During Bulk Earthworks

Tree Protection Zones: Refer to the Tree Assessment Table (Attachment A) and Tree Protection Plan (Attachment C) for the spread of TPZ's of trees nominated for retention. The following should be prohibited within the Tree Protection Zones:

- Stripping of topsoil or organic surface material.
- Stockpiling of spoil or fill
- Storage of building material, vehicles and machinery.

- Disposal of solid, liquid or chemical waste.
- Any excavation, fill or other construction activity other than that discussed in this report.

Earthworks within the TPZ of Trees 13, 36, 37, 38: Basement level excavation is proposed within the TPZ of these trees. Project Arborist guidance will be required during this process. Any roots encountered should be cleanly cut using a sharp saw or secateurs. The purpose of this is to minimise the surface area of pruning wounds and avoid additional root damage (tearing/splintering) that typically occurs when roots are pruned using an excavator.

6.5 During Construction/Landscaping

Ground Floor Deck Construction within the TPZ of Tree 13: The proposed ground floor deck is within the TPZ of Tree 13. The finished level must be at least FL. 24.75 to allow space for aeration, bearers and joists without needing to excavate.

Deck Construction within the TPZ of Trees 13, 36 and 37: The new entrance walkway deck is within the TPZ of Trees 36 and 37. The finished level must be at least FL. 24.32 to allow space for aeration, bearers and joists without needing to excavate.

Soft Landscaping Works (Trees 13, 36, 37, 38): Soft landscaping works are proposed within the TPZ and Structural Root Zones of these trees. These trees have large structural roots visible on the ground surface. Even minor ground level adjustments could result in major impacts. All new soil and lawn must be installed above existing ground levels.

6.6 Post Construction Tree Care

At the completion of the project, the retained trees should be inspected by the Project Arborist. Depending on the health and vitality of retained trees, the Project Arborist may prescribe some remedial tree care. This may include installation of temporary or permanent irrigation, application of soil conditioners, compost application and installation of mulch.

7 Statement of Impartiality

- This report prepared by Bluegum Tree Care & Consultancy (BTCC) reflects the impartial and expert opinion of Alexis Anderson.
- BTCC is acting independently of and not as the advocate for the owners of the subject trees.
- BTCC does not undertake tree pruning and removal works and will not have any involvement with pruning or removing trees which are the subject of this report.

8 Limitations

- The findings of this report are based upon and limited to visual examination of trees from ground level without any climbing, internal testing or exploratory excavation.
- The tree assessment was undertaken for the purpose of pre-development planning. Detailed tree risk assessment was not requested or included in the scope of works.
- This report reflects the health and structure of trees at the time of inspection. Bluegum cannot guarantee that a tree will be healthy and safe under all circumstances or for a specified period of time. There is no guarantee that problems or defects with assessed trees, will not arise in the future. Liability will not be accepted for damage to person or property as a result of failure of assessed trees.

