Project No: WAV/CHAM/21 Report No: WAV/CHAM/AIA/A

ARBORICULTURAL IMPACT ASSESSMENT
TREE PROTECTION SPECIFICATION

Waverley Council Chambers Refurbishment
Bondi Road
Bondi Junction

Prepared for: LAHZNIMMO

Revision A
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1.0 INTRODUCTION

1.1 Background

1.1.1 This Arboricultural Impact Assessment Report and Tree Protection Specification was prepared for Lahznimmo, on behalf of Waverley Council, in relation to the Waverley Council Chambers Refurbishment project. The purpose of this Report is to determine the impact of the proposed works on the trees, and where appropriate, recommend the use of sensitive construction methods and tree protection measures to minimise adverse impacts. This Report should be read in conjunction with the Preliminary Arboricultural Report (Rev A) prepared for the site in August 2021.

1.1.2 In preparing this Report, the authors are aware of and have considered the objectives of the following:

- *State Environmental Planning Policy Vegetation in Non-Rural Areas (2017)*
- *Waverley Council Tree Management Policy (2019)*
- *Waverley Council Significant Tree Register (2012)*
- *Australian Standard 4970 Protection of Trees on Development Sites (2009)*
- *Australian Standard 4373 Pruning of Amenity Trees (2007)*
- *Australian Standard 2303 Tree Stock for Landscape Use (2015)*
- *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)*

Refer to Methodology **(Appendix 1)**

1.1.3 This impact assessment is based on an assessment of the following supplied documentation/plans only:

- Site Plan – prepared by Lahznimmo, (Rev 01, dated 11.10.2021)
- Landscape Masterplan – prepared by Black Bettle, (Rev 03, dated September 2021)
- Landscape Plan – prepared by Black Bettle, (Rev 02, dated 16.09.21)

Refer to Plans **(Appendix 2)**

1.2 The Proposal

1.2.1 The proposed Waverley Council Chambers refurbishment works include:

- Internal refurbishments
- Internal furnishings
- External refurbishments including upgrading of façade, roof, windows, forecourt/turning circle, western landscaped area and footpath to kerb

2.0 RESULTS

2.1 The Site

2.1.1 The existing Waverley Council Chambers is located at 49A Bondi Rd, Bondi Junction however the building also encroaches over the adjacent site 'Water Supply System' to the east. The site accommodates an existing four-storey (ground, first, second and third level with mezzanine levels in-between in some areas) administrative building.

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2.1.2 There is an existing vehicular access road to the front of the site (north) with an accompanying pedestrian entry way, both connecting to Bondi Road. A further existing vehicular access road exists to the rear of the site (south) connecting to Paul Street and to an open at grade car park.

2.1.3 The site adjoins Waverley Park to the east and south which comprises Waverley Oval, Waverley Synthetic Fields, basketball courts, and Margaret Whitlam Recreational Centre.

2.2 The Trees

2.2.1 Nineteen (19) trees were assessed in preparation of the Preliminary Arboricultural Report (August 2021). The trees comprise of a mix of locally indigenous, Australian-native and exotic species.

2.1.2 Tree 17 *Syagrus romanzoffiana* (Cocos Palm) is considered an environmental weed species due to its propensity to self-seed and is exempt from Council's tree management controls.[1]

2.1.3 None of the trees are listed within the *Waverley Council Significant Tree Register (2012).*[2] None of the trees are listed in Schedule 5 Environmental Heritage of the *Waverley Local Environmental Plan (2012).*[3]

2.1.4 A review of the 1943 aerial photograph of the site shows trees in the locations of Tree 1 *Phoenix canariensis* (Canary Island Date Palm) and Tree 13 *Quercus ilex* (Holm Oak).[4] Tree 1 appears to form part of the original row of *Phoenix canariensis* (Canary Island Date Palm) which runs along the Bondi Road frontage of Waverley Park. It is understood several palms within the row have been removed due to infection with the fungal disease *Fusarium oxysporum* (Fusarium Wilt). The Waverley Park Plan of Management (2012) notes the Canary Island Date Palms in the Memorial Gardens date from 1916.[5] It is assumed Tree 13 *Quercus ilex* (Holm Oak) dates from the same era.

2.1.5 A search of the BioNet Atlas of NSW Wildlife Database was undertaken in August 2021. No individual threatened tree species listed within this database for the area were identified during the current field investigations of the site.[6] The ecological significance and habitat value of the trees has not been assessed and is beyond the scope of this report.

2.1.6 As required by Clause 2.3.2 of *Australian Standard 4970 Protection of Trees on Development Sites (2009)*, each of the trees assessed has been allocated a Retention Value. TreeiQ allocates one of four Retention Value categories based on a combination of Landscape Significance and Useful Life Expectancy (ULE). The assessment of Landscape Significance and ULE involves a degree of subjectivity and there will be a range of tree quality and value within each of the Retention Value categories. The Retention Values do not consider any proposed development works and are not a schedule for tree retention or removal. The trees have been allocated one of the following Retention Values:

- Priority for Retention
- Consider for Retention
- Consider for Removal
- Priority for Removal

Refer to Tree Assessment Schedule **(Appendix 3)**

[1] Waverley Council (2019)
[2] Waverley Council (2012)
[3] Waverley Council (2012)
[4] NSW Government Spatial Services (2016)
[5] Waverley Council (2012)
[6] NSW Office of Environment and Heritage (2011)

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3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 Tree 1

3.1.1 Tree 1 was identified as *Phoenix canariensis* (Canary Island Date Palm) and is a late-mature specimen located on the Bondi Road frontage. The tree is in good health and structural condition. Tree 1 is of high Landscape Significance and has been allocated a Retention Value of *Priority for Retention.*

3.1.2 The supplied plans show Tree 1 is to be retained with the reconfigured forecourt/driveway access, building entry and roof proposed within its Tree Protection Zone (TPZ). The extent of work represents a *Major Encroachment* as defined by *Australian Standard 4970 2009 Protection of Trees on Development* Sites (AS-4970).

3.1.3 Clause 3.3.4 of AS-4970 outlines that tree species and tolerance to root disturbance should be considered when determining the potential impact of an encroachment. Palms are arborescent monocots which have an adventitious root system comprised of numerous fibrous roots that arise independently from the Root Initiation Zone (RIZ) at the base of the trunk. Research has shown that when transplanting palms, most species require a minimum rootball radius of 300mm for successful transplantation.[7]

3.1.4 With consideration to this research, palm species can be considered more tolerant of root disturbance within the TPZ than tree species that produce a woody root system. Therefore, the reconfigured forecourt/driveway access and building entry should not impact its health and structural condition. The supplied plans/montage show the new roof is to sit below the crown of the tree.

3.1.5 Recommendations

- Preliminary excavation and root pruning should be undertaken along the excavation line of the reconfigured forecourt/driveway access within the TPZ prior to the commencement of the bulk excavation works. No over-excavation, battering or benching should be undertaken.
- The new roof is approximately 800mm from the trunk which is sufficient to allow for trunk movement and growth. An RL at the base of the tree's crown should be taken to ensure proposed roofline can sit below and with sufficient clearance to the crown of the tree.

3.2 Tree 2

3.2.1 Tree 2 was identified as *Casuarina glauca* (Swamp She-Oak) and is late-mature specimen located adjacent to the existing building. The tree is in fair health as evidenced by a reduced crown density and presence of deadwood within its crown. It has a short ULE (5-15 years), is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.*

3.2.2 The supplied plans show that Tree 2 is to be retained with no works proposed within its TPZ.

3.2.3 Recommendations

- There is limited clearance between Tree 2 and the flagpole on the upper courtyard. The flagpole should be relocated as part of the works to avoid crown conflict with the tree.

