



Project No: WENT/PARK/17 Report No: BRIDGE/IMPROV/AIA/A

ARBORICULTURAL IMPACT ASSESSMENT TREE PROTECTION SPECIFICATION

Bridge Road Improvements Pymont

Prepared for: UrbanGrowth Development Corporation

26th June 2019
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 UrbanGrowth Development Corporation in relation to a State Significant Development Application (SSDA) for road works for the improvement of Bridge Road, Pyrmont. The purpose of this Report is to undertake a Visual Tree Assessment¹ (VTA), provide an overview of the quality and value of the trees, determine the impact of the proposed works on the trees, and where appropriate, recommend the use of sensitive construction methods to minimise adverse impacts.

1.1.2 In preparing this Report, the author has considered the objectives of the *Sydney Local Environmental Plan 2012*, *Sydney Development Control Plan 2012 (Section 3.5 Urban Ecology)*, *City of Sydney Register of Significant Trees (2013)*, *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)* and *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:

- Sydney Fish Market Bridge Road Upgrade from Wattle Street to Wentworth Park Road Drainage and Public Utilities Plan, (Issue 0), Sheets 1-3 (09.10.2018) – prepared by Mott MacDonald
- Sydney Fish Market Bridge Road Upgrade from Wattle Street to Wentworth Park Road Pavement Plan (Issue 0), Sheets 1-3 (09.10.2018) – prepared by Mott MacDonald
- Sydney Fish Market Bridge Road Upgrade from Wattle Street to Wentworth Park Road Roadworks Plan (Issue 0), Sheets 1-3 (09.10.2018) – prepared by Mott MacDonald
- Sydney Fish Market Bridge Road Upgrade from Wattle Street to Wentworth Park Road Typical Cross Sections (Issue 0), Sheets 1-3 (09.10.2018) – prepared by Mott MacDonald
- Sydney Fish Market Bridge Road Upgrade from Wattle Street to Wentworth Park Road Roadworks Longitudinal Sections (Issue 0), Sheets 1-3 (09.10.2018) – prepared by Mott MacDonald

Refer to Plans (**Appendix 2**)

1.1 The Proposal

1.2.1 The SSDA seeks approval for improvements to Bridge Road. The works will raise the level of Bridge Road to 3.1 RL, between the intersection of Bridge Road with Wentworth Park, Wentworth Park Road and Wattle Street. The proposed roadway works will provide a continuous linkage between the footpaths surrounding the new Sydney Fish Market development and the existing level of Wentworth Park, and will assist in managing flooding at the site.

1.2.2 The SSDA also seeks approval to widen Bridge Road to include a footpath area, a median, a dedicated drop-off area and cycle path, landscaping and compliant lane dimensions.

Refer to Plans (**Appendix 2**)

¹ Mattheck & Breloer (2003)

2.0 RESULTS

2.1 The Site

2.1.1 Location

The site includes a roughly triangular section of parkland at the northern end of Wentworth Park and the carriageway and road reserve of Bridge Road between Wentworth Park Road and Wattle Street.

2.1.2 Wentworth Park is elevated by approximately 1m above street level. A brick retaining wall is located on the park boundary on Bridge Road, Wattle Street and Wentworth Park Road. The wall along Bridge Road is intersected by three (3) pedestrian ramps and one (1) flight of stairs. A second flight of stairs is located in the retaining wall on Wentworth Park Road.

2.1.3 Historical Background

Wentworth Park was created through the reclamation of Blackwattle Bay during the late 19th century. The park came to serve as a focus for sports and community activities including concerts, celebrations and moving picture shows in the 1880's and 1890's. Numerous timber sheds were erected on the northern sports ground to store wool for the war effort during World War I. These sheds remained for some years after the end of the war.

2.1.4 The high-level railway viaduct was built in 1919. Greyhound racing began in the park in 1932 and subsequently grew to dominate the park. American troops established a large camp in Wentworth Park and more wool stores were built during World War II. These were eventually demolished in the 1950's.²

2.1.5 The Wentworth Park precinct includes a number of items of built and landscape heritage significance, including the Glebe and Wentworth Park Viaduct (an item of State significance as listed in the Heritage Act - s.170 NSW State Agency Heritage Register).³

2.2 The Trees

2.2.1 Sixty (60) trees were assessed using the Visual Tree Assessment⁴ (VTA) criteria and notes and comprise of a mix of locally indigenous, Australian-native and exotic species. Trees 1WP-4WP and 13WP-56WP are located within Wentworth Park and Trees 41BMD-46BMD and 62BMD-66BMD are street trees located within the northern road reserve of Bridge Road. Tree A is a street tree located within the western road reserve of Wentworth Park Road.

2.2.2 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. The Retention Value is based on the tree's Useful Life Expectancy and Landscape Significance with consideration to its health, structural condition and site suitability. 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**)

² City of Sydney (2017)

³ NSW Office of Environment & Heritage (2017)

⁴ Mattheck & Breloer (2003)

- 2.2.3 A search of the BioNet Atlas of NSW Wildlife Database was undertaken in May 2019. No individual threatened tree species were listed within this database for the area were identified during the current field investigations of the site.⁵ The ecological significance and habitat value of the trees has not been assessed and is beyond the scope of this report.
- 2.2.4 **Tree 1WP**
Tree 1WP was identified as *Corymbia citriodora* (Lemon Scented Gum) and is located in the north-eastern corner of the park, adjacent to Bridge Road. The tree is in good health and structural condition. Tree 1WP has an estimated Useful Life Expectancy (ULE) of 40+ years, is of high Landscape Significance and has been allocated a Retention Value of *Priority for Retention*.
- 2.2.5 **Tree 2WP**
Tree 2WP was identified as *Celtis sinensis* (Chinese Hackberry) and is located in the north-eastern corner of the park, at the junction of Wattle Street and Bridge Road. The tree is in good health and structural condition. Tree 2WP has an estimated ULE of 15-40 years, is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention*.
- 2.2.6 *Celtis sinensis* (Chinese Hackberry) is considered an environmental weeds species and is regulated by a *General Biosecurity Duty* by the Department of Primary Industries. It is not to be sold in NSW.⁶
- 2.2.7 **Tree 3WP**
Tree 3WP was identified as *Ficus microcarpa* var. *hillii* (Hills Weeping Fig) and is located in the north-eastern corner of the park, adjacent to Wattle Street. The tree is in good health and structural condition. Tree 3WP has an estimated ULE of 40+ years, is of very high Landscape Significance and has been allocated a Retention Value of *Priority for Retention*.
- 2.2.8 Tree 3WP is listed in the *City of Sydney Register of Significant Trees*.⁷ The Register notes the tree possibly dates from the early period of park planting. An aerial photo of the site from 1943 shows a small tree in the same location as Tree 3WP. Refer to Plate 1 (**Appendix 4**).
- 2.2.9 **Tree 4WP**
Tree 4WP was identified as *Ficus macrophylla* (Moreton Bay Fig) and is located in the north-eastern corner of the park, adjacent to Wattle Street. The tree is a semi-mature specimen which is in good health and structural condition. Tree 4WP has an estimated ULE of 15-40 years, is moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention*.
- 2.2.10 **Tree 13WP**
Tree 13WP was identified as *Celtis australis* (European Hackberry) and is located at the western end of the park, adjacent to Wentworth Park Road. The tree is in good health and structural condition. Tree 13WP has an estimated ULE of 40+ years, is of high Landscape Significance and has been allocated a Retention Value of *Priority for Retention*.
- 2.2.11 **Trees 14WP, 15WP, 17WP-21WP, 24-50WP & 52WP-56WP**
Trees 14WP, 15WP, 17WP-21WP, 24-50WP and 52WP-56WP are the double row avenue of *Ficus macrophylla* (Moreton Bay Fig) located along the northern park boundary adjoining Bridge Road. The trees are in good health, and in general, good structural condition.