Tree No.	Common Name/ Genus Species	Trunk Diameter (cm)	Height (m)	Canopy Spread Radius (m)	Age Class	Health / Vitality	Structural Condition	Tree Protection Zone (m)	Structural Root Zone (m)	Estimated Life Expectancy (ELE)	Landscape and Environmental Significance	Retention Value	Comments	Likely Construction Impacts	Proposed Action.
1	Cottonwood, *Hibiscus tiliaceus*	41	6	5	M	G	G	4.9	2.3	Long (30+ yrs)	2	High	Street tree. Lower branches are obstructing footpath passage. Part of a uniform row of streetscape planting.	Nil.	Retain.
2	African Olive, *Olea europaea subsp. cuspidata*	15	5	2	M	G	G	2.0	1.5	Long (30+ yrs)	5	Low	Weed species. 3m tall Hibiscus growing from the base.	Within the area of proposed basement level excavation.	Remove.
3	Bangalay, *Eucalyptus botryoides*	87	24	10	M	G	G	10.4	3.1	Long (30+ yrs)	2	High	Prominent within the landscape. Previous live branch failure is evident. Future live branch failure is likely in storm conditions. Crown reduction pruning is recommended.	Within the area of proposed basement level excavation.	Remove.
4	Frangipani, *Plumeria acutifolia* (Group of 2)	10, 10, 10	5	3	M	G	G	3.0	1.0	Long (30+ yrs)	3	Medium	Root spread is restricted by the existing building footings.	Within the area of proposed basement level excavation.	Remove.
5	Orange Jasmin, *Murraya paniculata*	10, 8, 8, 8	4	3	M	G	G	3.0	1.5	Long (30+ yrs)	3	Medium		Within the area of proposed basement level excavation.	Remove.
6	Lemon Tree, *Citrus limon*	10, 7	4	2	M	F	F	2.0	1	Medium (10-30 yrs)	3	Medium	Productive fruiting tree.	Within the area of proposed basement level excavation.	Remove.
7	Wild Tobacco, *Solanum mauritianum*	9, 7	3	1	M	F	G	2.0	1.0	Medium (10-30 yrs)	5	Low	Weed species.	Within the area of proposed basement level excavation.	Remove.
8	Wild Tobacco, *Solanum mauritianum*	8	3	1	M	F	G	2.0	1.0	Medium (10-30 yrs)	5	Low	Weed species.	Within the area of proposed basement level excavation.	Remove.
9	Hibiscus Tree, *Hibiscus sp.*	7, 7, 6, 5	3	2	M	G	G	2.0	1.0	Medium (10-30 yrs)	4	Low	Celtis (weed) is located on the neighbouring side of the fence.	Within the area of proposed basement level excavation.	Remove.
10	Duranta, *Duranta erecta*	12	4	3	M	G	G	3.0	1.5	Long (30+ yrs)	3	Medium		Within the area of proposed basement level excavation.	Remove.
11	Orange Tree, *Citrus sinensis*	11	4	3	M	F	F	2.0	1.0	Medium (10-30 yrs)	3	Medium	Productive fruiting tree.	Within the area of proposed basement level excavation.	Remove.
12	Dwarf Umbrella Tree, *Schefflera arboricola*	9, 9, 9, 9	3	3	M	G	G	2.0	1.0	Long (30+ yrs)	4	Low		Within the area of proposed basement level excavation.	Remove.
13	Jacaranda, *Jacaranda mimosifolia*	39, 25, 20	10	6	M	G	G	6.1	2.5	Long (30+ yrs)	2	High	Provides boundary screening.	Basement level excavation is proposed within the TPZ.	Retain.
14	Frangipani, *Plumeria acutifolia*	11	3	2	M	F	F	2.0	1.0	Medium (10-30 yrs)	4	Low	Supressed by Tree 13.	Nil.	Retain.
15	White Cedar, *Melia azederach*	35, 30	8	6	M	G	G	5.5	2.4	Long (30+ yrs)	3	Medium	2 stems from ground level.	Basement level excavation is proposed within the SRZ.	Remove.
16	Loquot, *Eriobotrya japonica*	13	5	3	M	G	G	2.0	1.5	Long (30+ yrs)	4	Low	Weed species.	Basement level excavation is proposed within the SRZ.	Remove.