[7] Hodel, Pittenger & Downer (2005)

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3.3 Tree 3, 5 & 12

3.3.1 Trees 3, 5 and 12 were identified as *Schefflera actinophylla* (Umbrella Tree), *Brachyciton acerifolious* (Illawarra Flame Tree) and *Buckinghamia celsissima* (Ivory Curl Tree) respectively and are mature rainforest-type species located adjacent to the existing building. The trees are in good health and structural condition. Trees 3, 5 and 12 are of moderate Landscape Significance and have been allocated a Retention Value of *Consider for Retention.*

3.3.2 The supplied plans show that Trees 3, 5 and 12 are to be retained with no works proposed within their TPZ areas.

3.4 Tree 4

3.4.1 Tree 4 was identified as *Ficus lyrata* (Fiddle Leaf Fig) and is a mature specimen located adjacent to the existing building. The tree is in fair health as evidenced by a reduced crown density. Tree 4 has been heavily suppressed by the adjacent trees and has been extensively pruned for building clearance which has affected its form and aesthetic value. The tree is of low Landscape Significance and has been allocated a Retention Value of *Consider for Removal.*

3.4.2 The supplied plans show that Tree 4 is to be retained with no works proposed within its TPZ.

3.5 Tree 6

3.5.1 Tree 6 was identified as *Tristaniopsis laurina* (Water Gum) and is a mature specimen located adjacent to the existing building. The tree is in fair health as evidenced by a reduced crown density and the presence of high volumes of deadwood within its crown. The tree is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.*

3.5.2 The supplied plans show that Tree 6 is to be retained with no works proposed within its TPZ.

3.5.3 **Recommendations**

There is limited clearance between Tree 6 and the building façade. Minor Reduction Pruning of branches less 50mm in diameter should be undertaken to provide a 500mm building clearance.

3.6 Tree 7

3.6.1 Tree 7 was identified as *Podocarpus elatus* (Brown Pine) and is a mature specimen located adjacent to the south-east of the building. The tree is in poor structural condition due to the presence of a major co-dominant inclusion which represents a significant structural defect. The loading on this defect will increase as the tree develops in crown size and sail area, particularly during severe weather events. Tree 7 has developed a moderate lean to the north-east, presumably as a phototropic response to suppression from adjacent trees. No evidence of root plate movement was observed at the time of assessment. The tree is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.*

3.6.2 The supplied plans show that Tree 7 is to be retained with no works proposed within its TPZ.

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3.7 Tree 8

3.7.1 Tree 8 was identified as *Cedrus deodara* (Himalayan Cedar) and is a late-mature specimen located adjacent to the south-east of the building. The tree is in fair health as evidenced by a reduced crown density and the presence of high volumes of deadwood within its crown. A concrete slab appears to have been recently constructed at the base of the tree. It is not known if any roots, and to what extent, may have been damaged or if these works are associated with the tree's declining health. The tree is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.*

3.7.2 The supplied plans show that Tree 8 is to be retained with no works proposed within its TPZ.

3.8 Tree 9

3.8.1 Tree 9 was identified as *Eucalyptus botryoides* (Southern Mahogany) and is a mature specimen located near the entrance to the Paul Street carpark. The tree is in fair health as evidenced by a reduced crown density and the presence of high volumes of deadwood within its crown. Tree 9 is in fair structural condition due to a previous branch failure at crown break. The wound created by the failure has decayed and is starting to develop into a cavity. The tree is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.*

3.8.2 The supplied plans show that Tree 9 is to be retained and no works are proposed within its TPZ.

3.9 Tree 10

3.9.1 Tree 10 was identified as *Casuarina glauca* (Swamp She-Oak) and is late-mature specimen located adjacent to the existing building. The tree is in fair health as evidenced by a reduced crown density and presence of deadwood within its crown. It has a short ULE (5-15 years), is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.*

3.9.2 The supplied plans show that Tree 10 is to be retained with a grease arrestor proposed within its TPZ. As the encroachment into the TPZ is less than 10% and outside of the Structural Root Zone (SRZ), the extent of work represents a *Minor Encroachment* as defined by AS-4970. A *Minor Encroachment* is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ. The encroachment into the TPZ should be compensated for by extending the TPZ in an area not subject to encroachment.

3.9.3 Recommendations

- Preliminary excavation and root pruning should be undertaken along the excavation line of the grease arrester footprint within the TPZ prior to the commencement of the bulk excavation works. No over-excavation, battering or benching should be undertaken beyond the arrestor footprint.

3.10 Tree 11

3.10.1 Tree 11 was identified as *Melaleuca quinquenervia* (Broadleaf Paperbark) and is a mature specimen located adjacent to the existing building. The tree is in fair structural condition due to the presence of bark inclusions, typical of species. The tree is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.*

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3.10.2 The supplied plans show that Tree 11 is to be retained with a grease arrester proposed within its TPZ. As an individual encroachment, the grease arrestor represents less than 10% of the TPZ and should not adversely impact the tree.

3.10.3 The supplied plans also show a booster assembly area, water pump, fire hydrant pump enclosure and footpath replacement are proposed within its TPZ. The extent of works represents a *Major Encroachment* as defined by AS-4970.

3.10.4 Tree sensitive design and construction methods can be used to minimise impacts of development on tree health and reduce conflict between trees and built structures. Much of the information published in this field has been incorporated into best practice guidelines and standards (i.e. *British Standard 5837 Trees in Relation to Design, Demolition and Construction 2012* & *Australian Standard 4970-2009 Protection of Trees on Development Sites*). Specifically, Clause 3.3.4 of AS-4970 notes that design factors and tree sensitive methods can be used to minimize the impact of the encroachment. The following tree sensitive methods should be used within the TPZ to minimise adverse impacts.

3.10.5 Recommendations

- Preliminary excavation and root pruning should be undertaken along the excavation line of the grease arrester footprint within the TPZ prior to the commencement of the bulk excavation works. No over-excavation, battering or benching should be undertaken beyond the arrestor footprint.
- The slabs for the booster assembly, water pump and fire hydrant pump enclosure should be installed above grade and supported by screw piles. Prior to installation, the location of the screw piles should be excavated using tree sensitive methods (hand/hydrovac/airspade etc) to a depth of 600mm. Screw piles should be relocated to enable the retention of roots (>25mmø) as required by the Project Arborist.
- The removal and replacement of the existing footpath should retain existing sub-base layers. If sections of the sub-base layer require refurbishment/modification, the sub-base materials should be removed in thin (20mm) layers using an excavator (<3.5T) fitted with a flat bladed bucket. The excavator operator should be guided by a spotter to identify and expose tree roots which may be present in/under the sub-base layer. Roots (>25mmø) should be exposed by localised hand excavation and protected from damage.Roots (>25mmø) identified with sub-base layers should be retained, and surfaces and sub-base layers should be thinned/modified as required by the Project Arborist. Root pruning should be undertaken by the Project Arborist only.
- Pipes for the fire hydrant pump and grease arrester should be installed using tree sensitive excavation (hand/hydrovac/airspade etc) methods with the pipes located around/below roots (>25mmø) as required by the Project Arborist. Excavation using compact machinery (<2T) fitted with a flat bladed bucket is permissible where approved by the Project Arborist. Excavation using compact machinery should be undertaken in small increments, guided by a spotter who is to look for and prevent damage to roots (>25mmø).

3.11 Tree 13

3.11.1 Tree 13 was identified as a *Quercus ilex* (Holm Oak) and is a late-mature specimen located adjacent to the Paul Street frontage. The tree is in good health and structural condition. The tree is of high Landscape Significance and has been allocated a Retention Value of *Priority for Retention.*

3.11.2 The supplied plans show that Tree 13 is to be retained with a booster assembly area, water pump, fire hydrant pump enclosure, footpath replacement, bike rack and new pavement area proposed within its TPZ. The extent of works represent a *Major Encroachment* as defined by AS-4970. The following tree sensitive methods should be used within the TPZ to minimise adverse impacts.

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3.11.3 Recommendations

- The slabs for the booster assembly, water pump and fire hydrant pump enclosure, footpath replacement and pipes for the fire hydrant pump and grease arrester should be installed as per Section 3.10.5 above.
- The area of new pavement should be installed above existing grade to minimise the potential for root damage. Levels may need to be locally raised, and surfaces and sub-base layers thinned/modified as required to enable the retention of roots (>25mmø) as required by the Project Arborist.
- Bike racks should be supported on isolated footings (with all other parts of the structures positioned above existing ground levels). Excavation for footings within the TPZ should be undertaken using tree sensitive methods (hand/hydrovac/airspade etc). Footing locations should be flexible and/or the footing design modified to enable the retention of roots (>25mmø) as required by the Project Arborist.
- There is limited clearance between Tree 13 and the building façade. Minor Reduction Pruning of branches less 50mm in diameter should be undertaken to provide a 500mm building clearance.

3.11.4 It should be noted that Tree 13 is of a significant age and may be less tolerant of construction impacts or than younger, more vigorous trees. Whilst is possible to undertake works within the TPZ with the use of tree sensitive design and construction methods as outlined above, the adherence of contractors to these methods and general tree protection requirements will ultimately determine whether the viability of the tree is maintained in the medium to long term.