⁵ NSW Office of Environment and Heritage (2011)

⁶ Department of Primary Industries (2017)

⁷ City of Sydney (2017)

- 2.2.12 Trees 18WP, 21WP, 24WP, 28WP, 30WP, 34WP, 44WP and 46WP are in fair structural condition due to the development of poor crown forms as a result of suppression by adjacent trees, and the presence of various, large wounds which exhibit advanced stages of decay. The presence of wounds in varying stages of decay is not uncommon in mature trees, and other than where specifically identified, do not require immediate remedial action. However, Trees 18WP, 28WP and 34WP have branches with wounds that extend over the footpath and carriageway on Bridge Road which require further assessment and may require pruning to reduce branch loading. All of the trees have stem injection plugs inserted into the cambium presumably for periodic applications of systemic insecticide.
- 2.2.13 Trees 14WP, 15WP, 17-21WP, 24-50WP and 52-56WP are listed in the *City of Sydney Register of Significant Trees*.⁸ The avenue of Moreton Bay Figs is recognised as an outstanding example of the stylistic approach and influence of Charles Moore (Director, Sydney Royal Botanic Gardens 1848-1896). The avenue is typical of Victorian period public planting schemes with native figs planted along park boundaries. These public planting schemes have matured to produce landscapes which are dominated by large Moreton Bay Figs and Port Jackson Figs. This design approach became a defining feature of much of Sydney's parkland during the Victorian period, with other notable examples at Centennial Park and Moore Park.⁹
- 2.2.14 Aerial photos from 1943 illustrate that the avenue was well-established and it is thought the formation of the avenue dates from 1890 or the early 1900's.
- 2.2.15 Trees 16WP, 22WP, 23WP & 51WP**
Trees 16WP, 22WP, 23WP and 51WP were identified as *Eucalyptus microcorys* (Tallowood) and are located along the northern park boundary adjoining Bridge Road. With the exception of Tree 16WP, the trees are in good health and structural condition. Tree 16WP is in fair structural condition due to the presence of bark inclusions. Trees 16WP, 22WP, 23WP and 51WP are of moderate Landscape Significance and have been allocated a Retention Value of *Consider for Retention*.
- 2.2.16 Whilst the trees meet the criteria to be allocated a Retention Value of *Consider for Retention*, generally the trees are suppressed by the adjacent trees within the avenue, and the trunks of Trees 22WP and 23WP have developed moderate and severe phototropic leans (respectively) towards Bridge Road. Arguably, the trees being of a different species, detract from the appearance of the avenue of Moreton Bay Figs. Periodic identification and removal of deadwood should be undertaken as the trees' crowns have developed towards (and mainly above) the footpath and carriageway on Bridge Road.
- 2.2.17 Trees 41BMD-46BMD & 62BMD-66BMD**
Trees 41BMD-46BMD and 62BMD-66BMD were identified as *Lophostemon confertus* (Brush Box) and are semi-mature street trees growing within the northern road reserve of Bridge Road. In general, the trees are in good health and structural condition. These trees are of low Landscape Significance and have been allocated a Retention Value of *Consider for Removal*.
- 2.2.18 Tree A**
Tree A was identified as *Afrocarpus falcatus* (Outeniqua) and is a mature street tree growing within the western road reserve of Wentworth Park Road. The tree is in good health and structural condition. The tree is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention*.

⁸ City of Sydney (2017)

⁹ City of Sydney (2017)

3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 Trees to be removed

- 3.1.1 The supplied plans show that eleven (11) trees will need to be removed to accommodate the proposed Bridge Road improvement works. These are Trees 41BMD-46BMD and 62BMD-66BMD.
- 3.1.2 The trees to be removed are all small, semi-mature specimens which are of low Landscape Significance and have been allocated a Retention Value of *Consider for Removal*.
- 3.1.3 No trees with a Retention Value of *Priority for Retention* or *Consider for Retention* are proposed for removal.

3.2 Trees to be retained

- 3.2.1 The supplied plans show that forty-nine (49) trees are to be retained as part of the proposed development. This includes forty-two (42) trees with a Retention Value of *Priority for Retention* and seven (7) trees with a Retention Value of *Consider for Retention*.
- 3.2.2 Table 1: Trees to be removed

Priority for Retention	Consider for Retention	Consider for Removal	Priority for Removal
1WP, 3WP, 13WP, 14WP, 15WP, 17WP, 18WP, 19WP, 20WP, 21WP, 24WP, 25WP, 26WP, 27WP, 28WP, 29WP, 30WP, 31WP, 32WP, 33WP, 34WP, 35WP, 36WP, 37WP, 38WP, 39WP, 40WP, 41WP, 42WP, 43WP, 44WP, 45WP, 46WP, 47WP, 48WP, 49WP, 50WP, 52WP, 53WP, 54WP, 55WP & 56WP	2WP, 4WP, 16WP, 22WP, 23WP, 51WP & A		

3.2.3 No Works within TPZ Areas

The supplied plans show no works are proposed within the Tree Protection Zone (TPZ) areas of Trees 2WP, 38WP, 42WP-44WP, 46WP and 51WP.

3.2.4 Minor Encroachment

The supplied plans show that works including new kerbs and gutters, footpath reconstruction, raising of services pits and manhole covers, removal of existing services pits, and installation of new services pits and pipes are proposed within the TPZ areas of Trees 1WP, 4WP, 14WP, 39WP-41WP, 45WP, 47WP-50WP and 52WP-56WP. The encroachments are less than 10% of the TPZ and represent *Minor Encroachments* as defined by *Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970)*. *Minor Encroachments* are considered acceptable by AS-4970 when compensated for elsewhere and contiguous within the TPZ. The encroachment into the TPZ should be compensated for by extending the TPZ in areas not subject to encroachment.

3.2.5 Major Encroachment

The supplied plans show works including new kerbs and gutters, footpath reconstruction, raising of services pits and manhole covers, removal of existing services pits, and installation of new services pits and pipes are proposed the TPZ areas of Trees 3WP, 13WP, 15WP-37WP and A. The encroachments are greater than 10% of the TPZ or inside the Structural Root Zone (SRZ) and represent *Major Encroachments* as defined by AS-4970.

3.2.6 Extensive information has been published relating to the use of tree sensitive design and construction methods which can be used to minimise impacts of development on tree health and reduce conflict between trees and built structures. Much of this information 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 minimise the impact of an encroachment. These methods should be confirmed as feasible by the relevant project consultants (i.e. architect, landscape architect, engineer etc) and may require flexibility at the time of construction.

3.2.7 The following tree sensitive methods should be used to minimise adverse impacts:

- Footpath, Kerb & Gutter Demolition: The demolition of the existing footpath, kerb and gutter along the southern side of Bridge Road should be supervised by the Project Arborist. The works should be undertaken using a compact excavator (<2T fitted with a flat bladed bucket). The excavator operator should be guided by a spotter at all times and machinery movements should be restricted to areas of existing pavement or ground protection. The asphalt surface, kerb and gutter should be broken up into small sections and carefully removed to minimise disturbance to the underlying sub-base/soil profile and prevent root damage.

Existing underground structures and sub-base materials should be left in situ and reused (where possible). Where the removal of the sub-base is required, the works should be undertaken using a combination of machine excavation (<2T fitted with a flat bladed bucket) and hand excavation to prevent root damage. Roots (>25mmØ) should be retained and protected for assessment by the Project Arborist.

- Road Demolition: The carriageway of Bridge Road is to be reconstructed with finished levels elevated above existing by up to 950mm (approx.). It is unlikely that any significant tree roots will be present below the road due to the depth of the existing road surface and highly compacted nature of the sub-base/sub-grade. Therefore, the demolition and reconstruction of the carriageway should not impact the trees and tree sensitive methods are not required.

Machinery operators should be guided by a spotter when working along the southern side of the carriageway to ensure that the crowns of the trees in Wentworth Park are not damaged.

- Pit Decommissioning: Existing pits to be decommissioned within TPZ areas should be left in situ and infilled (where possible). Where their removal is required, the pits should be broken-up into small sections and carefully removed to minimise disturbance to the adjacent sub-base/soil profile and prevent root damage.
- New Footpath: The footpath on Bridge Road is to be reconstructed with finished levels elevated above existing by up to 950mm (approx.). Minor excavation will be required in the TPZ areas of Tree 3WP and Tree A where the new footpath joins the existing footpath on Wattle Street and Wentworth Park Road.

The works should be undertaken using a combination of machine excavation and hand excavation (as detailed above) to minimise disturbance to the underlying sub-base/soil profile and prevent root damage. Roots (>25mmØ) should be retained and protected for assessment by the Project Arborist. Existing sub-base layers should be retained and reused where possible.

New pavement sub-base layers should be thinned to enable the retention of roots (>25mmØ) as required by the Project Arborist. Root pruning should be undertaken by the Project Arborist only. Roots to be retained should be protected by wrapping in Abelflex (or similar compressible material) with the new sub-base materials installed around the root. Compaction of the surrounding sub-base should be undertaken using hand tools only.