Tree No.	Common Name/ Genus Species	Trunk Diameter (cm)	Height (m)	Canopy Spread Radius (m)	Age Class	Health / Vitality	Structural Condition	Tree Protection Zone (m)	Structural Root Zone (m)	Estimated Life Expectancy (ELE)	Landscape and Environmental Significance	Retention Value	Comments	Likely Construction Impacts	Proposed Action.
17	Weeping Fig, *Ficus benjamina*	15, 5, 5, 5	6	3	M	G	G	3.0	1.5	Long (30+ yrs)	3	Medium	Vigorous shallow roots. Potentially invasive roots.	Within the area of proposed basement level excavation.	Remove.
18	Brazilian Coral Tree, *Erythrina crista-galii*	12, 10	4	2	IM	F	F	2.0	1.5	Medium (10-30 yrs)	4	Low	Supressed.	Within the area of proposed basement level excavation.	Remove.
19	Weeping Bottlebrush, *Callistemon viminalis*	4, 3, 3, 3	3	2	IM	G	G	2.0	1.5	Long (30+ yrs)	4	Low		Within the area of proposed basement level excavation.	Remove.
20	Frangipani, *Plumeria acutifolia*	5, 4, 3, 3	2	2	IM	G	G	2.0	1.0	Long (30+ yrs)	4	Low		Within the area of proposed basement level excavation.	Remove.
21	Peppercorn, *Schinus areira*	19, 15	6	4	M	G	G	2.9	1.8	Long (30+ yrs)	3	Medium		Within the area of proposed basement level excavation.	Remove.
22	Frangipani, *Plumeria acutifolia*	4, 4, 4, 4	2	2	IM	G	G	2.0	1.0	Long (30+ yrs)	4	Low		Within the area of proposed basement level excavation.	Remove.
23	Jacaranda, *Jacaranda mimosifolia*	44	10	7	M	G	G	5.3	2.4	Long (30+ yrs)	2	High		Within the area of proposed basement level excavation.	Remove.
24	Lemon Tree, *Citrus limon*	8, 6, 6, 6, 6	3	2	M	F	F	2.0	1.0	Medium (10-30 yrs)	4	Low	Productive fruiting tree.	Within the area of proposed basement level excavation.	Remove.
25	Loquot, *Eriobotrya japonica*	23	6	4	M	G	G	2.8	1.8	Long (30+ yrs)	4	Low	Weed species.	Basement level excavation is proposed within the SRZ.	Remove.
26	Avocado Tree, *Persea americana*	19	5	3	IM	G	G	2.0	1.5	Long (30+ yrs)	4	Low		Basement level excavation is proposed within the SRZ.	Remove.
27	Loquot, *Eriobotrya japonica*	10	4	2	M	F	F	2.0	1.5	Medium (10-30 yrs)	4	Low	Supressed. Weed species.	Within the proposed pedestrian walkway.	Remove.
28	Loquot, *Eriobotrya japonica*	15	5	2	M	G	G	2.0	1.5	Long (30+ yrs)	4	Low	Weed species.	Within the proposed pedestrian walkway.	Remove.
29	Cottonwood, *Hibiscus tiliaceus*	27, 21	5	4	M	G	G	4.1	2.1	Long (30+ yrs)	2	High	Street tree. Part of a double row of uniform species forming the streetscape character.	Nil.	Retain.
30	Cottonwood, *Hibiscus tiliaceus*	24	5	4	M	G	G	2.9	1.8	Long (30+ yrs)	2	High	Street tree. Part of a double row of uniform species forming the streetscape character.	Nil.	Retain.
31	Weeping Bottlebrush, *Callistemon viminalis*	25	5	4	M	G	G	3.0	1.8	Long (30+ yrs)	2	High		Nil.	Retain.
32	Cottonwood, *Hibiscus tiliaceus*	29	5	4	M	G	G	3.5	2.0	Long (30+ yrs)	2	High	Street tree. Part of a double row of uniform species forming the streetscape character.	Nil.	Retain.
33	Cottonwood, *Hibiscus tiliaceus*	32	5	5	M	G	G	3.8	2.1	Long (30+ yrs)	2	High	Street tree. Part of a double row of uniform species forming the streetscape character.	Nil.	Retain.