3.11.5 Given the age and significance of Tree 13, it is recommended that an irrigation system is installed prior to the commencement of construction to promote new fibrous root development and maintain tree health.

3.11.6 The temporary irrigation system should be installed to the following specification:

- A low-pressure drip irrigation system shall be installed across the TPZ (proposed garden bed) prior to commencement of the excavation works.
- Drip lines should be installed on the ground surface at spacings of 600mm centres and covered with a 50mm thick layer of composted mulch.
- The system should be operated via an automated timer every third day for a duration of 45 minutes (or as permitted under current watering restrictions).
- The operation of the system should be periodically checked by the Project Arborist during the construction period and the watering duration adjusted as required.
- A soil wetting agent should be applied (in accordance with the manufacturer's instructions) to the irrigated areas to promote infiltration of irrigation through the soil profile.
- A seaweed-based soil conditioner should be applied (in accordance with the manufacturer's instructions) to the irrigated area to promote a healthy soil microbiome.

3.12 Trees 14 & 18

3.12.1 Trees 14 and 18 were identified as *Butia capitata* (Jelly Palm) and *Livistona autralis* (Cabbage Tree Palm) respectively and are located near the vehicular driveway on Bondi Road. The trees are in good health and structural condition. Trees 14 and 18 are of low Landscape Significance and have been allocated a Retention Value of *Consider for Removal.*

3.12.2 The supplied plans show that Trees 14 and 18 are to be removed as part of the proposed landscape treatment. New tree plantings using healthy, advanced-sized specimens could replace the loss of amenity from tree removal within a short timeframe.

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3.13 Trees 15, 16 & 17

3.13.1 Trees 15-17 are a group of palms including *Livistona autralis* (Cabbage Tree Palm), *Howea forsteriana* (Kentia Palm) and *Syagrus romanzoffiana* (Cocos Palm), and are located near the vehicular driveway on Bondi Road. The trees are in good health and structural condition. Tree 15 is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.* Tree 16 is of low Landscape Significance and has been allocated a Retention Value of *Consider for Removal.* Tree 17 is of low Landscape Significance and has been allocated a Retention Value of *Priority for Removal.*

3.13.2 The supplied plans show Trees 15-17 are to be transplanted to a new garden bed on site. These species generally transplant successfully due to their fibrous root system.

3.13.3 Recommendations

- Tree 15 has developed a minor trunk sweep and above ground guying may be required as part of the transplanting works. In many circumstances, the planting of a new advanced-size palm of similar dimensions often is a more practical and less costly exercise than transplanting.
- Transplanting works should be undertaken by an experienced Tree Transplanting Contractor with a minimum qualification equivalent (using the Australian Qualifications Framework) of Level 3 or above, in Arboriculture or its recognised equivalent.
- Any transplanted trees which fail to establish or where transplanting is deemed unfeasible should be replaced with new trees of the same size and species.
- Tree 17 *Syagrus romanzoffiana* (Cocos Palm) should not be transplanted due to its weed status.

3.14 Tree 19

3.14.1 Tree 19 was identified as *Eucalyptus botryiodes* (Southern Mahogany) and mature specimen located to the north-east of the building. The tree is in good health and structural condition. Tree 19 is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.*

3.14.2 The supplied plans show that Tree 19 is to be retained with the reconfigured forecourt/driveway access proposed within its TPZ. The extent of work represents a *Minor Encroachment* as defined by AS-4970. A *Minor Encroachment* is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ. The encroachment into the TPZ should be compensated for by extending the TPZ in an area not subject to encroachment.

3.15 Other Works within Areas

3.15.1 Demolition Works

Demolition works within TPZ areas should be supervised by the Project Arborist and utilise tree sensitive methods. Structures should be demolished in small sections ensuring demolition machinery/equipment does not contact with any parts of the trees.

3.15.2 Underground Services

Underground services should be located outside of TPZ areas. Where this is not possible, services should be installed using tree sensitive excavation (hand/hydrovac etc) methods with the services located around/below roots as deemed necessary by the Project Arborist.

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3.15.3 Landscape Planting

The installation of plants within TPZ areas should be undertaken using hand tools and roots should be protected. No mechanical cultivation/ripping of soils should be undertaken within TPZ areas.

3.16 New Tree Planting

3.16.1 Advanced-size replacement trees should be installed to help off-set the loss of amenity and canopy cover from the tree removal.

3.16.2 New trees should be grown in accordance with *Australian Standard 2303 Tree Stock for Landscape Use (2015).*

4.0 CONCLUSION

4.1.1 Nineteen (19) trees were addressed within this report and comprise of a mix of locally indigenous, Australian-native and exotic species. Tree 1 *Phoenix canariensis* (Canary Island Date Palm) and Tree 13 *Quercus ilex* (Holm Oak) likely date from the early 20th century and are considered the most significant trees on site. Of the nineteen (19) trees assessed:

- Two (2) were trees allocated a Retention Value of *Priority for Retention*
- Twelve (12) trees were allocated a Retention Value of *Consider for Retention*
- Four (4) trees were allocated a Retention Value of *Consider for Removal*
- One (1) tree was allocated a Retention Value of *Priority for Removal*

4.1.2 The proposed Waverley Council Chambers refurbishment works include internal refurbishments and furnishings, and external refurbishments including upgrading of façade, roof, windows, forecourt/turning circle, western landscaped area and footpath to kerb.

4.1.3 The supplied plans show that Trees 1-13 and 19 are to be retained as part of the proposed development. Tree sensitive methods should be used within the TPZ areas (as per Section 3) to minimise adverse impacts. The trees to be retained should be protected in accordance with the Tree Protection Specification **(Appendix 4)** and Typical Tree Protection Details **(Appendix 5).** The location of TPZ fencing and ground protection is shown on the Landscape Plan **(Appendix 2).**

4.1.4 The supplied plans show that Trees 14 and 18 are to be removed as part of the proposed development. These trees are of low Landscape Significance and have been allocated a Retention Value of *Consider for Removal.* New tree plantings using healthy, advanced-sized specimens could replace the loss of amenity from tree removal within a short timeframe.

4.1.5 The supplied plans show Trees 15-17 are to be transplanted to a new garden bed on site. Tree 17 *Syagrus romanzoffiana* (Cocos Palm) should not be transplanted due to its weed status. Transplanting works should be undertaken by an experienced Tree Transplanting Contractor with a minimum qualification equivalent (using the Australian Qualifications Framework) of Level 3 or above, in Arboriculture or its recognised equivalent. Any transplanted trees which fail to establish or where transplanting is deemed unfeasible should be replaced with new trees of the same size and species.

4.1.6 Advanced size replacement trees should be installed to help off-set the loss of amenity and canopy cover from the tree removal. New trees should be grown in accordance with *Australian Standard 2303 Tree Stock for Landscape Use (2015).*

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4.1.7 The distribution of tree age classes at the site is heavily weighted towards the mature and late-mature categories and approximately one third of the trees at the site fall within the ULE range of 5-15 years. This indicates that many trees may need to be removed in a similar period. Whilst not impacted by the proposed refurbishment works, Tree 4 *Ficus lyrata* (Fiddle Leaf Fig), Tree 7 *Podocarpus elatus* (Brown Pine), Tree 9 *Eucalyptus botryoides* (Southern Mahogany) and Tree 10 *Casuarina glauca* (Swamp She-Oak) should be considered for removal and replacement. Once replacement trees have established, the remaining trees should be reassessed and a program of removal and replacement should be implemented based on the results of the tree assessment.

4.1.8 Trees 6 and 13 are located in close proximity to the Chambers building and the Reduction Pruning of branches less than 50mm should be undertaken to provide a 500mm building clearance. Pruning works should be undertaken by an Arborist (AQF Level 3 or above in Arboriculture, or recognised equivalent) in accordance with *Australian Standard 4373 Pruning of Amenity Trees (2007)* and the *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016).*

4.1.9 Tree 7 *Podocarpus elatus* (Brown Pine) is a mature specimen located adjacent to the south-east of the building. The tree is in poor structural condition due to the presence of a major co-dominant inclusion which represents a significant structural defect. The loading on this defect will increase as the tree develops in crown size and sail area, particularly during severe weather events. Council's Tree Management Team should be notified of the defect.