- Park Boundary Wall & Stairs: The existing park boundary wall has three (3) openings and a set of stairs that provide access to the footpath on Bridge Road. In addition, a section of boundary wall is cracked and bowed, presumably due to roots from the fig trees in the park exerting pressure on the rear of the wall. The supplied plans show no detail on how the proposed raised pavement levels will affect these openings/stairs or if repair of the damaged section of wall is to be undertaken as part of the works. Any works associated with these areas will need to use tree sensitive design and construction methods and may require preliminary, exploratory root investigations to ensure the root systems of the trees in the park is not significantly impacted.
- Kerb: Works to the kerb section in the SRZ of Tree A will need to use tree sensitive design and construction methods and may require preliminary, exploratory root investigations to ensure its root system is not significantly impacted.
- Underground Services: Sections of new stormwater pipes and pits connecting to existing infrastructure are to be installed along the southern edge of the carriageway of Bridge Road and existing pits within the footpath are to be raised in line with new footpath levels. The installation of underground services and pits should be supervised by the Project Arborist. The works should be undertaken using a combination of machine excavation and hand excavation (as detailed above) to prevent root damage. Roots (>25mmØ) should be retained and protected for assessment by the Project Arborist.

Services should be located around/below roots (>25mmØ) and the location of pits adjusted as required by the Project Arborist. Existing pits that are to be raised in line with new footpath levels should be retained and extended rather than replaced with new pits (where possible).

Alternatively, boring methods may be used for underground service installation where the obvert level (highest interior level of pipe) is greater than 1500mm below existing grade. Excavations for starting and receiving pits for boring equipment should be located outside of the TPZ areas or located to avoid roots (>25mmØ) as required by the Project Arborist.

3.3 Pruning

- 3.3.1 The supplied plans show that the Trees 1WP, 15-23WP and 25-37WP will require Crown Lifting to provide additional vertical clearance for the reconstructed carriageway of Bridge Road. Refer to Pruning Specification (**Appendix 4**).
- 3.3.2 It should be noted that the assessment of pruning requirements was estimated from the footpath on Bridge Road using a height pole. It was not possible to stand in the carriageway immediately below the crowns of the trees due to safety reasons. A second assessment of pruning requirements should be undertaken at the completion of the construction period when Bridge Road is still closed to vehicular traffic. This two-stage approach is also recommended to reduce the potential for unnecessary over pruning.

- 3.3.3 The Stage 1 pruning as outlined within the Pruning Specification (**Appendix 4**) addresses the main branches where conflict will occur and provides additional access for construction machinery. The Stage 2 pruning will involve minor pruning at the completion of the works to address any (generally smaller) conflicting branches which could not be accurately identified during the initial assessment. In addition, as part of the second pruning assessment the trees should be inspected for structural defects and significant deadwood (>25mmØ) which require additional pruning works.
- 3.3.4 Pruning works should be carried out by a Practising Arborist. The Practising Arborist should hold a minimum qualification equivalent (using the Australian Qualifications Framework) of Level 3 or above, in Arboriculture or its recognised equivalent. The Practising Arborist should have a minimum of 3 years' experience in practical Arboriculture. Pruning work should be undertaken in accordance with *Australian Standard 4373: Pruning of Amenity Trees (2007)*, *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)* and other applicable legislation and codes.

4.0 SUMMARY & CONCLUSIONS

- 4.1.1 Sixty (60) trees were addressed within this report and comprise of a mix of locally indigenous, Australian-native and exotic species. Trees 3WP, 14WP, 15WP, 17WP-21WP, 24WP-56WP are listed in the *City of Sydney Register of Significant Trees*.¹⁰
- 4.1.2 The SSDA seeks approval for improvements to Bridge Road including the raising the level of road and footpath, and the construction of a median, a dedicated drop-off area and cycle path, landscaping and compliant lane dimensions.
- 4.1.3 The supplied plans show that eleven (11) trees will need to be removed to accommodate the proposed Bridge Road improvement works. These are Trees 41BMD-46BMD and 62BMD-66BMD. The trees to be removed are all small, semi-mature specimens which are of low Landscape Significance and have been allocated a Retention Value of *Consider for Removal*. No trees with a Retention Value of *Priority for Retention* or *Consider for Retention* are proposed for removal.
- 4.1.4 The supplied plans show that forty-nine (49) trees are to be retained as part of the proposed development. These are Trees 1WP-4WP, 13WP-56WP and A. Tree sensitive methods (as outlined within Section 3.2.7) should be used within the TPZ areas of Trees 3WP, 13WP, 15WP-37WP and A to minimise adverse impacts. The trees to be retained should be protected in accordance with the Tree Plan (**Appendix 2**) and Tree Protection Specification (**Appendix 6**).
- 4.1.5 The supplied plans show that the Trees 1WP, 15-23WP and 25-37WP will require Crown Lifting to provide additional vertical clearance for the reconstructed carriageway of Bridge Road. Pruning work should be undertaken in accordance with *Australian Standard 4373: Pruning of Amenity Trees (2007)*, *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)* and other applicable legislation and codes.

¹⁰ City of Sydney (2017)

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.

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6.0 BIBLIOGRAPHY & REFERENCES

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Standards Australia (2007), *Pruning of Amenity Trees AS-4373*

Standards Australia (2015) *Tree Stock for Landscape Use AS-2303*

Appendix 1: Methodology

- 1.1 Site Inspection:** This report was determined as a result of a comprehensive site inspection during May 2019.
- 1.2 Visual Tree Assessment (VTA):** The subject tree(s) was assessed using the Visual Tree Assessment criteria and notes as described in *The Body Language of Trees – A Handbook for Failure Analysis*.¹¹ The inspection was limited to a visual examination of the subject tree(s) from ground level only. The inspection was limited to a visual examination of the subject tree(s) from ground level only. No internal diagnostic or tissue testing was undertaken as part of this assessment. Trees outside the subject site were assessed from the property boundaries only.
- 1.3 Tree Dimensions:** The dimensions of the subject tree(s) are approximate only.
- 1.4 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**.
- 1.5 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.
- 1.6 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
- 1.7 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)
- 1.8 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

¹¹ Mattheck & Breloer (2003)

1.9 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.

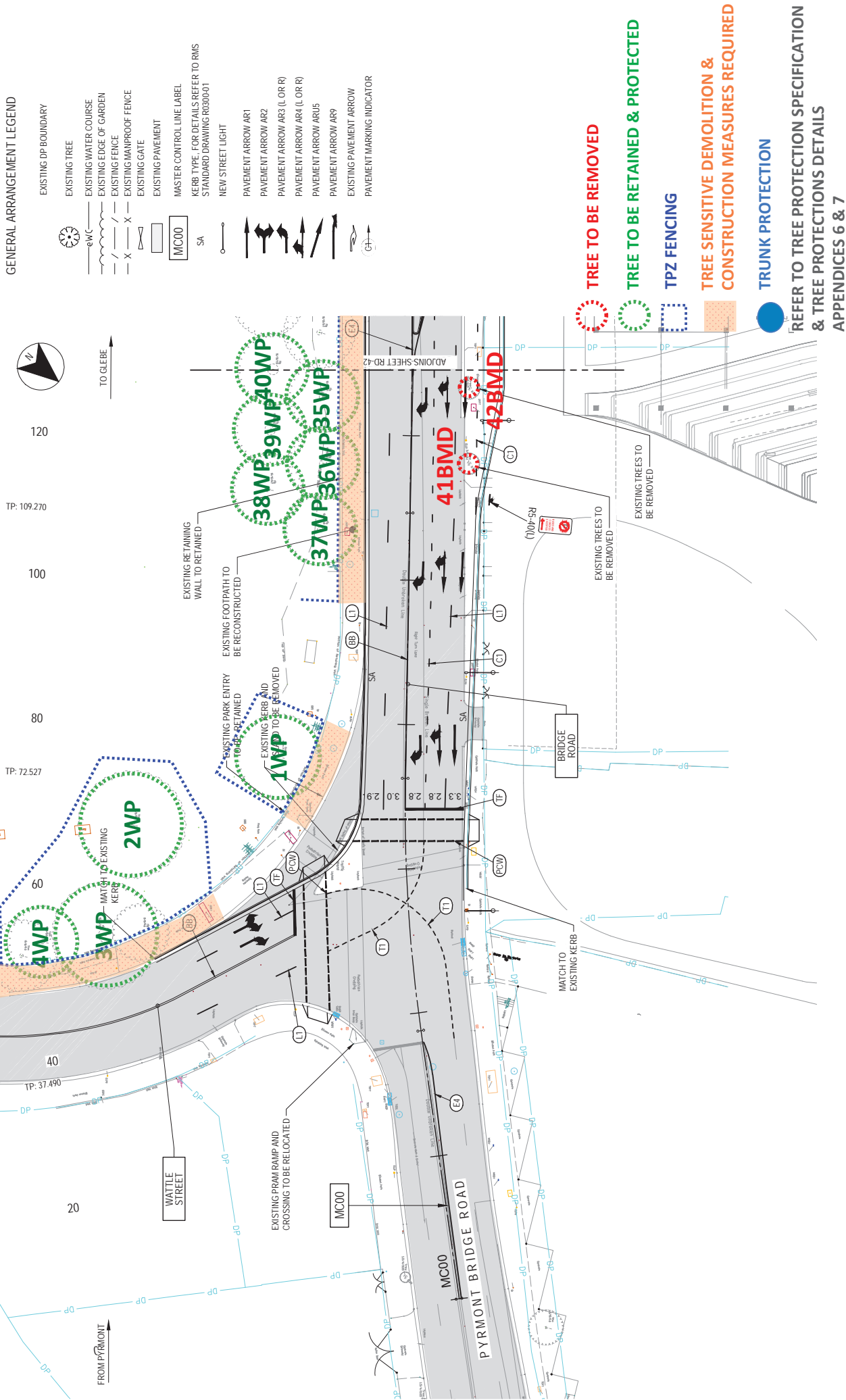
Landscape Significance	Description
Very High	The subject tree is listed as a Heritage Item under the <i>Local Environmental Plan</i> with a local or state level of significance.
	The subject tree is listed on Council's Significant Tree Register or is considered to meet the criteria for significance assessment 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 local, cultural or historical importance or is widely known.
	The subject tree 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 <i>Biodiversity Conservation Act (2016)</i> or the Commonwealth <i>Environmental Protection and Biodiversity Conservation Act (1999)</i> .
	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 <i>Biodiversity Conservation Act (2016)</i> or the Commonwealth <i>Environmental Protection and Biodiversity Conservation Act (1999)</i> .
	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 exempt under the provisions of the local 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.