Tree No.	Common Name/ Genus Species	Trunk Diameter (cm)	Height (m)	Canopy Spread Radius (m)	Age Class	Health / Vitality	Structural Condition	Tree Protection Zone (m)	Structural Root Zone (m)	Estimated Life Expectancy (ELE)	Landscape and Environmental Significance	Retention Value	Comments	Likely Construction Impacts	Proposed Action.
34	Bangalay, *Eucalyptus botryoides*	26	10	4	EM	G	G	3.1	1.9	Long (30+ yrs)	3	Medium		Basement level excavation is proposed within the SRZ.	Remove.
35	African Olive, *Olea europaea subsp. cuspidata*	30, 22	7	5	M	G	G	4.5	1.8	Long (30+ yrs)	4	Low	Weed species. Well formed branching structure.	Soft landscaping works are proposed within the TPZ.	Retain.
36	Bangalay, *Eucalyptus botryoides*	99	26	10	M	G	G	11.9	3.4	Long (30+ yrs)	2	High	Prominent within the landscape.	Deck construction and soft landscaping works are proposed within the TPZ.	Retain.
37	Bangalay, *Eucalyptus botryoides*	71	26	9	M	G	G	8.5	2.9	Long (30+ yrs)	2	High	Prominent within the landscape.	Deck construction and soft landscaping works are proposed within the TPZ.	Retain.
38	Bangalay, *Eucalyptus botryoides*	75	26	9	M	G	G	9.0	3.0	Long (30+ yrs)	2	High	Prominent within the landscape.	Deck construction and soft landscaping works are proposed within the TPZ.	Retain.
39	Bangalay, *Eucalyptus botryoides*	80	27	9	M	G	G	9.6	3.0	Long (30+ yrs)	2	High	Prominent within the landscape.	Within the area of proposed basement level excavation.	Remove.
40	Bangalay, *Eucalyptus botryoides*	75	27	9	M	G	G	9.0	3.0	Long (30+ yrs)	2	High	Prominent within the landscape.	Within the area of proposed basement level excavation.	Remove.
41	Bangalay, *Eucalyptus botryoides*	77	27	9	M	G	G	9.2	3.0	Long (30+ yrs)	2	High	Prominent within the landscape.	Within the area of proposed basement level excavation.	Remove.
42	White Cedar, *Melia azederach*	14	6	3	IM	G	G	2.0	1.5	Long (30+ yrs)	4	Low	Likely to have self-sown.	Within the area of proposed basement level excavation.	Remove.
43	Bangalay, *Eucalyptus botryoides*	9	7	1	IM	F	G	2.0	1.5	Long (30+ yrs)	4	Low		Within the area of proposed basement level excavation.	Remove.
44	Arborvitae, *Thuja sp.*	3, 3, 3, 3	3	1	M	G	G	3.0	1.0	Long (30+ yrs)	4	Low	Exotic ornamental species.	Within the area of proposed basement level excavation.	Remove.
45	Mulberry, *Morus nigra*	8, 7	7	3	M	F	G	2.0	1.0	Medium (10-30 yrs)	4	Low	Likely to have self-sown. May be considered a weed species when self-sown.	Within area of soft landscaping works.	Remove.
46	Loquot, *Eriobotrya japonica*	10, 9, 9, 8	3	3	M	G	G	2.0	1.5	Medium (10-30 yrs)	4	Low	Weed species.	Within area of soft landscaping works.	Remove.
47	Bangalay, *Eucalyptus botryoides*	25	11	3	EM	G	G	3.0	1.9	Long (30+ yrs)	3	Medium		Basement level excavation is proposed within the SRZ.	Remove.
48	Canary Island Date Palm, *Phoenix canariensis*	60	15	3	M	G	G	4.0	1.0	Long (30+ yrs)	2	High	Street tree. Prominent landscape feature.	Nil.	Retain.
49	Mulberry, *Morus nigra*	9	5	3	EM	F	G	2.0	1.0	Long (30+ yrs)	4	Low	Likely to have self-sown.	Within the area of proposed basement level excavation.	Remove.

Attachment B: TREE ASSESSMENT DEFINITIONS

Height. Tree height is estimated from ground level. This assessment is made independently of data plotted on survey plan. These measurements have not been confirmed with clinometer or other surveying instrument.