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5.0 LIMITATIONS& DISCLAIMER

TreeiQ takes care to obtain information from reliable sources. However, TreeiQ can neither guarantee nor be responsible for the accuracy of information provided by others. Plans, diagrams, graphs and photographs in this Arboricultural Report are visual aids only and are not necessarily to scale. This Report provides recommendations relating to tree management only. Advice should be sought from appropriately qualified consultants regarding design/construction/ecological/heritage etc issues.

This Report has been prepared for exclusive use by the client. This Report shall not be used by others or for any other reason outside its intended target or without the prior written consent of TreeiQ. Unauthorised alteration or separate use of any section of the Report invalidates the Report.

Many factors may contribute to tree failure and cannot always be predicted. TreeiQ takes care to accurately assess tree health and structural condition. However, a tree's internal structural condition may not always correlate to visible external indicators. There is no warranty or guarantee, expressed or implied that problems or deficiencies regarding the trees or site may not arise in the future. Information contained in this Report covers only the trees assessed and reflects the condition of the trees at the time of inspection. Additional information regarding the methodology used in the preparation of this Report is attached as Appendix 1. A comprehensive tree risk assessment and management plan for the trees is beyond the scope of this Report.

Reference should be made to any relevant legislation including Tree Management Controls. All recommendations contained within this Report are subject to approval from the relevant Consent Authority.

6.0 BIBLIOGRAPHY& REFERENCES

Barrell (1995), 'Pre-development Tree Assessments', in *Trees & Building Sites, Proceedings of an International Conference Held in the Interest of Developing a Scientific Basis for Managing Trees in Proximity to Buildings*, International Society of Arboriculture, Illinois, USA, pp. 132-142.

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7.0 APPENDICES

Appendix 1: Methodology

1.1 **Site Inspection**: This report was determined as a result of a comprehensive site inspection during August 2021.

1.2 **Tree Dimensions**: The dimensions of the subject tree(s) are approximate only.

1.3 **Tree Locations:** The location of the subject tree(s) was determined from the supplied plans. Trees not shown on the supplied plans have been plotted in their **approximate location only.**

1.4 **Trees & Development**: Tree Protection Zones, Tree Protection Measures and Sensitive Construction Methods for the subject tree were based on methods outlined in *Australian Standard 4970-2009 Protection of Trees on Development Sites*.

The *Tree Protection Zone* (TPZ) is described in AS-4970 as a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The *Structural Root Zone* (SRZ) is described in AS-4970 as the area around the base of a tree required for the tree's stability in the ground. Severance of structural roots within the SRZ is not recommended as it may lead to the destabilisation and/or demise of the tree.

In some cases it may be possible to encroach into or make variations to the theoretical TPZ. A *Minor Encroachment* is less than 10% of the area of the TPZ and is outside the SRZ. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. A *Major Encroachment* is greater than 10% of the TPZ or inside the SRZ. In this situation the Project Arborist must demonstrate that the tree would remain viable. This may require root investigation by non-destructive methods or the use of sensitive construction methods.

1.5 **Tree Health**: The health of the subject tree(s) was rated as *Good*, *Fair* or *Poor* based on an assessment of the following factors:

I. Foliage size and colour
II. Pest and disease infestation
III. Extension growth
IV. Crown density
V. Deadwood size and volume
VI. Presence of epicormic growth

1.6 **Tree Structural Condition**: The structural condition of the subject tree(s) was rated as *Good*, *Fair* or *Poor* based on an assessment of the following factors:

I. Assessment of branching structure
(i.e. co-dominant/bark inclusions, crossing branches, branch taper, terminal loading, previous branch failures)
II. Visible evidence of structural defects or instability
(i.e. root plate movement, wounds, decay, cavities, fungal brackets, adaptive growth)
III. Evidence of previous pruning or physical damage
(root severance/damage, lopping, flush-cutting, lions tailing, mechanical damage)

1.7 **Useful Life Expectancy (ULE)**: The ULE is an estimate of the longevity of the subject tree(s) in its growing environment. The ULE is modified where necessary to take in consideration tree(s) health, structural condition and site suitability. The tree(s) has been allocated one of the following ULE categories (Modified from Barrell, 2001):

I. 40 years +
II. 15-40 years
III. 5-15 years
IV. Less than 5 years

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1.8 **Landscape Significance**: Landscape Significance was determined by assessing the combination of the cultural, environmental and aesthetic values of the subject tree(s). Whilst these values are subjective, a rating of high, moderate, low or insignificant has been allocated to the tree(s). This provides a relative value of the tree's Landscape Significance which may aid in determining its Retention Value. If the tree(s) can be categorized into more than one value, the higher value has been allocated.

Landscape Significance	Description
Very High	The subject tree is listed as a Heritage Item under the *Local Environmental Plan* with a local or state level of significance.
	The subject tree is listed on Council's Significant Tree Register or meets the criteria for significance assessment of trees and/or landscapes by a suitably qualified professional. The criteria are based on general principles outlines in the Burra Charter and on criteria from the Register of the National Estate.
High	The subject tree creates a 'sense of place' or is considered 'landmark' tree.
	The subject tree is of cultural or historical importance or is widely known.
	The subject tree is a prominent specimen which forms part of the curtilage of a heritage item with a known or documented association with that item.
	The subject tree has been identified by a suitably qualified professional as a species scheduled as a Threatened or Vulnerable Species for the site defined under the provisions of the NSW *Biodiversity Conservation Act (2016)* or the Commonwealth *Environmental Protection and Biodiversity Conservation Act* (1999).
	The subject tree is known to contain nesting hollows to a species scheduled as a Threatened or Vulnerable Species for the site as defined under the provisions of the NSW *Biodiversity Conservation Act (2016)* or the Commonwealth *Environmental Protection and Biodiversity Conservation Act* (1999).
	The subject tree is an excellent representative of the species in terms of aesthetic value.
	The subject tree is of significant size, scale or makes a significant contribution to the canopy cover of the locality.
Moderate	The subject tree makes a positive contribution to the visual character or amenity of the area.
	The subject tree provides a specific function such as screening or minimising the scale of a building.
	The subject tree is a good representative of the species in terms of aesthetic value.
Low	The subject tree is a known environmental weed species or is not protected by Council's Tree Management Controls.
	The subject tree makes little or no contribution to the amenity of the locality.
	The subject tree is a poor representative of the species in terms of aesthetic value.

1.9 **Retention Value**: Retention Value was based on the subject tree's Useful Life Expectancy and Landscape Significance. The Retention Value was modified where necessary to take in consideration the subject tree's health, structural condition and site suitability. The subject tree(s) has been allocated one of the following Retention Values:

I. Priority for Retention
II. Consider for Retention
III. Consider for Removal
IV. Priority for Removal

ULE		Landscape Significance		
	Very High	High	Moderate	Low
40 years +	Priority for Retention	Priority for Retention		Consider for Removal
15-40 years		Priority for Retention	Consider for Retention	
5-15 years		Consider for Retention		
Less than 5 years	Consider for Removal	Priority for Removal		

The above table has been modified from the Footprint Green Tree Significance and Retention Value Matrix.