1.10 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.



GENERAL ARRANGEMENT LEGEND

- EXISTING DP BOUNDARY
- EXISTING TREE
- EXISTING WATER COURSE
- EXISTING EDGE OF GARDEN
- EXISTING FENCE
- EXISTING MANPROOF FENCE
- EXISTING GATE
- EXISTING PAVEMENT
- MASTER CONTROL LINE LABEL
- KERB TYPE. FOR DETAILS REFER TO RMS STANDARD DRAWING R0300-01
- NEW STREET LIGHT
- PAVEMENT ARROW AR1
- PAVEMENT ARROW AR2
- PAVEMENT ARROW AR3 (L OR R)
- PAVEMENT ARROW AR4 (L OR R)
- PAVEMENT ARROW AR5
- PAVEMENT ARROW AR9
- EXISTING PAVEMENT ARROW
- PAVEMENT MARKING INDICATOR

TREE TO BE REMOVED

TREE TO BE RETAINED & PROTECTED

TPZ FENCING

TREE SENSITIVE DEMOLITION & CONSTRUCTION MEASURES REQUIRED

TRUNK PROTECTION

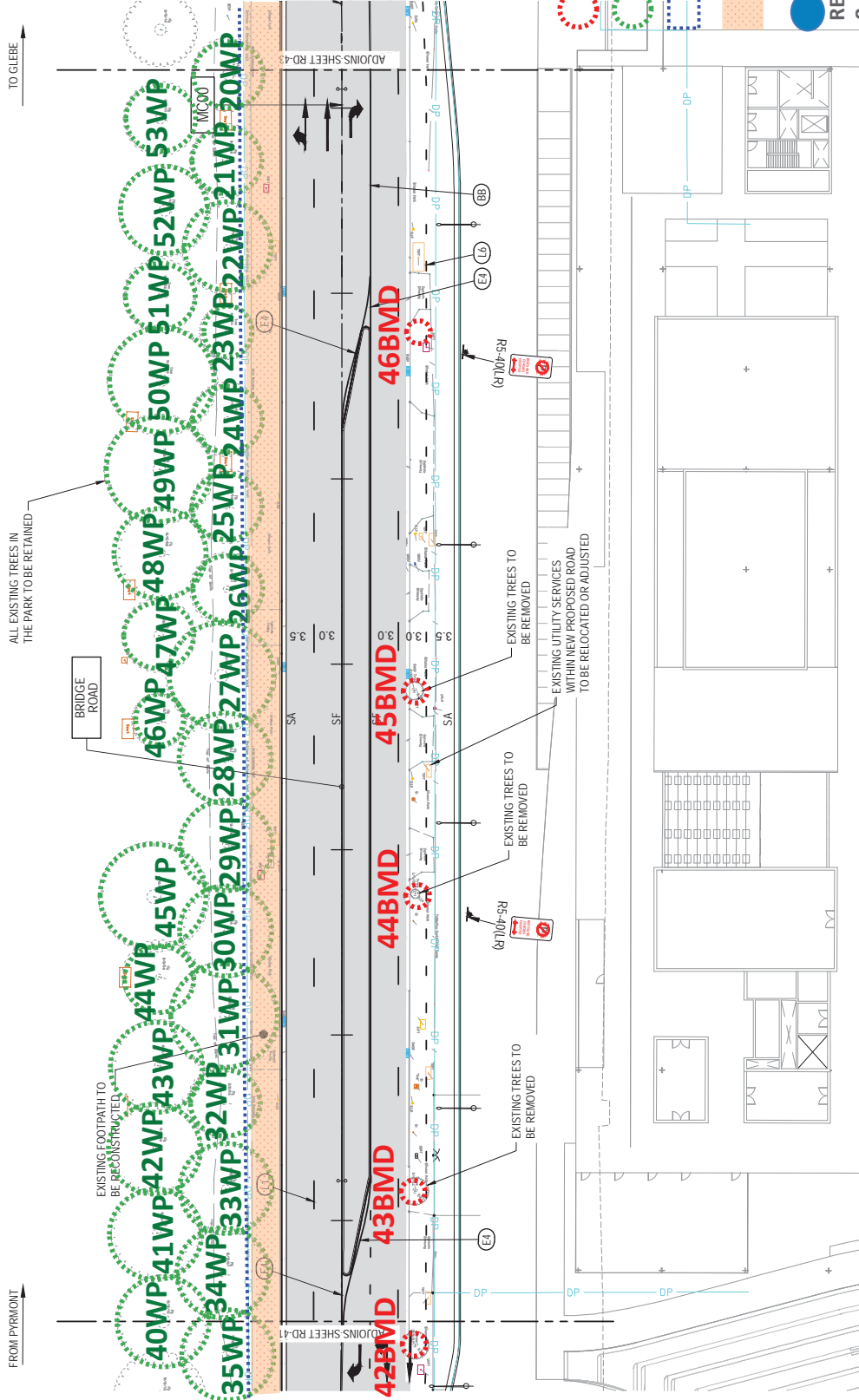
REFER TO TREE PROTECTION SPECIFICATION & TREE PROTECTIONS DETAILS APPENDICES 6 & 7

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EXTERNAL REFERENCE FILES		APPROVAL B.500		DRAWINGS / DESIGN PREPARED BY M. HOFMANN		PLOT BY JED64037		ULTIMO - CITY OF SYDNEY MR 00000 - BRIDGE ROAD	
REV / DATE		AMENDMENT / REVISION DESCRIPTION		DATE		NAME		SYDNEY FISH MARKET BRIDGE ROAD UPGRADE	
0 / 9/10/2018		ISSUED FOR CONCEPT DESIGN		09/10/18		M. HOFMANN		ROADWORKS PLAN	
				09/10/18		B.500		SHEET 1 OF 3	
				09/10/18		M. JEDNIUK		ROADWORKS PLAN	
				09/10/18		V. SLOREVSKI		SHEET 1 OF 3	
				09/10/18		B.500		SHEET 1 OF 3	
				09/10/18		G. BABCOCK		SHEET 1 OF 3	
								ISSUE	
								CONCEPT DESIGN	
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GENERAL ARRANGEMENT LEGEND

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- EXISTING TREE
- EXISTING WATER COURSE
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- EXISTING FENCE
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TPZ FENCING