Trunk Diameter Trunk diameter is measured at 1.4 metres above ground level. A diameter tape is used which calculates the diameter from a measurement of the circumfrence. DBH is primarily used for the calculation of the TPZ. The trunk diameter above the root buttress is measured to calculate the Structural Root Zone.
If a tree has more than 4 trunks, the diameter of the four largest trunks is recorded. For irregular trunk formations the DBH is calculated as outlined in Appendix A of AS4970-2009 -*Protection of Trees on Development Sites*.

Canopy Spread Radius. Average canopy spread radius is estimated from the centre of trunk to the outer edge of canopy. Refer to Comments column for detail of heavily skewed canopy spread.

Age Class - This is an estimation of the tree's current age class based on size, growth habit, local environmental conditions and comparison with surrounding trees.

- **Immature (IM)**: This is a juvenile specimen that is likely to have germinated within the previous 5 years.
- **Early Mature (EM)**: This is a tree that is established within its growing environment, though has not reached an age of reproductive maturity or the natural growth habit of a mature individual.
- **Mature (M)**: This is a tree has reached both reproductive maturity and a physical form and shape typical for the species. Trees can have a Mature Age Class for the majority of their life span.
- **Late-Mature (LM)**: There trees show early signs of senescence with symptoms such as reduced canopy density and an accumulation of dead branches.
- **Over-mature (OM)**: These trees show symptoms of irreversible decline such as canopy dieback with dead branches concentrated in the upper canopy.

Health/Vitality- Good (G), Fair (F) or Poor (P). This is primarily based on the extent of vigorous new foliage growth at branch tips and the colour, size and density of foliage generally. The percentage of live branches to dead branches is considered. The location of any dead branches is also considered. The presence of any pest or disease is considered as part of this assessment. Health can vary with climatic conditions.

Structural Condition - Good (G), Fair (F) or Poor (P). This is an assessment of tree structure and stability. Root anchorage, trunk lean, structural defects, canopy skew and any hazardous features are considered. Dead branches can be considered as part of Structural Condition if they are of a size and location that could cause injury or property damage.

Tree Protection Zone (TPZ). This is a radial distance of (12X) the DBH measured from centre of trunk. TPZ is rounded to the nearest 0.1 metre. A TPZ should not be less than 2m or greater than 15m. The TPZ for palms and other monocots should not be less than 1m outside of the crown projection. Existing constraints to root spread can vary the TPZ. For a tree to remain viable, construction activity should be excluded or undertaken with care within the TPZ. Disturbance within up to 10% of the TPZ area is considered to be a minor encroachment. Disturbance to more than 10% of the TPZ area is considered a major encroachment. Major encroachment into the TPZ is possible depending on the type of disturbance, and species tolerance to disturbance. Exploratory excavation may be required to quantify the presence of roots at the alignment of proposed ground disturbance.
This is based upon the Australian Standard AS 4970, 2009, *Protection of trees on development sites* and the Matheney & Clarke "*Guidelines for adequate tree preservation zones for healthy, structurally stable trees*".

Structural Root Zone (SRZ). This is a radial distance based on the following formula- **SRZ =(D x 50) $^{0.42}$ x 0.64** (for trees less than 150mm Diameter, a minimum SRZ of 1.5 metres). The **D** in the formula is the trunk diameter measured above the root buttress. This wass recorded in the field notes. SRZ measurements are rounded to the nearest 0.1m. The Structural Root Zone is the area of soil and roots required to maintain tree stability. Excavation within the SRZ can result in whole tree failure. Fully elevated construction is possible within SRZ with specific rootzone assessment. Existing constraints to root spread can vary the SRZ. This method of determining SRZ is outlined at Section **3.3.5** of Australian Standard AS 4970, 2009, *Protection of trees on development sites.*

Estimated Remaining Life Expectancy: This gives a length of time that the Arborist believes a particular tree can be retained from the time of assessment with an acceptable level of risk based on the information available at the time of the inspection. This system of rating does not take into consideration the likely impacts of any proposed development. Ratings are **Long** (retainable for 30 years or more with an acceptable level of risk), **Medium** (retainable for 10-30 years), **Short** (retainable for 0-10 years) and **Removal** (tree requiring removal due to risk/hazard or absolute unsuitability).