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Appendix 2: Plans

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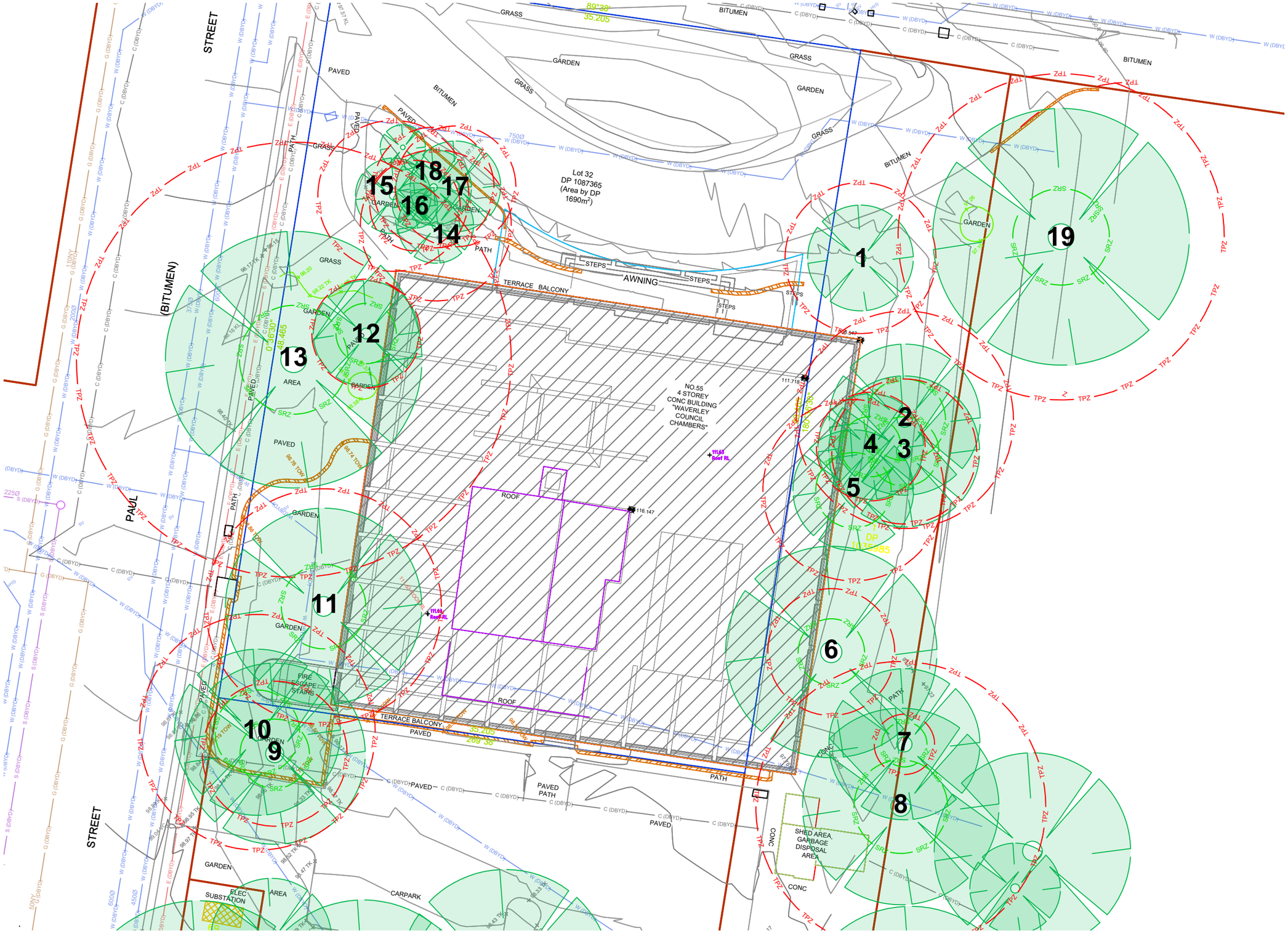

Legend

Tree Protection Zone (TPZ) — Structural Root Zone (SRZ)

0 1 2 3 4 5 6 7 8 9 10

SCALE 1:250

Waverley Council Chambers Refurbishment
TPZ SRZ Plan
Client: Iahznimmo Architects
date: 17th August 2021
scale: 1:250 (A3)

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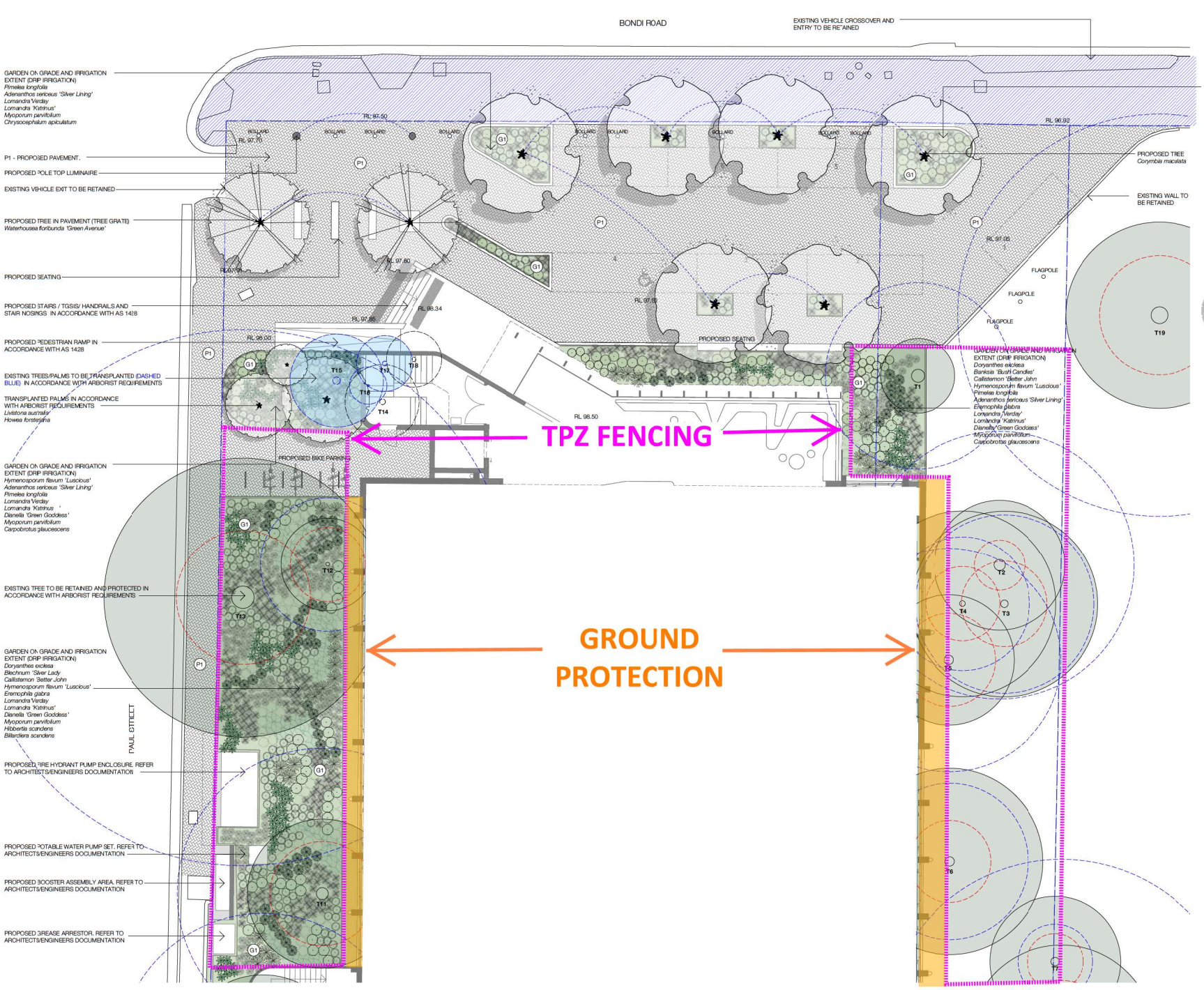

LEGEND

BOUNDARY

EXISTING TREE TO BE RETAINED AND PROTECTED. REFER TO ARBORIST RPORT.

SRZ - STRUCTURAL ROOT ZONE
TPZ - TREE PROTECTION ZONE

EXISTING TREE TO BE REMOVED. REFER TO ARBORIST REPORT.

EXISTING TREE / PALM TO BE TRANSPLANTED. REFER TO ARBORIST REPORT.

P1 - PAVEMENT TYPE 1

G1 - GARDEN PROFILE 01- GARDEN ON GRADE AND IRRIGATION EXTENT (DRIP IRRIGATION)

PROPOSED TREES, SHRUBS AND GROUNDCOVERS AS NOTED

GENERAL NOTES

1. DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ENGINEERING DRAWINGS. NOTE ALL LANDSCAPE HARDWORKS INCLUDING PAVING, STEPS, RETAINING WALLS AND FENCES TO ARCHITECTS DOCUMENTATION AND DETAILS

2. ALL PLANTING AREAS TO BE MULCHED, TYPICALLY 50MM DEPTH. ORGANIC MULCH TO CONFORM TO AS 4454-2012 COMPOST, SOIL CONDITIONERS AND MULCHES.

3. SOILS TO CONFORM TO AS 4419-2003 SOILS FOR LANDSCAPING AND GARDENS USE.
SOIL DEPTHS
- ON GRADE 300MM

4. ALL PLANTING AREAS TO HAVE DRIP IRRIGATION SYSTEM WITH BACK UP PROTECTION TO THE MAIN SUPPLY, TO ALL CURRENT SYDNEY WATERS REQUIREMENTS AND RELEVANT AUSTRALIAN STANDARDS

5. MAINTAIN ALL WORKS DURING THE CONTRACT PERIOD FOR 52 WEEKS FROM THE DATE OF PRACTICAL COMPLETION INCLUDING, BUT NOT LIMITED TO WATERING, WEEDING, RUBBISH REMOVA., REPLACEMENT PLANTING, DISEASE AND PEST CONTROL, PRUNING, SOIL AND MULCH CONTROL REINSTATEMENT.