TREE SENSITIVE DEMOLITION & CONSTRUCTION MEASURES REQUIRED

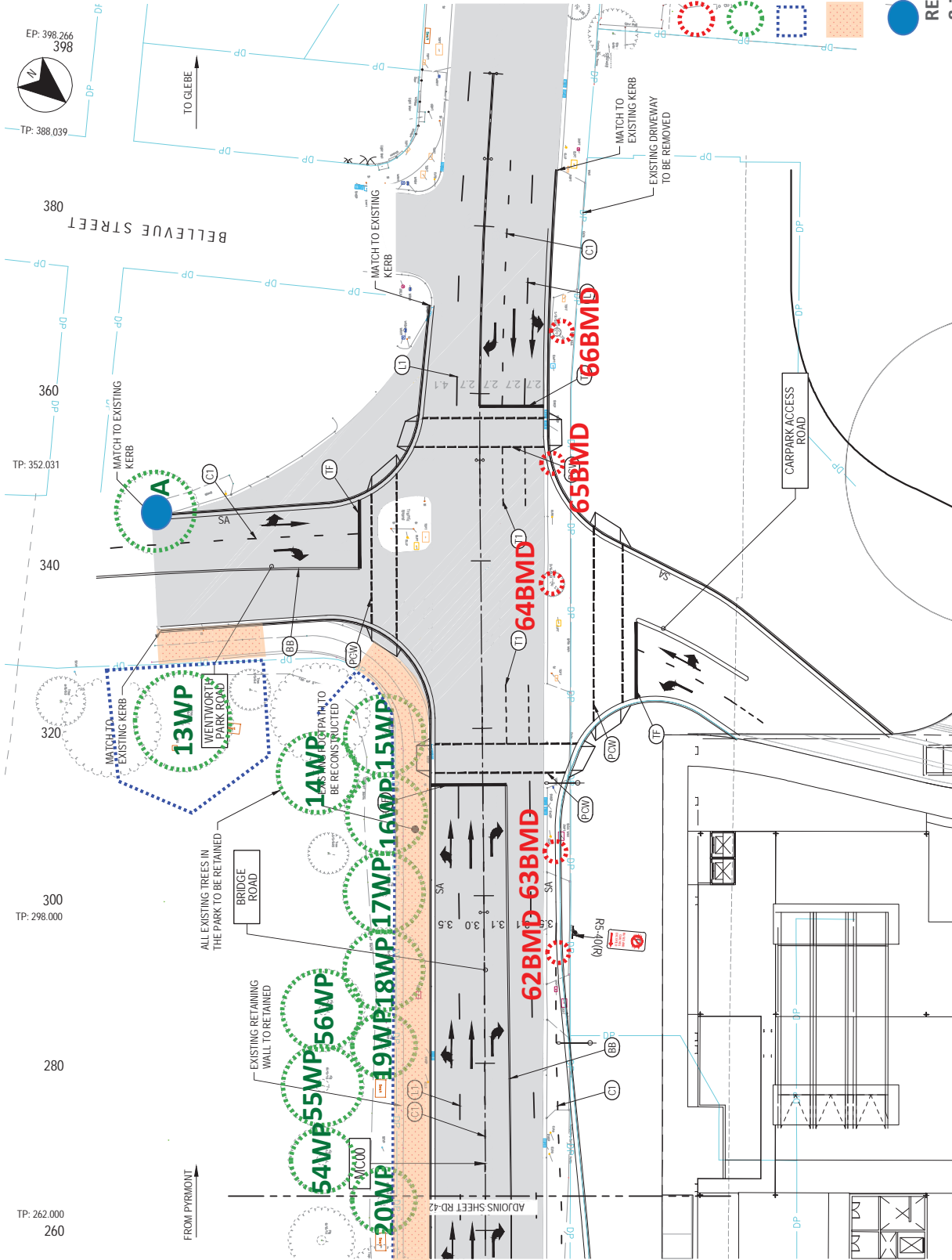
TRUNK PROTECTION

REFER TO TREE PROTECTION SPECIFICATION & TREE PROTECTIONS DETAILS APPENDICES 6 & 7

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									PLAN		B. SOO		MR 00000 - CITY OF SYDNEY	
									MGA ZONE 56		V. SOFREVSKI		SYDNEY FISH MARKET	
									COORDINATE SYSTEM		DESIGN MINOR		BRIDGE ROAD UPGRADE	
									CI-RD3-B20-RD-0302		DESIGN CHECK		FROM WATTLE STREET TO WENTWORTH PARK ROAD	
									AHD		DESIGN MINOR		ROADWORKS PLAN	
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0 / 9/10/2018		B.500		DRAWN		M.HOFMANN		09/10/18		09/10/18		NAME	
ISSUED FOR CONCEPT DESIGN		B.500		DESIGN CHECK		B.500		09/10/18		09/10/18		DRAWN	
				DESIGN		M.JEDNIUK		09/10/18		09/10/18		DESIGN CHECK	
				DESIGN CHECK		V.SOFREVSKI		09/10/18		09/10/18		DESIGN IMGR	
				PROJECT NUMBER		CI-RD3-B20 RD-0303		PROJECT MGR		G.BABCOCK		PROJECT MGR	
				COORDINATE SYSTEM		MGA ZONE 56		HEIGHT DATUM		AHD		PROJECT MGR	
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				SCALE		AS SHOWN		SCALE		AS SHOWN		SCALE	
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Appendix 3: Tree Assessment Schedule