Landscape & Environmental Significance*. This is an assessment of the impact of the tree on the surrounding landscape amenity and natural environment. Rarity, habitat value, physical prominence, historical and cultural significance of the tree are considered in this rating system. The Landscape & Environmental Value ratings used in this report are:

1. **Very High Value:** This is an outstanding specimen that holds irreplaceable environmental, landscape or cultural value.
2. **High Value:** An excellent specimen that holds environmental, landscape or cultural value that is present in other site trees or that could be replaced.
3. **Moderate Value:** Can be a good to fair specimen with environmental, landscape or cultural value that is common within other trees in the locality.
4. **Low Value:** Removal would not result in any loss of site amenity or environmental value. Can include undesirable or weed species or trees growing in unsuitable locations.
5. **Very Low Value**: Dead or hazardous with no other environmental or cultural value. Could also include weed species. These trees should be removed or pruned in a way to make safe irrespective of any development.

***Note**: The concept of using a five (5) point scale to assess tree significance was derived from the Tree Wise Men® Australia Pty Ltd ©Significance Rating Scale.

Retention Value*. Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings.

<table>
<tr><td rowspan="6">Landscape & Environmental Significance</td><td></td><td colspan="4">Estimated Life Expectancy</td></tr>
<tr><td></td><td>Long</td><td>Medium</td><td>Short</td><td>Removal</td></tr>
<tr><td>Very High (1)</td><td rowspan="2" colspan="2">HIGH</td><td rowspan="2">MEDIUM</td><td rowspan="2"></td></tr>
<tr><td>High (2)</td></tr>
<tr><td>Medium (3)</td><td colspan="2">MEDIUM</td><td rowspan="3" colspan="2">LOW</td></tr>
<tr><td>Low (4)</td><td colspan="2"></td></tr>
<tr><td>Very Low (5)</td><td colspan="2"></td></tr>
</table>

HIGH Retention Value: These trees are worthy of retention and major design consideration should be made where feasible to allow this.

MEDIUM Retention Value: These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures, garden retaining walls, driveway levels).

LOW Retention Value: These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

***Note:** The method of determining and defining retention values used in this report has been derived from the ©Retention Index developed by Tree Wise Men® Australia Pty Ltd.