6. REFER TO ARBORIST REPORT REGARDING RETENTION AND REMOVAL OF TREES

PLANT SCHEDULE

BOTANICAL NAME	COMMON NAME	HEIGHT	POT SIZE	QTY
TREES				
Howea forsteriana	Kentia Palm	12M	silvaged	as shown
Corymbia maculata	Spotted Gum	20M	400L	as shown
Livistona australis	Cabbage Tree Palm	15M	silvaged	as shown
Waterhousea floribunda 'Green Avenue'	Green Avenue Weeping Lilly Pilly	8M	400L	as shown
SHRUBS AND CLIMBERS				
Adenanthis sericeus 'Silver Lining'	Dwarf Woolly Bush	0.8M	300MM	3/m2
Banksia 'Bush Candles'	Bush Candles	0.6M	200MM	3/m2
Billardiera scandens	Apple Berry	4M	150MM	5/m2
Blechnum nudum 'Silver Lady'	Fishbone Fern	0.6M	200MM	2/m2
Callistemon 'Better John'	Better John Bottlebrush	1M	300MM	3/m2
Carpobrotus glaucescens	Pig Face	0.2M	150MM	5/m2
Chrysocephalum apiculatum	Yellow Buttons	0.2M	150MM	5/m2
Dianella 'Goddess'	Goddess Native Flax	0.5M	150MM	5/m2
Doryanthes excelsa	Gymea Lily	1.2M	300MM	2/m2
Eremophila glabra	Emu Bush	0.3M	200MM	3/m2
Hibbertia scandens	Climbing Guinea Flower	4M	150MM	5/m2
Hymenospermum 'Luscious'	Luscious Native Frangipani	0.8M	300MM	2/m2
Isolepis nodosa	Knobby Club Rush	0.8M	150MM	5/m2
Lomandra 'Katrinus'	Shara	0.6M	150MM	5/m2
Lomandra 'Verday'	Verday	0.6M	150MM	5/m2
Myoporum parvifolium	Creeping Boobialla	0.3M	150MM	5/m2
Pimelea longifolia	Rice Flower	0.8M	300MM	2/m2

REV:	DATE:	DOCUMENT STATUS/ AMENDMENTS
01	15.09.21	DRAFT REF
02	16.09.21	DRAFT REF

1:100 @ A1
0 1 2 5 7.5M

NORTH

black beetle
Landscape Architecture and Design
Black Beetle pty ltd
Level 1, 1073 Pittwater Road, Collaroy NSW 2097
Tel: 0422 104 416
email: blackbeetle@blackbeetle.com.au

PROJECT
Waverley Council Chambers
49A Bondi Rd
BONDI JUNCTION, NSW

DRAWING TITLE
Landscape Plan

Drawn IK / GB
L.Architect Authorised IK / GB
Scale 1:100 @ A1
Client Waverley Council
Status Draft REF

JOB NUMBER BB 1293
DRAWING NUMBER / ISSUE LA LP 01/ 02

Appendix 3: Tree Assessment Schedule

Tree No.	Species	DBH comb. (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)
1	*Phoenix canariensis* (Canary Island Date Palm)	700	20	4	Good	Good		Late Mature	15-40	High	Priority for Retention	5.0	N/A
2	*Casuarina glauca* (Swamp She-Oak)	600	21	7	Fair	Good	Limited flag clearance, pruning <50mm. Crown density 75-95%. Small (<25mmø), medium (25-75mmø) & large (>75mmø) deadwood in low volumes. Wound(s), various stages of decay.	Late Mature	5-15	Moderate	Consider for Retention	7.2	2.7
3	*Schefflera actinophylla* (Umbrella Tree)	400	15	10	Good	Good	Partially suppressed. Phototropic lean, moderate. Branch inclusion(s), minor.	Mature	15-40	Moderate	Consider for Retention	4.8	2.3
4	*Ficus lyrata* (Fiddle Leaf Fig)	300	15	10	Fair	Good	Extensively pruned for building clearance. Crown density 75-95. Heavily suppressed. Wound(s), various stages of decay.	Mature	5-15	Low	Consider for Removal	3.6	2.0
5	*Brachyciton acerifolious* (Illawarra Flame Tree)	500	20	7	Good	Good	Limited building clearance. Extensively crown lifted. Crown density 75-95%. Partially suppressed.	Mature	15-40	Moderate	Consider for Retention	6.0	2.5
6	*Tristaniopsis laurina* (Water Gum)	250 250	15	10	Fair	Good	Limited building clearance, pruning <50mm. Crown density 75-95%. Partially suppressed. Small (<25mmø) and medium (25-75mmø) deadwood in high volumes.	Mature	5-15	Moderate	Consider for Retention	4.2	2.2
7	*Podocarpus elatus* (Brown Pine)	450	15	7	Good	Poor	Partially suppressed. Phototropic lean, moderate. Co-dominant inclusion(s), major. Wound(s), various stages of decay.	Mature	5-15	Moderate	Consider for Retention	2.0	1.5
8	*Cedrus deodara* (Himalayan Cedar)	800	20	10	Fair	Good	Crown density 50-75%. Small (<25mmø), medium (25-75mmø) & large (>75mmø) deadwood in moderate volumes.	Late Mature	5-15	High	Consider for Retention	9.6	3.1

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Tree No.	Species	DBH comb. (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)
							Wound(s), various stages of decay. Adaptive growth on trunk. Recently constructed slab at base.						
9	*Eucalyptus botryoides* (Southern Mahogany)	400	12	10	Fair	Fair	Crown density 75-95%. Small (<25mmø) epicormic growth in moderate volumes. Wound(s), various stages of decay. Previous branch failure developing into a cavity at crown break. Hanger in crown.	Mature	5-15	Moderate	Consider for Retention	4.8	2.3
10	*Casuarina glauca* (Swamp She-Oak)	650	22	9	Fair	Good	Crown density 50-75%. Small (<25mmø) & medium (25-75mmø) deadwood in moderate volumes.	Late Mature	5-15	Moderate	Consider for Retention	7.8	2.8
11	*Melaleuca quinquenervia (Broadleaf* Paperbark)	650	17	8	Good	Fair	Crown density 75-95%. Small (<25mmø) deadwood in low volumes. Bark inclusion(s), typical of species.	Mature	15-40	Moderate	Consider for Retention	7.8	2.8
12	*Buckinghamia celsissima* (Ivory Curl Tree)	200 200 100	6	5	Good	Good	Partially suppressed.	Mature	15-40	Moderate	Consider for Retention	3.6	2.0
13	*Quercus ilex* (Holm Oak)	1200	17	15	Good	Good	Limited building clearance, pruning <50mm. Crown density 75-95%. Small (<25mmø) deadwood in low volumes. Wound(s), various stages of decay.	Late Mature	15-40	High	Priority for Retention	14.4	3.6
14	*Butia capitata* (Jelly Palm)	300	5	4	Good	Good		Mature	15-40	Low	Consider for Removal	5.0	N/A
15	*Livistona autralis* (Cabbage Tree Palm)	400	17	4	Good	Good	Trunk sweep, minor.	Mature	15-40	Moderate	Consider for Retention	5.0	N/A

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Tree No.	Species	DBH comb. (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)
16	*Howea forsteriana* (Kentia Palm)	100	5	2	Good	Good		Mature	15-40	Low	Consider for Removal	3.0	N/A
17	*Syagrus romanzoffiana* (Cocos Palm)	250	8	3	Good	Good		Mature	<5	Low	Priority for Removal	4.0	N/A
18	*Livistona autralis* (Cabbage Tree Palm)	200	6	3	Good	Good	Partially suppressed.	Mature	15-40	Low	Consider for Removal	4.0	N/A
19	*Eucalyptus botryiodes* (Southern Mahogany)	900	17	10	Good	Good	Small (<25mmø), medium (25-75mmø) & large (>75mmø) deadwood in low volumes. Small (<25mmø) and medium (25-75mmø) epicormic growth in moderate volumes. Wound(s), various stages of decay.	Mature	15-40	Moderate	Consider for Retention	10.8	3.2