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
1WP	<i>Corymbia citriodora</i> (Lemon Scented Gum)	600	14	7	Good	Good	Small (<25mm) diameter deadwood in low volumes.	40+	High	Priority for Retention	7.2	2.7	Retain. Minor encroachment, footpath.
2WP	<i>Celtis sinensis</i> (Chinese Hackberry)	800	13	9	Good	Good	Partially suppressed. Medium (25-75mm) diameter deadwood in low volumes. Wound/s, no visible signs of decay.	15-40	Moderate	Consider for Retention	9.6	3.1	Retain. No works within TPZ.
3WP	<i>Ficus microcarpa</i> var. <i>hillii</i> (Hills Weeping Fig)	1550	25	13	Good	Good	Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter epicormic growth in low volumes.	40+	Very High	Priority for Retention	15	4.0	Retain. Major encroachment, road & footpath.
4WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	200	7	2	Good	Good	Semi-mature specimen.	15-40	Moderate	Consider for Retention	2.4	1.7	Retain. Minor encroachment, footpath.
13WP	<i>Celtis australis</i> (European Hackberry)	900	9	6	Good	Good	Wound/s, no visible signs of decay. Small (<25mm) epicormic growth in low volumes.	40+	High	Priority for Retention	10.8	3.2	Retain. Major encroachment, footpath.
14WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1200	15	12	Good	Good	Partially suppressed. Wound/s, early stages of decay-not structurally significant. Medium (25-75mm) diameter deadwood in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	14.4	3.6	Retain. Minor encroachment, footpath.
15WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	700	9	8	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	8.4	2.9	Retain. Major encroachment, road & footpath.
16WP	<i>Eucalyptus microcoryns</i> (Tallowood)	750	24	7	Good	Fair	Co-dominant inclusion. Branch inclusion/s, minor.	15-40	Moderate	Consider for Retention	9	3.0	Retain. Major encroachment, road & footpath.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
17WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	750	14	9	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter deadwood in low volumes. Small (<25mm) diameter epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	9	3.0	Retain. Major encroachment, road & footpath.
18WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	850	16	11	Good	Fair	Wound with advanced stages of decay on second order branch over road-further assessment required. Medium (25-75mm) diameter epicormic growth in low volumes. stem injection. Partially suppressed. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	10.2	3.1	Retain. Major encroachment, road & footpath.
19WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	850	13	9	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay. Rubbing branch at 7m. Stem injection plugs.	40+	Very High	Priority for Retention	10.2	3.1	Retain. Major encroachment, road & footpath.
20WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1000	16	8	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	12	3.4	Retain. Major encroachment, road & footpath.
21WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	650	10	7	Good	Fair	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter epicormic growth in low volumes. Stem injection plugs in trunk.	15-40	Very High	Priority for Retention	7.8	2.8	Retain. Major encroachment, road & footpath.
22WP	<i>Eucalyptus microconys</i> (Tallowood)	800	18	10	Good	Good	Phototropic lean, moderate. Partially suppressed. Medium (25-75mm) diameter deadwood in low volumes. Small (<25mm) epicormic growth in low volumes.	15-40	Moderate	Consider for Retention	9.6	3.1	Retain. Major encroachment, road & footpath.
23WP	<i>Eucalyptus microconys</i> (Tallowood)	500	8	10	Good	Good	Phototropic lean, severe. Heavily suppressed. Small (<25mm) epicormic growth in low volumes. Wound/s, no visible signs of decay.	5-15	Moderate	Consider for Retention	6	2.5	Retain. Major encroachment, road & footpath.
24WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	600	9	5	Good	Fair	Heavily suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Crown consists mainly of mature epicormic growth. Stem injection plugs in trunk.	15-40	Very High	Priority for Retention	7.2	2.7	Retain. Major encroachment, road & footpath.
25WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	600	11	7	Good	Good	Heavily suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Medium (25-75mm) epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	7.2	2.7	Retain. Major encroachment, road & footpath.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
26WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	600	12	8	Good	Good	Partially suppressed. Wound/s, advanced stages of decay. Wound/s, early stages of decay-not structurally significant. Small (<25mm) epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	7.2	2.7	Retain. Major encroachment, road & footpath.
27WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1500	19	10	Good	Good	Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter deadwood in low volumes. Small (<25mm) epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	15	4.0	Retain. Major encroachment, road & footpath.
28WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	800	10	9	Good	Fair	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Longitudinal wound on upper side of second order branch over road-further assessment required. Small (<25mm) epicormic growth in low volumes. Stem injection plugs in trunk.	15-40	Very High	Priority for Retention	9.6	3.1	Retain. Major encroachment, road & footpath.
29WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	850	15	9	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay. Branch inclusion/s, minor. Small (<25mm) diameter epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	10.2	3.1	Retain. Major encroachment, road & footpath.
30WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	600	7	9	Good	Fair	Heavily suppressed. Wound/s, advanced stages of decay. Small (<25mm) diameter deadwood in low volumes. Stem injection plugs in trunk.	15-40	Very High	Priority for Retention	7.2	2.7	Retain. Major encroachment, road & footpath.
31WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1100	17	10	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter epicormic growth. Medium (25-75mm) epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	13.2	3.5	Retain. Major encroachment, road & footpath.
32WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	450	8	7	Good	Good	Heavily suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Trunk cavity, minor. Stem injection plugs in trunk.	15-40	Very High	Priority for Retention	5.4	2.4	Retain. Major encroachment, road & footpath.
33WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1200	14	9	Good	Good	Partially suppressed. Wound/s, advanced stages of decay. Wound/s, early stages of decay-not structurally significant. Small (<25mm) epicormic growth. in low volumes.	40+	Very High	Priority for Retention	14.4	3.6	Retain. Major encroachment, road & footpath.
34WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	500	7	9	Good	Fair	Heavily suppressed. Wound/s, early stages of decay on upper side of first order branch over road-further assessment required. Wound/s, advanced stages of decay. Stem injection plugs in trunk.	15-40	Very High	Priority for Retention	6	2.5	Retain. Major encroachment, road & footpath.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
35WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1200	18	9	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Medium (25-75mm) diameter epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	14.4	3.6	Retain. Major encroachment, road & footpath.
36WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	900	10	9	Good	Good	Heavily suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter epicormic growth. Medium (25-75mm) epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	10.8	3.2	Retain. Major encroachment, road & footpath.
37WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	800	10	8	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	9.6	3.1	Retain. Major encroachment, road & footpath.
38WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	550	10	8	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	6.6	2.6	Retain. No works within TPZ.
39WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1200	20	11	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) & medium (25-75mm) diameter epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	14.4	3.6	Retain. Minor encroachment, footpath.
40WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1500	23	11	Good	Good	Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Branch inclusion/s, minor. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	15	4.0	Retain. Minor encroachment, footpath.
41WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1500	12	10	Good	Good	Partially suppressed. Trunk cavity, minor. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	15	4.0	Retain. Minor encroachment, footpath.
42WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	700	8	6	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	8.4	2.9	Retain. No works within TPZ.
43WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	700	11	8	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter deadwood in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	8.4	2.9	Retain. No works within TPZ.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
44WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	500	8	9	Good	Fair	Heavily suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Majority of crown previously removed. Small (<25mm) epicormic growth in low volumes. Stem injection plugs in trunk.	15-40	Very High	Priority for Retention	6	2.5	Retain. No works within TPZ.
45WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1700	18	12	Good	Good	Wound/s, no visible signs of decay. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) & medium (25-75mm) diameter epicormic growth in moderate volumes. Hollow trunk-not structurally significant. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	15	4.2	Retain. Minor encroachment, footpath.
46WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	600	7	9	Good	Fair	Heavily suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Stem injection plugs in trunk.	15-40	Very High	Priority for Retention	7.2	2.7	Retain. No works within TPZ.
47WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1000	15	9	Good	Good	Partially suppressed. Crown density 75-100%. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Stem injection plugs in trunk.	15-40	Very High	Priority for Retention	12	3.4	Retain. Minor encroachment, footpath.
48WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	900	16	10	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	10.8	3.2	Retain. Minor encroachment, footpath.
49WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1100	17	11	Good	Good	Wound/s, early stages of decay. Wound/s, advanced stages of decay. Small (<25mm) diameter deadwood in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	13.2	3.5	Retain. Minor encroachment, footpath.
50WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1150	16	10	Good	Good	Wound/s, early stages of decay. Wound/s, advanced stages of decay. Small (<25mm) diameter epicormic growth in moderate volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	13.8	3.6	Retain. Minor encroachment, footpath.
51WP	<i>Eucalyptus microcorys</i> (Tallowood)	600	22	7	Good	Good	Large (>75mm) diameter deadwood in low volumes.	15-40	Moderate	Consider for Retention	7.2	2.7	Retain. No works within TPZ.
52WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1300	19	11	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Large (>75mm) diameter deadwood in low volumes. Small (<25mm) epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	15	3.7	Retain. Minor encroachment, footpath.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
53WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	800	16	10	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	9.6	3.1	Retain. Minor encroachment, footpath.
54WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1100	19	12	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay. Small (<25mm) & medium (25-75mm) diameter epicormic growth in low volumes. Trunk cavity, minor. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	13.2	3.5	Retain. Minor encroachment, footpath.
55WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1600	18	11	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay. Small (<25mm) epicormic growth. in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	15	4.1	Retain. Minor encroachment, footpath.
56WP	<i>Ficus macrophylla</i> (Moreton Bay Fig)	1350	20	10	Good	Good	Partially suppressed. Wound/s, early stages of decay. Wound/s, advanced stages of decay-not structurally significant. Small (<25mm) diameter epicormic growth in low volumes. Stem injection plugs in trunk.	40+	Very High	Priority for Retention	15	3.8	Retain. Minor encroachment, footpath.
41BMD	<i>Lophostemon confertus</i> (Brush Box)	100	8	3	Good	Fair	Trunk cavity(s), major. Structures within SRZ.	5-15	Low	Consider for Removal	2	1.5	Remove. Road widening.
42BMD	<i>Lophostemon confertus</i> (Brush Box)	75	5	2	Good	Good	Structures within SRZ.	15-40	Low	Consider for Removal	2	1.5	Remove. Road widening.
43BMD	<i>Lophostemon confertus</i> (Brush Box)	100	7	2	Good	Good	Structures within SRZ.	15-40	Low	Consider for Removal	2	1.5	Remove. Road widening.
44BMD	<i>Lophostemon confertus</i> (Brush Box)	50	2	1	Fair	Good	Crown density 50-75%.	5-15	Low	Consider for Removal	2	1.5	Remove. Road widening.
45BMD	<i>Lophostemon confertus</i> (Brush Box)	100	4	1	Good	Good	Structures within SRZ.	15-40	Low	Consider for Removal	2	1.5	Remove. Road widening.

Tree No.	Species	DBH (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	ULE (years)	L/Significance	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
46BMD	<i>Lophostemon confertus</i> (Brush Box)	75	3	1	Good	Good		15-40	Low	Consider for Removal	2	1.5	Remove. Road widening.
62BMD	<i>Lophostemon confertus</i> (Brush Box)	100	4	1	Good	Good		15-40	Low	Consider for Removal	2	1.5	Remove. Road widening.
63BMD	<i>Lophostemon confertus</i> (Brush Box)	100	3	1	Good	Good		15-40	Low	Consider for Removal	2	1.5	Remove. Road widening.
64BMD	<i>Lophostemon confertus</i> (Brush Box)	150	6	2	Good	Good		15-40	Low	Consider for Removal	2	1.5	Remove. Carpark access road.
65BMD	<i>Lophostemon confertus</i> (Brush Box)	75	3	1	Good	Good		15-40	Low	Consider for Removal	2	1.5	Remove. Road widening.
66BMD	<i>Lophostemon confertus</i> (Brush Box)	75	3	1	Good	Good		15-40	Low	Consider for Removal	2	1.5	Remove. Road widening.
A	<i>Afrocarpus falcatus</i> (Outeniqua)	650	14	10	Good	Good	Kerb displacement. Large surface root. Branch impact damage. Powerlines through crown.	15-40	Moderate	Consider for Retention	7.8	2.8	Retain. Major encroachment, road & footpath.