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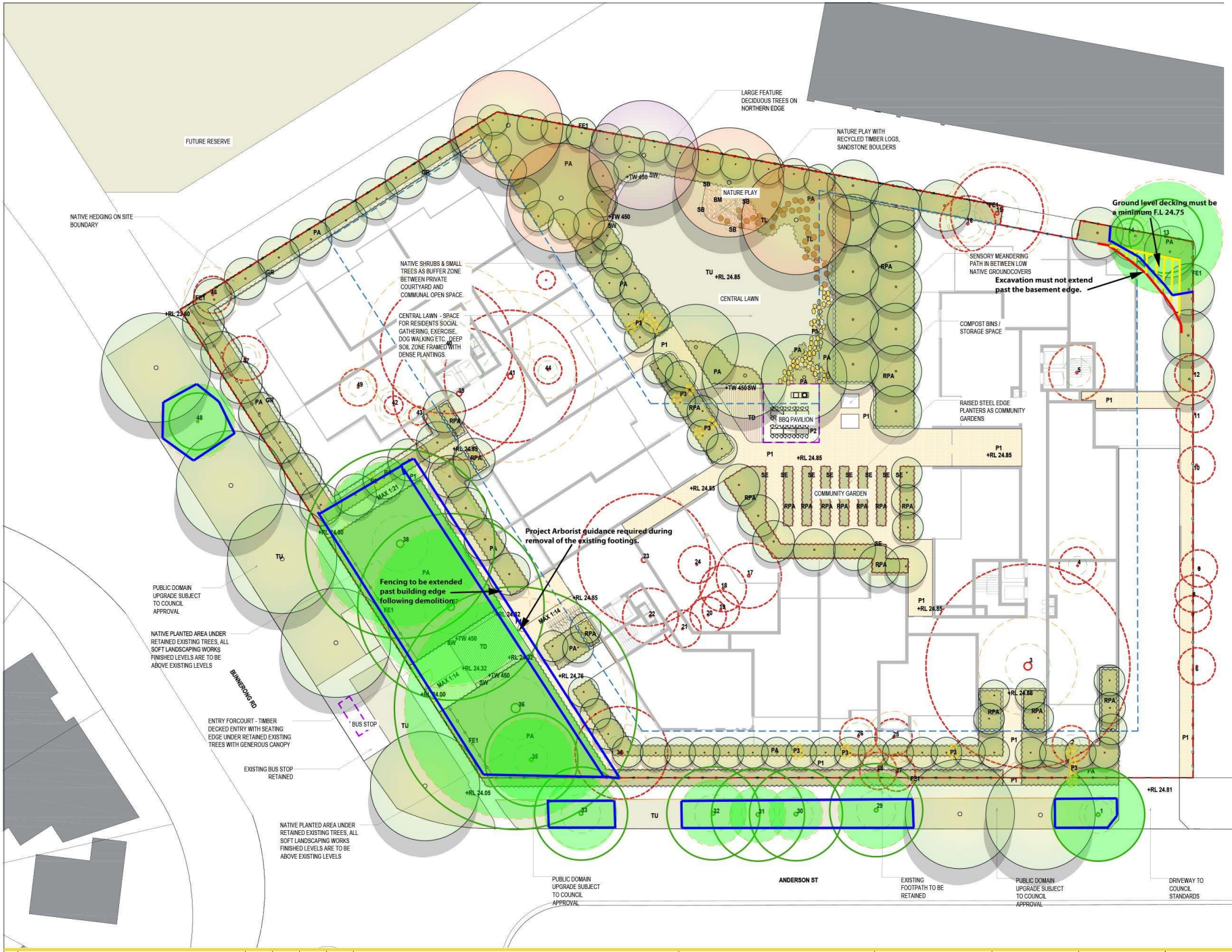

Bluegum Tree Care and Consultancy®

Tree Protection Plan

47-55 Bunnerong Road, Kingsford

This plan is to be read in conjunction with the Arboricultural Impact Assessment report prepared for this site, November 2023.

This plan has been prepared using the Landscape Plan- Landform, as a base.

Tree protection detail is indicative only. Final positions should be determined with co-ordination between the Site Foreman and Project Arborist to allow adequate site access during construction.

Legend

Tree Protection Zone	
Tree Protection Fencing	
Tree to be Removed	

NOT FOR CONSTRUCTION

No	Revision	Drawn	Job Manager	Project Director	Date
1	PLANNING PROPOSAL	RL	CR	CR	13.11.23

Note: * indicates signatures on original issue of drawing or last revision of drawing

0 2 4 6 8 10m
SCALE 1:200 AT ORIGINAL SIZE

CLIENT: NSW Land & Housing Corporation

ARCHITECT: PTW

LANDSCAPE: LAND AND FORM

DO NOT SCALE

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Drawn	RI	Designer	CR/ RI
Drafting Check	CR	Design Check	CR
Approved (Project Director)			
Date			
Scale	1:100		

This Drawing must not be used for Construction unless signed as Approved

Client: NSW LAND & HOUSING
Project: 47-55 BUNNERONG RD, KINGSFORD
Title: GROUND FLOOR & PUBLIC DOMAIN

Original Size: A1
Drawing No: LD-DA100
Rev: 1

Plot Date: 13 November 2023 - 11:03 AM Plotted by: Runshi Liu

Cad File No: C:\Users\RunshiLiu\Landform Studios\Company Files - Documents\2023\2023008 Bunnerong Rd, Kingsford PP\Drawings\cad\2023008-LD-DA100[1].dwg