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Appendix 4: Plates

Plate 1: Showing Tree 1

Plate 2: Showing Trees 2-5

Plate 3: Showing Trees 6-8

Plate 4: Showing Trees 9 & 10

Plate 5: Showing Tree 11

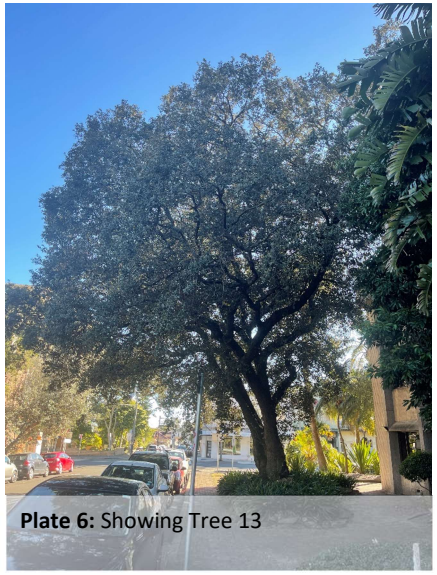

Plate 6: Showing Tree 13

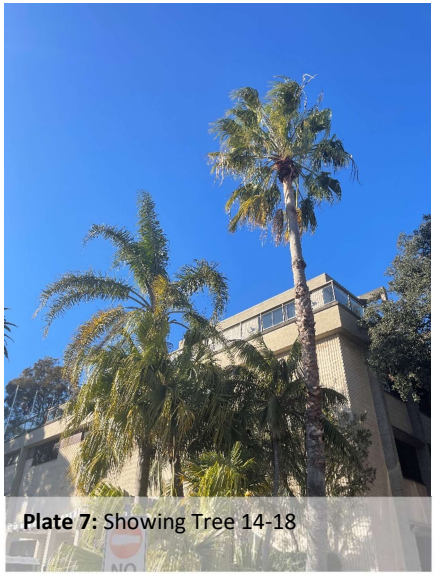

Plate 7: Showing Tree 14-18

Plate 8: Showing Tree 19 (left)

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Appendix 5: Tree Protection Specification

1.0 Appointment of Project Arborist

A Project Arborist shall be engaged prior the commencement of work on-site and monitor compliance with the protection measures. The Project Arborist shall inspect the tree protection measures and Compliance Certification shall be prepared by the Project Arborist for review by the Principal Certifying Authority prior to the release of the Compliance Certificate.

The Project Arborist shall have a minimum qualification equivalent (using the Australian Qualifications Framework) of NSW TAFE Certificate Level 5 or above in Arboriculture.

1.1 Tree Protection Zone

The trees to be retained shall be protected prior and during construction from activities that may result in an adverse effect on their health or structural condition. The area within the Tree Protection Zone (TPZ) shall exclude the following activities, unless otherwise stated: -

- Modification of existing soil levels, excavations and trenching
- Mechanical removal of vegetation
- Movement of natural rock
- Storage of materials, plant or equipment or erection of site sheds
- Affixing of signage or hoarding to the trees
- Preparation of building materials, refueling or disposal of waste materials and chemicals
- Lighting fires
- Movement of pedestrian or vehicular traffic
- Temporary or permanent location of services, or the works required for their installation
- Any other activities that may cause damage to the tree

NOTE: If access, encroachment or incursion into the TPZ is deemed essential, prior authorisation is required by the Project Arborist.

1.2 Tree Protection Fencing

TPZ fencing shall be installed as shown on the Landscape Plan **(Appendix 2)**. Fencing setback distances may be reduced for demolition/construction access with approval from the Project Arborist and where ground protection is installed to the unfenced areas of the TPZ. Where TPZ areas merge together, a single fence encompassing the area is permissible. Existing site boundary fences may form part of the enclosure. The exact location of the fencing shall be confirmed through consultation between the Head Contractor/Project Manager and the Project Arborist prior to the commencement of works. Refer to Typical Tree Protection Details **(Appendix 6).**

1.3 Site Management

Materials, waste storage, and temporary services shall not be located within the TPZ.

1.4 Works within the Tree Protection Zones

In some cases works within the TPZ may be authorized by the determining authority. **These works shall be supervised by the Project Arborist**. When undertaking works within the TPZ, care should be taken to avoid damage to the tree's root system, trunks and lower branches.

1.5 Ground Protection

Ground protection shall be installed as shown on the Landscape Plan **(Appendix 2)** or as required by the Project Arborist. Vehicular and machinery access shall be restricted to areas of existing pavement or from areas of temporary ground protection such as ground mats or steel road plates. Refer to Typical Tree Protection Details **(Appendix 6).**

1.6 Trunk Protection

Trunk protection shall be installed as required by the Project Arborist. Installation includes wrapping padding (either carpet underlay or 10mm thick jute geotextile mat) around the trunk and first order branches to a minimum height of 2m. Timber battens (90 x 45mm) spaced at 150mm centres shall be strapped together and placed over the padding. Timber battens must not be fixed to the trees. Refer to Typical Tree Protection Details **(Appendix 4)**. Branch protection shall be installed as deemed necessary by the Project Arborist.

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1.7 Tree & Vegetation Removal

Tree removal works shall be undertaken in accordance with the *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)* and other applicable codes and legislation.

Tree removal shall not damage the trees to be retained. Other vegetation to be removed within a TPZ shall be carefully lifted by hand/hand tools to avoid damaging roots within the surrounding soil profile.

1.8 Structure & Pavement Demolition

Demolition of existing structures/pavement within the TPZ shall be supervised by the Project Arborist. Machinery is to be excluded from the TPZ unless operating from the existing slabs, pavements or areas of ground protection (refer to Section 1.5). Machinery should not contact the tree's roots, trunk, branches and crown.

The existing pavement shall be carefully lifted by hand to minimise damage to the existing sub-base and to prevent damage to tree roots. Wherever possible, the existing sub-base material shall remain in-situ. Where deemed necessary by the Project Arborist, the structures shall be shattered prior to removal with a hand-operated pneumatic/electric breaker.

1.9 Pavement Installation

New pavements (including sub-base materials) within TPZ areas shall be installed above or at existing grade. Pavement sub-base layers shall either be thinned or finished pavement levels modified as required to enable the retention of roots (>25mmø) as deemed necessary by the Project Arborist.

1.10 Footings within the TPZ

Footing installation within TPZ areas shall be supervised by the Project Arborist. Other than for the isolated piers/postspads all other parts of the structure shall be installed above grade.

Drilling/piling machinery shall be excluded from the TPZ unless operating from an area where ground protection has been installed (refer to Section 1.8) or from the existing slabs or pavements. Drilling/piling machinery shall be of a suitable size to not damage the trees' roots, trunk, branches and crown. Machinery shall work in conjunction with an observer to ensure that adequate clearance from trees is maintained at all times.

1.11 Underground Services

Underground services shall be located outside of the TPZ. Where this is not possible, they shall be installed using tree sensitive excavation methods (hand/hydrovac/airspade) with the services installed around/below roots or as determined by the Project Arborist). Excavation using compact machinery fitted with a flat bladed bucket is permissible where approved by the Project Arborist. Excavation using compact machinery should be undertaken in small increments, guided by a spotter who is to look for and prevent damage to roots.

1.12 Turf/Plant Installation

Turf/plant installation within TPZ shall be undertaken using hand tools and roots shall be protected. No mechanical cultivation/ripping of soils shall be undertaken within the TPZ.

Landscape planting shall be completed in the final stage of the development works and and trunk protection shall remain in place until these works are due to commence.