Appendix 4: Pruning Specification

Tree No.	Branch 1 ø (mm)	Branch 1 Order	Branch 1 4373 Code	Branch 1 Orientation	Branch 1 Height (m)	Branch 1 (%)	Branch 2 ø (mm)	Branch 2 Order	Branch 2 4373 Code	Branch 2 Orientation	Branch 2 Height (m)	Branch 2 (%)	Branch 3 ø (mm)	Branch 3 Order	Branch 3 4373 Code	Branch 3 Orientation	Branch 3 Height (m)	Branch 3 (%)	Crown Total (%)
1WP	<25	Higher	Crown Lifting (C)	West	2.5	1%													1%
15WP	100	Second	Crown Lifting (C)	West	4m	2%	50	Higher	Crown Lifting (C)	North	4.5m	2%							4%
16WP	50	Higher	Crown Lifting (C)	North-West	4.5	2%													2%
17WP	50	Higher	Crown Lifting (C)	North-West	4.5	2%													2%
18WP	100	Higher	Crown Lifting (C)	North	4.5	5%													5%
19WP	200	Second	Crown Lifting (C)	North-West	4.5	2%	50	Higher	Crown Lifting (C)	North	4.5	2%							4%
20WP	50	Higher	Crown Lifting (C)	North	4.5	2%													2%
21WP	75	Higher	Crown Lifting (C)	North	4.5	5%													5%
22WP	75	Higher	Crown Lifting (C)	North	4.5	2%													2%
23WP	125	Third	Crown Lifting (C)	North-West	6	2%	50	Higher	Crown Lifting (C)	North	4.5	2%							4%
25WP	100x2	Third x2	Crown Lifting (C)	North	6	2%													2%

Tree No.	Branch 1 ø (mm)	Branch 1 Order	Branch 1 4373 Code	Branch 1 Orientation	Branch 1 Height (m)	Branch 1 (%)	Branch 2 ø (mm)	Branch 2 Order	Branch 2 4373 Code	Branch 2 Orientation	Branch 2 Height (m)	Branch 2 (%)	Branch 3 ø (mm)	Branch 3 Order	Branch 3 4373 Code	Branch 3 Orientation	Branch 3 Height (m)	Branch 3 (%)	Crown Total (%)
26WP	225	First	Crown Lifting (C)	North-West	5	5%	125x2	Secondx2	Crown Lifting (C)	North	4.5	2%							7%
27WP	250	Third	Crown Lifting (C)	North-West	5.5	3%	150	Higher	Crown Lifting (C)	North-West	5	3%	150	Higher	Crown Lifting (C)	North	5	3%	9%
28WP	175	Second	Crown Lifting (C)	North	4	5%	100	Third	Crown Lifting (C)	North-West	5	2%	150	Second	Crown Lifting (C)	North-West	3	3%	10%
29WP	100	Second	Crown Lifting (C)	North	5	2%	125	Third	Crown Lifting (C)	North-West	5.5	2%	100	Higher	Crown Lifting (C)	North-West	5	2%	6%
30WP	200	First	Reduction Pruning (R)	North-West	4.5	5%	75	Higher	Crown Lifting (C)	North	5.5	2%							7%
31WP	125	Higher	Crown Lifting (C)	North	4.5	5%													5%
32WP	100	Higher	Crown Lifting (C)	North	4.5	5%													5%
33WP	175	Third	Crown Lifting (C)	North-West	4.5	3%	175	Third	Crown Lifting (C)	North	5	2%	75	Higher	Crown Lifting (C)	North	4.5	3%	8%
34WP	150	First	Reduction Pruning (R)	North	2.5	5%													5%
35WP	175	Second	Crown Lifting (C)	North	5	3%													3%
36WP	100	Higher	Crown Lifting (C)	North	4.5	5%													5%
37WP	50	Higher	Crown Lifting (C)	North	4.5	2%													2%



Tree 1 - Pruning



Tree 15 - Pruning



Tree 15 - Pruning



Tree 16 - Pruning



Tree 17 - Pruning



Tree 18 - Pruning



Tree 19 - Pruning



Tree 19 - Pruning



Tree 20 - Pruning



Tree 21 - Pruning



Tree 22 - Pruning



Tree 23 - Pruning



Tree 25 - Pruning



Tree 26 - Pruning



Tree 26 - Pruning



Tree 27 - Pruning





Tree 33 - Pruning



Tree 33 - Pruning



Tree 34 - Pruning



Tree 35 - Pruning



Tree 36 - Pruning



Tree 37 - Pruning

Appendix 5: Plates



Plate 1: Showing 1974 aerial photos of the site (*From The Skies 1943*)



Plate 2: Showing Tree 3



Plate 3: Showing double row of *Ficus macrophylla* (Moreton bay Fig)



Plate 4: Showing double row of *Ficus macrophylla* (Moreton bay Fig)



Plate 5: Showing Tree 44 and the Bridge Road

Appendix 6: 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 Compliance

Contractors and site workers shall receive a copy of these specifications a minimum of 3 working days prior to commencing work on-site. Contractors and site workers undertaking works within the Tree Protection Zone shall sign the site log confirming they have read and understand these specifications, prior to undertaking works on-site.

The Project Arborist shall undertake regular site inspections and certify that the works are being undertaken in accordance with this specification.

Compliance Documentation shall be prepared by the Project Arborist following each site inspection. The Compliance Documentation shall include documentary evidence of compliance with the tree protection measures and methods as outlined within this Specification. Upon the completion of the works, a final assessment of the trees shall be undertaken by the Project Arborist and future recommended management strategies implemented as required.

1.2 Tree & Vegetation Removal

The trees to be removed shall be removed prior to the establishment of the tree protection measures. Tree removal works shall be undertaken in accordance with the *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)*.

Tree and vegetation removal shall not damage the trees to be retained.

1.3 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, trenching or movement of rock
- Mechanical removal of vegetation
- 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.

1.4 Tree Protection Fencing

TPZ fencing shall be installed as shown on the Tree Plan (**Appendix 2**). Fencing set back 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. 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.

As a minimum, the Tree Protection Fence shall consist of 1.8m high wire mesh panels supported by concrete feet. Panels shall be fastened together and supported to prevent sideways movement. The tree shall not be damaged during the installation of the Tree Protection Fencing. Refer to Typical Tree Protection Details (3) (**Appendix 7**).

1.5 Site Management

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

1.6 Works within the Tree Protection Zones

In some cases works within the TPZ may be authorised 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.

If roots (>25mmØ) are encountered during the demolition, excavation and construction works, these roots must be retained in an undamaged condition and advice sought from the Project Arborist. Adjustment of final levels and design shall remain flexible to enable the retention of roots (>25mmØ) where deemed necessary by the Project Arborist.

1.7 Ground Protection

Where deemed necessary by the Project Arborist, machinery movements 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 (3) (**Appendix 7**).

1.8 Trunk Protection

Trunk protection shall be installed on Tree A and as deemed necessary by the Project Arborist. Trunk protection shall be installed by 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 (3) (**Appendix 7**).

Branch protection shall be installed as deemed necessary by the Project Arborist.

1.9 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 1.8). Machinery should not contact the tree's roots, trunk, branches and crown.

The existing pavement shall be carefully lifted 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. Machinery shall work backwards out of the TPZ to ensure machinery remains on un-demolished sections of pavement at all times.

Structures below grade shall be retained to minimise disturbance to the tree's roots. Where this is not possible structures shall be shattered prior to removal with a hand-operated pneumatic/electric breaker. Where the Project Arborist determines that the tree is using underground elements (i.e footings, pipes, rocks etc.) for support, these structures shall be left in-situ.

If roots (>25mmØ) are encountered during the demolition works, these roots must be retained in an undamaged condition and advice sought from the Project Arborist. Exposed roots shall be protected from direct sunlight, drying out and extremes of temperature by covering with a 10mm thick jute geotextile fabric. The geotextile fabric shall be kept in a damp condition at all times.

1.10 Pavement Installation

New pavements (including sub-base materials) within TPZ areas shall be installed above 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.

1.11 Underground Services

Underground service installation within the TPZ shall be supervised by the Project Arborist.

The installation of 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 (>25mmØ, or as determined 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).

Alternatively, boring methods may be used for underground service installation where the obvert level (highest interior level of pipe) is greater than 1000mm below existing grade. Excavations for starting and receiving pits for boring equipment should be located outside of the TPZ areas or located to avoid roots (>25mmØ) as deemed necessary by the Project Arborist. OSD tanks (where required) should be located outside of the TPZ areas.

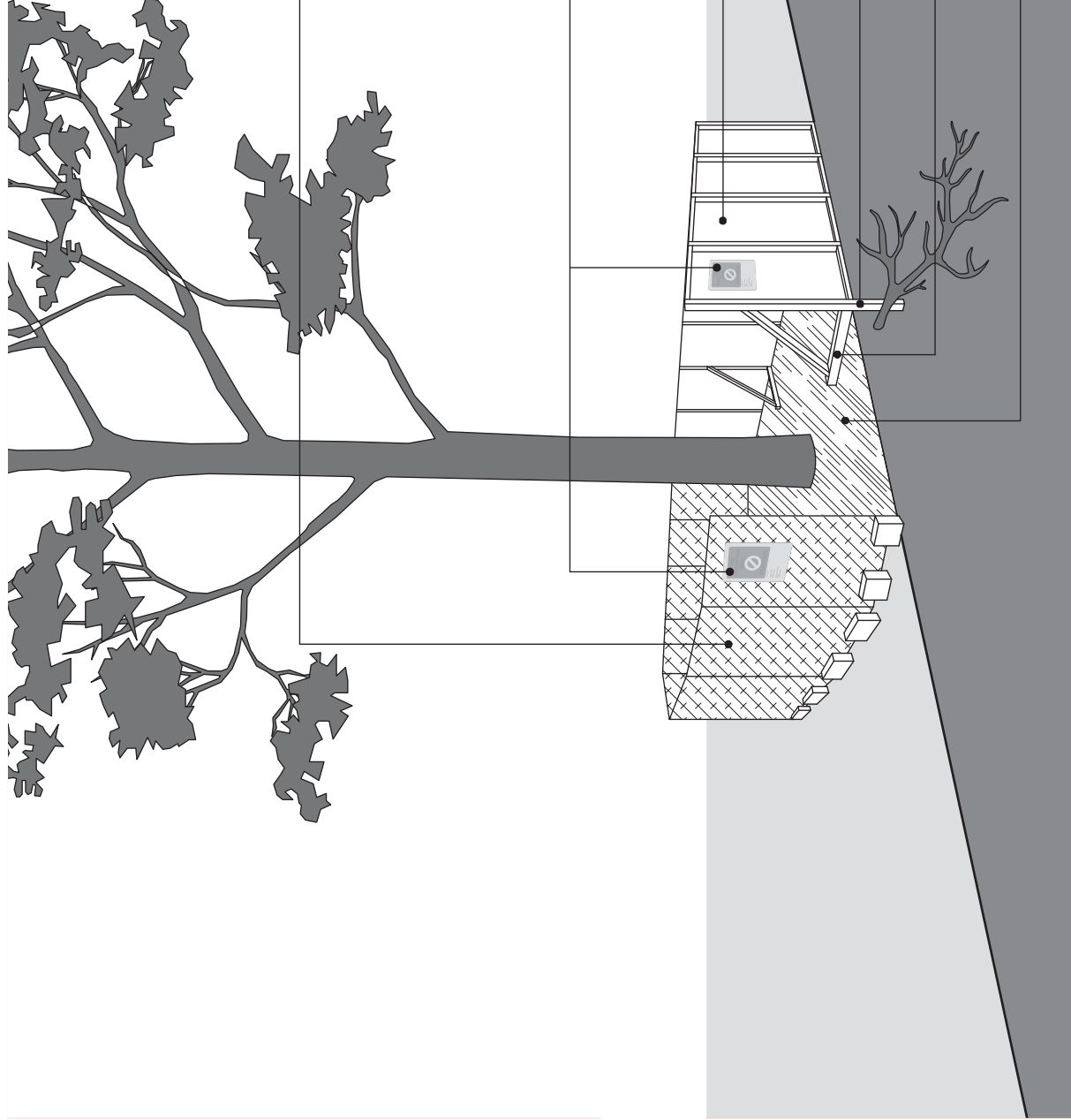
1.12 Excavations, Root Protection & Root Pruning

All excavation works (including root investigations) within TPZ areas shall supervised by the Project Arborist and utilise tree sensitive methods (hand/hydrovac/airspade). 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).

Exposed roots shall be protected from direct sunlight, drying out and extremes of temperature by covering with a 10mm thick jute mat, followed by a layer of plastic membrane. Coverings shall be weighted to secure them in place. The mat shall be kept in a damp condition at all times.

No over-excavation, battering or benching shall be undertaken beyond the footprint of any structure unless approved by the Project Arborist. Tree sensitive excavation and root pruning shall be undertaken along the excavation line prior to the commencement of mechanical excavation to prevent tearing and shattering damage to the roots from excavation equipment.

Roots (>25mmØ) shall be pruned by the Project Arborist only. Roots (<25mmØ) may be pruned by the Principal Contractor. Root pruning shall be undertaken with clean, sharp secateurs or a pruning saw to ensure a smooth wound face, free from tears. Damaged roots shall be pruned behind the damaged tissues with the final cut made to an undamaged part of the root.



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

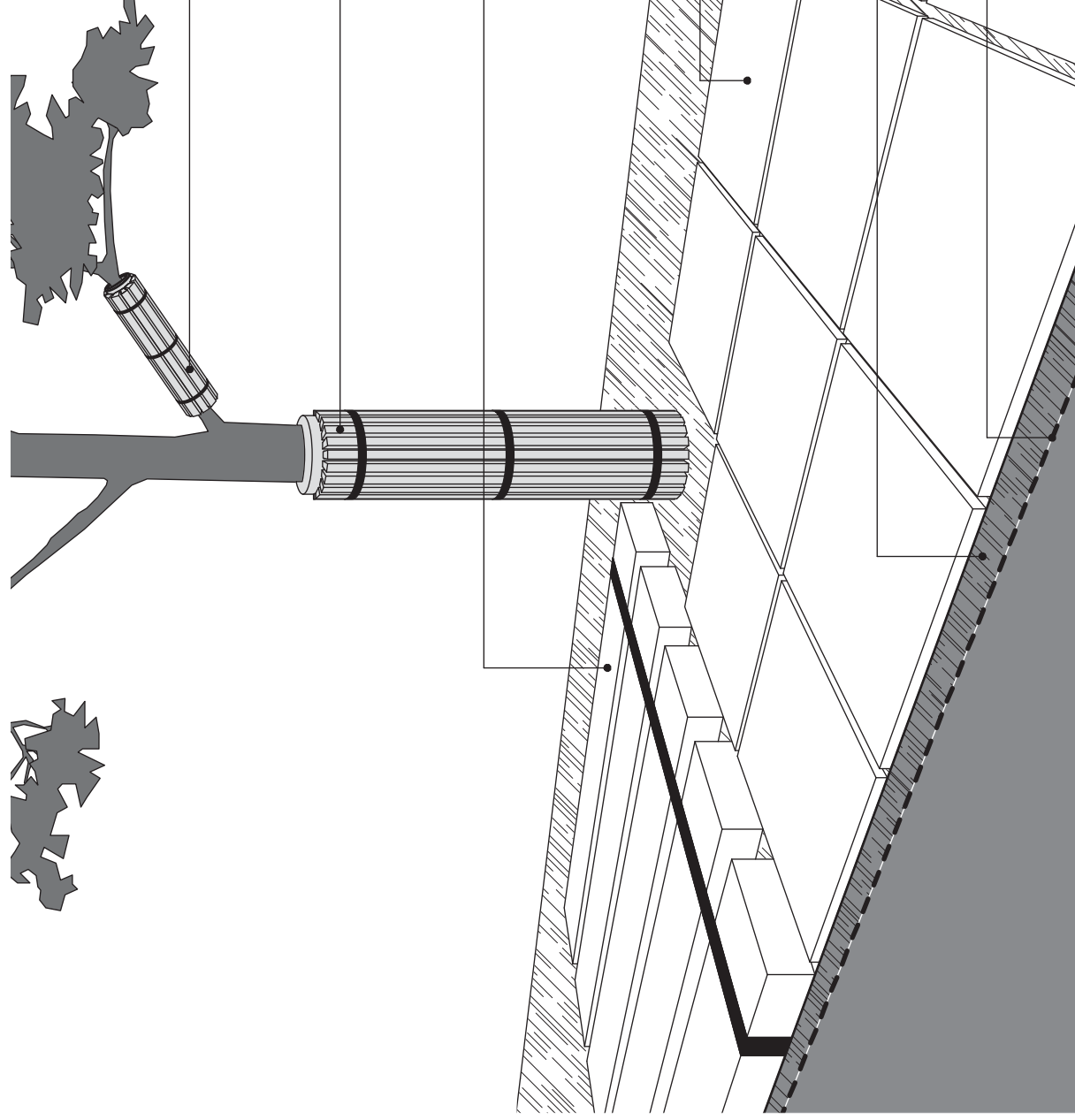
Option 2 - Fencing

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.



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.