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Appendix 6: Typical Tree Protection Details

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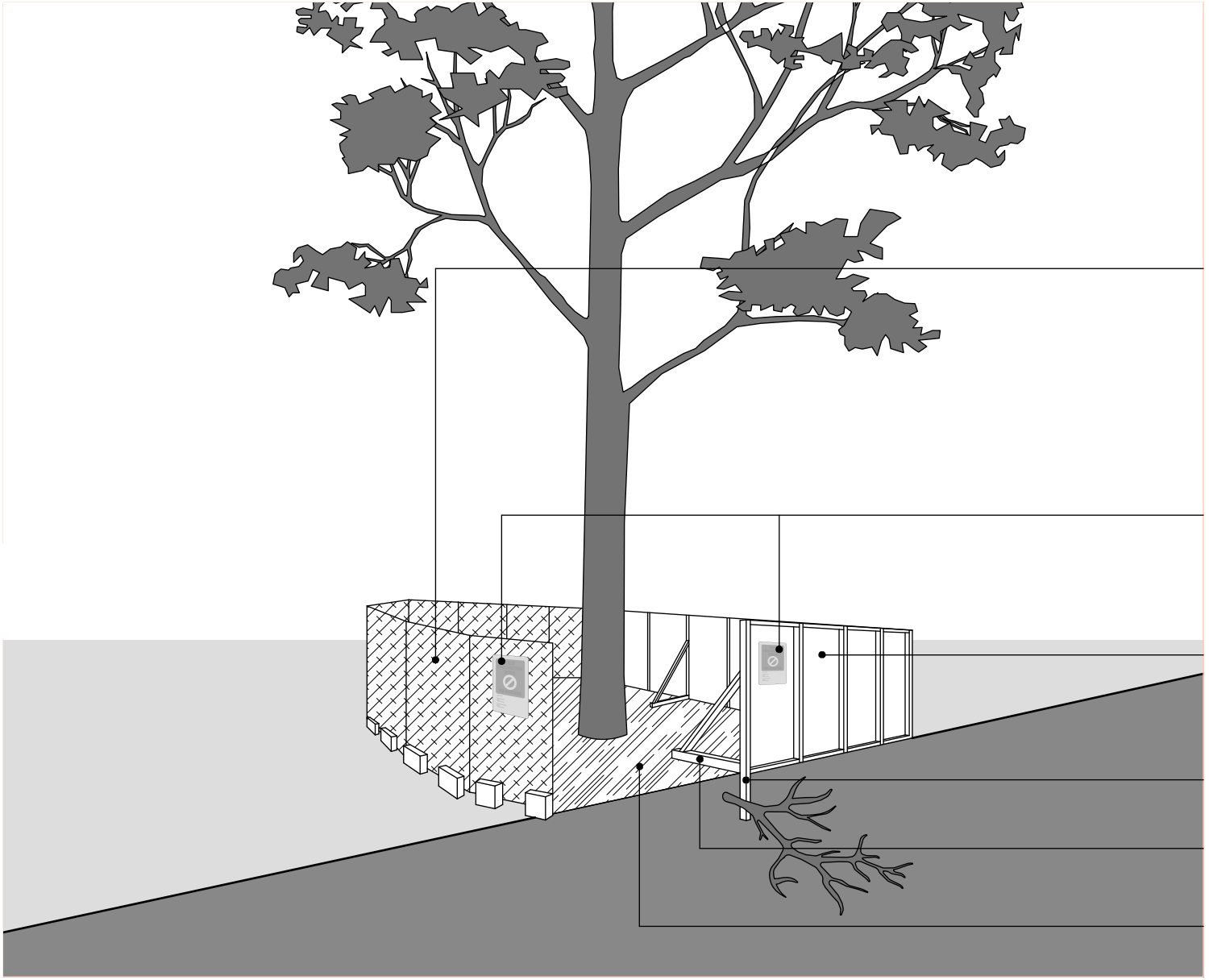


Note:
No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.

Option 1 - Fencing
1.8m high chain wire mesh panels with shade cloth attached (if required), held in place with concrete feet.

Tree Protection Zone (TPZ) sign

Option 2 - Fencing
Plywood or wooden panel paling fence. This type of fencing material also prevents building materials or soil entering the TPZ.

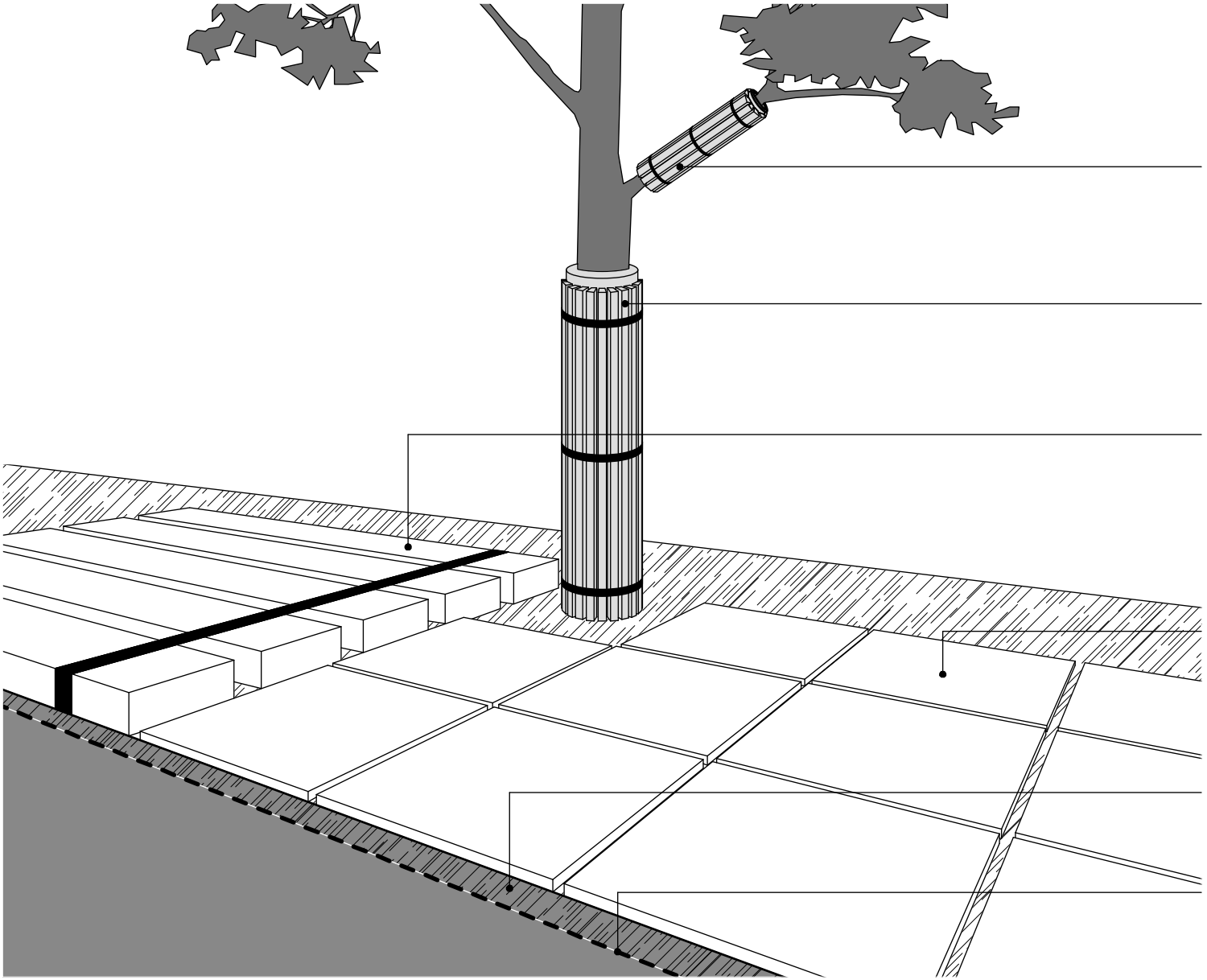
Installation of supports should avoid damaging roots.

Bracing is permissible within the TPZ.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer installed across surface of TPZ.

03 Tree Protection Fencing

Not to Scale



Branch Protection - use boards and padding to prevent damage to bark on branch. Boards are to be strapped, not screwed or nailed to the branch.

Trunk Protection - use boards and padding to prevent damage to bark (minimum 2m). Boards are to be strapped, not screwed or nailed to the trunk.

Ground Protection - use device strapped over mulch or aggregate layer. Ground protection device should be of a suitable thickness to prevent soil compaction and root damage.

Steel plates (or approved equivalent) with or without mulch or aggregate layer below.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer.

Geotextile fabric underneath mulch or aggregate layer.

04 Examples of Branch, Trunk and Ground Protection

Not to Scale

Branches may require pruning to erect scaffolding. Pruning may be subject to local regulations. Flexible branches should be tied back in preference to pruning.

Minimum 1.8m high hoarding. Temporary fencing may be incorporated into scaffolding as either containment screening or as hoarding.

Note:
If excavation is required for installation of support post for fencing, the Project Arborist should assess any pruning of roots greater than 20mm diameter.

Scaffold planks

Boards or plywood to be installed over mulch or aggregate layer for any areas requiring access within the TPZ.

Soleplate over geotextile. No excavation for soleplate within TPZ.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer within TPZ.

Geotextile fabric

05 Indicative Scaffolding within a Tree Protection Zone (TPZ) Not to Scale